

The relationship between fiscal deficits and monetary variables: An application of the ARDL bounds testing approach for emerging economies

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Acknowledgement

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- 1 Overview
 - The adoption of the inflation targeting regime
 - Fiscal performance and sovereign default risks
 - Research aims
- 2 Literature review: the model of the risk premium
 - Fiscal deficits and the interest rate
 - Fiscal deficits and the exchange rate
 - Fiscal deficits and inflation expectation
- 3 Model specification
- 4 The ARDL models for cointegration
 - The advantages of the ARDL models
 - Modelling procedure
 - Stability tests

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- Inflation targeting in emerging economies is a more challenging task than in advanced countries (Mishkin, 2004).

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Fiscal performance and sovereign default risks

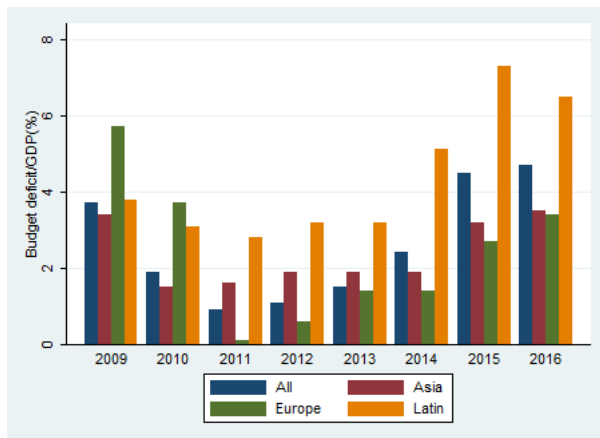


Figure: Fiscal deficits in emerging economies (Source: IMF, 2016)

Fiscal performance and sovereign default risks

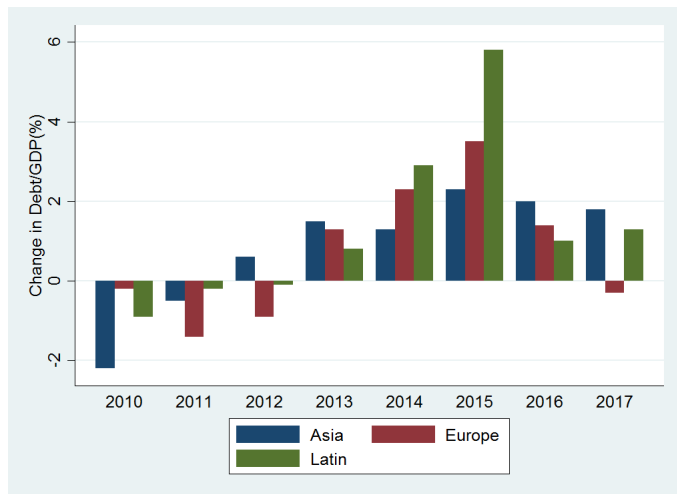


Figure: Government debt performance in emerging economies (Source: IMF, 2016)

Fiscal performance and sovereign default risks

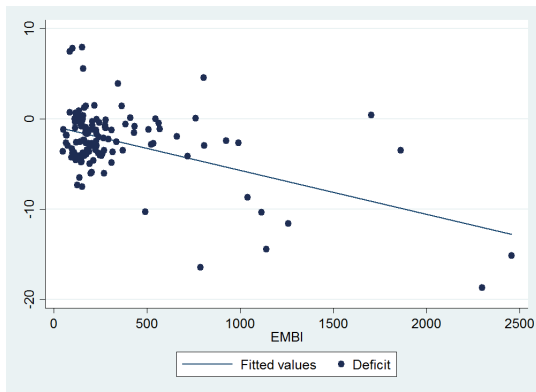


Figure: Correlation between fiscal balance and sovereign risk premium

The increasing risk of sovereign defaults reflects the dominant role of fiscal policy to drive monetary variables.

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The study investigates the **impacts of fiscal deficits on monetary variables** for several emerging economies (Brazil, the Philippines, and Turkey) during the period from 1990 to 2016 by applying the Autoregressive Distributed Lag (ARDL) models.

