Exchange Rate movements, stock prices and volatility in the Caribbean and Latin America

Andre Haughton
Department of Economics
University of the West Indies

Dornbusch and Fisher (1980) is the ‘flow oriented’ model

Exchange rates → Stock prices

Examine the balance of trade between countries.

Theoretically, exchange rate fluctuations influence the output hence competiveness of firms.

If firms are more competitive this has a direct positive effect on its stock prices; since stock prices represents future cash flow streaming for a company

The ‘stock oriented’ model of exchange rate proposed by Frankel (1983) and Branson (1993),

- Stock Market $\Rightarrow$ Exchange Rate
- Via the liquidity and the wealth effects.
- A decrease in stock prices reduces the wealth of investors, which lowers their demand for money; banks react by lowering interest rates which dampens capital inflows, reducing the demand for local currency which increases the exchange rate.

Portfolio Balancing Effect,

- Since domestic and foreign assets are not perfect substitutes,
- Investors adjust their portfolio ratio of domestic to foreign assets in response to changes in economic conditions, the exchange rate responds accordingly.
- Evidence of either theory is not uniform across countries as various studies employing a range of techniques revealed varying results. Most of these studies have focused on North America, Europe, Asia, and Latin America to a lesser extent but none have investigated the issue in the Caribbean.

Objective

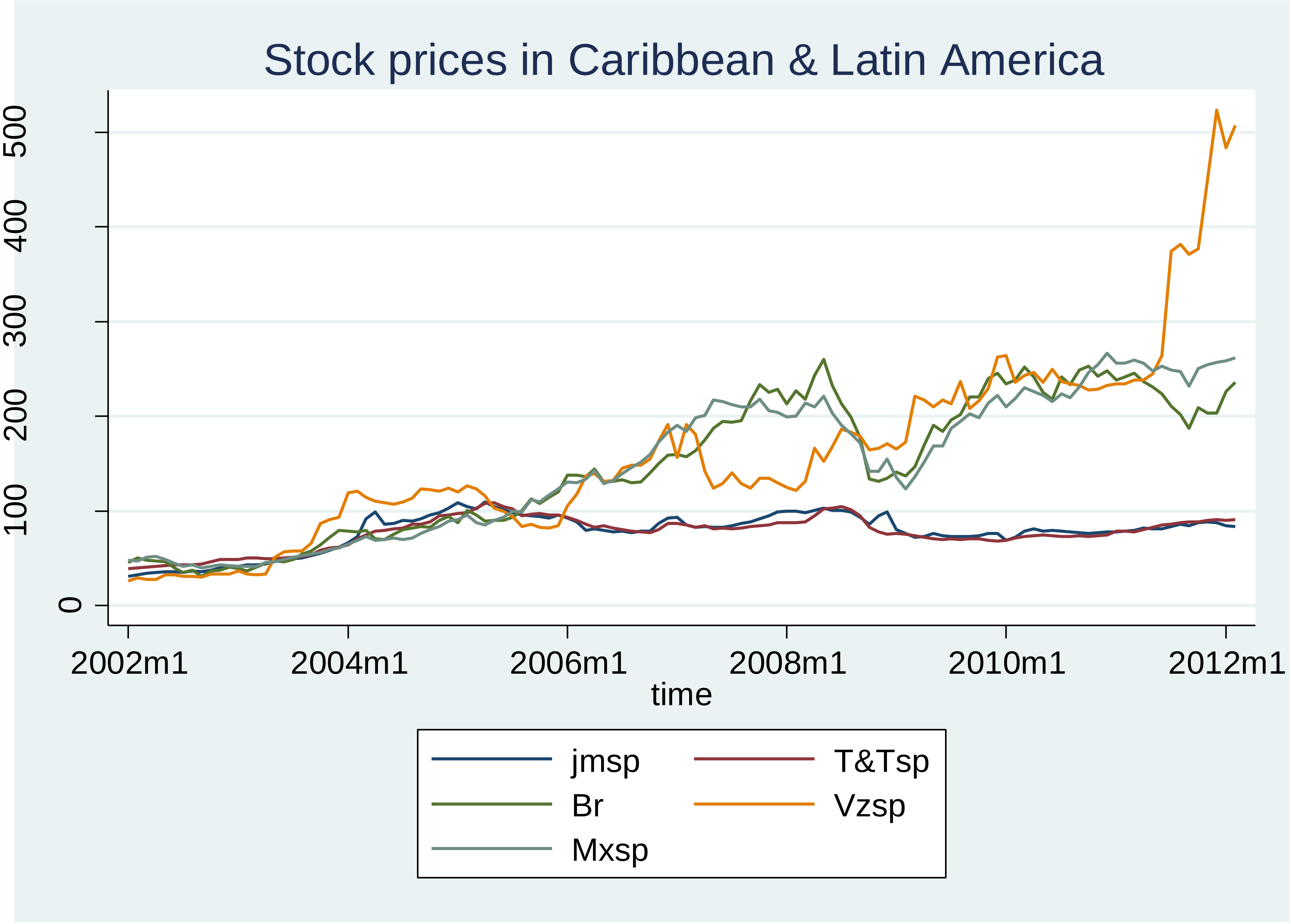
- We analyse the interrelationship between stock prices and exchange rates in the only two Caribbean countries with stock market and floating exchange rates: Jamaica and Trinidad and Tobago in the period 2002-2012.
- We also study the same four Latin American countries as in Diamandis and Drakos (2011): Argentina, Brazil, Chile and Mexico.
- Using the Autoregressive Distributed Lag (ARDL) model bounds test approach proposed by Pesaran et al (2001), Following Lin (2012), who examined the same issue in six Asian emerging markets

