The Impact of Exchange Rate Variation on Inflation in South Asian Countries

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Abstract

This paper examines the impact of exchange rate variation on inflation in South Asian countries for the sample of the period 1981 to 2012 in a panel data framework rather than time series. The main purpose of this study is to examine whether exchange rate pass-through and/or volatility of exchange rate causes inflation in South Asian countries and what are the policy implications of it for the South Asian countries. This study first estimates inflation model for full sample (60 countries) and then estimates the inflation model for sub-sample of four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka). For estimation of full sample this paper uses fixed effect model and GMM estimation techniques. In case of sub-sample (South Asian countries) this paper uses random effect model and GMM estimation techniques. While using full sample (for 60 countries), it is found that change in exchange rate has significant impact on inflation but exchange rate volatility has no impact on inflation. However, in case of South Asian countries both the exchange rate pass-through and volatility of exchange rate have significant impact on inflation. So, the policy makers of these four South Asian countries should take necessary steps for controlling inflation due to the volatility of exchange rate.

JEL classification: C13, C23, C33, F41.

Key words : *Exchange Rate, Inflation, Volatility.*

Introduction

The current states of South Asian countries have the highest rate of inflation in comparison to other regions of the world. Moreover, both the inflation and exchange rates are also volatile and unstable. There are several reasons which fuel the high inflation in this region. Some of them are; domestic and external demand, government intervention to the market, inappropriate fiscal and monetary policy and adverse supply shock due to the internal political conflict and stock of goods by high profit seeking firms and businesses. South Asia is home to over one-fifth of the world's population, and is the most populous and

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densely populated geographical region of the world. To a certain extent, South Asia is considered one of the poorest regions of the world. It is well known that the incident of high inflation hampered the purchasing power of the poor and fixed income groups. Moreover, most South Asian countries have deficit in their current account balances. Additionally, increases in oil or food prices in the world market widen the deficit of the current account balance. This widening deficit affects the exchange rate, therefore making it more volatile. The volatile exchange rate may affect inflation, exports, imports and the overall balance of payment situation. As the incidence of inflation is greatly affects the poor and fixed income groups, hence, the volatility of exchange rate and inflation are growing concern in this region. This study investigates whether exchange rate pass-through and/or volatility of exchange rate causes inflation in South Asian countries or not. Also, what are the macroeconomic policy implications of it for the South Asian countries?

There are a vast number of studies on exchange rate movements to inflation, but most of them have investigated an individual country by using a time series data framework. Hossain (2002) investigated the exchange rate response to inflation in Bangladesh from 1972 to 1999. Hyder & Shah (2004) assessed the extent to which the movements in exchange rate affect domestic wholesale and consumer prices in Pakistan by analyzing data from January 1988 to September 2003 using a VAR approach. Sohrabji (2011) examined the relation between exchange rates and prices in India over three periods, 1975-1986, 1992-1998 and 1999-2010, and Duma (2008) investigated pass-through of external shocks (exchange rate, oil price, and import price shocks) to inflation in Sri Lanka. These studies only focused on the individual countries, not on the whole of South Asia. Perceptibly, there is less attention given to the South Asian region in this area of research. That is why, this study attempts to focus on South Asia by using a panel data framework for the time period of 1981 to 2012.

This study attempts to make a contribution to the literature in three ways. First, this study uses a panel data framework for the time period of 1981 to 2012 because time series analysis on an individual country often lacks sufficient observations. Secondly, it calculates exchange rate volatility for each country using *daily* exchange rate data. Thirdly, this study provides empirical evidence that exchange rate volatility has positive impacts on inflation in South Asia.

This study first estimates the inflation model for the full sample (by using 1812 observations for 60 countries) and then estimates the inflation model for a sub-sample of four South Asian countries (Bangladesh, India, Pakistan and Sri Lanka). For the estimation of the full sample, this study uses the fixed effect model and dynamic panel model. In the case of South Asia countries, this study uses the random effect and dynamic panel model. This study found that a change in the exchange rate had a significant impact on inflation but exchange rate volatility had no impact on inflation when using the full sample. On the other hand, in the case of South Asian countries, both the change in exchange rate and

volatility of exchange rate have significant impact on inflation.

Hypotheses for this study are as follows:

(a) The level of exchange rate has a positive and significant effect on inflation.

