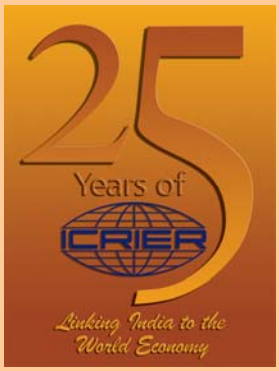
View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Research Papers in Economics



Working Paper No. 191

Does Capital Account Openness Lower Inflation?

Abhijit Sen Gupta

January 2007

INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS

Foreword

With the submission of Tarapore II report on capital account convertibility, the issue is once again topical. This paper contributes to the ongoing debate by arguing that one of the potential collateral benefits of financial globalization is reduction in inflation. The above argument is supported by both developing a theoretical model and empirical analysis. The paper establishes that the threat of capital outflow in the face of loose monetary policy acts as a strong deterrent for such policies. Looking specifically at the Indian case, the paper finds that financial integration since mid 90s has exercised some degree of "disciplinary effect" and helped to curb inflation. The paper points out that before proceeding for greater capital account convertibility issues like fiscal discipline and appropriate exchange rate regime need to be addressed.

It is hoped that this working paper will help policymakers and stakeholders to take a view on this important issue.

Rajiv Kumar
Director and Chief Executive

January 29, 2007

Abstract

This paper investigates the relationship between capital account openness and inflation since the 1980s. It argues that widespread capital account liberalization during the last two decades appears to have contributed to the worldwide disinflation observed during the same period. The paper builds a theoretical model to motivate the presence of a negative link between financial integration and inflation. It tests the prediction of the theoretical model by employing static and dynamic panel data procedures. Financial integration appears to discipline monetary authorities, or to help them convince the private sector that they will be more disciplined in the future.

JEL Classification: F36, F41, E32
Keywords: Capital Account Openness, Inflation, Seignorage, Discipline Effect

Table of Contents

List of Tables

List of Figures

Does Capital Account Openness Lower Inflation?*

1. Introduction

Over the last two decades, a large number of developed and developing countries have become more open and integrated with the rest of the world. Both the volume and nature of international capital flow have radically altered during this period. In the 1970s, international borrowing and lending was primarily made up of foreign aid or official finance for developing countries. However, with the liberalization of capital and investment controls during the 1980s and 1990s, the vast majority of international capital now comes from private investors, through capital markets (such as sales of bonds and equities) and international investment by multinational companies.

During the early 1990s, there was a growing belief that relaxing restraints on movement of capital would yield benefits similar to liberalized trade. It was believed that free movement of capital can have several important benefits for the domestic economy. It led to overall improved international allocative efficiency. In particular, it created opportunities for portfolio diversification, consumption smoothing, risk sharing and intertemporal trade. By holding claims on foreign countries, agents could protect themselves against adverse shocks affecting home country alone. Thus, increased capital mobility raised the risk adjusted rates of return, which in turn encouraged higher savings and investment, leading to faster rates of growth. An open capital account also induced policymakers to undertake and adhere to good policies. The threat of capital outflow, in the face of opportunistic policies, acted as a "discipline effect" for the policymakers.

However, a spate of financial crises in the 1990s forced policymakers to rethink the strategy of unbridled capital flows. The countries, which were worst affected by these crisis, were the ones which had opened up capital inflows. As a result, several economists have pointed out that unrestrained capital flows can act as a serious impediment to global financial stability and have called for the imposition of capital controls like Tobin Tax on trade in international assets.

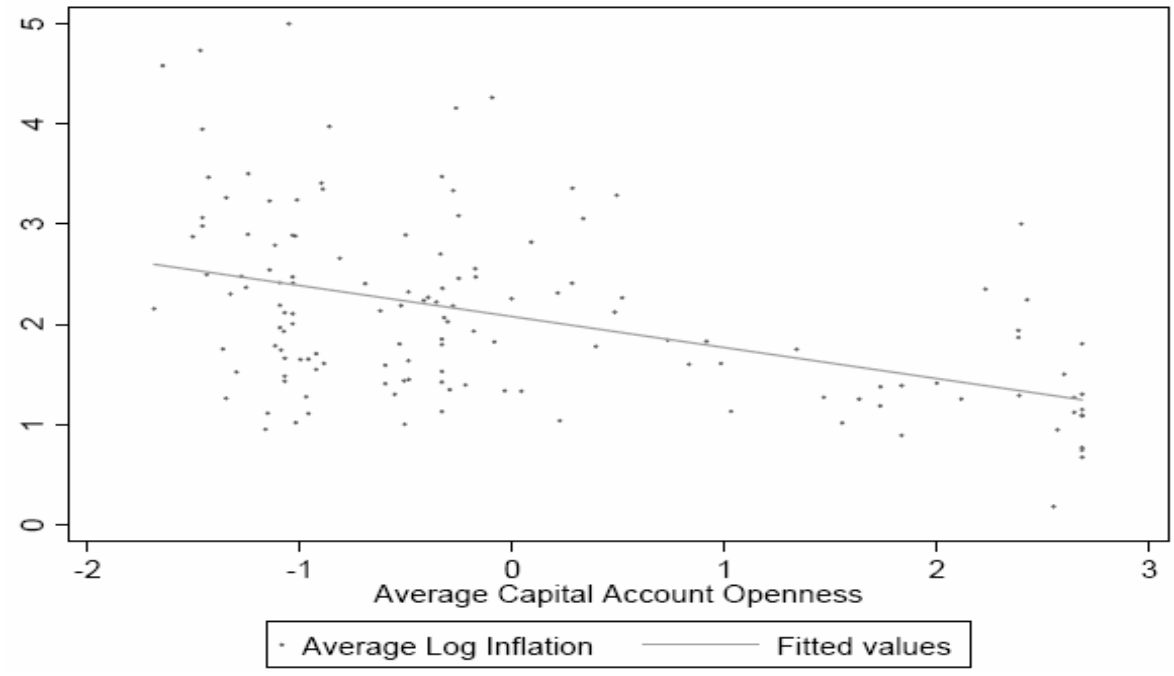
In recent years, several economists have pointed out that it is highly likely that the major benefits of successful financial liberalization are primarily indirect. Successful financial liberalization acts as a catalyst for growth by imposing discipline on macroeconomic policies, promoting development of the financial sector and exposing domestic firms to competition from foreign competitors. Thus freer movement of capital flows tend to generate a number of, what Kose et al. (2006) term as "potential collateral benefits" of financial integration.

I would like to thank Thorsten Janus, Ken Kletzer, Rajiv Kumar, Ila Patnaik, Federico Ravenna, Rashmi Shankar, TCA Srinivasa-Raghavan. Carl Walsh and participants at presentations at the University of California, Santa Cruz and Research and Information System, New Delhi for their very helpful comments. I would also like to thank Menzie Chinn and Hiro Ito for providing me with their index on capital account liberalization. Financial assistance from the Graduate Division of University of California, Santa Cruz, is acknowledged with thanks. All the remaining errors are mine.

In this paper, we look at the validity of the one such benefit. In particular, we focus on how opening up the capital account has affected inflation across a wide range of countries. In the past two decades, the world observed two distinct international economic trends. First, there was global disinflation, with inflation rates falling on average even in countries which had a history of high inflation like some Latin American countries. Secondly, several countries liberalized their capital account, despite warnings of the risks of currency and banking crises. In this paper, we investigate whether these two events were related? The paper builds a theoretical model, which predicts that opening up of the capital significantly lowers the policymakers' incentive to generate an inflationary shock. The paper provides theoretical and empirical evidence for a strong negative relationship between capital account openness and inflation. It goes on to argue that opening up the capital account disciplines the monetary authorities as it raises the penalties for loose monetary policy. By opening up the capital account, policymakers also impart a signal to the private sector that it is willing to suffer the punishment of loose monetary policy in the form of capital outflow. Thus it alters the private sector expectations about the future monetary policy, which in itself can be inflation reducing.

Figure 1 below motivates the main idea of the paper by plotting average rate of inflation in the last two decades (measured on a logarithmic scale) and the average capital account openness for 163 countries.[1] Figure 1 shows a strong negative relationship between capital account openness and inflation.

Figure 1: Capital Account Openness and Inflation (1980-2003)



[1] The index on capital account openness has been taken from Chinn and Ito (2005).

The primary channel through which capital account openness affects inflation is through its impact on the elasticity of demand for money. Bartolini and Drazen (1997) argue that by liberalizing the capital account, governments boost foreign and domestic investor confidence. On the other hand, capital account liberalization directly raises the penalty for loose monetary policy. Easier access to foreign exchange raises the elasticity of demand for money, and makes the monetary authority vulnerable to rapid reserve losses. In a flexible exchange rate regime, loss of reserves is not that important, but rapid currency depreciations can also be inflationary. By signaling that it is willing to raise the penalties for loose monetary policy, the policymaker alters the private sector expectations regarding future monetary policy. This reduces the temptation to print excess money and lowers the time consistent inflation rate.

Grilli et al. (1991) find that countries with less independent central banks resort to capital controls. In these countries, the governments by controlling the monetary policy directly can impose a higher levy, when capital controls are in place. Using empirical methods, the paper finds a negative relationship between central bank independence and inflation. These two conclusions together imply that capital controls are associated with higher inflation rates.