Crisis Period

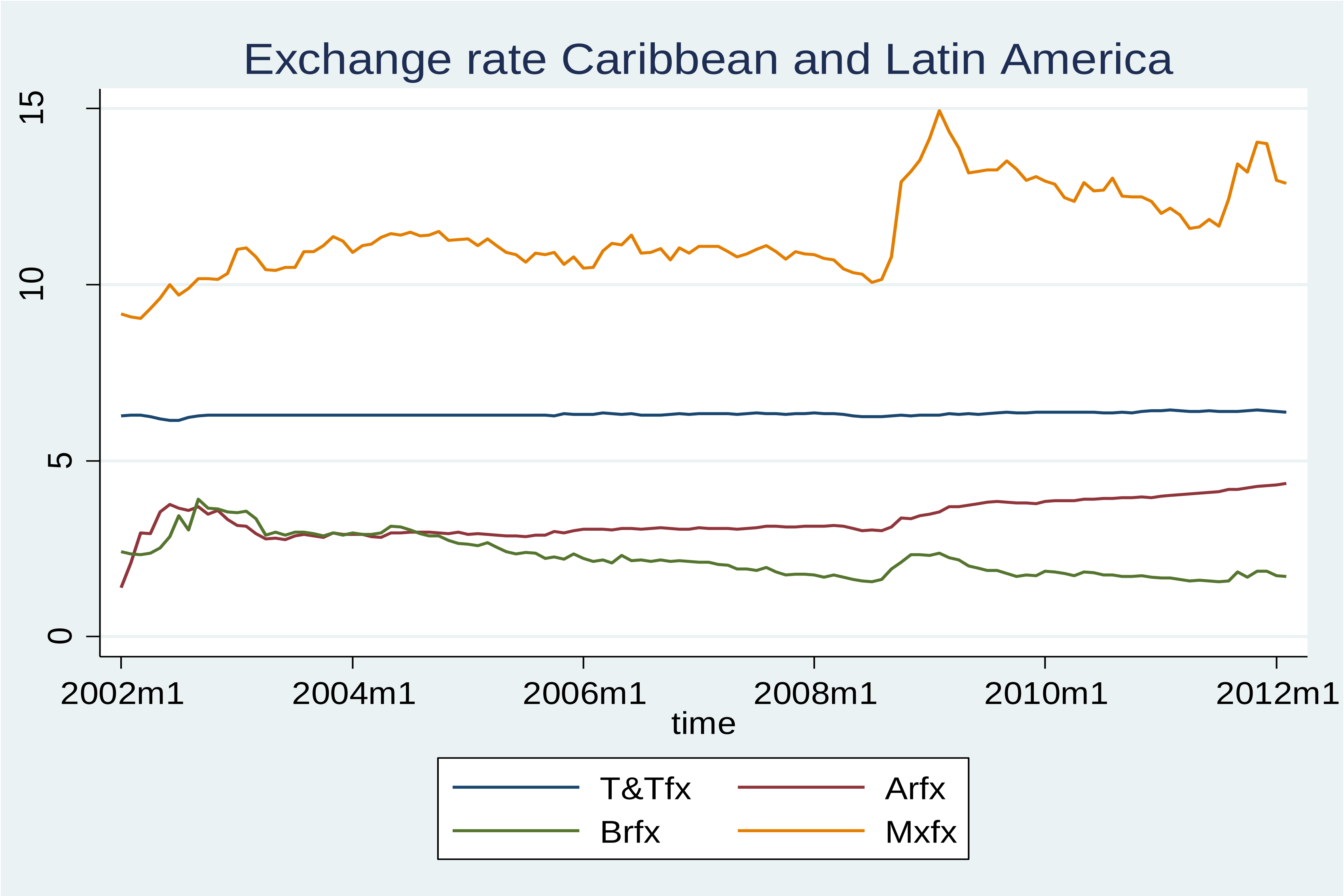
- hypothesized that the relationship between exchange rate and stock prices have a tendency to be greater during crisis periods as returns in asset markets are lower and volatility are higher; see Lin (2012) and Gau, Chen and Huang (2012).
- We wish to investigate if there is any evidence to support this in the Caribbean and Latin America.

