



University of Dundee

Fluctuation in the international currency reserves of less developed countries: HIPC vs non-HIPC

Boakye, Augustine A.; Molana, Hassan

Publication date:
2007

[Link to publication in Discovery Research Portal](#)

Citation for published version (APA):

Boakye, A. A., & Molana, H. (2007). Fluctuation in the international currency reserves of less developed countries: HIPC vs non-HIPC. (Dundee Discussion Papers in Economics; No. 203). University of Dundee.

General rights

Copyright and moral rights for the publications made accessible in Discovery Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from Discovery Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



Dundee Discussion Papers in Economics

Fluctuation in the International Currency Reserves of Less Developed Countries: HIPC vs Non-HIPC

Augustine A. Boakye and Hassan Molana

Department of
Economic Studies,
University of Dundee,
Dundee.
DD1 4HN

Working Paper
No. 203
September 2007
ISSN:1473-236X

**FLUCTUATIONS IN THE INTERNATIONAL CURRENCY RESERVES OF
LESS DEVELOPED COUNTRIES: HIPC vs NON-HIPC**

Augustine A. Boakye* and Hassan Molana*
University of Dundee

September 2007

ABSTRACT

This paper uses the principles of the monetary approach model of balance of payments and exchange market pressure to analyze the fluctuations in the international reserves of LDCs. The motivation for this analysis derives from the recent emphasis of the debt reduction policies that target the HIPCs. These policies stress the importance of non-monetary, and to some extent non-economic factors such as institutional improvements, good governance, infrastructural development and poverty reduction strategies. The argument is that once such reforms are implemented effectively, the economic forces will work in the right direction enabling the HIPCs to sustain a healthy balance of payments. We use panel data analysis to examine whether there is a significant difference between international reserves fluctuations in the HIPCs and in the rest of the LDCs. Evidence from data over the period 1983–2003 for 47 LDCs – of which 20 qualify as HIPCs by the IMF-World Bank criteria – suggests that there are significant differences in the way the reserve flows respond to their main determinants in the two sets of countries. This begs the question of whether the above mentioned policies can alleviate the causes of such differences.

JEL Classification: F31, F33, F34, F35, H63, O11

Keywords: monetary approach, exchange market pressure, international reserves, Heavily Indebted Poor Country (HIPC)

* The authors would like to thank Ronald MacDonald, the discussant Thomas Bwire and participants at the 2007 Business & Economics Society International Conference (Antibes, France), and anonymous conference referees for helpful comments and suggestions. They remain responsible for all errors or omissions.

I. INTRODUCTION

Following a persistent and unsustainable debt accumulation, poor economic performance and constant balance of payment problems in many poor countries, the World Bank (WB) and the International Monetary Fund (IMF) in September 1996 jointly launched the Heavily Indebted Poor Countries (HIPC) initiative whose aim is to reduce the external debt burdens of eligible countries to a sustainable level within a specified period of time – see Makhan (2002) for details. The Initiative was enhanced in 1999 for the implementation of comprehensive country specific Poverty Reduction Strategy Programs (PRSP) providing deeper, broader and faster debt relief and aiming to eliminate any debt over-hang¹ that discourages investment and hinders growth. The prime concern is claimed to be achieving debt sustainability and channeling resources freed up by debt relief towards social expenditure and other poverty reduction programs – see Abrego and Ross (2001) for details.

In August 2006, twenty nine HIPCs had reached the decision point², of which nineteen reached the completion point³ – see Allen and Leipziger (2006). The limited evidence that has become available since the reforms were introduced shows that while in most cases growth rates are still not sufficiently high to counteract the pervasive poverty and enable the countries to catch up with other LDCs, an increasing number of sub-Saharan African countries are showing signs of significant economic progress. These countries have successfully cut domestic and external financial imbalances and thereby enhancing economic efficiency. In addition, there has been a growing movement towards more open and participatory forms of government that encourage cooperation between the state and the private sector – see Basu et al. (2000). The argument is that if the HIPC initiative reforms are effectively implemented, the economic forces will continue to work efficiently in the right direction enabling the HIPC to sustain a healthy growth and balance of payment.