In another study, Grilli and Milesi-Ferretti (1995) look at a panel of 61 developing and developed countries. They conclude that restrictions on capital account transactions tend to be associated with higher inflation, a higher share of seignorage revenue in total revenue, and lower real interest rates. Razin and Yuen (1995) show that the slope of the Phillips curve (inflation output tradeoff) becomes steeper in the presence of capital controls. This is due to a lower semi-elasticity of demand for money, and absence of any real exchange rate effect on aggregate demand, because of a zero trade balance restriction under capital controls. Thus the policymaker of a closed economy has to generate a higher inflationary shock to reduce unemployment by a given amount.

Gruben and McLeod (2002) use cross section data to investigate the relationship between capital account openness and inflation and conclude that capital account openness appears to lower inflation by disciplining monetary authorities. They also point out that sustained removal of even one capital or current account restriction can reduce average annual inflation by as much as 3 per cent.

In another study, Tytell and Wei (2004) study the "discipline effect" of financial openness on national policies. They find that financial globalization induces countries to pursue lower inflation rates but does not succeed in lowering the budget deficit.

However, the strongest advocates of capital account liberalization recognize that liberalization can expose the vulnerabilities of a weak domestic financial system. To the extent that capital account liberalization places pressures on weak domestic banks, and to the extent that adequate prudential supervision is absent, liberalization can encourage individually rational but socially harmful activities such as excessive risk-taking and "gambling for redemption," which can culminate in full-blown and costly banking crises. As a result, any benefits of capital account liberalization may easily be obscured by the

costs of the greater financial fragility it brings, especially in economies with poorly regulated financial sectors. More generally, one might expect the benefits of capital account liberalization to be more pronounced in countries characterized by a sound macro-economic framework and strong institutions. If this is the case, the lack of strong empirical evidence on the benefits of capital account liberalization may simply be due to the fact that previous research has not considered the role of policies and institutions in intermediating the effects of capital account liberalization on growth or investment.

There have been several studies that have questioned the wisdom of financial openness, especially capital account convertibility. Rodrik (1998) looks at 100 countries over the period 1975-89 and concludes that there is no evidence that greater capital account convertibility is associated with lower inflation. Rodrik goes on to assert that in fact capital inflows undermine central bank's efforts to control inflation.

McKinnon and Mathieson (1981) argue for imposition of capital controls to reduce inflation. They point out that capital controls reduce opportunities of currency substitution and hence lower the interest elasticity of demand for domestic currency. This in turn reduces the inflation rate that is necessary to generate a given amount of seignorage revenue. It is interesting to note that both Bartolini and Drazen (1997) and McKinnon and Mathieson (1981) use the same argument to reach opposite conclusion. Both papers agree that a decrease in capital controls will increase the elasticity of demand for money by increasing opportunities of currency substitution. However, while Bartolini and Drazen (1997) argue that this would raise the penalty for loose monetary policy and hence enforce a more disciplined monetary policy, where the incentive to inflate is significantly lowered, McKinnon and Mathieson (1981) argue that it would raise the inflation rate required to generate a specific amount of seignorage revenue.

Apart from the debate on the effect of capital account liberalization, another issue that is of associated interest is the ability of the policymaker to independently undertake monetary policy. With free movement of capital, countries can either adopt a fixed exchange rate or independent monetary policy, but not both. This is known as the *impossible trinity* or the *trilemma*, popularized by Robert Mundell. Thus while fixed exchange rates provide a credible monetary anchor it comes at a heavy price i.e. loss of monetary independence.

Table 1 lists the countries according their exchange rate regimes in 2001. It is clearly evident that bulk of countries has chosen to peg their exchange rate or operate a crawling peg. According to Calvo and Reinhart (2002), the primary reason for this "fear of floating" is lack of credibility. If credibility is not conferred then the monetary policymaker has no authority and most outcomes are driven by expectations. There are several other reasons why a country might prefer a stable exchange rate. In emerging markets large devaluations (depreciations) tend to be associated with recessions. Moreover, a big decline in the exchange rate creates severe problems for external trade and debt servicing as they tend to be invoiced in foreign currency. In many countries there is a high exchange rate pass through, which results in high inflation. As a result,

several countries tend to use either foreign exchange reserves or interest rate as the tool to stabilize exchange rates.

Irrespective of the stabilization variable i.e. exchange rate or interest rate, financial integration will increase the elasticity of money demand with respect to inflation. Consequently, there will be a significant reduction in the incentive of the policymaker to generate inflationary shock with a desire to generate seignorage revenue.

Table 1: Classification of Exchange Rate Regime (2001)

Code	Description	No. of Countries
1	No separate legal tender	18
2	Pre announced peg or currency board arrangement	30
3	Pre announced horizontal band that is narrower than or equal to +/-2%	0
4	De facto peg	10
5	Pre announced crawling peg	0
6	Pre announced crawling band that is narrower than or equal to +/-2%	1
7	De factor crawling peg	11
8	De facto crawling band that is narrower than or equal to +/-2%	22
9	Pre announced crawling band that is wider than or equal to +/-2%	1
10	De facto crawling band that is narrower than or equal to +/-5%	8
11	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time)	1
12	Managed floating	22
13	Freely floating	9
14	Freely falling	4

Source: Reinhart and Rogoff (2004).

This paper adds to the existing literature by explicitly considering the fact that the choice of imposing or restricting capital controls may be endogenous. First, inflation levels may influence the policy choice regarding the capital account. One generally expects countries to remove capital controls when inflation is reasonably under control. Thus, one would expect that any empirical results would be biased in the direction of finding a strong positive relationship between open capital accounts and reasonably low levels of inflation. Secondly, it may be difficult to accurately assess the benefits of capital account liberalization if capital controls are correlated with other fundamental determinants of inflation. Grilli and Milesi-Ferretti (1995) find that open capital accounts are more likely to be found in countries with small public sectors and independent central banks. These, however, are factors, which may directly impact on inflation, thus making it difficult to isolate the impact of financial liberalization on inflation levels or volatility. This paper also takes into account the fact that inflation has shown great deal of persistence across a large number of countries. The paper attempts to correct for these econometric issues by employing static as well as dynamic panel data analyses.

2. Theoretical Framework

The government is made up of two branches: a fiscal authority and a monetary authority or the central bank. The fiscal authority issues an exogenously determined debt and uses the proceeds to purchase goods and services. The central bank issues currencies by open market operations in domestic and foreign bonds. The central bank is also required to monetize the fiscal debt by printing money and buying it back from the public. In this scenario, the real revenue that the government acquires by issuing newly used money to buy goods and non-money assets is referred to as "seignorage." Thus the overall government welfare is increasing in the amount of seignorage revenue earned. On the other hand, the monetization of debt by issuing new money can potentially be inflationary. In most countries hyperinflations stem from the government's need for seignorage revenue. The central bank is concerned about inflation as inflation has several costs associated with it. It results in loss of reserves in a fixed exchange rate regime and depreciation of the currency in a flexible exchange rate. Higher anticipated inflation reduces the demand for money, which is relatively costless to produce but provides liquidity services at the margin. Higher expected inflation sharpens random income distributions, degrades the allocation signals in relative prices and raises distortions, a non-indexed tax system inflicts on the people. We assume a quadratic cost of the inflation. Thus the government's welfare function can be written as

$$W = S(\pi) - \psi \frac{1}{2}\pi^2, \tag{1}$$

where ψ is the weight that the government puts on the costs involved with increasing inflation, like loss of reserves or depreciation of the currency vis-à-vis the gains from inflation in terms of seignorage revenue. The demand for money is denoted by a Cagan money demand function, where nominal interest rates are dominated by nominal inflation. Let the money supply of the country be given by M and the price level be denoted by P. According to the discrete time version of the model, the demand for real money balances M/P is isoelastic and depends entirely on future inflation

$$\frac{M_t}{P_t} = \left(\frac{P_{t+1}}{P_t} \right)^{-\eta}. \tag{2}$$

The Cagan model in its log linear stochastic form is given as

$$m_t - p_t = -\eta E_t \left[p_{t+1} - p_t \right], \tag{3}$$

where $m \equiv \log M$, $p \equiv \log P$ and η is the semi-elasticity of the demand for real balances with respect to expected inflation. Real money balances depend on expected future inflation and higher expected inflation lowers the demand for real balances by raising the opportunity cost of holding money. Several papers such as Bartolini and Drazen (1997), McKinnon and Mathieson (1981) and Gruben and McLeod (2002) point out that opening up of the capital account leads to an increase in the elasticity of demand for money. With an open capital account there are increased opportunities of currency substitution. Easier

access to foreign currency raises the inflation elasticity of demand. Following the literature, it is assumed that the semi-elasticity of demand for money is related to capital account liberalization according to a constant elasticity relationship

$$\eta = \frac{1}{\alpha}\xi^{\alpha}, \tag{4}$$

where ξ is the degree of capital account liberalization and α is the elasticity of the semi-elasticity of demand for money with respect to capital account liberalization. A value of α greater than unity implies that the semi-elasticity of demand for money is highly elastic with respect to capital account liberalization. In that case, a given increase in capital account liberalization increases the semi-elasticity of demand for money by a greater amount. On the other hand, if α is less than unity then a given increase in capital account liberalization would increase the semi-elasticity of demand for money by a smaller amount. Here $\xi > 0$ and $\alpha > 0$ as a result $n'(\xi) > 0$.