Possible Structural break

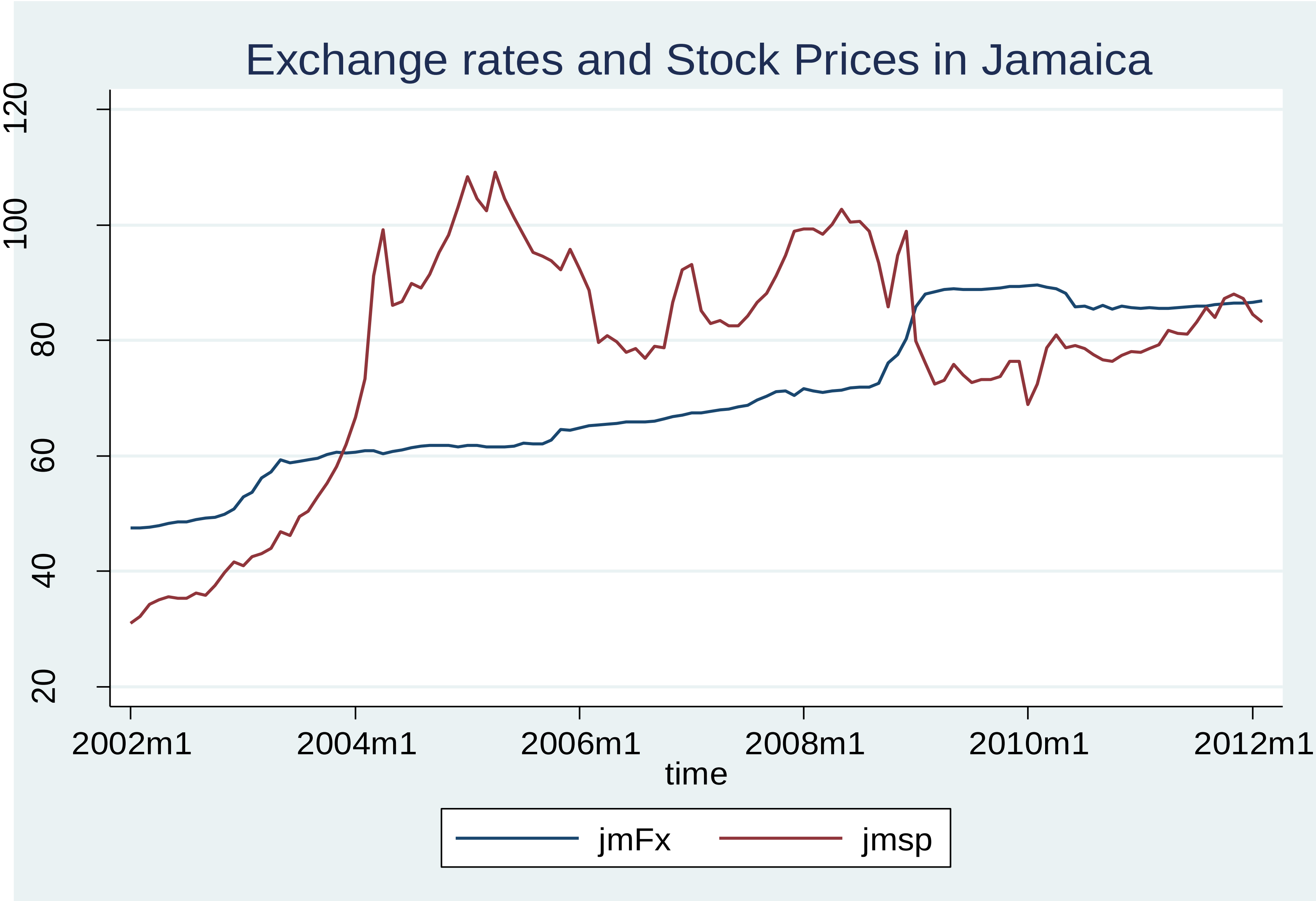
- Like Asia, North America and Europe, the Global Financial Crisis in 2008 resulted in an immediate decline in the stock prices in the Caribbean and Latin American Countries; see figure 1 below. Notice the behaviour is similar for the countries in each group; stock prices in Latin America tend to be higher, corresponding to the larger economies than the Caribbean.