(b) Exchange rate volatility also has a positive and significant effect on inflation.

(c) Exchange rate regime plays an important role for inflation.

The remainder of this thesis is as follows; Chapter Two presents a literature review, then Chapter Three describes the exchange rate movements and inflation situation in South Asian countries: Some stylized facts and Chapter Four deals with exchange rate history and exchange rate system in South Asian countries. Theory and Empirical Analysis are explained in Chapter Five. Chapter Six contains the empirical results and Chapter Seven presents the conclusion & policy recommendations.

Literature Review

There are two popular views regarding the relation of exchange rate movements and inflation: the structuralist view and the monetarist view. Structuralists argue that the prices of tradable goods rise directly and the prices of non-tradable goods may also rise depending on the labor markets conditions and on institutional arrangements such as wage indexation when there is depreciation. Even if the price of non-tradable goods does not rise in response to wage increases but remains sticky downward, which may raise the general price level or its growth rate (Agenor, 1991), (Aghevli, 1991),(Montiel, 1997), (Krugman P. and Taylor, 1987).

The Monetarist view is very different from that of the structuralists. They view inflation always and everywhere as a monetary phenomenon. An anticipated currency devaluation may increase the excess money supply and thereby inflation (Hossain, 2002).

The exchange rate variation on inflation means that changes in imports prices are translated into domestic prices. There is vast literature on this occurrence (Dornbusch, 1987; Fischer, 1989; Klein, 1990; Freenstra and Kendal, 1994; Amitrano et al., 1997 and Campa and Goldberg, 2002) and the importance given to this issue has increased after the advent of Inflation Targeting. Many authors, such as Goldfajn and Werlang (2000), Calvo and Reinhart (2002), Schmidt-Hebbel and Tapia (2002) and Schmidt-Hebbel and Werner (2002) have shown that the pass-through is higher for emerging than for developed economies.

It is often believed that exchange rate depreciation is closely linked with price inflation. "Traditional monetary theory regards excessive money creation as a common source of instability in both the exchange rate and price level. In the presence of large monetary shocks, price inflation and exchange rate depreciation should, therefore, be closely linked" (Mishkin, 2008).

It is widely recognized in macroeconomic literature that, exchange rate variation on inflation is determined mainly by the level of inflation, the output gap and the credibility of the monetary authority. The output gap affects pass-through by reducing the firm's power to increase prices, as increasing sales firms find it easier to pass-through in cost of final prices (Goldfajn and Werlang , 2000)

Taylor (2000), states that, "the lower pass-through should not be taken as exogenous to the inflationary environment (p.1390)."" Generally, low inflation regime lowers the pass-through by way of weakening the expected future effect of the shocks (via its reaction to price deviations from the target path). Also, low inflation economies could be matter to less variable monetary shocks. The lower variability of monetary shocks would weakening the information content of the exchange rates in expecting monetary shocks and this effect suggests another reason for the pass through to be smaller under a low inflation regime" (Choudhri and Hakura , 2001).

Campa and Goldberg, (2002) found that counties with less exchange rate and inflation variability also have lower rate of pass through of exchange rate into import prices. Mishkin Frederic S.,(2008) argued that, the correlation between consumer price inflation and the rate of nominal exchange rate depreciation can indeed be high in an unstable monetary environment in which nominal shocks fuel both high inflation and exchange rate depreciation.

"If exchange rate pass-through is low it tends to permit a more independent monetary policy. On the one hand, on the time when business cycle are in downward phases, monetary authorities would be less controlled to dampen exchange rate induced inflation and would have more room for countercyclical policies. Moreover, when there are strong demand pressures, a low pass-through helps to contain inflation" (Razafimahefa, 2012).

There have two impacts of goods prices on inflation; first, the shocks of goods prices have an immediate that means direct effect on prices, second, a change in goods prices through exchange rates has an indirect effect on inflation (Furlong and Ingenito, 1996). Country size may be another important factor in ranking pass-through elasticities of countries (Campa and Goldbeg, 2002). It is also explained by Dornbusch (1987), that exchange rate pass-through may be higher if the exporters are large in number relative to the presence of local competitors. One approximation to this point is that pass-through elasticities might be inversely related to a country's real GDP. An alternative approach would be also to consider measures of sector-specific openness for countries.