As noted by Cukierman et al. (1992a), seignorage is the amount of real purchasing power that a government can extract from the public by printing money. A government's real seignorage revenue in period t is given by

$$S_t = \frac{M_t - M_{t-1}}{P_t}. \tag{5}$$

The numerator in equation (5) is the increase in nominal money supply between periods t and t-1, while the denominator P_t converts this nominal increase into a flow of real resources to the government. However, there are limits to the real resources that the government can obtain by issuing money. The resulting high inflation can lead to a reduction in the real money balances holdings and shrinking of the tax base. As a result, the marginal revenue from printing money can be negative at sufficiently high levels of inflation. Thus there exists a seignorage maximizing money growth rate. In equilibrium, the rate of inflation is equal to the growth rate of money supply. We assume that money supply grows at a constant rate μ. With this assumption, equation (3) can be rewritten as

$$p_t = m_t + \eta\mu. \tag{6}$$

Combining the above equation with equations (4) and (5) yields

$$S_t = \mu(1+\mu)^{-\frac{1}{\alpha}\xi^{\alpha}-1}. \tag{7}$$

The seignorage revenue maximizing growth rate of money is given by the following first order condition

$$(1+\mu)^{-\frac{1}{\alpha}\xi^{\alpha}-1} - \mu\left(1+\frac{1}{\alpha}\xi^{\alpha}\right)(1+\mu)^{-\frac{1}{\alpha}\xi^{\alpha}-2} = 0$$

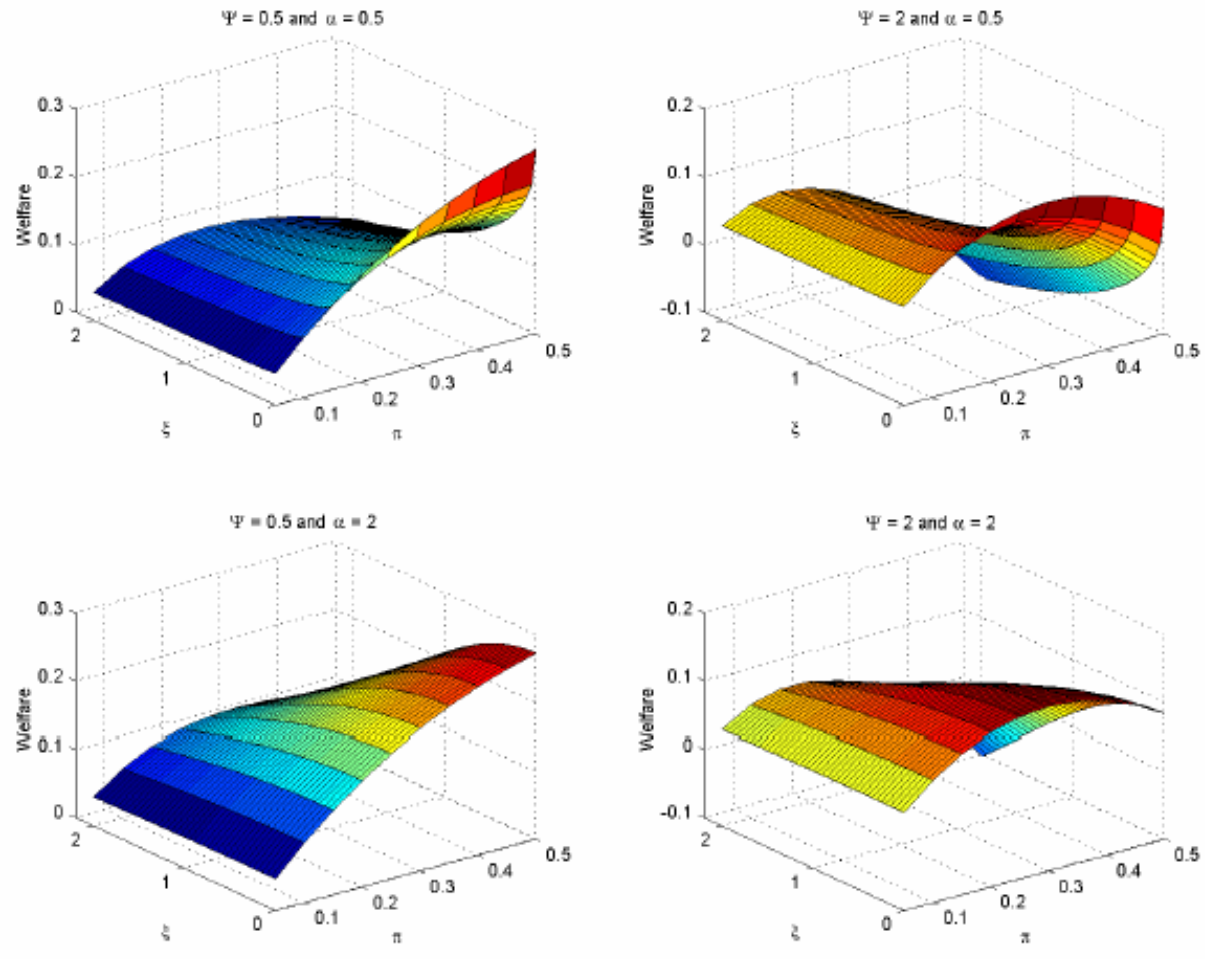
$$\Rightarrow \pi^s = \mu^{\text{Max}} = \frac{1}{\frac{1}{\alpha}\xi^a} = \frac{\alpha}{\xi^a}. \tag{8}$$

Note that the optimal seignorage revenue maximizing rate of inflation, π^s, depends inversely on the capital account liberalization. Liberalizing the capital account leads to lowering of the seignorage revenue maximizing rate of inflation. Using the definition of seignorage given in equation (5), equation (1) can be rewritten as

$$W = \pi\left(1+\pi\right)^{-\frac{i}{\alpha}\xi^{\alpha}-1} - \psi\frac{1}{2}\pi^2 \tag{9}$$

Figure 2 depicts the change in the government's welfare as the inflation rate and the degree of capital account liberalization is changed. We evaluate the government welfare for different combinations of π between 0.05 and 0.5 and ξ between 0.05 and 2. We restrict the numerical analysis to two values of ψ and α. It can be seen that when

Figure 2: Change in Central Bank's Welfare due to Change in Inflation and Capital Account Openness



the central bank is moderately concerned about stabilizing inflation, ($\psi = 0.5$), the welfare increase monotonically with inflation. On the other hand, if the central bank is excessively concerned about inflation, ($\psi = 2$), the overall government welfare increases till inflation rate of 0.3 and falls subsequently. At high rates of inflation, the overall welfare turns negative. However, in either case, for any given rate of inflation, the welfare decreases with the extent of capital account liberalization.

The rate at which the government's welfare decreases with capital account liberalization depends upon the parameter α. The decrease in the welfare is much more prominent at higher rates of inflation. Thus in countries with high inflation rate, capital account liberalization would reduce more rapidly the incentive for the government to impose inflation tax. The government solves the following optimaility condition to obtain the optimal inflation rate that maximizes its overall welfare

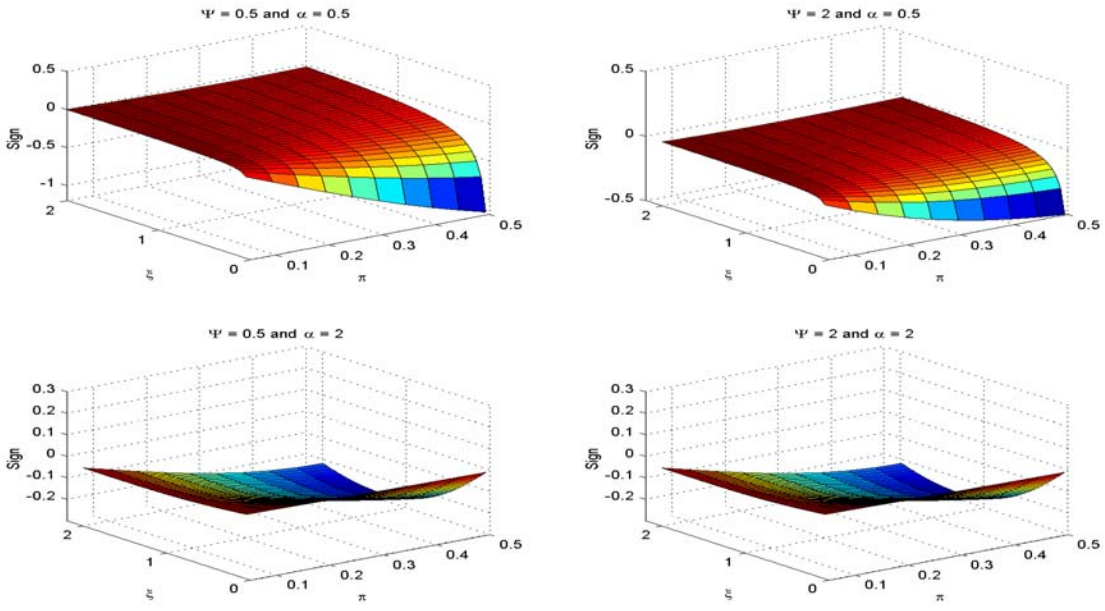
$$(1+\pi)^{-\frac{1}{\alpha}\xi^{\alpha}-1} - \pi\left(1+\frac{1}{\alpha}\xi^{\alpha}\right)(1+\pi)^{-\frac{1}{\alpha}\xi^{\alpha}-2} - \pi = 0\,. \tag{10}$$