Stock prices in Caribbean & Latin America
0
100
200
300
400
500
2002m1
2004m1
2006m1
2008m1
2010m1
2012m1
time
jmsp
T&Tsp
Br
Vzsp
Mxsp



Exchange rate Caribbean and Latin America
0
5
10
15
2002m1
2004m1
2006m1
2008m1
2010m1
2012m1
time
T&Tfx
Arfx
Brfx
Mxfx


Exchange rates and Stock Prices in Jamaica
120
100
80
60
40
20
2002m1
2004m1
2006m1
2008m1
2010m1
2012m1
time
jmFx
jmsp

Literature Review

- In Latin America, Diamandis and Drakos (2011),
- Argentina, Brazil, Chile, and Mexico
- Cointegration techniques and Granger causality tests.
- They found no significant long run relationship between stock process and exchange rate for each country.
- However, after incorporating US stock market, the results show that stock prices and exchange rates has long run interaction , with the US stock market facilitation the transmission between the two in these countries.

Neih and Lee (2001)

- examine the dynamic relationship between stock prices and exchange rates for the G7 countries
- cointegration tests and Vector Error correction models from 1993 to 1996.
- their findings suggest that there is no long run relationship between stock prices and exchange rate in the G7 counties.

Vygodina (2006)

- Granger causality test
- investigate the relationship between stock prices and exchange rate controlling for the size of the firm from 1987 to 2005.
- Their results found causality from large stock prices to US exchange rate but
- no causality from small stock prices.
- The results from the subsamples show that there might be evidence to support the claim that level of causality between the two variables is changing overtime

Zhao (2010)

- examine the dynamic effects between exchange rate and stock prices in China
- Vector Autoregressive approach (VAR) and multivariate generalised Autocorrelation conditional heteroskedasticity (GARCH).
- Their results show that there is no definite long run relationship between the Chinese Renminbi (RMB) real effective exchange rate and stock prices in china.

Chien-Hsiu Lin (2012)

- Asia's emerging markets from 1986 to 2010. Using monthly data,
- ARDL Auto regressive distributed lag model proposed by Persaran et al (2001) was employed.
- This method is designed to account for structural breaks and data that are integrated of different orders.
- The results from the cointegration tests as well as the short run causality tests indicate that the co-movement between exchange rate and stock prices increases during times of economic crisis and reduces when the economies are stable.
- The results also show that most spillovers are in the channel from stock price shocks to exchange rates. (stock oriented model)
- In theory, economic slowdown reduces the value of companies stocks causing investors to withdraw their capital which reduces the demand for the domestic currency and put downward pressure on the exchange rate.

Data

- Monthly data from 2002:01 to 2012:02 from the International Monetary fund (IMF) International Financial Statistics (IFS).
- Share Price Index (sp),
- The exchange rate relative to the US dollar (fx),
- The money Market Rate (mm) and
- Foreign Reserves minus gold (r)

All data are transformed into log form.

- First we analyse the data across the full time period then we split the data into two parts;
- The first sub sample from 2002:01 to 2008:08 the so called tranquil period where the asset bubble was developing,
- The second sub sample from 2008:09 to 2012:02 the period crisis period and after.

