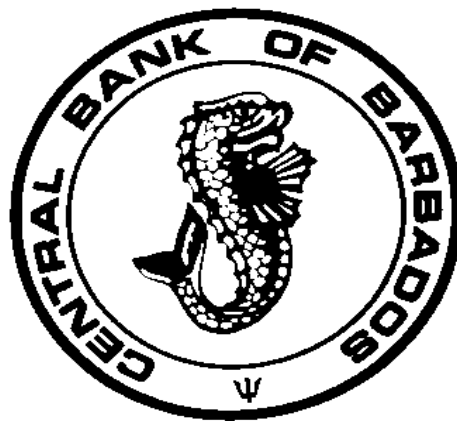


The authors would welcome any comments on this paper. Citations should refer to a Central Bank of Barbados Working Paper. The views expressed are those of the author(s) and do not necessarily represent those of the Central Bank of Barbados

**PROSPERITY AND THE EXCHANGE RATE REGIME IN  
SMALL OPEN ECONOMIES**

BY

**WINSTON MOORE, JAMILA BECKLES AND  
DELISLE WORRELL**



**CENTRAL BANK OF BARBADOS**

April 6, 2016

# Prosperity and the Exchange Rate Regime in Small Open Economies

Winston Moore<sup>\*</sup>, Jamila Beckles<sup>\*\*</sup> and DeLisle Worrell<sup>\*\*</sup>

## Abstract

This paper explores the difference in perception between economists and ordinary folk about the importance of stable exchange rates for small open economies. Small open economies everywhere are preoccupied with exchange rate stability, whereas most economists believe that exchange rates should be managed flexibly to maintain competitiveness or allowed to float freely. To most non-economists it is fairly obvious that countries with more stable exchange rates are more prosperous. Our paper finds empirical evidence in support of that view.

Keywords: small states; exchange rate regime; development; growth

Subject classification codes: F41; O2; O11; P51

---

<sup>\*</sup> Corresponding Author: W. Moore, Department of Economics, The University of the West Indies, Cave Hill Campus, Bridgetown BB11000, Barbados; Tel.: 1-246-4174279; Fax: 1-246-4389104; Email: [winston.moore@cavehill.uwi.edu](mailto:winston.moore@cavehill.uwi.edu)

<sup>\*\*</sup> The Central Bank of Barbados, Tom Adams Financial Centre, Bridgetown BB11000, Barbados

## 1 Introduction

Economists are perplexed by the universal concern in small open economies to maintain the value of their currency in terms of foreign exchange. To the classically trained economist the exchange rate is a price, and prices are best determined by supply and demand in the open market. The economics literature is replete with studies purporting to show that exchange rate flexibility makes for greater competitiveness in international markets and stimulates economic growth.<sup>1</sup> This literature is at variance with what seems apparent to informed observers, that the most prosperous small open economies are those that are able to maintain stable exchange rates. Our paper will show that this view is supported by the empirical evidence, once we adopt the most appropriate measure of prosperity and the correct definition of exchange rate stability.

Economists continue to measure economic achievement by real GDP, even though for more than two decades we have had a measure which is unquestionably more comprehensive, in the form of the Human Development Index (HDI), which is available for virtually all countries and updated annually by an agency of the United Nations. The HDI incorporates real GDP, but corrects for the fact that the purchasing power of a unit of the same currency varies widely around the world. The purchasing power parity of GDP is one element in the calculation, but in addition, the HDI incorporates indices of two other factors that are vital elements of a good quality of life, i.e. education and health. The HDI is acknowledged to be a continuous work in progress, but it is unquestionably superior to the real GDP as a measure of development. This study uses the HDI as the measure of economic prosperity.

---

<sup>1</sup> For example, (Levy-Yeyati & Sturzenegger, To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth, 2003; Obstfeld & Rogoff, 1995),

All cross-country studies of which we are aware measure the volatility of the home exchange rate in terms of the same denominator for all countries, whether that denominator is the US dollar or some composite of currencies, such as the SDR or a trade-weighted index.<sup>2</sup> However, it is clear that the exchange rate that is of concern to the Balkans and other countries in the neighbourhood of the euro area is not the US dollar (or any basket of currencies), but the euro. The second innovation in our study is the use of a reference currency for each country which represents the observed market preference. We do this by comparing volatility of domestic currency in terms of the US dollar, with volatility of domestic currency in terms of each country's dominant neighbour. Whichever appears to have the lower volatility is assumed to be the currency on which that country anchors the stability of its own currency.

It has been observed that many small states have higher standards of living, after controlling for other factors, than do larger countries. For example, Easterly and Kraay (2000) note that on average small states are 50 percent richer than their larger regional neighbours (measured in terms of GDP per capita), and have higher levels of human development. Among the explanations offered is the fact that exchange rate depreciation has limited impact on their competitiveness. Domestic production is inelastic with respect to relative price changes, because of limited natural resources and skills; cross border financial flows render exchange rates volatile (Armstrong & Read, 1998); and the high import propensity means that the pass through of depreciations to domestic inflation is strong. Exchange rate variations can also result in an unhealthy redistribution of income, as devaluation tends to benefit exporters and disadvantage the purchasers of imported goods.

---

<sup>2</sup> Examples include (Devereux & Lane, 2003; Amuedo-Dorantes & Pozo, 2004).