From the above optimality condition, one obtains a relationship between the optimal inflation and the extent of capital account liberalization. Using the implicit function theorem we get

$$\frac{\delta\pi^{w}}{\delta\xi} = \frac{(1+\pi)\alpha\xi^{-1+\alpha}\left(\pi\alpha + \left(\alpha - \pi\xi^{\alpha}\right)\log(1+\pi)\right)}{(-2+\pi)\alpha\xi^{\alpha} + \pi\xi^{2\alpha} - \alpha^{2}\left(2+(1+\pi)^{3+\frac{\xi^{\alpha}}{\alpha}}\psi\right)}\,. \tag{11}$$

Since it is difficult to assign a sign to the above function analytically, we resort to numerical methods. Figure 3 displays the results of the numerical analysis. We again evaluate the sign of the above derivative for different combinations of π and ξ.

Figure 3: Impact of Capital Account Liberalization on Inflation



Across the entire range of π and ξ considered, the derivative has a negative sign. Thus the optimal inflation is negatively related to the extent of capital account liberalization. The rate of inflation that maximizes government welfare, π^w, falls with opening of the capital account.

3. Empirical Analysis

In this section we use cross-country panel data for 163 countries over the period 1980-2003 to test the prediction of the theory that inflation will be lower in countries that have liberalized their capital account. We consider the log of average inflation instead of the level of inflation as a few countries in the sample have extremely high average inflation rates. Thus the parameter estimates from a regression would be determined by a handful of observations. We use the Chinn-Ito index, developed by Chinn and Ito (2005), to measure capital account liberalization. The index is the first principal component of the binary variables pertaining to cross border financial transactions, based on the International Monetary Fund's (IMF) categorical enumeration reported in Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). This is a compilation of four dichotomous variables accounting for restrictions on capital account transaction, current account transactions, requiring surrendering of export proceeds, and the presence of multiple exchange rates. Since these four binary variables account for the degree of control than openness, Chinn and Ito flip their values and construct an index based on the standardized principal components. The index ranges from −1.7 to 2.7 and a higher value of the index indicates greater financial openness. We measure financial globalization with a de jure measure instead of a de facto one. We want to study the signaling and discipline effect of capital account liberalization on inflation and a de jure measure is more appropriate.

In addition, we use several other control variables that have been found in the literature as being principal determinants of inflation. The first control variable is a measure of real income per capita, which acts as a measure of the overall development of the economy and captures a wide range of factors that affect average inflation. Owing to the large variation in this variable across the sample of countries, the log of real per capita GDP instead of level is used.

Countries with high fiscal deficit are also associated with high inflation. This can be due to two reasons. First, if large fiscal deficit is associated with increased government spending, it will increase aggregate demand and result in higher inflation. Secondly, if the government is financing its spending by borrowing from the public, inflation will reduce the burden of debt and redistribute wealth towards the government. While data on per capita GDP have been obtained from World Development Indicators, data on budget deficit have been taken from Government Finance Statistics.

Several other factors have been known to influence the level of inflation in a country. Primary among them is the level of independence that the central bank enjoys. Intuitively, a less independent central bank is associated with a higher rate of inflation.

Central bank independence refers to the obligations of the central bank regarding financing the budget deficit through money creation and/or interest rate manipulation. The freer the central bank is from this point of view, the lower is the inflation rate. A less free central bank will be forced to introduce inflationary shocks to generate seignorage revenue to finance the budget deficit. Moreover, a less free central bank is unable to precommit to its policy choices, which results in higher inflation. Cukierman et al. (1992b) empirically show that inflation is higher in countries with low central bank independence. De facto central bank independence is controlled using the turnover rate of central bank governor from Ghosh et al. (2003). A high turnover of the governor implies a low independence from the government and should be associated with higher inflation rates. The index goes from 0 to 1.4, with countries like Bolivia and Costa Rica having least independent central banks.

The level of inflation is also affected by the extent of political stability that a country enjoys. Cukierman et al. (1992a) show that inflation will be higher in countries, which are politically unstable because the policymaker lacks the ability to precommit. We use the political stability index developed by Intra Country Risk Guide. The index is made up of variables like government stability, socio-economic conditions, conflicts, law and order, etc. The index ranges from 0 to 100 with a higher number indicating a more politically stable regime.

Fixed exchange rates are associated with low inflation as they serve as a nominal anchor for the monetary policy. Fixed exchange rate also imposes a discipline effect, as the political costs of abandoning the peg result in tighter policies. To control for exchange rate regimes, we use the exchange rate index formulated by Reinhart and Rogoff (2002), which is based on market determined exchange rates rather than official exchange rates. The index ranges from 1 to 15 with a higher number implying a more flexible exchange rate regime.

The final control variable is trade openness. Trade openness is calculated as the share of imports in GDP. Romer (1993) shows that there exists a significant negative relationship between trade openness and inflation. Generally, inflation leads to real exchange rate depreciation and the harms of depreciation are greater in more open economies. As a result, the government has lower incentive in open economies to introduce surprise inflationary shock. Data on trade openness have been obtained from World Development Indicators. Finally, we include a dummy variable for the Latin American countries as countries in this region have behaved very differently compared to other regions. The empirical model is given by following equation

$$Y_{it} = \alpha_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + v_i + \varepsilon_{it}. \quad (12)$$

where i refers to the country and t represents the time period. Here Y is the dependent variable, measured as log of inflation. Among the explanatory variable, X1 is the main variable of interest, i.e. capital account liberalization, X2 is log of per capita GDP, X3 is the budget deficit as a percentage of GDP, X4 is a measure of exchange rate regime, X5 is the degree of political stability, X6 is a measure of central bank dependence and X7 is a measure of trade openness.

A large econometric literature, including Nelson and Plosser (1992), Fuhrer and Moore (1995) and Pivetta and Reis (2004), has found that post-war inflation in the United States and other industrial countries exhibits high persistence. Other works like Baum et al. (1999) and Francisco and Bleaney (2005) have looked at developing countries and have found evidence for persistent inflation. In our sample of 163 countries, a Woolridge test for auto-correlation, suggests the presence of first order serial correlation. In the presence of auto-correlation, the error term in equation 12 can be written as

$$\varepsilon_{it} = \rho_i \varepsilon_{it-1} + u_{it}$$

In the literature, there are several ways to estimate the model in the presence of serial correlation. One can use a feasible GLS with AR1 correlation. However, this procedure has been criticized for underestimating the standard errors. The panel corrected standard error estimates, which uses Prais-Winstein regression, addresses this problem. It assumes that the disturbances are heteroskedastic and contemporaneously correlated across panels. The panel corrected standard error estimates allow for first order correlation, AR(1), with a common coefficient of the AR(1) process across all the panels, ($\rho_i = \rho, \forall i$), as well as a specific coefficient of the AR(1) process for each panel, ($\rho_i \neq \rho_j, \forall i \neq j$).

When auto-correlation with common coefficient of correlation is specified, the common correlation coefficient is computed as

$$\rho = \frac{\rho_1 + \rho_2 + \rho_3 + ...\rho_m}{m}$$

where ρ_i is the autocorrelation coefficient for country i and m is the number of countries.

Table 2 displays the results of the Prais-Winstein regression with a common auto-correlation coefficient, while Table 3 considers the case of panel specific coefficients. All the specifications have a dummy variable for Latin American countries, which has not been reported. The results are broadly similar. The data supports the prediction of the theoretical model. Capital account openness is highly significant across all specifications thereby implying a statistically significant negative relationship between capital account openness and inflation. In column (II), we add per capita GDP to the regression. The coefficient on per capita GDP across different specification suggests that higher real per capita income is significantly associated with a lower level of inflation. We find that central government budget deficit is not a significant predictor of inflation. On the other hand, the exchange rate regimes show up as a very strong and significant predictor of inflation across all specifications.