One of the main motivations underlying the HIPC initiative is to prevent the accumulation of large external debts by the LDCs. However, the process seems to rely on an implicit assumption that there is a clear separation between those ‘non-HIPC’ LDCs which do not yet have an ‘unsatisfactory’ external debt history and those LDCs which are classified as HIPCs. As a result, finding no significant differences in the processes of reserve accumulation in the two sets of countries will be rather alarming in the sense that it does not rule out the possibility of a typical LDC – which has so far avoided debt crisis and is currently performing well above the HIPC thresholds – to fall into the poverty vicious circle. Clearly, this possibility severely undermines the global effectiveness of the HIPC initiative.

On the other hand, finding significant differences between the two sets of LDCs in the above context and identifying the underlying causes of these differences can make a significant contribution to the understanding of how a typical HIPC's macroeconomic structure is disadvantaged relative to a typical non-HIPC LDC.

In this paper we focus on the above issue. More specifically, we use data over the period 1983–2003 for 47 LDCs – of which 20 qualify as HIPCs – to examine whether there is a significant difference in the behavior of international reserves in HIPCs and in the rest of the LDCs. We use the principles of the monetary model to balance of payments and exchange market pressure to approximate the behavior of international reserves and apply the pooled cross-section time-series estimation methods to test the existence of a significance difference in the way international reserves respond to the typical determinants in the two groups of countries. Our findings suggest that there is a significant difference in the reserve accumulation process in the two sets of countries-the HIPCs and the non-HIPCs.

The rest of the paper is organized as follows. Section II provides a brief theoretical background on the monetary approach and the exchange market pressure and outlines the specification of the models. Section III gives the parameter estimates of these models, examines the consequences of allowing the parameters for HIPCs and non-HIPCs to be estimated freely and checks the statistical validity of imposing identical parameters. Section IV summarizes the main findings and concludes the paper.

II. THEORETICAL SPECIFICATION OF FOREIGN RESERVES EQUATION

There are a number of alternative models which explain the behavior of balance of payments (BOP) and its components amongst which the monetary model remains prominent. This is because the BOP itself is seen as essentially a monetary phenomenon. Since the BOP is simply a “money account” of official settlements balance of a country with the rest of the World and is mainly manipulated by the monetary authorities, the analysis of BOP becomes more meaningful when it is expressed within a monetary framework. As Winters (1985) further elaborates, official settlements' surpluses and deficits are just reflections of hoarding and dishoarding respectively, such that a surplus (hoarding) shows an increase in the stock on money held in the economy while a deficit (dishoarding) reflects in reducing stock of money. But as Musa (1974) stresses, the stock of money is not the only relevant factor: “...to say something is an essentially monetary phenomenon shows that money plays a vital role, but does not imply that only money plays a role” (p. 335). He suggests that monetary approach

provides a broad framework of analysis for BOP problem through explicit specification of the monetary behavior as governed by income, price level and interest rate.

The theoretical foundation of the monetary model is based on the demand for money and the basic model of reserves determination is derived by manipulating the money market equilibrium condition. To see this, let $M(Y, P, R)$ denote the demand for nominal money holdings where $M'_Y \geq 0$, $M'_P \geq 0$ and $M'_R \leq 0$, and Y , P and R are the real domestic income (GDP), the price level and the nominal interest rate, respectively. The money market equilibrium condition is

$$M(Y, P, R) = M^S, \quad (1)$$

where M^S is the money supply. Using the multiplier model, the latter is determined by $M^S = \mu(F + D)$ where μ , F and D respectively denote the money multiplier and stocks of foreign reserves (measured in domestic currency) and domestic credit. Substituting the latter in (1) we obtain an equation explaining the determination of foreign reserves by domestic variables, namely,

$$F = \frac{M(Y, P, R)}{\mu} - D. \quad (2)$$

The explicit effects of price, interest rate and income are then captured by postulating a functional form of the demand for money. A typical function would be $M = Y^\alpha P^\beta e^{k+\gamma R}$, where $\alpha \geq 0$, $\beta \geq 0$ and $\gamma \leq 0$ are constant parameters capturing the elasticities of money demand with respect to income, price⁴ and interest rate and k is a constant reflecting autonomous demand. Thus, the money market equilibrium implies $\mu(F + D) = Y^\alpha P^\beta e^{k+\gamma R}$.