In the next section of the paper we infer the appropriate reference currency for each country in our sample by comparing volatilities with reference to the US dollar and the international currency that would intuitively appear to be of greatest interest to the exchange market of each country, whether that currency is the euro, Australian dollar or the South African rand, etc. We then set up our hypothesis about the relationship of the country's prosperity and the stability of its exchange rate by a graphical examination of the bivariate relationship between the HDI and the volatility of daily exchange rate changes. The third section of the paper presents the results of our cross-country analysis of the importance of exchange rate stability for the development of the economy, when we take account of some control variables that would have affected the outcomes.

## **2 The Exchange Rate and the HDI**

Our paper utilises Moore, Beckles, and Worrell's (2015) list of small open economies<sup>3</sup> defined by population, size of GDP and the extent of their export diversification, the last being an important structural characteristic of small economies which is often neglected.<sup>4</sup> Data for each country's HDI and daily exchange rates were sourced from the UNDP and Bloomberg respectively. Figures 1 – 5 illustrate the comparisons that were made for each country, to determine what seems to be the correct international reference currency on which that country anchors its exchange rate. Figure 1 shows the picture for the typical European country, in this case Luxembourg, up to the date at which the country joined the euro. As may be readily seen, the volatility in terms of the deutsche mark was much lower

---

<sup>3</sup> With the exception of Sao Tome and Principe, for which data could not be found.

<sup>4</sup> By our definition, Singapore is excluded, because of the size of its GDP.

than for the US dollar, a reflection of the fact that the German currency was the anchor for the stability of the domestic currency. It turns out that the euro is the only international currency anchor, apart from the US dollar. In Figures 2-5 we examined the volatility comparisons of the currencies of our sample in relation to the Australian dollar, the Indian rupee, the South African rand and the Saudi Arabian riyal, for a typical country in each case. Contrary to our expectations, typically these charts confirmed the standard assumption, that volatility of the domestic currency is assessed against the US dollar by agents in the domestic currency markets. Figure 6 summarises these results, for all the countries included in our sample. In the case of European countries, the volatility in terms of the US dollar is higher, except for Montenegro, which has high volatility by both measures. However, in all other cases, volatility in terms of the US dollar is lower.

We infer from these observations that the US dollar is indeed the reference currency for all countries except those in the neighbourhood of the euro area. In what follows, we compare HDI performance against volatility, with volatility measured in terms of the revealed reference currency, i.e. the euro in terms of European countries and the US for all others. In order to illustrate that this serves to uncover the expected relationship between the HDI and exchange rate volatility, in Figures 7-10 we compare the relationship as it appears when using the appropriate reference currency (Figures 8 and 10) with the picture as it appears when the US dollar is used for all countries.<sup>5</sup> As may be seen, there appears to be the expected negative relationship – higher exchange rate volatility associated with lower HDI performance – even though it is weak. However, that relationship is apparent only when the

---

<sup>5</sup> The difference between Figures 7 and 8 on the one hand, and Figures 9 and 10 is the time period over which we have observations, and therefore the number of countries included. We have fewer countries' data for the longer period.

appropriate reference currency is used (Figures 8 and 10); if the US dollar (rather than the euro) is used to measure the volatility of European currencies the relationship is essentially imperceptible (Figures 7 and 9).