	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	mean	***Std dev***	***mean***	***Std dev***	***mean***	***Std dev***
Stock prices						
Jamaica	0.151	0.048	-0.004	0.049	0.008	0.049
Trinidad and Tobago	0.012	0.031	-00.1	0.031	0.007	0.032
Argentina	0.019	0.071	0.013	0.093	0.016	0.079
Brazil	0.019	0.072	0.007	0.074	0.136	0.073
Chile	-0.126	0.171	-0.134	0.123	-0.134	0.123
Mexico	0.017	0.049	0.010	0.063	0.014	0.054
Exchange rate						
Jamaica	0.005	0.009	0.004	0.015	0.005	0.012
Trinidad and Tobago	-0.000	0.003	0.000	0.003	0.000	0.003
Argentina	0.009	0.066	0.008	0.014	0.009	0.054
Brazil	-0.005	0.055	-0.003	0.047	-0.002	0.542
Chile	-0.063	0.081	-0.069	0.185	-0.069	0.185
Mexico	0.001	0.020	0.004	0.042	0.003	0.030
Interest Rate						
Jamaica	-0.007	0.242	-0.056	2.370	-0.007	0.222
Trinidad and Tobago	0.012	0.171	-0.169	0.409	-0.049	0.287
Argentina	-0.384	8.614	0.006	0.921	-.244	6.928
Brazil	-0.078	0.678	-0.073	0.375	-0.071	0.590
Chile	-0.989	0.489	-2.590	0.579	-2.590	0.680
Mexico	0.007	0.549	-0.094	0.234	-0.026	0.465
Foreign Reserves						
Jamaica	0.003	0.059	-0.003	0.075	0.000	0.064
Trinidad and Tobago	0.019	0.047	0.004	0.025	0.014	0.041
Argentina	0.015	0.062	0.001	0.019	0.009	0.054
Brazil	0.022	0.059	0.013	0.019	0.189	0.049
Chile	-0.166	0.131	-0.069	0.101	-0.165	0.131
Mexico	0.009	0.022	0.010	0.037	0.009	0.027

Methodology

- **Unit Root Tests**
- Zivot ad Andrews (1992)
- **Model A**
- $$y_t = \varphi + \beta t + \tau DU_t(\lambda) + \alpha y_{t-1} + \sum_{i=1}^{k} c_t \Delta y_{t-i} + \varepsilon_t \qquad (1)$$
- **Model B**
- $$y_t = \varphi + \beta t + \vartheta DT_t(\lambda) + \alpha y_{t-1} + \sum_{i=1}^{k} c_t \Delta y_{t-i} + \varepsilon_t \qquad (2)$$
- **Model C**
- $$y_t = \varphi + \beta t + \tau DU_t(\lambda) + \vartheta DT_t(\lambda) + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + \varepsilon_t \qquad (3)$$

Clemente, Montanes and Reyes (1998)

- Additive Outliers

$$y_t = \varphi + d_1 DU_{1t} + d_2 DU_{2t} + \tilde{y}$$

- Where

$$\tilde{y} = \sum_{j=0}^{k} \tau_{1t} DT_{B1t-i} + \sum_{i=0}^{k} \tau_{2t} DT_{B2t-i} + \alpha \tilde{y}_{t-1} + \sum_{i=1}^{k} \theta \Delta \tilde{y}_{t-i} + \varepsilon_t$$

- Innovative outliers

$$y_t = \varphi + d_1 DU_{1t} + d_2 DU_{2t} + \delta_1 DT_{B1t} + \delta_2 DT_{B2t} + \sum_{i=1}^{k} c_t \Delta y_{t-i} + \varepsilon_t$$

	Jamaica	Trinidad & Tobago	Argentina	Brazil	Chile	Mexico
Unit root test with no structural breaks						
Stock Prices	-3.282	-2.447	-2.602	-2.167	-2.634	-1.634
Exchange Rates	-2.640	-3.781	-5.110*	-4.452*	-2.686	-3.637*
Interest rates	-3.076	-0.994	-4.386*	-4.484*	-3.315	-2.776
foreign reserves	-2.813	-0.606	-1.092	-1.819	-0.899	-2.357
Unit root test with one structural break						
Stock Prices	-3.800	-3.369	-4.043	-3.586	-4.217	-4.431
	[03/11]	[03/09]	[08/06]	[08/06]	[07/11]	[08/06]
Exchange Rates	-3.487	-4.711	-6.994	-7.339*	-5.330*	-6.025
	[08/09]	[09/07]	[08/09]	[08/09]	[08/08]	[08/09]
Interest rates	-4.792	-7.707*	-11.766*	-5.491	-5.845*	-4.003
	[10/03]	[09/01]	[05/11]	[10/01]	[09/01]	[04/08]
foreign reserves	-3.820	-2.919	-2.671	-4.680	-2.554	-3.077
	[04/02]	[05/07]	[09/12]	[07/02]	[09/06]	[10/07]
Unit root test with two structural breaks						
Stock Prices	-2.456	-4.373	-4.035	-3.616	-3.894	-3.719
	[03/10, 08/11]	[03/08,08/06]	[08/09, 09/02]	[03/01,05/06]	[03/02,09/02]	[03/02, 09/01]
Exchange Rates	-4.445	-4.445	-3.886	-2.905	-3.895	-6.756
	[05/08, 08/08]	[09/05,10/09]	[02/10, 08/07]	[04/06,04/01]	[03/07,08/09]	[08/07,09/11]
Interest rates	-4.649	-11.778*	-4.991	-4.337	-5.319	-6.613*
	[04/01, 11/01]	[06/01, 08/12]	[02/05, 05/09]	[03/05, 06/07]	[05/06,09/11]	[03/08,09/02]
foreign reserves	-3.770	-3.691	-5.670*	-4.043	-4.456	-2.799
	[03/12, 09/06]	[04/04, 05/05]	[02/12, 05/12]	[02/10 ,06/03]	[08/03,11/1]	[05/04,09/10]