Totally differentiating both sides of this equation and rearranging terms we obtain

$$\frac{dF}{F + D} = \alpha \frac{dY}{Y} + \beta \frac{dP}{P} + \gamma dR - \frac{dD}{F + D} - \frac{d\mu}{\mu}. \quad (3)$$

A generalization of (3) in discrete time then yields a regression equation which can be used to estimate the contribution of each variable to foreign reserves fluctuations, namely

$$\tilde{F}_t = \phi_0 + \phi_1 \dot{Y}_t + \phi_2 \dot{P}_t + \phi_3 \dot{R}_t + \phi_4 \tilde{D}_t + \phi_5 \dot{\mu}_t + \varepsilon_t, \quad (4)$$

where the subscript t denotes the observation date, ϕ_i are to be estimated, ε is a disturbance term capturing the random shocks and omitted effects, and:

$$\tilde{F}_t \equiv \frac{\Delta F_t}{F_{t-1} + D_{t-1}}; \dot{Y}_t \equiv \frac{\Delta Y_t}{Y_{t-1}}; \dot{P}_t \equiv \frac{\Delta P_t}{P_{t-1}}; \dot{R}_t \equiv \Delta R_t; \tilde{D}_t \equiv \frac{\Delta D_t}{F_{t-1} + D_{t-1}}; \text{ and } \dot{\mu}_t \equiv \frac{\Delta \mu_t}{\mu_{t-1}}.$$

Equation (4) and close variants of it are known in the literature as the 'reserve flow equation' and have been used extensively in the empirical studies of the monetary approach

to the BOP. The following studies provide a good coverage of various empirical issues in connection with the estimation and interpretation of the reserve flow equation: Sargen (1975); Bean (1976); Connolly and Taylor (1976); Courchene and Singh (1976); De Grauwe (1976); Genberg (1976); Guitan (1976); Magee (1976); Zecher (1976); Aghevli and Khan (1977); Kreinin and Officer (1978); Wilford and Zecher (1979); Spanos and Taylor (1984); Kulkarni (1985); Uddin (1985); Kamas (1986); Khan (1990); Sahadevan and Kamaiah (1995); Arize et al. (2000); Kasbhatla et al. (2000); Rivera-Solis et al. (2000); Nwaobi (2003) and Das and Wahid (2004).

The analysis of the monetary approach to balance of payment maintained that, under a fixed exchange rate, changes in a country's international reserves are due to imbalances in the demand for and supply of money stock. Some of the above mentioned studies argued that the underlying equation could also be suitably modified to be applicable when the exchange rate system is floating or managed floating – see, for instance, Magee (1976). However, as the strict adherence to the fixed exchange regime became less practical, more attention was paid to formulating a suitable modification of the reserve flow equation which would accommodate the impact of exchange rate fluctuations. The exchange rate market pressure (EMP) approach, accredited to Girton and Roper (1977), provides a modified model which fulfils this requirement by introducing what is usually known as the EMP variable which is a measure of the volume of intervention necessary to achieve any desired exchange rate target. Later, Connolly and Silveira (1979) defined EMP as the pressure that an excess supply of domestic money puts on the volume of international reserves and the exchange rate in a floating (or managed floating) exchange rate regime. Their argument was based on the observation that any such excess supply of money can be offset by one or a combination of (i) an exchange rate depreciation, and (ii) a loss of foreign reserves, and the EMP variable was introduced to capture this idea – see Pentecost et al. (2001) for further details. In this context, therefore, the EMP variable at any period could be measured by the sum of foreign reserves inflows (outflow) and exchange rate appreciation (depreciation) which as Tanner (2001) explains is a country's equivalence, in foreign sector, of the excess demand for (supply of) money.

Theoretically, the EMP model is developed using the assumption of existence of a stable demand for money which facilitates the Quantity Theory relationship, $M = vPY$ where v is the inverse of velocity of circulation. Postulating the money multiplier model $M^s = \mu(F + D)$ and invoking the purchasing power parity assumption $P = eP^*$ – where P^* and e are the foreign

price level and the nominal exchange rate measured as domestic currency per unit of foreign currency – the money market equilibrium implies $\mu(F + D) = veP^*Y$. Totally differentiating both sides of equation this equation and rearranging the terms yields

$$\frac{dF}{F + D} - \frac{de}{e} = \frac{dY}{Y} + \frac{dP^*}{P^*} - \frac{dD}{F + D} + \frac{dv}{v} - \frac{d\mu}{\mu}. \quad (5)$$