Central bank dependence shows up with the expected positive sign indicating that countries with highly dependent central bank are characterized by higher inflation. The results also show that countries, which are politically stable, are associated with lower inflation. However, when we control for central bank dependence as well as political stability, only central bank dependence shows up as a significant predictor. Finally, we

Table 2: Prais-Winstein Estimates with Common Auto-Correlation Coefficient

	I	II	III	IV	V	VI	VII	VIII
Constant	1.872***	3.090***	3.126***	2.261***	3.277***	2.053***	3.103***	3.145***
	[20.97]	[6.60]	[6.61]	[4.58]	[5.15]	[3.09]	[3.67]	[3.74]
Capital Account Openness	-0.270***	-0.218***	-0.204***	-0.216***	-0.216***	-0.239***	-0.248***	-0.240***
	[8.06]	[6.21]	[5.67]	[5.69]	[5.33]	[5.15]	[5.21]	[4.93]
Log of Per Capita GDP		-0.148***	-0.154***	-0.116**	-0.224***	-0.035	-0.177*	-0.183**
		[2.70]	[2.79]	[2.22]	[3.18]	[0.46]	[1.93]	[1.97]
Budget Deficit			-0.002	0	0.012*	-0.005	0.007	0.008
			[0.26]	[0.02]	[1.69]	[0.67]	[0.86]	[0.97]
Exchange Rate Regime				0.081***	0.070***	0.088***	0.078***	0.077***
				[7.00]	[7.29]	[6.70]	[5.89]	[5.95]
Political Stability						-0.010**	-0.006	-0.005
						[2.13]	[1.25]	[1.06]
Central Bank Dependence					0.720***		0.628***	0.660***
					[3.95]		[3.43]	[3.62]
Trade Openness								-0.001
								[0.32]
No. of Observations	2987	2780	2628	1999	1353	1375	994	981
No. of Countries	160	145	137	110	83	91	73	72

Robust t statistics in parentheses.
**** indicates significant at 1%, ** indicates significant at 5% and *indicates significant at 10%*

Table 3: Prais-Winstein Estimates with Country Specific Auto-Correlation Coefficient

	I	II	III	IV	V	VI	VII	VIII
Constant	1.841***	2.999***	3.022***	2.178***	3.211***	1.889***	2.869***	2.983***
	[288]	[6.97]	[7.13]	[4.44]	[5.90]	[3.09]	[3.88]	[4.12]
Capital Account Openness	-0.238***	-0.187***	-0.175***	-0.185***	-0.209***	-0.221***	-0.242***	-0.222***
	[9.25]	[6.95]	[6.07]	[5.32]	[5.28]	[5.43]	[5.63]	[5.47]
Log of Per Capita GDP		-0.141***	-0.145***	-0.110**	-0.220***	-0.018	-0.149*	-0.156*
		[2.68]	[2.80]	[2.04]	[3.53]	[0.24]	[1.80]	[1.87]
Budget Deficit			0.002	0.001	0.012*	-0.002	0.005	0.006
			[0.40]	[0.21]	[1.86]	[0.34]	[0.65]	[0.76]
Exchange Rate Regime				0.079***	0.071***	0.093***	0.081***	0.081***
				[8.01]	[8.39]	[7.83]	[5.78]	[5.82]
Political Stability						-0.011***	-0.007*	-0.006
						[2.61]	[1.77]	[1.39]
Central Bank Dependence					0.518***		0.400**	0.411***
					[3.22]		[2.50]	[2.65]
Trade Openness								-0.003*
								[1.88]
No. of Observations	2987	2780	2628	1999	1353	1375	994	981
No. of Countries	160	145	137	110	83	91	73	72

Robust t statistics in parentheses.
**** indicates significant at 1%, ** indicates significant at 5% and *indicates significant at 10%*

find that there is a small but significant negative relationship between trade openness and inflation, if it is assumed that the countries are characterized by different degrees of persistence.

The impact of capital account openness on inflation could be magnified or mitigated by quality of institutions. Countries with weak institutions, like political instability and dependent central bank, suffer from a pre-commitment problem due to lack of credibility. In these countries, opening up the capital account is seen as a step to build credibility. By signaling that it is increasing the penalties of excess money creation, the central bank is able to alter the expectations of the private sector. As a result, one can expect the negative relationship between capital account openness and inflation to be greater in these countries. To test this possibility, we rank the countries in our sample according to the average political stability and central bank dependence index. We then identify the countries with least stable political regime and most dependent central banks. Table 4 reports the regression results based on this sample of relatively politically unstable countries and countries with more dependent central banks.

The results indicate that in countries with weak institutions, the magnitude of the relationship between capital account openness and inflation is significantly higher than the overall sample. Thus opening the capital account in these countries yields significant benefits in terms of reduced inflation.

Another way to explain the persistence in inflation is by introducing lagged value of the variable on the right hand side.[2] With the presence of lagged dependent variable, complications arise in the estimation of the model using least square methods. In this case the lagged dependent variable tends to be correlated with the error term. Arellano and Bond (1991) develop a generalized method of moments (GMM) estimator that solves this problem. First differencing equation 12 removes the v_i and produces an equation that can be estimated using instrumental variables.

$$DY_{it} = \beta_1 DX_{1it} + \beta_2 DX_{2it} + \beta_3 DX_{3it} + \beta_4 DX_{4it} + \beta_5 DX_{5it} + \beta_6 DX_{6it} + \beta_7 DX_{7it} + \mu_{it}. \quad (12)$$

where D is the first difference operator. The Arellano-Bond dynamic panel data estimator uses lagged levels of the dependent variable and the predetermined variables and the differences of the strictly exogenous variables as instruments. A variable x_{it} is said to be strictly exogenous if $E[x_{it}\varepsilon_{is}] = 0$ for all t and s. If $E[x_{it}\varepsilon_{is}] \neq 0$ for $s \leq t$ but $E[x_{it}\varepsilon_{is}] = 0$ for all s > t, the variable is said to be endogenous. Intuitively, if the error term at time t has some feedback on the subsequent realizations of x_{it}, then x_{it} is an endogenous variable.

As pointed out earlier, the choice of imposing capital controls may be endogenous. Inflation levels influence the policy choice regarding the capital account. One generally expects countries to remove capital controls when inflation is reasonably

[2] A theoretical explanation of the presence of lagged inflation is provided in papers like Fuhrer and Moore (1995), Gali and Gertler (1999) and Woodford (2003).

Table 4: Subsample Prais-Winstein Estimates with Country Specific Auto-Correlation Coefficient

	Politically Unstable Countries					Countries with Dependent Central Banks				
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**
Constant	2.54***	2.05*	2.21**	1.42	1.34	4.68**	2.23	1.80	1.07	-0.80
	[2.83]	[1.95]	[2.29]	[1.23]	[1.16]	[2.45]	[0.80]	[0.80]	[0.34]	[0.32]
Capital Account Openness	-0.21***	-0.19***	-0.24***	-0.22***	-0.24***	-0.20***	-0.21**	-0.24***	-0.28**	-0.23*
	[3.66]	[2.94]	[3.73]	[2.87]	[2.97]	[3.10]	[2.19]	[2.88]	[2.45]	[1.72]
Log of Per Capita GDP	-0.13	-0.07	-0.07	-0.01	-0.01	-0.39*	-0.11	0.06	0.01	0.28
	[1.20]	[0.54]	[0.61]	[0.05]	[2.40]	[1.82]	[0.33]	[0.21]	[0.02]	[0.88]
Budget Deficit	0.01*	0.01*	0.01	0.01	0.01	-0.01	0.00	-0.01	0.00	0.00
	[1.88]	[1.82]	[0.83]	[0.60]	[0.78]	[0.51]	[0.10]	[0.60]	[0.35]	[0.03]
Exchange Rate Regime	0.09***	0.09***	0.11***	0.11***	0.11***	0.07***	0.07***	0.08***	0.10***	0.11***
	[5.05]	[5.46]	[5.90]	[6.10]	[6.22]	[3.55]	[3.72]	[3.24]	[3.84]	[4.40]
Political Stability			-0.01*	0.00	0.00			-0.02**	0.00	0.00
			[1.73]	[0.48]	[0.67]			[2.54]	[0.68]	[0.47]
Central Bank Dependence		0.19		0.19	0.24		0.55**		0.60	0.70*
		[1.00]		[0.89]	[1.12]		[2.19]		[1.56]	[1.89]
Trade Openness					0.00					-0.03*
					[0.92]					[1.74]
No. of Observations	628	566	522	460	459	384	314	273	239	227
No. of Countries	34	34	34	34	34	23	23	19	19	18

Robust t statistics in parentheses.
**** indicates significant at 1%, ** indicates significant at 5% and *indicates significant at 10%*

under control. The unforecastable errors today might affect future changes in capital account liberalization and hence this variable is not strictly exogenous but endogenous. Its lagged values two periods are used as instruments.

Another possible endogenous variable is the exchange rate regime. Generally, higher inflation can trigger a switch in an exchange rate regime. The regime switch can take place in both directions. Higher inflation makes a peg less convenient. Either the peg has to be adjusted very frequently or there is great deal of fluctuation in the real exchange rate. Higher inflation can also make a departure from a float more likely. Countries with severe inflationary problems frequently adopt a peg as a highly visible nominal anchor in a stabilization attempt. Thus in the subsequent analysis, capital account liberalization and exchange rate are treated as endogenous variables.