Bounds Tests for Cointegration:

- Unit root test with and without structural break(s) confirm that our variables of interest, mm, sp, fx and r are integrated of different orders over time and across countries.
- Regular Engle and Granger (1987) and the VAR based tests of Johansen (1988) and Johansen and Juselius (1998) are mis-specified given these conditions.
- To correct this, we follow Lin (2012) by employing the Autoregressive Distributed Lag model (ARDL) bounds test approach proposed by Pesaran et al (2001).
- This approach solves the problem, as it provides valid test results even if the variables are integrated of different orders.
- The order of integration of the variables do not have to be the same; i.e. it accounts for the inclusion of both I(0) and I(1) in the same equation.

Bounds Tests for Cointegration

- Here similar to Lin (2001) we employ the bounds test corresponding to the *Case v,* from Pesaran et al (2001) which accounts for an unrestricted intercept and an unrestricted trend in the model.
- The model is specified in VAR terms as follows:

$$z_t = \alpha + \omega t + \sum_{i=1}^{p} \gamma_i \, z_{t-i} + \varepsilon_t, t = 1,2 \ldots., T$$

Pesaran et al (2001) derived the following :

- VECM representation

$$z_t = \alpha + \omega t + \Pi z_{t-1} + \sum_{i=1}^{p} \theta_i \Delta z_{t-i} + \varepsilon_t, t = 1,2 \dots ., T$$

- the null hypothesis test the joint significance of the lagged variables

$$\Pi = 0$$

Versus the alternative that it is not equal to zero

Under the ADRL model, the F-statistic can no longer be compared to the critical values of the F-tables

- The bounds test provides two asymptotic critical values for which to compare the calculated F-statistic. It provides a lower bound critical value assuming the variables are I(0) and an upper bound critical value assuming the variables are I(1).
- If the F-statistic is greater than the critical value for the upper bound, the null of no cointegrating relationship can be rejected.
- If the F-statistic falls between the upper and lower bound then the test is inconclusive and
- If the F-statistic is lower than the critical value for the lower bound then the null of no cointegrating cannot be rejected.

	Jamaica	Trinidad and Tobago	Argentina	Brazil	Chile	Mexico
Full Sample from 2002m1 to 2012m06						
F[fx|sp,mm,R]	4.160	4.160	9.20*	6.410*	3.350	0.610
F[sp|fx,mm,R]	5.440	7.510	2.920	4.600	2.650	3.190
Tranquil Period 2002m1 to 2008m08						
F[fx|sp,mm,R]	2.300	3.900	35.06*	6.620*	4.450	4.020
F[sp|fx,mm,R]	6.300*	2.370	2.17	4.700	1.870	2.130
Crisis Period 2008m09 to 2012m05						
F[fx|sp,mm,R]	19.005*	2.690	2.65	3.630	5.06	2.340
F[sp|fx,mm,R]	4.406	5.310	4.23	3.240	2.08	3.230

Critical values are from Pesaran et al. (2001), Table CI(v), Case (v), unrestricted intercept and unrestricted trend, lower bound I(0)=4.87 and upper bound I(1) = 5.875 at the 5% level of significance *indicates that cointegration exists at the 5% level of significance.