A generalization of (5) in discrete time then yields a regression equation such as

$$\tilde{F}_t - \dot{e}_t = \delta_0 + \delta_1 \dot{Y}_t + \delta_2 \dot{P}_t^* + \delta_3 \tilde{D}_t + \delta_4 \dot{\mu}_t + \delta_5 \dot{v}_t + \xi_t, \quad (6)$$

where the subscript t denotes the observation date, δ_i are to be estimated, ξ is a disturbance

term capturing the random shocks and omitted effects, and $\tilde{F}_t \equiv \frac{\Delta F_t}{F_{t-1} + D_{t-1}}$; $\dot{e}_t \equiv \frac{\Delta e_t}{e_{t-1}}$; $\dot{Y}_t \equiv \frac{\Delta Y_t}{Y_{t-1}}$;

$P_t^* \equiv \frac{\Delta P_t^*}{P_{t-1}^*}$; $\tilde{D}_t \equiv \frac{\Delta D_t}{F_{t-1} + D_{t-1}}$; $\dot{\mu}_t \equiv \frac{\Delta \mu_t}{\mu_{t-1}}$; and $\dot{v}_t \equiv \frac{\Delta v_t}{v_{t-1}}$. The left-hand-side (6) is simply a measure of

the (proportional) change in the foreign reserves and the exchange rate that is required to equilibrate the money market when the variables on the right-hand-side of the equation – i.e., foreign inflation, income growth, domestic credit expansion, and changes in the velocity of circulation and money supply multiplier – push the market away from equilibrium.

Regression equations similar to (6) have been used in the literature to empirically examine various aspects of the EMP model – see, in addition to Girton and Roper (1977) and Connolly and Silveira (1979) which are the pioneering contributions, Modeste (1981); Kim (1985); Weymark (1995); Sahadevan and Kamaiah (1995); Tanner (2001); Pentecost et al. (2001); Baig et al. (2003); Hallwood and Marsh (2004); and Gochoco-Bautista and Bautista (2005).

III. EVIDENCE

Given that our purpose is to investigate the difference in behavior of the foreign reserves fluctuations in response to a monetary disequilibrium in HIPCs and the rest of the LDCs, in this section we use data from 47 LDCs⁵ over the period 1983–2003 to estimate regression equations based on (4) and (6) derived above and examine whether there is a significant difference in the way the determining variables affect movements in foreign reserve. The results of estimating these equations are given in Tables 1 and 2 respectively where we have included the lagged dependent variable to account for any omitted dynamics and also report both Least Squares and the Instrumental Variable (2SLS) estimates since some of the explanatory variables may be argued to be endogenous. In each table, we have used the

dummy variable H , which assumes 0 for the HIPCs and 1 for non-HIPCs, to allow the coefficients for each group to be estimated freely. Hence, the coefficient estimates for HIPCs are the first set of coefficients (of the explanatory variables not involving H) and those for non-HIPCs are obtained by adding the two estimates (i.e., for each regressor x we obtain the non-HIPC coefficient by adding the coefficient estimates of x and $H \cdot x$).

Starting with the estimates of the reserve flow equation in Table 1, the OLS estimates suggest that there is a significant difference between the coefficients of the two groups of countries; the t-ratios on coefficients estimates for $H \cdot \dot{P}_t$, $H \cdot \dot{R}_t$, $H \cdot \dot{\mu}_t$ and $H \cdot \tilde{F}_{t-1}$ lie in the critical region and the joint restrictions implied by imposing identical coefficients are rejected – Wald $\chi^2_{(6)} = 369$ and Likelihood Ratio $\chi^2_{(6)} = 327$. But since the OLS estimates do not fully satisfy the sign conditions – i.e., while Y , P and D have the correct signs, R and μ do not – we focus on the 2SLS estimates – which are supported statistically by Hausman test when D and μ are treated as endogenous. These estimates imply that: (i) unlike in the non-HIPCs, income does not play a significant role in the HIPCs; (ii) the price and interest rate effects are much larger in the HIPCs; (iii) the domestic credit only has an impact in the HIPCs – the corresponding Wald test statistic is $\chi^2_{(6)} = 0.55$; (iv) the money multiplier is effective only in the non-HIPCs; and (v) there seems to be no difference in the speed of adjustment in the two countries and, given the negative coefficient of the lagged dependent variable, the short-run impacts are larger than their long-run counterparts.