Table 5: Arellano Bond Estimates with Lagged Dependent Variable

	I	II	III	IV	V	VI
D.Lagged Inflation	0.436***	0.447***	0.449***	0.488***	0.520***	0.505***
	[8.20]	[7.81]	[8.31]	[7.83]	[7.38]	[6.97]
D2.Lagged Inflation	0.109***	0.102**	0.074*	0.073	0.034	0.026
	[3.10]	[2.55]	[1.82]	[1.37]	[0.60]	[0.45]
D.Capital Account Openness	-0.248***	-0.293***	-0.154***	-0.109**	-0.128**	-0.150***
	[-3.38]	[-3.74]	[-3.15]	[-1.97]	[-2.18]	[-2.78]
D.Log of Per Capita GDP	-1.180***	-0.952**	-1.135***	-0.776***	-0.735**	-0.886**
	[-3.14]	[-2.32]	[-3.64]	[-2.70]	[-2.08]	[-2.36]
D.Budget Deficit		-0.010	-0.007	0.000	0.000	-0.001
		[-1.26]	[-1.00]	[-0.01]	[-0.00]	[-0.14]
D.Exchange Rate Regime			0.073***	0.083***	0.081***	0.079***
			[3.81]	[3.68]	[3.40]	[3.29]
D.Central Bank Dependence				0.316**	0.381**	0.375**
				[2.09]	[2.47]	[2.40]
D.Political Stability					0.001	-0.000
					[0.13]	[-0.05]
D.Trade Openness						0.011
						[1.55]
No. of Observations	2091	1896	1480	1052	841	833
No. of Countries	143	133	108	79	69	68

Robust t statistics in parentheses.
**** indicates significant at 1%, ** indicates significant at 5% and *indicates significant at 10%*

The estimation results of the model described above using the method of difference-GMM are shown in Table 5. The dependent variable is the first difference (D) of Log Inflation and the explanatory variables are in first difference as well. The results reported in Table 5 shows that even after accounting for the observed persistence in inflation and endogeneity of capital account liberalization and exchange rate regimes, the hypothesis that opening up the capital account leads to lower inflation holds and the effects are significant and sizeable across all specifications. An increase in capital account openness index of 0.1 unit decreases the inflation rate by as much as 2.9 per cent. Thus, if the inflation is at its sample mean of 58.15 per cent, opening up of the capital account will reduce it by 1.68 per cent to 56.46 per cent.

Among other explanatory variables, per capita GDP, exchange rate regimes and central bank dependence continue to have significant impact on inflation in the expected direction. However, trade openness and political stability no longer affect inflation in a significant way. Finally, as before, budget deficit has no impact on inflation.

Next, we divide the entire sample of countries on the basis of inflation, income and indebtedness. From Table 6, we find that the negative relationship between capital account openness and inflation is three times stronger in high inflation countries than low inflation countries and twice as stronger than the entire sample. Column (III) and (IV) of Table 6 indicate that the coefficient for high income countries is not statistically significant while that for low income countries is highly significant. Thus the overall negative relationship between opening of capital account and inflation is primarily driven by low income countries.

Table 6: Subsample Results using Arellano Bond Estimates

	Inflation		**Income**		**Indebtedness**	
	High	**Low**	**High**	**Low**	**High**	**Low**
	I	**II**	**III**	**IV**	**V**	**VI**
D.Lagged Inflation	0.790***	0.357***	0.564***	0.472***	0.587***	0.413***
	[10.04]	[5.29]	[4.48]	[5.97]	[5.90]	[5.53]
D2.Lagged Inflation	-0.335***	0.076*	0.019	0.004	-0.005	0.008
	[3.94]	[1.75]	[0.21]	[0.06]	[0.06]	[0.12]
D.Capital Account Openness	-0.362***	-0.088*	-0.023	-0.165**	-0.156**	-0.014
	[-3.08]	[-1.71]	[-0.40]	[-2.43]	[-2.41]	[-0.23]
D.Log of Per Capita GDP	-3.451***	-0.967***	-1.163**	-0.727*	-0.788*	-0.837**
	[-2.99]	[-2.74]	[-2.28]	[-1.69]	[-1.70]	[-2.46]
D.Budget Deficit	-0.022	0.007	0.004	-0.004	-0.007	0.006
	[-0.89]	[0.90]	[0.40]	[-0.26]	[-0.55]	[0.60]
D.Exchange Rate Regime	0.080*	0.059***	0.117***	0.038*	0.073***	0.076***
	[1.93]	[2.65]	[3.34]	[1.84]	[2.69]	[2.64]
D.Central Bank Dependence	1.060***	0.504***	0.427**	0.471**	0.395**	0.463**
	[3.69]	[3.21]	[2.06]	[2.45]	[2.30]	[2.55]
D.Political Stability	0.003	0.002	0.008	-0.006	-0.002	-0.003
	[0.38]	[0.38]	[1.27]	[-1.10]	[-0.43]	[-0.66]
D.Trade Openness	0.011	0.016	0.004	0.021*	0.009	0.015
	[1.58]	[1.54]	[0.49]	[1.93]	[1.09]	[1.33]
No. of Observations	125	708	474	359	494	339
No. of Countries	11	57	40	28	38	30

Robust t statistics in parentheses.
**** indicates significant at 1%, ** indicates significant at 5% and *indicates significant at 10%*

Finally column (V) and (VI) show that, the negative relationship is also significantly strong for highly indebted countries. A country that is faced with an external debt can raise the resources to pay the debt either externally or internally. It can raise the resources externally in two different ways. It could undertake a devaluation, which would make its exports more competitive and generate a trade surplus. Alternatively, it could open up the capital account by removing capital controls on foreign investment. This will pave the way for a more efficient allocation of savings and increase the country's attractiveness

to foreign investors. The resulting higher growth rate and accumulation of reserves will provide the economy with resources to service the debt. However, if the economy is closed then the government will have to raise the resources internally. This implies that resources will have to be transferred from the private sector to the government. If inflation tax is the major mechanism for this transfer then it will result in a higher inflation.

4. Capital Account Liberalization: Indian Experience

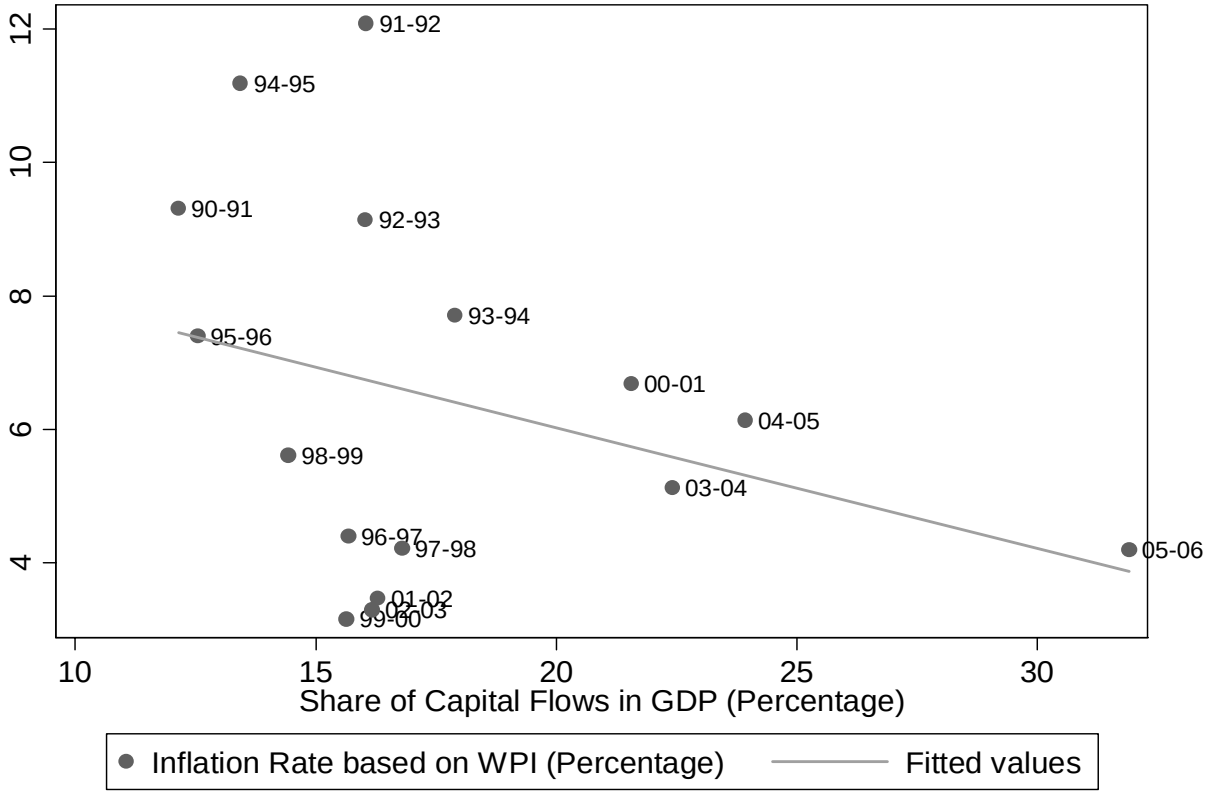
Having theoretically and empirically looked at the relationship between opening up of the capital account and inflation, it would be instructive to look at the issues currently facing India. In March of last year, Prime Minister Dr. Manmohan Singh floated the idea of revisiting full capital account convertibility. With a comfortable external and internal position it was time to see if full capital account convertibility was a viable option. Since then a high level committee was set up by the Reserve Bank of India under the chairmanship of Mr. S.S. Tarapore to establish a framework for fuller capital account convertibility. The committee submitted its report, Tarapore (2006), on July 31, 2006 and took the view that there is already an ongoing process of capital account liberalization and the report was aimed at deepening this.