There are various theoretical models which analyze the links between exchange rate and inflation, and the pass-through reflects the interaction of micro and macro phenomena. On the micro side, producers like to maximize expected profits by fully reflecting the changes in the exchange rate into sales prices. When the structure of the domestic economy is close to a monopoly or to imperfect competition this case will likely to be occurred. Obstfeld and

Rogoff (1995) called this "producer currency pricing". However, in the case of more competitive markets, producers may need to bear a part of the exchange rate changes by reducing mark-ups to keep market share. This behavior is defined by Krugman (1987) as a "pricing to market". In the case where prices are sticky or rigid because of imperfect market mechanisms or administrative constraints, a phenomenon of "local currency pricing" keep it up. Also, if consumers like to maximize their utility by "flying from quality", that is consuming locally produced goods instead of imported ones, the degree of the overall pass-through might be reduced. On the macro side, most recent studies utilize the framework of new open macroeconomics or new Keynesian models to establish the effects of exchange rate changes on inflation (Choi and Cook, 2008).

Asia Economic Monitor (2011) found that an increase in food and energy prices has had an upward pressure on inflation in emerging market economies like Southeast Asian countries.

De Gregorio (2012) found the same findings like Asia Monitor. De Gregorio (2012) recommends that in emerging market economics that are dependent on food and energy imports, an increase in goods prices predictably has an upward pressure on inflation rates.

Theory and Empirical Analysis:

Theoretical Model

This study motivated the empirical investigation from the theoretical model in Goldberg & Knetter (1997). They analyze the related strands of literature on goods price and exchange rates by "the law of one price". The summery of the theoretical model are as follows.

Suppose P is denoted the home currency price in country A, P* the home currency price in country B, and e is the exchange rate of A's currency per unit of B's. If the law of one currency holds for some good i, then:

$P_i = EP^*_i$ …… (1)

If the law of one currency price held for all countries for some product we would characterize this as an integrated world market. If the law of one price held for all products between two countries then the absolute purchasing power parity theory (PPP) of exchange rates would hold between two countries:

$P = E$ …… (2)

Where P and P* are price levels in countries A and B.

Because the assumptions of costless transportation and resale are likely to hold in practice and the absolute version of the law of one price and PPP are often modified. Let costs of transportation or resale preclude price equalization, but the frictions give rise to a stable price differential across two markets. In this case, we have

$P_i = \alpha E$ and ……. (3)

$P = \alpha EP^*$ …..……..... (4)

Here α is the real exchange rate. If α remains constant overtime, then common currency prices for a particular product changes in the same way overtime in two countries, and the relative LOP (Law of one price) and PPP holds.

Rogoff (1996) provides an excellent review of theory and evidence on PPP. We concentrate here on studies of the LOP.

Consider the following generic regression model which will be used to discuss the research on prices and exchanges rates:

$Pt = \alpha + \delta Xt + \gamma Et + \Psi Zt + \varepsilon_t$ …….(5)

Here all variables are in logs and p is price for a particular product, X is the primary control variable, E is the exchange rate, Z denotes other control variables in the model, ε is the error term, and t denotes the time period.

Empirical Model

It is generally said that inflation is always a monetary phenomenon. In fact, traditional monetarists support the strict view that non-monetary factors are extraneous in determining inflation. According to the traditional monetarists view, inflation results from monetary growth (M_2), and demand and supply have no roles in clarifying inflation. Kuttner (1990) expressed the opposite view of the pure monetarist. He noted that in the long run, although some measures of money (possibly M_2) may be the main determinant of inflation, not only money matters in determining inflation over all horizons.

Moreover, a number of empirical studies show that the sources of inflation are quite diverse in developing countries and include the following:

First, exchange rate variation potentially affects inflation. A previous study found that (for example, Goldfajn and Valdes, 1999) for future depreciations real exchange rate depreciation is an important element.

Second, output gap also affects inflation. A deviation of an economy's actual output from its potential level as a result of an excess demand in an overheated economy will lead to a inflation.

Third, inflationary environment also determins the willingness of firms to increase price in the presence of increasing cost.

Fourth, the degree of openness of a country to the rest of the world should also affect the inflation. Blejer and Leiderman (1981) claimed that in an open economy, there is a strong

presumption that domestic relative price volatility will be influenced by foreign relative price volatility.