Moving on to the estimates of the EMP equation in Table 2, while we report the OLS estimates for the same reasons mentioned above we focus on the 2SLS estimates – which are supported statistically by Hausman test when D , μ and v are treated as endogenous. These estimates imply that: (i) income has the same impact in both groups; (ii) the world price plays no significant role in either group; (iii) the domestic credit effect is only significant in the non-HIPCs; and (iv) the money multiplier is effective only in the HIPCs and the money velocity has no significant impact in either group. Finally, to capture the dynamics we used \tilde{F}_{t-1} and \dot{e}_{t-1} separately, rather than including the lagged dependent variable $\tilde{F}_{t-1} - \dot{e}_{t-1}$. This was done in order to allow for the impacts of these to be freely estimated as emphasized by the EMP principle. As can be seen, these do turn to have different effects, but both have much larger impacts in the HIPCs⁶.

On the whole, these results seem to confirm the existence of significant differences in the way the movements in the foreign reserves respond to their determinants in the two groups of

countries, where these differences do indicate a more robust and policy responsive process underlying the reserve accumulation process in the non-HIPCs.

Table 1: Estimates of the Reserve Flow Equation; Dependent Variable: \tilde{F}_t

Regressors	Panel OLS with country fixed effects		Panel 2SLS with country fixed effects	
	Coeff. Estimates	t-ratios	Coeff. Estimates	t-ratios
\dot{Y}_t	0.004180	0.876968	0.002100	0.273721
\dot{P}_t	0.003189	83.63558	0.003702	39.38672
\dot{R}_t	0.000004	8.159896	-0.034072	-7.755297
\tilde{D}_t	-0.015632	-3.750959	-0.443169	-7.836406
$\dot{\mu}_t$	3.29E-05	0.000183	0.248865	0.307871
\tilde{F}_{t-1}	-0.054211	-5.114789	-0.067696	-3.980586
$H \cdot \dot{Y}_t$	-0.004909	-0.692397	0.029779	2.069030
$H \cdot \dot{P}_t$	-0.001007	-6.195728	-0.002010	-2.438897
$H \cdot \dot{R}_t$	-0.000256	-6.180402	0.033604	7.646651
$H \cdot \tilde{D}_t$	-0.015875	-0.660565	0.545216	3.664860
$H \cdot \dot{\mu}_t$	-0.491971	-1.940692	-7.184507	-3.727914
$H \cdot \tilde{F}_{t-1}$	0.081643	2.612973	0.033621	0.636029
\bar{R}^2	0.923417		0.800166	
SER	0.451231		0.720053	
RSS	172.2534		434.4832	
D-W	1.912146		2.188742	
No. of obs.	905		897	

- i) P is the GDP deflator. R is the deposit rate. μ was generated by dividing M2 with (F+D). H is a dummy which assumes 0 for HIPCs and 1 for non-HIPCs.
- ii) The sample is not balanced due to the missing observations problem.
- iii) We have allowed for D and μ to be endogenous and have used lagged values of the explanatory variables as instruments.
- iv) Given the existence of the lagged dependent variable, the D-W statistic is not strictly appropriate for testing the existence of residual autocorrelation and is quoted here simply to give an indication.

Table 2: Estimates of the EMP Reserve Flow Equation; Dependent Variable: $\tilde{F}_t - \dot{e}_t$

Regressors	Panel OLS with country fixed effects		Panel 2SLS with country fixed effects	
	Coeff. Estimates	t-ratios	Coeff. Estimates	t-ratios
\dot{Y}_t	0.069255	3.708146	0.074021	2.343550
\dot{P}_t^*	0.035582	0.331938	0.019617	0.112452
\dot{R}_t	0.165293	7.215397	0.321914	1.768404
\tilde{D}_t	-5.681867	-6.975018	-13.61451	-2.981884
\dot{v}_t	-9.238843	-13.32881	-8.275906	-1.581202
\tilde{F}_{t-1}	1.802970	23.99015	2.085617	10.66366
\dot{e}_{t-1}	-0.737316	-39.60091	-0.853963	-7.941468
$H \cdot \dot{Y}_t$	-0.033146	-1.096795	-0.073804	-1.254949
$H \cdot \dot{P}_t^*$	-0.025693	-0.179441	0.115990	0.519430
$H \cdot \tilde{D}_t$	-0.953631	-19.62102	-1.588506	-4.518315
$H \cdot \dot{\mu}_t$	3.767338	3.130246	10.04250	1.363382
$H \cdot \dot{v}_t$	6.163474	5.868003	11.48273	1.077648
$H \cdot \tilde{F}_{t-1}$	-1.259065	-4.677224	-1.589074	-3.460741
$H \cdot \dot{e}_{t-1}$	0.577168	7.489653	0.744153	4.096036
\bar{R}^2	0.798321		0.708433	
SER	2.118446		2.547158	
RSS	4061.470		5871.653	
D-W	2.136236		2.131930	
No. of obs.	966		966	