In India also capital account liberalization has exercised some degree of "disciplinary effect" on the Reserve Bank of India (RBI). India had a history of tight controls on current and capital payments till the 1990s. However, since then it has taken major strides to liberalize transactions on these accounts. It accepted Article VIII status, requiring current account convertibility in August 1994. Moreover, since the mid 90s, India has slowly but steadily moved towards greater capital account convertibility. The RBI undertook several steps to ease the flow of capital once the initial problems related to the Asian crises were overcome. In recent years a large number of restrictions on capital flows have been removed.[3] During this time, the policy endeavor of the RBI has been to keep year on year inflation at a low level. Though India does not follow a specific inflation target, the RBI keeps a strict vigilance over inflation and especially inflation expectations. Through several speeches, notifications and press releases, the RBI has made its preference for anchoring inflation expectations clear. For e.g. in the First Quarter Review of Annual Statement on Monetary Policy for 2006-07, it was pointed out that *the overall monetary stance would be to ensure a monetary and interest rate environment that enables continuation of the growth momentum while emphasizing price stability with a view to anchoring inflation expectations*. The recent hike in the cash reserve ratio (CRR) by 50 basis points was aimed at reducing excess liquidity and curbing inflation expectations. One major reason for the concern about inflation expectation is the threat of capital outflow in the face of loose monetary policy and high inflation. A causal observation of the scatter plot of inflation rate against share of capital flows in GDP, in Figure 4, shows a strong negative relationship between the two, indicating the "discipline effect". Moreover, it can be seen that India has been moving down the line of fit i.e. moving away from a closed

[3] Shah and Patnaik (2005) provide a list of steps that were taken to ease restrictions on capital account from 1992 to 2004.

capital account and high inflation regime to relatively more open capital account and low inflation regime.

Figure 4: Relationship between Capital Account Openness & Inflation in India



However, there are still several challenges that India faces for a successful move towards capital account convertibility. Even Tarapore (1997) had pointed out certain preconditions that needed to be satisfied before moving to capital account convertibility. These included lowering the gross fiscal deficit, keeping inflation rate between 3 and 5 percent and reducing the cash reserve ratio (CRR) and the non performing assets (NPAs). The general consensus is that while India has achieved the targets for inflation and NPAs, it has not made adequate progress on reduction of CRR and fiscal discipline.[4]

This section looks at another challenge that the monetary authority will face with further opening up of the capital account, which is the choice of the exchange rate regime. Officially, India's exchange rate is "market determined" i.e. the exchange rate is determined in the currency market and not administratively determined. However, the RBI actively intervenes in the currency market with the stated objective of "containing volatility". Papers like Patnaik (2003) and Reinhart and Rogoff (2002) point out that India

[4] Kletzer (2004) and Williamson (2006), among others analyze India's performance on these indicators in detail.

has allowed limited currency volatility over the period 1979-2003. Capital controls allowed the simultaneous pursuit of exchange rate stability and independent monetary policy. However, with free capital flows, the government can not independently set interest rates as well as resist exchange rate movements.

The adoption of greater capital account convertibility presumes the adoption of flexible exchange rate system and independent monetary policy. The exchange rate acts as a shock absorber to external shocks. However, leaving the exchange rate to be decided by market forces can prove to be detrimental to the growth rate of an economy, especially if the growth is driven by exports. Dooley et al. (2003) point out that the growing stockpiles of international reserves can be attributed to a deliberate strategy, which facilitates growth by maintaining an undervalued exchange rate. This would imply that every time there is a pressure on the domestic currency to appreciate i.e. traders want to sell foreign currency and buy domestic currency; the Central Bank intervenes by printing domestic currency and buying up all the foreign currency, which translates into additional reserves. In recent years India has experienced a massive accumulation of international reserves. Patnaik (2003) points out that in India, reserve accumulation has been a passive consequence of an exchange rate policy aimed at preventing the exchange rate from rising.

A relatively weak rupee has helped India to achieve significant export led growth in the recent past. As such it might be a mistake to allow the exchange rate to be pushed up to uncompetitive levels owing to market pressure, especially when competing countries like China are resisting pressure to have a stronger currency. This would result in lower growth, higher unemployment and loss of competitiveness for India. However, undervalued exchange rate can not work in the long run as an engine of export led growth. In the long run export led growth has to be based on higher productivity.

Tarapore (2006) recommended the introduction of a Monitoring Exchange Rate Band of +/- 5.0 per cent around the neutral real effective exchange rate (REER). By doing so, the RBI will be giving up the control of monetary policy to an extent, which is not the optimal thing to do, especially in the face of external shocks and diverse macroeconomic experience of other countries. Historically exchange rate bands have not been very successful as can be seen from the failure of the European Monetary System. Moreover, with free capital flows, exit from a relatively fixed exchange rate, in the face of adverse shocks, can be costly in terms of output and welfare, as was observed by countries like Argentina, Brazil and Russia in recent past.

The primary instrument for managing capital flows in India has been sterilization. The impact of rising foreign exchange assets on monetary base has been neutralized through open market sales of government securities. However, there is an interest cost associated with such sterilization, which is the spread between the interest on domestic government bonds and the yield of reserves. Tarapore (2006) estimates such cost to be to the tune of Rs. 4000 crores in 2005-06. Moreover, excess accumulation of reserves, which is a consequence of the exchange rate regime, can prove to be counterproductive in the longer run. Excess accumulation of reserves imply that funds are being diverted towards

foreign currency assets, with low but stable yields, instead of being used to augment the capital stock of the economy.

Thus, given the above issues, it is imperative that the issue of appropriate exchange rate regime be addressed and resolved before India moves towards greater capital account convertibility.

5. Conclusion

This paper investigates the relationship between capital account openness and inflation. Using the Cagan money demand relationship, the paper builds a theoretical model, which predicts that opening up the capital account will lower inflation. Thereafter using both dynamic and static panel data estimators, on a sample covering 163 countries analyzed in the period from 1980 to 2003, this paper finds that a higher degree of capital account openness generates lower inflation rates. A breakdown of the sample indicates that the negative relationship is significant in countries that are characterized by lower political stability and countries with more dependent central banks. The paper also finds that the overall negative relationship is also driven by high inflation, low income and highly indebted countries.

The spate of financial crises in Latin America and Asia in the last two decades has led many to question the benefits of capital account liberalization. Rodrik (1998) succinctly sums up the skeptics' view: "*Enshrining capital account convertibility in the IMF's articles of agreement is an idea whose time has not yet come. We have no evidence it will solve any of our problems, and some reason to think it will make them worse.*" Despite these warnings the last two decades witnessed a concerted effort towards capital account liberalization. This paper tries to identify one potentially important benefit of such liberalization. Capital account openness appears to discipline monetary authorities, or to help them convince the private sector that they will be more disciplined in the future.

Focusing on India, the paper finds that the opening up of the capital account since mid 90s did have a "disciplinary effect" on the RBI as the RBI has kept a strict vigilance over inflation and inflation expectations. However, for a move to greater capital account convertibility certain pre-conditions need to be fulfilled like fiscal discipline and reduction in CRR. The paper also identifies the appropriate choice of an exchange rate regime as an important issue that needs to addressed and resolved before a move towards the greater account convertibility. While the existing exchange rate regime has its benefits in terms of inducing export led growth, there are several costs associated with it and it would become unsustainable after greater integration with the global capital markets.

References

Arellano, M. and S. Bond (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58; pp. 277–297.

Bartolini, L. and A. Drazen (1997). "Capital Account Liberalization as a Signal." *American Economic Review*, 87; pp. 138–54.

Baum, C., J. Barkoulas, and M. Caglayan (1999). "Persistence in International Inflation Rates." *Southern Economic Journal*, 65; pp. 900–913.

Calvo, G.A. and C.M. Reinhart, (2002), "Fear Of Floating," *Quarterly Journal of Economics*, 107, pp. 379-408.

Chinn, M. and H. Ito (2005). "What Matters for Financial Development? Capital Controls, Institutions and Interactions." *Journal of Development Economics.*

Cukierman, A., S. Edwards, and G. Tabellini (1992a). "Seigniorage and Political Instability." *American Economic Review*, 82; pp. 537–55.

Cukierman, A., B. Neyapti, and S. Webb (1992b). "Measuring the Independence of Central Banks and its Effect on Policy Outcomes." *World Bank Economic Review*, 6; pp. 353–398.

Dooley, M., D. Folkerts-Landau, and P. Garber (2003). "An Essay on The Revived Bretton Woods System." NBER Working Paper No. 9971.

Francisco, M. and M. Bleaney (2005). "Inflation Persistence and Exchange Rate Regimes: Evidence from Developing Countries." Economic Policies Research Unit Working Paper.

Fuhrer, J. and G. Moore (1995). "Inflation Persistence." *Quarterly Journal of Economics*, 110 (1); pp. 127–159.

Gali, J. and M. Gertler (1999). "Inflation Dynamics: A Structural Econometric Analysis." *Journal of Monetary Economics*, 44 (2); pp. 195–222.