Figure 1: Euro as the reference currency

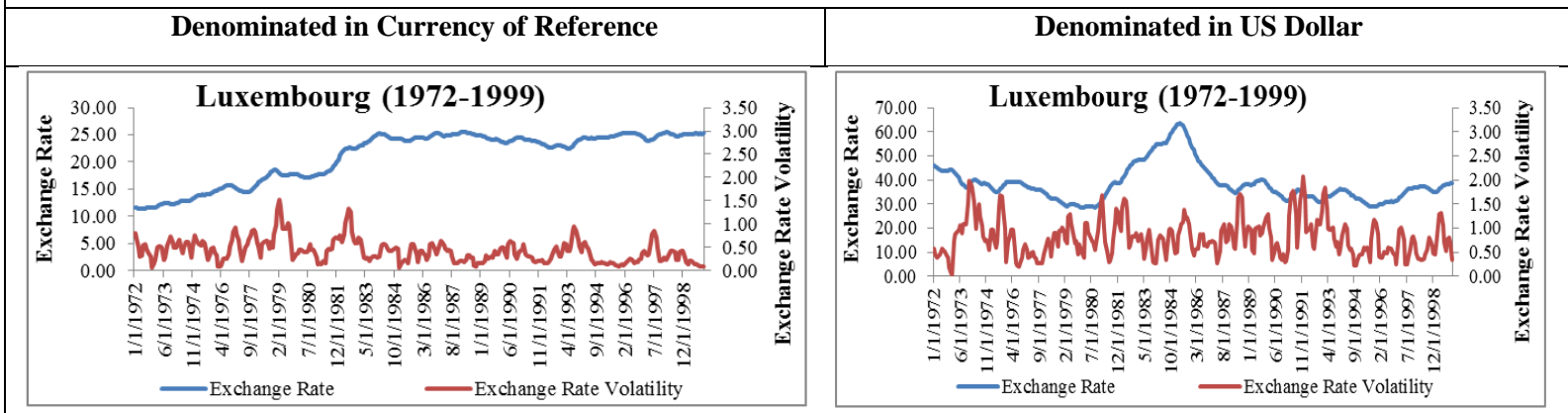


Figure 2: Australian dollar as the reference currency

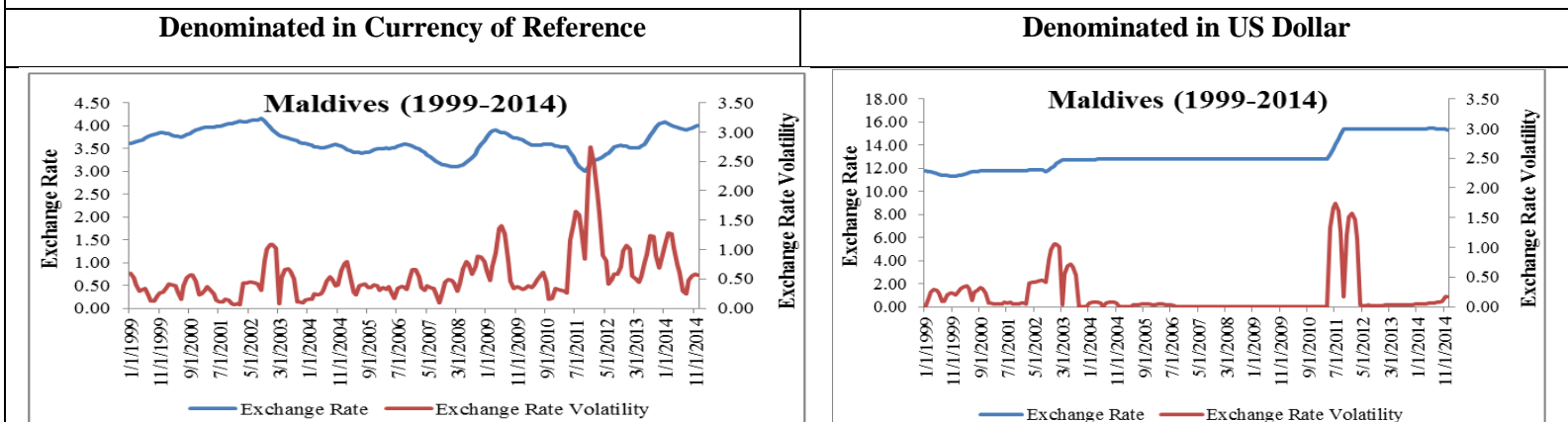


Figure 3: Rupee as the reference currency

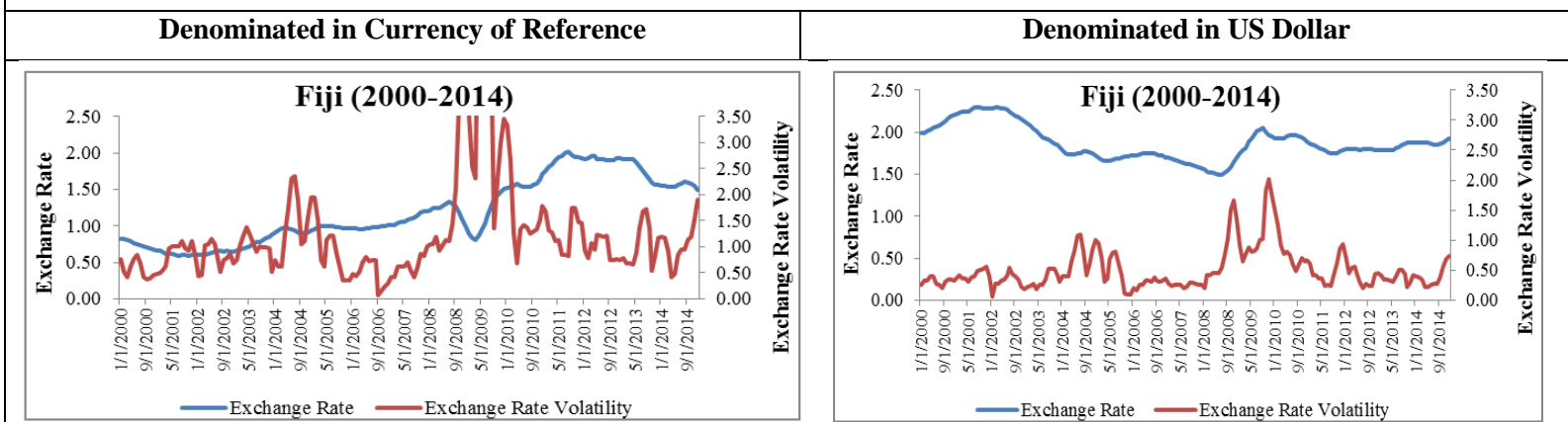


Figure 4: South African Rand as the reference currency

Denominated in Currency of Reference

Denominated in US Dollar

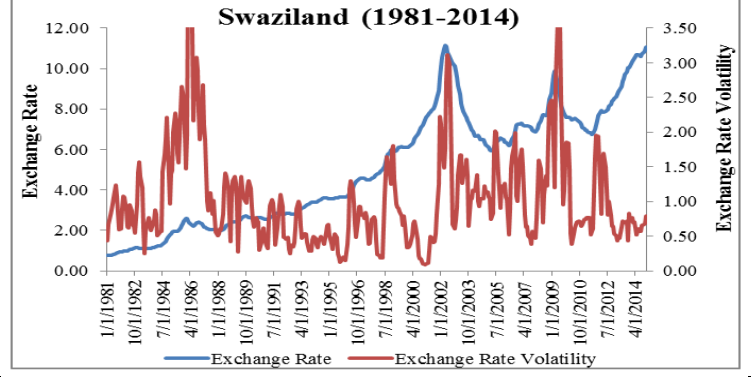
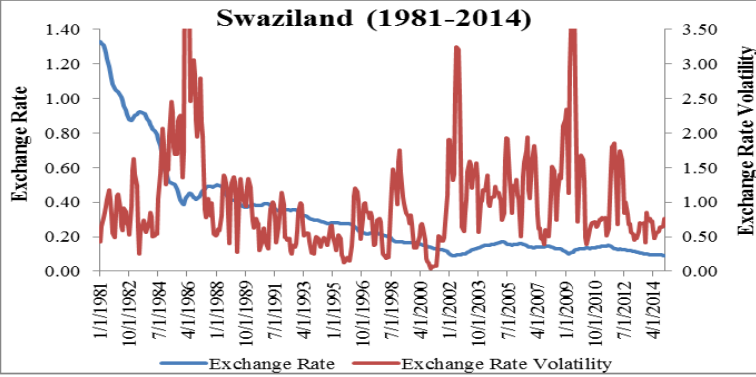