- i) P^* is approximated by the US CPI. μ was generated by dividing M2 with (F+D). v was generated by dividing nominal GDP with M2. H is a dummy which assumes 0 for HIPCs and 1 for non-HIPCs.
- ii) The sample is not balanced due to the missing observations problem.
- iii) We have allowed for D , v and μ to be endogenous and have used lagged values of the explanatory variables as instruments.
- iv) Given the existence of the lagged dependent variable, the D-W statistic is not strictly appropriate for testing the existence of residual autocorrelation and is quoted here simply to give an indication.

IV. SUMMARY AND CONCLUSIONS

In this paper we have used the principles of the monetary model of balance of payments and of exchange market pressure to carry out an empirical analysis of the fluctuations in the international reserves of Less Developed Countries. Our main objective has been one of examining whether there is a significant difference in the movements of international reserves between the heavily indebted poor countries (HIPCs) and in the rest of the LDCs. This analysis is motivated by the recent emphasis of the debt reduction policies that target the HIPCs and stress the importance of non-monetary, and to some extent non-economic factors such as institutional improvement, good governance, infrastructural development and more importantly poverty reduction strategies. The argument is that once reforms which target those factors are implemented effectively, the economic forces will work in the right direction and will be more efficient, enabling the HIPCs to sustain a healthy growth and balance of payment. There is no doubt that these policies are extremely important for the HIPCs and their success is absolutely crucial in determining their future economic performance and strengthening their balance of payments position so as to prevent a further debt accumulation. It is therefore useful to examine whether the process underlying the flow of foreign reserves in the HIPCs differs from the non-HIPCs, and if so, whether such differences are sufficiently strong and the right direction so as to signal a healthier reserve accumulation process in the rest of the LDCs.

We have used data from 47 LDCs to estimate two equations that in the literature are known to determine the behavior of foreign reserves fluctuations and examine the differences in the two sets of countries. Our results suggest that there is a significant difference in the way the movements in the foreign reserves respond to their determinants in the two groups of countries, and that on the whole the process seems to be more robust and policy responsive in the non-HIPCs. An interesting line of inquiry would be to explore whether the policies prescribed within the HIPC initiative package would in any way alleviate the causes of such differences.

ENDNOTES

1. Debt overhang is a situation where the debt stock of a country exceeds the country's future capacity to repay it.
2. Following an assessment of the progress made with policy developments, the executive boards of the IMF and the WB formally decide on a country's eligibility and the international community commits to an agreed target for debt reduction. From this point on, the debt service payments of any eligible country will begin to be provided from the HIPC fund.
3. Countries must maintain economic stability, carry out the key structural and social reforms agreed at the decision point, and implement a Poverty Reduction Strategy (PRS) satisfactorily for at least one year. Once a country has met these criteria, it can reach its completion point, at which time lenders are expected to provide the full relief committed at the decision point. See Stiglitz (2002) for issues surrounding the IMF and World Bank policy.
4. In the absence of any money illusion it is usually expected that $\beta=1$.
5. The countries were chosen on the basis of data availability and were divided into HIPC and non-HIPC groups using the IMF initial classification which are, respectively, {Burkina Faso, Bolivia, Burundi, C. African Rep, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Honduras, Kenya, Madagascar, Malawi, Nicaragua, Niger, Rwanda, Senegal, Sierra Leone, Sudan, Togo and Zambia}, and {Algeria, Argentina, Bangladesh, Barbados, Brazil, Chile, Colombia, Dominican Rep, Ecuador, Egypt, Gabon, Grenada, Guatemala, Haiti, India, Indonesia, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Swaziland, Thailand, Tunisia, Turkey, Venezuela}.
6. It may be noted that the coefficient of \tilde{F}_{t-1} is greater than unity in the HIPCs. But this does not have any implications for dynamic stability; we checked this by estimated the restricted version which the regression that includes $\tilde{F}_{t-1} - \dot{e}_{t-1}$ whose coefficient turns out to be less than unity in both OLS and 2SLS cases.