Fifth, fiscal balances also affect the inflation. This approach links inflation to public sector deficits. Lim and Papi (1997) found that public sector deficits play a central role in the inflationary process.

Sixth, exchange rate regime also plays an important role for determining inflation.

According to the above discussion, the following model is built to explain inflation due to exchange rate variation:

Model:

$$\mathbf{lncpi_{it} = \beta_0 + \beta_1 lnex_{it} + \beta_2 exvol_{it} + \beta_3 lngdpgap_{it} + \beta_4 M_{2it} + \beta_5 lncpi_{i,t-1} + \beta_6 tradeopen_{it} + \beta_7 fiscalbal_{it} + \beta_8 exregime_{it} + \alpha_{it} + u_{it}}$$

The model basically follows the literature on exchange rate variation on inflation at the macroeconomic level. The idea is straightforward: today's inflation is determined by the past inflation, output gap, exchange rate depreciation, exchange rate volatility, broad money growth, fiscal deficit and trade openness.

Methodology

This study estimates the impact of exchange rate variation on inflation in a dynamic panel data model from the period 1981 to 2012 for four South Asian countries.

To minimize the measurement error we calculate GDP gap by using the Hodrick-Prescott filter method (the deviation of actual GDP from an estimated trend).

First, we estimate the model by using fixed effect model and random effect model for calculating the Hausman test. The result of the Hausman test determines whether the model is fixed effect model or random effect model.

Second, we estimate a dynamic panel model using Generalized Moments of Method (GMM). Since a dynamic model includes lags of the dependent variable as explanatory variables standard econometric techniques such as OLS, IV, etc. do not yield efficient estimates of the parameters (Sevestre, 2002). In this case, the GMM method delivers a solution to the problems of simultaneity bias, reverse causality and omitted variable bias (Kpodar, 2007), as well as yielding estimates of unobserved country-specific effects and dummy coefficients for which the usual methods ("within" or "difference") would be unsuitable given the dynamic nature of the regression (see Calderon et al. 2006).

As lagged inflation is dependent variable of inflation here, lagged inflation may be correlated with error term. That is why here we use system GMM estimation.

Empirical Results

Table 1 shows the estimation results of the fixed effect model for all countries. Based on the random effect and fixed effect model, the Hausman test was carried out, and the results of the Hausman test show that our model is fixed effect model.

Two types of specification are shown in the Table- 1. First, estimation results depict that lnex (exchange rate pass-through), m_2 (broad money) and lncpi1 (previous inflation) and tradopen (trade openness) are significant at the 1% level of significance and all of them are correctly signed except tradopen variable. Though the exchange rate regime can play an important role for pass-through inflation but here exchange rate regime variable (exregime) is not significant. Moreover, exvol (exchange rate volatility) also has no impact on inflation. The second estimation in table-1 shows the conditioned regression. Here, also, all variables except exvol are statistically significant.

In addition , the conditioned variable lnexregime (lnex*exregime) is highly significant that meaning that the exchange rate regime has significant impact on inflation which is relevant to other empirical studies such as Dosse Toulaboe & Rory Terry (2013). These authors also found that the rate of inflation is unambiguously positively linked to real exchange rate depreciation regardless of exchange rate arrangements.

Table-1: Estimation Result of FE Model for All Countries

Dependent	(1)	(2)
variable lncpi	FE	FE
lnex	0.100***	0.027**
	(0.010)	(0.013)
exvol	-0.000	-0.000
	(0.000)	(0.000)
lngdpgap	0.017**	0.019**
	(0.008)	(0.008)
tradopen	0.149***	0.151***
	(0.039)	(0.038)
exregime	-0.003	-0.014***
	(0.004)	(0.004)
m2	0.001***	0.001***
	(0.000)	(0.000)

lncpi1	0.847***	0.809***
	(0.009)	(0.011)
lnexregime		0.009***
		(0.001)
Constant	0.018	0.200
	(0.187)	(0.185)
Observations	1,812	1,812
R-squared	0.970	0.971
Number of id	60	60

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2 shows the GMM estimation. From this table we see that lagged inflation is highly significant which tells that the lack of monetary stability and credibility of the exchange rate system provides an environment which highlighted uncertainty and generates a high coefficient for the lagged price changed. GMM estimation in Table 2 shows almost the same specification like as the fixed effect model in Table 1.