Figure 5: Saudi Arabia Riyal as the reference currency

Denominated in Currency of Reference

Denominated in US Dollar

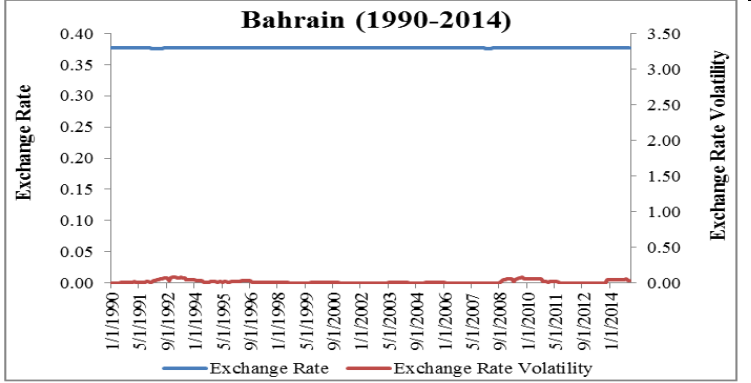
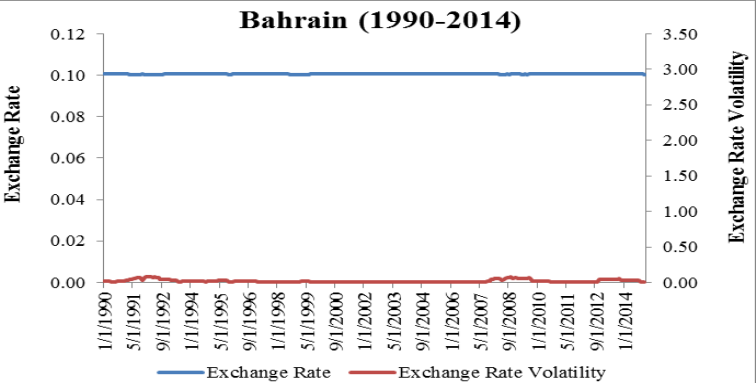




Figure 6: Countries Denominated in the Euro, Australian Dollar, Indian Rupee, South African Rand and Saudi Arabia Riyal

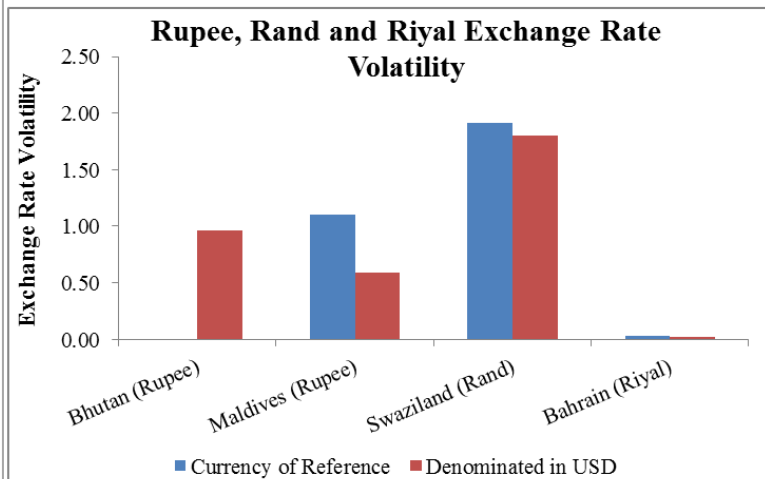
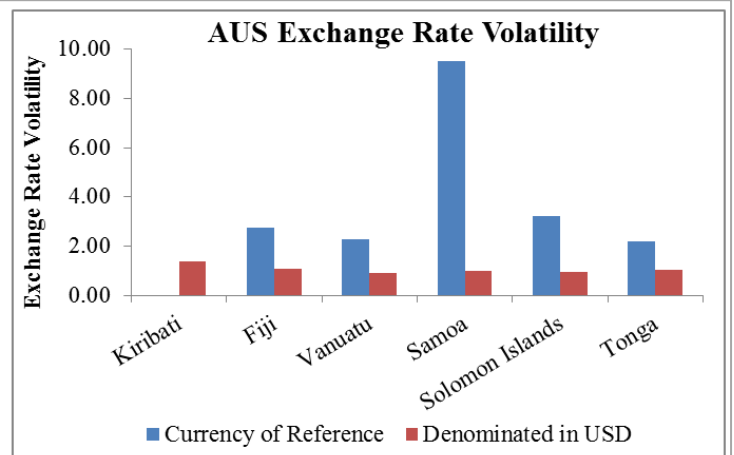
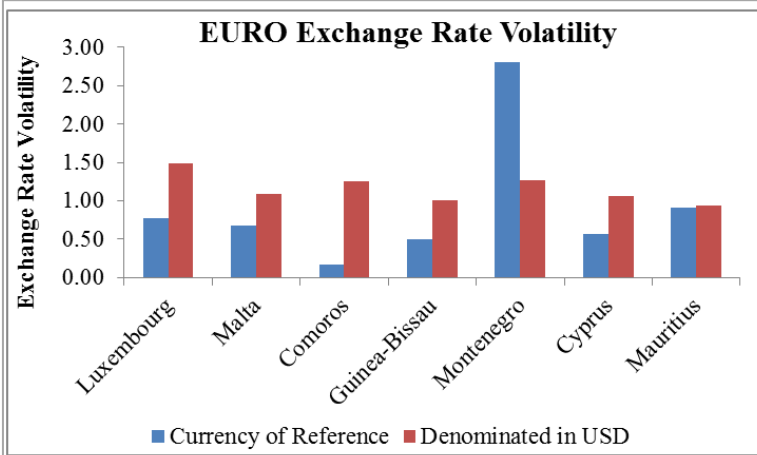