REFERENCES

- Abrego, L. and Ross, D.C. (2001) Debt Relief under the HIPC Initiative: Context and Outlook for Debt Sustainability and Resources Flow, *IMF Working Paper*, WP/01/144, Washington, D.C.
- Aghevli, B.B. and Khan, M.S. (1977) *The Monetary Approach to Balance of Payments Determination: An Empirical test*, A Collection of Research Papers by the Staff of the IMF, 275-290.
- Allen, M. and Leipziger, D. (2006) IDA and IMF, Heavily Indebted Poor Countries (HIPC) Initiative and Multilateral Debt Relief Initiative (MDRI) - Status of Implementation, *Prepared by the Staffs of IDA and IMF*, August, 2006.
- Arize, A.C., Grivoyannis, E.C., Kallianiotis, I.N. and Malindretos, J. (2000) Empirical Evidence for the Monetary Approach to Balance of Payments Adjustments, *Contributions in Economics and Economic History*, No. 203, Greenwood Press: Westport, Conn. and London.
- Baig, M.A., Narasimhan, V. and Ramachandran, M. (2003) Exchange Market Pressure and Reserve Bank of India's Intervention Activity, *Journal of Policy Modelling*, 25, 727-748.
- Basu, A., Calamitsis, E.A. and Ghura, D. (2000) Promoting Growth in Sub-Saharan Africa, *Economic Issues*, No. 23, IMF, August, 2000.
- Bean, D.L. (1976) International Reserves Flow and Money Market Equilibrium: the Japanese Case, in Frenkel, J.A. and Johnson, H.G. (eds), *The Monetary Approach to Balance of Payments*, University of Toronto Press: Toronto.
- Connolly, M. and Silveira, J.D. (1979) Exchange Market Pressure in Postwar Brazil: An Application of the Girton-Roper Monetary Model, *American Economic Review*, 69, 448-454.
- Connolly, M. and Taylor, D. (1976) Testing the Monetary Approach to Devaluation in Developing Countries, *Journal of Political Economy*, 81, 849-860.
- Courchene, T.J. and Singh, K. (1976) *The Monetary Approach to Balance of Payments: An Empirical Analysis for fourteen Industrial Countries* in Parkin, M. and Zis, G. (eds), *Inflation in the World Economy*, Manchester University Press: Manchester.
- Das, S.K. and Wahid, A.N.M. (2004) The Monetary Theory of Balance of Payments: An Application to the Economy of Bangladesh, *Journal of International Business and Entrepreneurship Development*, 2, 55-62.
- De Grauwe, P. (1976) *Monetary Interdependency and International Monetary Reform*, Saxon House, D.C. Heath Ltd: England.
- Genberg, A.H. (1976) Aspects of the Monetary Approach to Balance of Payments Theory: An Empirical Study of Sweden, in Frenkel, J.A. and Johnson, H.G. (eds), *Monetary Approach to Balance of Payment*, Allan and Unwin Ltd: London.