Ghosh, A.R., A.-M. Gulde, and H. C. Wolf (2003). "Exchange Rate Regimes: Choices and Consequences," MIT Press., Cambridge, Massachusetts, 1st edition.

Grilli, V., D. Masciandaro, and G. Tabellini (1991). "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries." *Economic Policy*, 6 (13); pp. 341–392.

Grilli, V. and G. Milesi-Ferretti (1995). "Economic Effects and Structural Determinants of Capital Controls." *IMF Staff Papers*, 42 (3).

Gruben, W. and D. McLeod (2002). "Capital Account Liberalization and Inflation." *Economic Letters*, 77 (2); pp. 221–225.

Kletzer, K. (2004). "Liberalizing Capital Flows in India: Financial Repression, Macroeconomic Policy and Gradual Reforms." Santa Cruz Center for International Economics Paper 04-16.

Kose, M., E. Prasad, K. Rogoff, and S. Wei (2006). "Financial Globalization: A Reappraisal." NBER Working Paper 12484.

McKinnon, R.I. and D.J. Mathieson (1981). "How to Manage a Repressed Economy?" Essays in International Finance.

Nelson, C. and C. Plosser (1992). "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications." *Journal of Monetary Economics*, 10; pp. 129–162.

Patnaik, I. (2003). 'Indias Policy Stance on Reserves and the Currency.' ICRIER Working Paper No. 108

Patnaik, I. (2005). "India's Experience with Pegged Exchange Rate." In S. Berry, B. Bosworth, and A. Panagariya, eds., 'The India Policy Forum 2004,' pp. 189–226. Brookings Institution Press and NCAER.

Pivetta, F. and R. Reis (2004). "The Persistence of Inflation in the United States." Unpublished.

Razin, A. and C.-W. Yuen (1995). "Can Capital Controls Alter the Inflation-Unemployment Tradeoff?" NBER Working Paper No. 5239.

Reinhart, C. and K. Rogoff (2002). "The Modern History of Exchange Rate Arrangements: A Reinterpretation." *Quarterly Journal of Economics*, 119 (1); pp. 1–48.

Rodrik, D. (1998). "Who Needs Capital Account Convertibility?" In S. Fisher, ed., "Should the IMF Pursue Capital-Account Convertibility?," Princeton University.

Romer, D. (1993). "Openness and Inflation: Theory and Evidence." *Quarterly Journal of Economics*, 108 (4); pp. 869–903.

Shah, A. and I. Patnaik (2005). "India's Experience with Capital Flows: The Elusive Quest for a Sustainable Current Account Deficit." NBER Working Paper No. 11387.

Tarapore S.S. (1997). "Report of the Committee on Capital Account Convertibility", Reserve Bank of India.

Tarapore, S.S. (2006). "Report of the Committee on Fuller Capital Account Convertibility." Reserve Bank of India

Tytell, I. and S. Wei (2004). "Does Financial Globalization Induce Better Macroeconomic Policies?" IMF Working Paper No. 04/84.

Woodford, M. (2003). Interest and Prices: Foundations of a Theory of Monetary Policy. Princeton University Press, 1st edition.

Williamson, J. (2006). "Why Capital Account Convertibility in India is Premature." *Economic and Political Weekly,* May 13

Appendix

Appendix Table 1: List of Countries

Afghanistan	Albania	Algeria	Angola	Antigua & Barbuda
Argentina	Armenia	Aruba	Australia	Austria
Azerbaijan	Bahamas, The	Bahrain	Bangladesh	Barbados
Belgium	Belize	Benin	Bhutan	Bolivia
Botswana	Brazil	Bulgaria	Burkina Faso	Burundi
Cambodia	Cameroon	Canada	Cape Verde	CAR
Chad	Chile	China	Colombia	Comoros
Congo, DR	Congo, Rep.	Costa Rica	Cote d'Ivoire	Cyprus
Denmark	Djibouti	Dominica	Dominican Republic	Ecuador
Egypt	El Salvador	Equatorial Guinea	Ethiopia	Fiji
Finland	France	Gabon	Gambia, The	Georgia
Germany	Ghana	Greece	Grenada	Guatemala
Guinea	Guinea-Bissau	Guyana	Haiti	Honduras
Hong Kong	Hungary	Iceland	India	Indonesia
Iran	Iraq	Ireland	Israel	Italy
Jamaica	Japan	Jordan	Kenya	Kiribati
Korea, Rep.	Kuwait	Lao PDR	Lebanon	Lesotho
Liberia	Libya	Macedonia	Madagascar	Malawi
Malaysia	Maldives	Mali	Malta	Mauritania
Mauritius	Mexico	Micronesia	Moldova	Mongolia
Morocco	Mozambique	Myanmar	Namibia	Nepal
Netherlands	Netherlands Antilles	New Zealand	Nicaragua	Niger
Nigeria	Norway	Oman	Pakistan	Panama
Papua New Guinea	Paraguay	Peru	Philippines	Poland
Portugal	Qatar	Romania	Russia	Rwanda
Samoa	Sao Tome and Principe	Saudi Arabia	Senegal	Seychelles
Sierra Leone	Singapore	Solomon Islands	Somalia	South Africa
Spain	Sri Lanka	St. Kitts and Nev.	St. Lucia	St. Vin and Gren
Sudan	Suriname	Swaziland	Sweden	Switzerland
Syria	Tanzania	Thailand	Togo	Tonga
Trinidad and Tobago	Tunisia	Turkey	Uganda	UAE
United Kingdom	United States	Uzbekistan	Vanuatu	Venezuela
Vietnam	Zambia	Zimbabwe		

LATEST ICRIER'S WORKING PAPERS

NO.	TITLE	AUTHOR	YEAR
190	INDO-US FTA : PROSPECTUS FOR THE TELECOMMUNICATION SECTOR	ARPITA MUKHERJEE PRERNA AHUJA	DECEMBER 2006
189	AN ANALYSIS OF THE SPECIAL SAFEGUARD MECHANISMS IN THE DOHA ROUND OF NEGOTIATIONS *A PROPOSED PRICE-TRIGGER-BASED SAFEGUARD MECHANISM*	PARTHAPRATIM PAL DEEPIKA WADHWA	OCTOBER 2006
188	THE DEBATE ON THE POVERTY ESTIMATES OF 1999–2000	K. L. DATTA	OCTOBER 2006
187	PROSPECTS FOR IT-ENABLED SERVICES UNDER A INDO-US FTA	ARPITA MUKHERJEE PARAMITA DEB GUPTA	SEPTEMBER 2006
186	ASIAN ECONOMIC INTEGRATION ASEAN+3+1 or ASEAN+1s?	AMITA BATRA	SEPTEMBER 2006
185	AN EXAMINATION OF THE RELATIONSHIP BETWEEN HEALTH AND ECONOMIC GROWTH	GARIMA MALIK	SEPTEMBER 2006
184	STRUCTURAL SHIFT IN DEMAND FOR FOOD: PROJECTIONS FOR 2020	SURABHI MITTAL	AUGUST 2006
183	DOMESTIC MARKET INTEGRATION	ARVIND VIRMANI SURABHI MITTAL	JULY 2006
182	INDIA - PAKISTAN TRADE	NISHA TANEJA	JUNE 2006
181	DISCIPLINING VOLUNTARY ENVIRONMENTAL STANDARDS AT THE WTO: AN INDIAN LEGAL VIEWPOINT	SAMIR R. GANDHI	JUNE 2006

About ICRIER

ICRIER, established in August, 1981, has successfully completed its 25 years, as an autonomous, policy oriented, not-for-profit research institute. We have nurtured our cherished autonomy by establishing an endowment fund, income from which meets all our administration expenses. ICRIER's offices are located in the prime institutional complex of India Habitat Centre, New Delhi. The prime focus of all our work is to support India's interface with the global economy.

ICRIER's founding Chairman was Dr. K B Lall who led the organization from its inception from 1981 to 1992 when he handed over the Chairmanship to Mr. R N Malhotra (1992-1996). He was followed by Dr. I G Patel who remained Chairman from 1997 to 2005 until his demise in July 2005. ICRIER's current Chairperson is Dr. Isher Judge Ahluwalia.

Amongst ICRIER's founding member are: Dr. Manmohan Singh, Dr. C Rangarjan, Dr. M S Swaminathan, Dr. Jagdish Bhagwati, Mr. Montek Singh Ahluwalia and Mr.Bharat Ram.

ICRIER conducts thematic research on its six thrust areas that are:

- Trade, Openness, Restructuring and Competitiveness
- WTO Related Issues
- Regional and Bilateral Issues
- Financial Liberalization and Integration
- Macroeconomic Management in an Open Economy
- Strategic Aspects of India's External Relations

In addition, ICRIER holds public policy workshops to bring together policy makers, academicians, senior industry representatives, MPs and Media persons to try and forge a consensus on issues of major policy interest. In the effort to better understand global developments and experiences of other economies which have bearing on India's policies and performance, ICRIER invites distinguished scholars and policy makers from around the world to deliver public lectures on economic themes of interest to contemporary India.

ICRIER's highly qualified core team of researchers includes several PhD's from reputed Indian and foreign universities. At present the team has 18 economists. The team is led by Dr. Rajiv Kumar, D.Phil in Economics from Oxford University.