Table-2: Estimation Result of GMM for all countries

Dependent	(1)	(2)
variable lncpi	GMM	GMM
L.lncpi	0.906***	0.884***
	(0.008)	(0.010)
lnex	0.022***	-0.041**
	(0.006)	(0.017)
exvol	-0.000	-0.000
	(0.000)	(0.000)
lngdpgap	0.016***	0.023***
	(0.002)	(0.002)
tradopen	0.044**	0.049***

	(0.019)	(0.019)
m2	0.001***	0.001***
	(0.000)	(0.000)
exregime	0.001	-0.007*
	(0.003)	(0.003)
lnexregime		0.006***
		(0.002)
Observations	1,812	1,812
Number of id	60	60

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Other variables, for instance lnex, lngdpgap and m_2 are highly significant on the first estimation in Table 2. The second estimation also shows the same specification.

The lnex variable is still significant at 5% level and interaction term also significant at 1% level. Exregime, m_2 and lncpi1 are significant at 1% level but exregime variable is not correctly signed.

Table 3 shows the random effect model estimation for the South Asian case. On the basis of random effect and fixed effect model, the Hausman test was carried out. The results of the Hausman test show that our model is random effect model. In the South Asian case, the exchange rate pass-through (lnex), lngdpgap, trade openness and fiscal balance variables are not significant but exvol (exchange rate volatility) and exchange rate regime (exregime) are significant. Also lagged inflation is highly significant with a large coefficient.

In Table 3, columns two and three show the estimation result of the interaction term exvol-regime (exvol*regime) and lnexregime (lnex*regime). All estimation results show that exvol is more significant than exchange rate change in South Asian countries.

Table -3: Estimation Result of RE Model for South Asian Countries

Dependent variable lncpi	(1) RE	(2) RE	(3) RE
lnex	0.008	0.008	-0.049*
	(0.006)	(0.006)	(0.029)
exvol	0.009***	-0.005	0.008***
	(0.003)	(0.016)	(0.003)
lngdpgap	0.000	0.000	0.001
	(0.002)	(0.002)	(0.002)
tradeopen1	-0.035	-0.041	-0.041
	(0.036)	(0.037)	(0.036)
fiscalbal	0.001	0.001	-0.000
	(0.002)	(0.002)	(0.002)
exregime	0.011***	0.005	-0.061*
	(0.004)	(0.009)	(0.037)
m2	0.001	0.001	0.000
	(0.000)	(0.000)	(0.000)
lncpi1	0.982***	0.982***	0.981***
	(0.003)	(0.004)	(0.003)
exvolregime		0.005	
		(0.005)	
lnexregime			0.019**
		(0.010)	
Constant	0.078*	0.097**	0.283**
	(0.041)	(0.047)	(0.112)
Observations	124	124	124
Number of id	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4 shows the estimation result of GMM for South Asian Countries. In this case, exchange rate regime (exregime), previous inflation (lncpi1), lngdp gap and exchange rate volatility (exvol) are highly significant. Broad money growth (m2) and fiscal balance are significant at 5% level. Trade openness is not significant at all though it is correctly signed.

Columns two and three of Table 4 also show the estimation result with interaction. According to the result, only exvol, exregime and lag inflation (lncpi1) are statistically significant at 1% level. From the estimation result, it is clear that, the pass through is very low. The exregime variable is significant which means exchange rate regime can play important role for inflation. The lncpi1 variable is highly significant that means, previous inflation and or inflation environment also play an important role for inflation.