Figure 7: Countries Denominated in USD

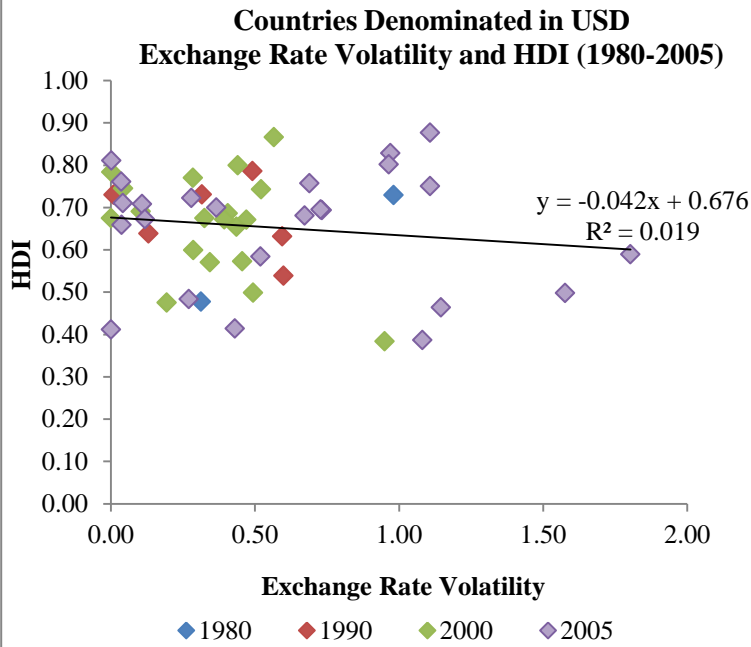


Figure 8: Countries Denominated in Currency of Reference

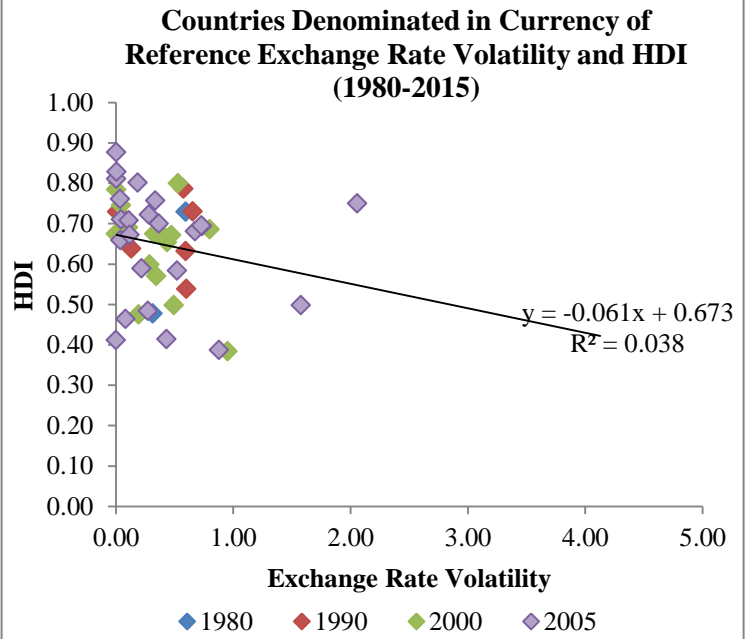


Figure 9: Countries Denominated in USD

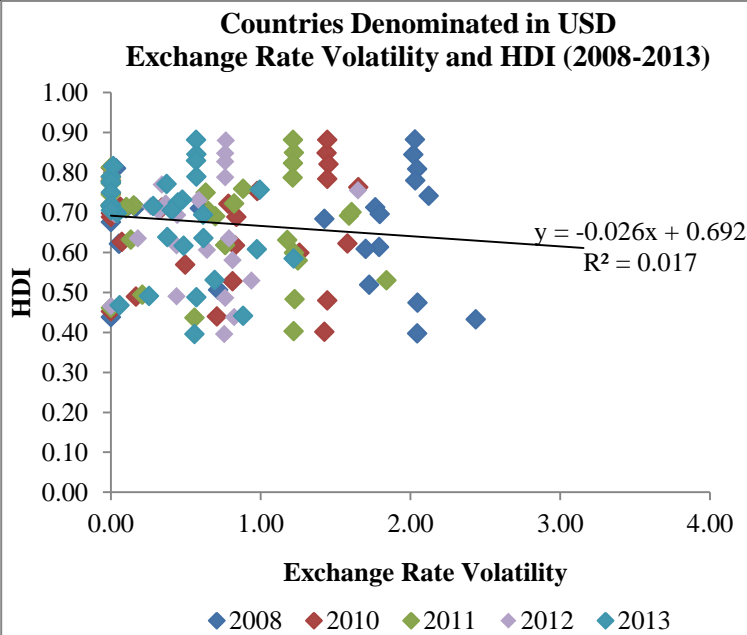
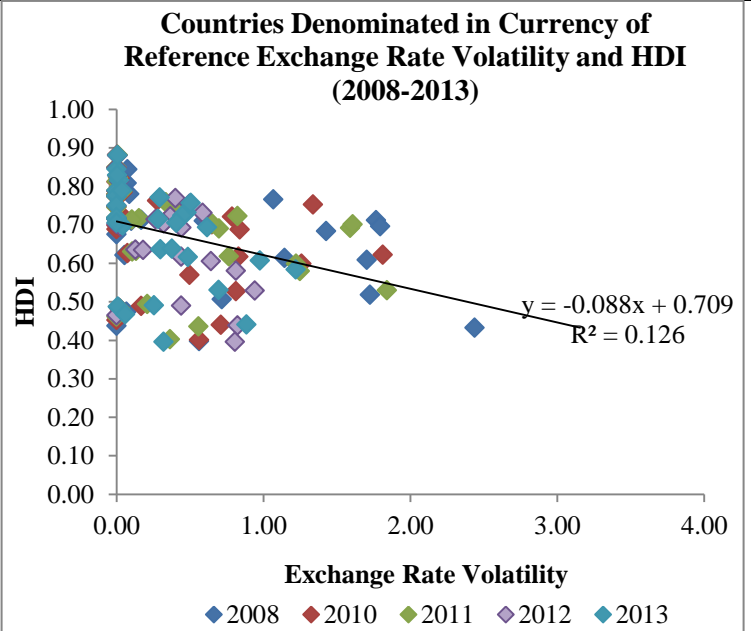


Figure 10: Countries Denominated in Currency of Reference



### 3 An empirical test of the relationship between exchange rate volatility and the HDI

Our test is of the following relationship:

$$HDI_{it} = \alpha_i + \theta ERVOL_{it} + \mu_{it} \quad (1)$$

where  $HDI$  is the value of the Human Development Index for country  $i$ ,  $ERVOL$  is the volatility of daily exchange rate changes,  $\alpha_i$  are the country-specific effects and  $\mu$  is an error term observed for each country  $i$  and each time period  $t$ . The value of  $\theta$  is expected to be negative. We can be a bit more specific about the factors subsumed in the  $\alpha_i$ , based on variables that are commonly used in studies of the determinants of growth in the cross-country growth literature (Sala-i-Martin, 1997). Formally,

$$HDI_{it} = \alpha_i + \theta ERVOL_{it} + \gamma X_{it} + \mu_{it} \quad (2)$$

Where the  $\gamma$  are vectors of parameter estimates on the matrix of control variables,  $X$ , that includes inflation (a proxy for economic uncertainty), school enrolment (a proxy for human capital) and trade intensity, measured as the ratio of total external trade to GDP.

The control variables are chosen on the basis of the established literature on the determinants of economic growth. Inflation affects growth by distorting the allocative efficiency of the price mechanism and reducing investment (Fountas, Karanasos, & Kim, 2006). Human capital enhances the productivity of the labour force, facilitating the implementation of new technologies (Benhabib & Spiegel, 1994). The impact of trade intensity on human development is ambiguous: while it may be argued that trade increases long-run per capita income and human development, it is also true that trade increases external vulnerability and may slow overall development (Davies and Quinlivan (2006)).