- Girton, L. and Roper, D. (1977) A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience, *American Economic Review*, 67, 537-548.
- Gochoco-Bautista, M.S. and Bautista, C.C. (2005) Monetary Policy and Exchange Market pressure: The Case of the Philippines, *Journal of Macroeconomics*, 27, 153-168.
- Guitan, M. (1976) The Balance of Payment as a Monetary Phenomenon in Frenkel, J.A. and Johnson, H.G. (eds), *Monetary Approach to Balance of Payment*, Allan and Unwin Ltd: London.
- Hallwood, P.C. and Marsh, I.W. (2004) Exchange Market Pressure on the Pound-Dollar Exchange Rate: 1925-1931, *North American Journal of Economics and Finance*, 15, 249-264.
- Kamas, L. (1986) The Balance of Payments Offsets to Monetary Policy: Monetarist, Portfolio Balance, and Keynesian Estimates for Mexico and Venezuela, *Journal of Money, Credit and Banking*, 18, 467-481.
- Kasibhatla, K.M., Malindretos, J. and Kutasovic, P.R. (2000) A Comparison of the Monetary and Traditional Approaches to International Competitiveness. *Contributions in Economics and Economic History*, No. 203, Greenwood Press: Westport, Conn. and London.
- Khan, M.S. (1990) Macroeconomic Policies and the Balance of Payments in Pakistan: 1972-1986, *IMF Working Paper*, 90/78, Washington, D.C.
- Kim, I. (1985) Exchange Market Pressure in Korean: An Application of the Girton-Roper Monetary Model, *Journal of Money, Credit and Banking*, 17, 258-263.
- Kreinin, M.E. and Officer, L.H. (1978) The Monetary Approach to Balance of Payments: A Survey, *Princeton Studies in International Finance*, No. 43, Princeton University, USA.
- Kulkarni, K.G. (1985) Capital Flow as an Offset to Monetary Policy: The Netherlands Evidence, *Indian Economic Journal*, 33, 127-129.
- Magee, S.P. (1976) The Empirical Evidence on the Monetary Approach to the Balance of Payments and Exchange Rates, *American Economic Review*, 66, 163-170.
- Makhan, V.S. (2002) *Economic Recovery in Africa, the Paradox of Financial Flows*, Palgrave Macmillan: Gordonsville, VA, USA.
- Modeste, N.C. (1981) Exchange Market Pressure during the 1970s in Argentina: An Application of Girton-Roper Monetary Model, *Journal of Money, Credit and Banking*, 13, 234-240.
- Musa, M. (1974) A Monetary Approach to Balance of Payments Analysis, *Journal of Money, Credit and Banking*, 6, 333-351.
- Nwaobi, G.C. (2003) The Balance of Payments as a Monetary Phenomenon: An Econometric Case Study of Nigeria, *International Economics Working Paper Archive at WUSTL*.

- Pentecost, J.E., Hooydonk, C.V. and Poeck, A.V. (2001) Measuring and Estimating Exchange Market Pressure in the EU, *Journal of International Money and Finance*, 20, 401-418.
- Rivera-Solis, L.E., Kasibhatla, K.M. and Malindretos, J. (2000) International Adjustment for Kenya: the Relevance of the Traditional and Monetary Approaches, *Contributions in Economics and Economic History*, No. 203, Greenwood Press: Westport, Conn. and London:
- Sahadevan, K.G. and Kamaiah, B. (1995) Monetary Model of Balance of Payments under Fixed and Managed Floating Exchange Rates: the Indian Case, *Indian Economic Journal*, 42, 50-69.
- Sargen, N. (1975) An Empirical Analysis of Monetary model of Exchange Rate and Reserve Fluctuations, *Manuscript*, Federal Reserve Bank of San Francisco, November, 1975.
- Spanos, A. and Taylor, M. (1984) The Monetary Approach to Balance of Payments: A Critical Appraisal of Some Empirical Evidence, *Oxford Bulletin of Economics and Statistics*, 46, 329-340.
- Stiglitz, J. (2002) *Globalization and Its Discontents*. Penguin Books Ltd: London.
- Tanner, E. (2001) Exchange Market Pressure and Monetary Policy: Asia and Latin America in the 1990s, *IMF Staff Papers*, 47, 311-333.
- Uddin, M.S. (1985) Monetary Approach to Balance of Payments: Evidence from Less Developed Countries, *The Indian Economic Journal*, 33, 92-103.
- Weymark, D.N. (1995) Estimating Exchange Market Pressure and the degree of Exchange Market Intervention for Canada, *Journal of International Economics*, 39, 273-295.
- Wilford, D.S. and Zecher, R.J. (1979) Monetary Policy and Balance of Payment in Mexico, 1955-75, *Journal of Money, Credit and Banking*, 11, 340-348.
- Winters, L.A. (1985) *International Economics (3ed)*, George Allen and Unwin Ltd: London.
- Zecher, R. (1976) Monetary Equilibrium and International Reserve Flows in Australia, *The Monetary Approach to Balance of Payments*, in Frenkel, J.A. and Johnson, H.G. (eds), University of Toronto Press: Toronto.