Table-4: Estimation Result of GMM for South Asian Countries

Dependent variable lncpi	(1) GMM	(2) GMM	(3) GMM
L.lncpi	0.983***	0.983***	0.983***
	(0.002)	(0.002)	(0.002)
lnex	0.008**	0.008**	0.019**
	(0.004)	(0.004)	(0.008)
exvol	0.009***	0.011	0.009***
	(0.002)	(0.009)	(0.002)
lngdpgap	0.003***	0.003***	0.002
	(0.001)	(0.001)	(0.001)
tradeopen1	-0.019	-0.019	-0.026
	(0.022)	(0.022)	(0.023)
m2	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)
fiscalbal	0.002**	0.002*	0.002*
	(0.001)	(0.001)	(0.001)
exregime	0.011***	0.012**	0.025***
	(0.002)	(0.005)	(0.009)
exvolregime		-0.001	
			(0.003)
lnexregime			-0.004
			(0.002)
Observations	124	124	124
Number of id	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From Table 4 it is clear that both the change in exchange rate and exchange rate volatility are responsible for inflation in South Asian countries. However, it is somehow different from the all country sample. In case of all country sample exchange rate volatility has no role for inflation, only change in exchange rate has some role for inflation.

Now it is clear from the estimation results that nominal exchange rate depreciation increase domestic price level both in the all country sample and the South Asian case. All estimation results show that the coefficient of exchange rate variable is low which indicates the lower passthrough. This may be because of exchange rate depreciation or fluctuation of the exchange rate not much more related to inflation and may inflation environment or adverse supply shock is responsible for inflation.

Moreover, the nominal exchange rate depreciation increase the domestic price of internationally–traded goods and put upward pressure on the general domestic price level. Additionally, the impact of nominal currency depreciation on domestic inflation depends on the degree of openness of the country and the response of foreign suppliers and local distributors to the devaluation.

Futhermore, exchange rate volatility also has a significant effect on inflation in the South Asian country case. There are several possible reasons here. Firstly, excessive volatility of exchange rate creates uncertainty in the exports and imports of a country. When uncertainty enters the producers/exporter's objective function, the profit of risk-averse firms declines because of uncertainty. When products are invoiced in the home currency, the exporter's will face a quantity risk because the quantity demanded will be uncertain and in this case firm contracting supply. Due to bottlenecks of supply will causes price hike in this region. Secondly, firms will also face uncertainty regarding cost of production. When exchange rates are volatile firm are unwilling to import factor inputs which reduces the supply and increases the prices. Thirdly, financial institutions may be weak and not well-developed in this region (except India), so that financial institutions cannot take proper steps for the fluctuation of exchange rate which ultimately affects the inflation

Lagged inflation rate is highly significant which points to an important role for expectations in deriving inflation. This could reflect either low credibility of the monetary policy and/or uncertainty concerning economic development and geopolitical changes in this region. Inflation expectations remain high in this region, because higher prices will cause workers to demand higher wages, causing a wage price spiral. Therefore, expectation of inflation is important; if people expect high inflation, it tends to be self-serving.

Exchange rate regime plays a significant role in inflation in the South Asian countries. Except India, the other three South Asian countries (Bangladesh, Pakistan and Sri Lanka) introduced flexible exchange rate system from the last decade. Intuitively, under a flexible exchange rate regime, countries experience volatile terms of trade will also experiencing volatile exchange rates; whereas under flexible exchange rate regimes, the consequence of a sharp increase in commodity price (such as the oil price) will be reflected in higher inflation. As a result, inflation will be more volatile, and hence, the underlying exchange rate will become more volatile as well.

Conclusion & Policy Recommendation

This study investigated the impact of exchange rate variation on inflation in four South Asian countries and found that both the change in exchange rate and volatility of exchange rate causes inflation in these countries. It was also found that not only exchange rate changes or volatility but other reasons such as exchange rate regime, inflation environment (lag inflation) are liable to cause higher inflation in this region.

The monetary authority should take the necessary steps with an aim to minimize wide ranging fluctuations in the exchange rate that may encourage speculative activities and weaken the stability of the economy. To achieve this goal, exchange rate policy should be such that if tries to maintain the right balance between necessary flexibility to guarantees the competitiveness and desirable stability to increase confidence in domestic currency and basic requirements should be fulfilled that provides support to the currency value over time.

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Appendix-A

$lncpi_{it}$ = log of CPI (Consumer Price Index)
$lnex_{it}$ = log of nominal exchange rate
$exvol_{it}$ = exchange rate volatility
$lngdpgap_{it}$ = log of GDP Gap
M_{2it} = Broad Money Growth
$lncpi_{i,t-1}$ = lag value of logcpi
$tradeopen_{it}$ = Trade openness
$Fiscalbal_{it}$ = Fiscal Balance
$Exregime_{it}$ = Exchange rate Regime