The Impact of Volatility

- **ADRL GARCH(1,1)**
- We go one step further to include a GARCH (1,1) component in the ADRL framework to incorporate the impact of volatility in the model, similar to Chen Chang Chen and McAleer (2013), in Modelling the effect of oil prices on global fertilizer Prices . We specifically examine the impact of stock price shock on exchange rate since this is the more prevalent channel in our analysis (stock oriented model)

Model Specification

- The model

$$z_t = \alpha + \omega t + \Pi z_{t-1} + \sum_{i=1}^{p} \theta_i \Delta z_{t-i} + \gamma_t + s\sqrt{\sigma_t^2} + \varepsilon_t, t = 1,2 \ldots., T$$

- Here $\gamma_t + s\sqrt{\sigma_t^2}$ are the GARCH (1,1) components,
- The results from the model estimation for each country during each period are as follows:

Jamaica	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	-0.028 (0.012)	0.018*	0.000 (0.001)	0.715	-0.028 (0.005)	0.000*
Δmm_{t-1}	-0.003 (0.002)	0.113	-0.000 (0.000)	0.929	-0.005 (0.001)	0.002*
ΔR_{t-1}	0.016 (0.007)	0.016*	-0.001 (0.001)	0.001*	0.002 (0.005)	0.664
sp_{t-1}	0.003 0.002	0.135	0.076 (0.007)	0.000*	-0.004 (0.002)	0.000*
mm_{t-1}	0.001 (0.002)	0.484	0.014 (0.002)	0.000*	0.001 (0.001)	0.342
R_{t-1}	0.001 (0.001)	0.305	0.001 (0.002)	0.657	0.002 (0.000)	0.001*
fx_{t-1}	-0.002 (0.007)	0.781	-0.084 (0.011)	0.000*	-0.005 (0.002)	0.038*
Arch	1.538 (0.427)	0.000*	2.247 (0.897)	0.012*	2.696 (0.320)	0.000*
Garch	0.108 (0.063)	0.088	0.012 (0.051)	0.829	0.016 (0.019)	0.393
F statistic	96.76	0.000**	198.54	0.000**	74.510	0.000**

Trinidad and Tobago	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	0.000 (0.001)	0.715	-0.016 (0.012)	0.178	-0.005 (0.001)	0.000*
Δmm_{t-1}	0.000 (0.000)	0.929	0.000 (0.000)	0.548	0.000 (0.000)	0.666
ΔR_{t-1}	-0.002 (0.001)	0.001	0.000 (0.004)	0.869	0.000 (0.002)	0.793
sp_{t-1}	-0.003 (0.000)	0.000*	0.076 (0.007)	0.000*	-0.001 (0.000)	0.034*
mm_{t-1}	-0.006 (0.001)	0.000*	0.014 (0.002)	0.000*	0.000 (0.000)	0.596
R_{t-1}	0.004 (0.000)	0.000*	0.001 (0.002)	0.657	0.001 (0.000)	0.027*
fx_{t-1}	-0.033 (0.003)	0.000*	-0.084 (0.114)	0.000*	-0.006 (0.003)	0.056
Arch	4.147 (0.963)	0.000*	2.247 (0.897)	0.012*	1.325 (0.329)	0.000*
Garch	0.012 (0.021)	0.560	0.010 (0.050)	0.829	0.314 (0.048)	0.000*
F statistic	126.040	0.000*	198.54	0.000*	29.71	0.000*

Argentina	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	0.025 (0.020)	0.220	0.001 (0.010)	0.865	0.012 (0.007)	0.104
Δmm_{t-1}	-0.001 (0.000)	0.000*	0.000 (0.001)	0.725	-0.000 (0.001)	0.808
ΔR_{t-1}	0.000 (0.017)	0.998	-0.003 (0.048)	0.995	-0.046 (0.021)	0.030*
sp_{t-1}	-0.025 (0.004)	0.000*	0.001 (0.005)	0.851	0.003 (0.254)	0.229
mm_{t-1}	0.019 (0.002)	0.000*	0.035 (0.008)	0.000*	-0.001 (0.001)	0.543
R_{t-1}	0.029 (0.002)	0.000*	0.003 (0.001)	0.007*	-0.000 (0.000)	0.445
fx_{t-1}	-0.547 (0.060)	0.000*	0.005 (0.025)	0.839	-0.002 (0.006)	0.714
Arch	1.954 (0.541)	0.000*	1.424 (0.529)	0.007	2.709 (0.292)	0.000*
Garch	-0.014 (0.035)	0.692	----- -----	-----	0.085 (0.048)	0.077