The results are provided in the Table 1 below. Four regression model specifications are provided, first a bivariate regression with the HDI and exchange rate volatility and then regressions which add the control variables, one at a time. The augmented models are an improvement on the bivariate model, which has no explanatory power, as indicated by the *R-squared* value. The augmented models explain about a quarter of the overall variation in the HDI, which is a marked improvement, but still suggests that we are missing most of the determinants of the difference between countries in terms of what affects their HDI achievements. The results also suggest that the trade variable adds nothing to the explanation. Bearing these qualifications in mind, the results of Equation (3), our best by a narrow margin, bear out our expectation that smaller states that have maintained relatively stable exchange rates, relative to the currency of reference used by domestic financial agents, have experienced better outcomes in terms of human development.

*Table 1: Regression Results using Currency of Reference*

	(1) HDI	(2) HDI	(3) HDI	(4) HDI
ExchangeRa~R	<b>-0.007</b> (0.004)	<b>-0.003</b> (0.002)	<b>-0.003**</b> (0.001)	<b>-0.002*</b> (0.001)
Schoolenro~g		<b>0.002***</b> (0.001)	<b>0.002***</b> (0.001)	<b>0.002***</b> (0.000)
Inflationc~a			<b>0.001</b> (0.001)	<b>0.002</b> (0.001)
Merchandis~P				<b>-0.000**</b> (0.000)
_cons	<b>0.675***</b> (0.001)	<b>0.506***</b> (0.042)	<b>0.495***</b> (0.045)	<b>0.590***</b> (0.033)
N	<b>201</b>	<b>138</b>	<b>136</b>	<b>135</b>
R-sq	<b>0.011</b>	<b>0.243</b>	<b>0.275</b>	<b>0.231</b>
Standard errors in parentheses				
* p<0.05, ** p<0.01, *** p<0.001				

Our finding explains away the apparent paradox in exchange rate management in small economies. Orthodox views, such as found in Levy-Yeyati et al. (2003), for example, are that exchange rate anchors are costly in terms of growth and output volatility.<sup>6</sup> It then becomes challenging, from an orthodox perspective, to explain the universal preoccupation with exchange rate stability among small open economies. Orthodox views have come around to accepting that there are reasons for open economies to care about the exchange rate, because of the potentially adverse effects of exchange rate volatility on financial flows and financial stability risks, but they believe that this presents these economies with a dilemma, between the beneficial financial effects of stable exchange rates and the growth effects of exchange rate flexibility.<sup>7</sup> Our paper gives support to the heterodox view that the presumed growth effects of flexible exchange rates are illusory, and there is therefore no merit to exchange rate flexibility in small open economies, and no inherent dilemma in maintaining an exchange rate anchor or other managed exchange rate strategy.

In order to demonstrate the importance of using the reference currency which best reflects the preferences in each country's currency market, we compared the results in Table 1 with those in **Error! Reference source not found.**, which reports on regressions using US dollar values as the standard for measuring exchange rate volatility for all countries. This table shows that the wrong choice of an international currency against which to measure

---

<sup>6</sup> The Levy-Yeyati et al. (2003) paper uses real GDP growth rather than the HDI as the dependent variable. In the interests of closer comparability with orthodox views, we tested the relationship between exchange rate volatility and growth in per capita GDP. The findings are presented in the appendix. The results indicate that there is a negative relationship between growth and volatility, consistent with our thesis and in contrast to the orthodox view, even when the less appropriate development variable is used, so long as the reference currency is correctly chosen, and control variables are included in the regression.

<sup>7</sup> These views are succinctly expressed in Blanchard, Olivier, Giovanni Dell'Ariccia, and Paolo Mauro, "Rethinking Macroeconomic Policy," IMF Staff Position Note, 2010, [www.imf.org](http://www.imf.org)

exchange rate volatility is at the root of the orthodox misperception of the relationship between exchange rate variability and economic growth. What is in fact a negative relationship, as seen in Table 1, appears to be positive in Table 2 (even though the coefficient is statistically insignificant), entirely because the US dollar rather than the euro is inappropriately chosen as the currency of reference for European countries.

*Table 2: Regression Results using US Dollar as the Currency of Reference*

	(1) HDI	(2) HDI	(3) HDI	(4) HDI
ExchangeRa~S	<b>-0.005</b> (0.005)	<b>0.005</b> (0.005)	<b>0.005</b> (0.005)	<b>0.005</b> (0.005)
Schoolenro~g		<b>0.003***</b> (0.000)	<b>0.003***</b> (0.000)	<b>0.003***</b> (0.001)
Inflationc~a			<b>-0.000</b> (0.001)	<b>-0.000</b> (0.001)
Merchandis~P				<b>-0.000</b> (0.000)
_cons	<b>0.656***</b> (0.003)	<b>0.407***</b> (0.031)	<b>0.409***</b> (0.036)	<b>0.423***</b> (0.079)
N	<b>181</b>	<b>119</b>	<b>117</b>	<b>116</b>
R-sq	<b>0.005</b>	<b>0.481</b>	<b>0.483</b>	<b>0.444</b>
Standard errors in parentheses * p<0.05, ** p<0.01, *** p<0.001				

#### 4 Conclusions

This paper presents empirical evidence in support of the popular notion that stable exchange rates in small open economies are unambiguously a good thing, because stable exchange rates produce better growth outcomes, as well as promoting financial stability and reducing financial risks. This evidence corrects the orthodox economic thesis that there is a

competitive benefit to exchange rate flexibility, irrespective of the size and openness of the economy, and that targeting the exchange rate therefore involves a sacrifice of potential growth. The apparent support for the orthodox view which is found in the literature is an illusion, created by a misperception of the measure of exchange rate volatility that matters for small European countries. Market agents in those countries measure their currency's volatility in terms of the euro, not the US dollar. Once this correction is made, we uncover the underlying negative relationship between exchange rate volatility and economic development.

## References

- Aghion, P., Bacchetta, P., Ranciere, R., & Rogoff, K. (2009). Exchange Rate Volatility and Productivity Growth: The Role of Financial Development. *Journal of Monetary Economics*, 56(4), 494-513.
- Aizenman, J. (2005). Pegged Exchange Rate Regimes - A Trap? *Federal Reserve Bank of San Francisco, Working Paper Series*.
- Amuedo-Dorantes, C., & Pozo, S. (2004). Workers' Remittances and the Real Exchange Rate: A Paradox of Gifts. *World Development*, 32(8), 1407-1417.
- Archer, C., & Nugent, N. (2002). Introduction: Small States and the European Union. *Current Politics and Economics of the European Union*, 11, 1-10.
- Armstrong, H., & Read, R. (1998). Trade and Growth in Small States: The Impact of Global Trade Liberalisation. *World Economy*, 21(4), 563-585.
- Armstrong, H., & Read, R. (2002). The Phantom of Liberty? Economic Growth and the Vulnerability of Small States. *Journal of International Development*, 14(4), 435-458.
- Backus, D., Kehoe, P., & Kehoe, T. (1992). In Search of Scale Effects in Trade and Growth. *Journal of Economic Theory*, 58(2), 377-409.
- Bambra, C. (2007). Defamilisation and Welfare State Regimes: A Cluster Analysis. *International Journal of Social Welfare*, 16(4), 326-338.
- Benhabib, J., & Spiegel, M. (1994). The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data. *Journal of Monetary Economics*, 34(2), 143-173.
- Berlage, L., & Terweduwe, D. (1988). The Classification of Countries by Cluster and by Factor Analysis. *World Development*, 16(12), 1527-1545.