Brazil	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	-0.131 (0.049)	0.007*	-0.053 (0.146)	0.715	-0.029 (0.051)	0.558
Δmm_{t-1}	-0.007 (0.004)	0.084	0.011 (0.034)	0.740	-0.004 (0.005)	0.381
ΔR_{t-1}	-0.102 (0.052)	0.049*	-0.891 (0.483)	0.065	-0.081 (0.064)	0.198
sp_{t-1}	-0.005 (0.018)	0.755	0.172 (0.108)	0.114	0.008 (0.020)	0.067
mm_{t-1}	0.012 (0.017)	0.497	0.078 (0.088)	0.375	0.029 (0.015)	0.047*
R_{t-1}	0.001 (0.005)	0.912	0.049 (0.030)	0.099	0.005 (0.005)	0.038*
fx_{t-1}	-0.026 (0.034)	0.437	0.313 (0.085)	0.000*	-0.015 (0.034)	0.668
Arch	1.392 (0.488)	0.004*	0.302 (0.315)	0.314	1.345 (0.375)	0.000*
Garch	-0.0968 (0.074)	0.193	0.536 (0.581)	0.356	-----	-----
F statistic	1.41	0.842	19.14	0.001*	18.29	0.001*

Chile	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	0.096 (0.079)	0.226	-0.269 (0.158)	0.088	-0.017 (0.007)	0.826
Δmm_{t-1}	-0.026 (0.124)	0.037	-0.007 (0.287)	0.795	-0.002 (0.101)	0.860
ΔR_{t-1}	-0.057 (0.074)	0.445	-0.224 (0.164)	0.172	-0.007 (0.101)	0.948
sp_{t-1}	-0.062 (0.023)	0.007*	-0.037 (0.069)	0.590	-0.071 (0.254)	0.005*
mm_{t-1}	0.001 (0.010)	0.080	-0.007 (0.008)	0.375	-0.003 (0.005)	0.532
R_{t-1}	0.062 (0.020)	0.002*	0.056 (0.391)	0.151	0.062 (0.021)	0.003*
fx_{t-1}	-0.187 (0.060)	0.002*	-0.184 (0.117)	0.116	-0.178 (0.061)	0.003*
Arch	0.201 (0.196)	0.304	0.250 (0.398)	0.630	0.371 (0.116)	0.001*
Garch	0.722 (0.314)	0.020	0.614 (0.639)	0.336	----- -----	

Mexico	Tranquil Period 2002/01 to 2008/08		Crisis Period 2008/09 to 2012:02		Full Period 2002/01 to 2012/02	
	coefficient	***P value***	***coefficient***	***p-value***	***coefficient***	***p-value***
Δsp_{t-1}	0.011 (0.051)	0.822	0.005 (0.131)	0.967	0.016 (0.054)	0.774
Δmm_{t-1}	-0.001 (0.004)	0.730	0.034 (0.052)	0.511	-0.002 (0.005)	0.782
ΔR_{t-1}	-0.073 (0.089)	0.413	0.133 (0.255)	0.602	-0.018 (0.099)	0.857
sp_{t-1}	-0.010 (0.004)	0.020*	-0.223 (0.164)	0.175	-0.008 (0.005)	0.117
mm_{t-1}	-0.025 (0.015)	0.093	-0.069 (0.094)	0.467	-0.029 (0.012)	0.013*
R_{t-1}	0.017 0.005	0.002*	0.084 0.055	0.125	0.015 (0.004)	0.002*
fx_{t-1}	-0.139 (0.055)	0.011*	-0.330 (0.163)	0.043*	-0.117 (0.039	0.003*
Arch	-0.089 (0.142)	0.531	0.440 (0.372)	0.236	0.560 (0.117)	0.000*
Garch	0.241 (1.675)	0.886	0.329 (0.365)	0.367	0.316 (0.182)	0.083
F statistic	15.12	0.004*	5.65	0.227	10.04	0.039*

Conclusion/Recommendations

- The structural break unit root tests reveal significant structural breaks in either the exchange rates, stock prices and our other control variables around the time of the crisis in all countries, validating our choice of subsample periods.
- The results of the bounds tests reveal more evidence to support the stock oriented models rather than the flow oriented models in Jamaica, Argentina and Brazil.
- According to Lin (2012), this suggests that governments should try to prevent a currency crisis by stimulating economic growth and expanding the stock market to attract capital inflow.
- The results for the other three countries coincide with the literature that there is no long run relationship between stock prices and exchange rates.

Conclusion/Recommendations

- In an attempt to improve our results, a GARCH(1,1) volatility factor was included in the ADRL framework.
- The volatility term was found to be statistically significant in all six countries and the results from our stock oriented models improved significantly.
- Now stock prices statistically significantly impacted the exchange rates; in the tranquil and full periods for Jamaica, over all three periods for Trinidad and Tobago, and in the tranquil period for Argentina, Mexico and Chile.
- This shows the importance of taking volatility into account as well as this suggests that governments should try to prevent a currency crisis by stimulating economic growth and expanding the stock market to attract capital inflow (see Lin (2012)).