- Chase, V. e. (2014). *Caribbean Forum: Shaping a Sustainable Development Agenda to Address the Caribbean Reality in the Twenty-First Century*. Santiago: Economic Commission for Latin America and the Caribbean.
- Commonwealth Secretariat. (1985). *Vulnerability: Small States in the Global Society*. Commonwealth Consultative Group. London: Commonwealth Secretariat.
- Commonwealth Secretariat. (1997). *A Future for Small States: Overcoming Vulnerability*. Commonwealth Advisory Group. London: Commonwealth Secretariat.
- Davies, A., & Quinlivan, G. (2006). A Panel Data Analysis of the Impact of Trade on Human Development. *Journal of Socio-Economics*, 35(5), 868-876.
- De Gregorio, J., & Guidotti, P. (1995). Financial Development and Economic Growth. *World Development*, 23(3), 433-448.
- Devereux, M., & Lane, P. (2003). Understanding Bilateral Exchange Rate Volatility. *Journal of International Economics*, 60(1), 109-132.
- Dowrick. (1996). Estimating the Impact of Government Consumption on Growth: Growth Accounting and Endogenous Growth Models. *Empirical Economics*, 21(1), 163-186.
- Easterly, W., & Kraay, A. (2000). Small States, Small Problems? Income, Growth, and Volatility in Small States. *World Development*, 28(11), 2013-2027.
- Fountas, S., Karanasos, M., & Kim, J. (2006). Inflation Uncertainty, Output Growth Uncertainty and Macroeconomic Performance. *Oxford Bulletin of Economics and Statistics*, 68(3), 319-343.
- Hagerty, M., & Veenhoven, R. (2003). Wealth and Happiness Revisited - Growing National Income Does Go with Greater Happiness. *Social Indicators Research*, 64(1), 1-27.

- Iqbal, N., & Nawaz, S. (2009). Investment, Inflation and Economic Growth Nexus. *The Pakistan Development Review*, 48(4), 863-874.
- Levy-Yeyati, E., & Sturzenegger, F. (2003). To Float or to Fix. *American Economic Review*, 1173-1193.
- Levy-Yeyati, E., & Sturzenegger, F. (2003). To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth. *American Economic Review*, 93(4), 1173-1193.
- Levy-Yeyati, E., & Sturzenegger, F. (2003). To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth. *American Economic Review*, 93(4), 1173-1193.
- Meissner, C. M., & Oomes, N. (2008). Why Do Countries Peg the Way They Peg? The Determinants of Anchor Currency Choice. *IMF Working Paper*.
- Moore, W., & Walkes, C. (2010). Does Industrial Concentration Impact on the Relationship between Policies and Volatility? *International Review of Applied Economics*, 24(2), 179-202.
- Moore, W., & Walkes, C. (2010). Does Industrial Concentration Impact on the Relationship between Policies and Volatility? *International Review of Applied Economics*, 24(2), 179-202.
- Moore, W., Beckles, J., & Worrell, D. (2015). Size, Structure and Devaluation. *Central Bank of Barbados Working Paper*.
- Noorbakhsh, F., Paloni, A., & Youssef, A. (2001). Human Capital and FDI Inflows to Developing Countries. *World Development*, 29(9), 1593-1610.
- Obstfeld, M., & Rogoff, K. (1995). The Mirage of Fixed Exchange Rates. *Journal of Economic Perspectives*, 9(4), 73-96.

- Osberg, L., & Sharpe, A. (2002). An Index of Economic Well-Being for Selected OECD Countries. *Review of Income and Wealth*, 48(3), 291-316.
- Pelling, M., & Uitto, J. (2001). Small Island Developing States: Natural Disaster Vulnerability and Global Change. *Global Environmental Change Part B: Environmental Hazards*, 3(2), 49-62.
- Reinhart, C. M., & Rogoff, K. S. (2002). The Modern History of Exchange Rate Arrangements: A Reinterpretation. *The National Bureau of Economic Research*(8663).
- Reinhart, C., & Rogoff, K. (2004). The Modern History of Exchange Rate Arrangements: A Reinterpretation. *Quarterly Journal of Economics*, 119(1), 1-48.
- Sala-i-Martin, X. (1997). I Just Ran Two Million Regressions. *American Economic Review*, 87(2), 178-183.
- Shambaugh, J. (2003). The Effect of Fixed Exchange Rates on Monetary Policy. *Quarterly Journal of Economics*, 119, 301-352.
- Shambaugh, J. C. (2003). The Effect of Fixed Exchange Rates on Monetary Policy. *Quarterly Journal of Economics* .
- Shiller, R. (1997). Why Do People Dislike Inflation? In C. Romer, & D. Romer, *Reducing Inflation: Motivation and Strategy* (pp. 13-70). Chicago: University of Chicago Press.
- Tanzi, V., & Zee, H. (1997). Fiscal Policy and Long-Run Growth. *IMF Staff Papers*, 44(2), 179-209.