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- Theoretically, the model of risk premium can be supported from the market discipline hypothesis (Flandreau et al., 1998)

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$$r = r^* + \theta$$

- Excessive deficits raise the probability of default, leading to the increase in the risk premium θ , which then causes the interest rate r to rise.
- Empirically, there is a widespread agreement that budget deficits are positively correlated with the risk premium and sovereign government bond yields (Akitoby and Stratmann 2008, Ardagna 2009, Baldacci and Kumar 2010, and Peiris 2010).

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- As a result of higher levels of budget deficits, higher risk premium causes capital outflows, leading to a depreciation of the domestic currency (Blanchard 2004 and Favero and Giavazzi 2004).

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- Empirical studies suggest that fiscal balance is a driving factor of exchange rates (Aktas et al. 2010 and Clostermann and Schnatz 2000).

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- Study on the relationship between budget deficits and the inflation expectation is limited (Tekin-Koru and Ozmen 2010, Catao and Terrones 2005).

Fiscal deficits and the inflation expectation

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- In a small open economy, forward-looking economic agents expect that the exchange-rate pass through into import prices will cause cost push inflation, therefore raising inflation expectations.

Fiscal deficits and the inflation expectation

- It is difficult to uncover significant and apparent relationship between fiscal deficits and inflation
 - Data sample highly weighed on advanced economies or low-inflation economies;

Fiscal deficits and the inflation expectation

- It is difficult to uncover significant and apparent relationship between fiscal deficits and inflation
 - Data sample highly weighed on advanced economies or low-inflation economies;
 - Inadequate modelling choice to capture the dynamic impacts of fiscal policy on inflation;

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 - A sample of emerging economies under high inflation pressure;

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 - A sample of emerging economies under high inflation pressure;
 - ARDL procedures developed by Pesaran and Shin (1999);

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- Quarterly observations from the 1990s to 2016
- Data are collected from Datastream, International Financial Statistics (IFS), and Bloomberg.

Table: Descriptive Statistics

Variable	Brazil (1997Q1-2016Q1)					Turkey (2002Q1-2016Q1)					The Philippines (1991Q1-2016Q1)				
	Obs	Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max	Obs	Mean	Sd	Min	Max
<i>Def</i>	77	-4.096	2.736	-13.980	0.110	57	-3.396	4.031	-18.190	3.140	101	-1.921	2.190	-6.620	2.360
<i>Risk</i>	77	4.972	3.726	1.480	19.060	57	3.361	1.731	1.720	9.490	101	3.854	2.259	1.070	11.860
r^L	77	53.122	16.358	26.230	97.700	57	19.297	11.314	8.300	52.430	101	11.204	4.670	5.430	26.250
<i>EX</i>	77	2.183	0.667	1.059	3.964	57	1.696	0.443	1.170	3.025	101	41.535	10.067	24.420	56.360
r^M	77	14.567	6.498	1.580	42.000	57	14.683	12.637	1.500	54.730	101	7.667	3.406	3.500	16.500
π^e	77	6.287	1.881	2.300	12.500	57	11.935	9.692	6.300	51.000	101	6.516	3.005	1.700	16.700

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- $I(1)$ and $I(0)$ variables;
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- Small and finite sample sizes;

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- The bound tests for cointegration

$$\Delta Z_t = c + \alpha t + \Gamma Z_{t-1} + \sum_{k=1}^{p-1} \Omega(k) \Delta Z_{t-k} + \varepsilon_t$$

where the matrix $\Gamma = \theta_{ij}$ represent long-run coefficients with $i,j=1,2,,6$;

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where the matrix $\Gamma = \theta_{ij}$ represent long-run coefficients with $i, j=1, 2, \dots, 6$;

- The bounds test for the long-run relationship is based on the F tests or Wald tests for the joint significance of $\theta_{ij} : \theta_{i1} = \theta_{i2} = \theta_{i3} = \theta_{i4} = \theta_{i5} = \theta_{i6} = 0$

Results for the bound tests

Table: Specified ARDL models and bound tests

Country	ARDL model	F-statistic	Serial Correlation	Heteroskedasticity
$F(r^L Def, Risk, EX, r^M, \pi^e)$				
Brazil	(4,4,0,0,1,1)	12.209***	2.483 (0.647)	8.549 (0.930)
Philippines	(4,0,0,2,2,0)	3.395	4.162 (0.384)	37.980 (0.000)
Turkey	(4,0,4,4,3,4)	6.850***	22.144 (0.000)	5.866 (0.995)
$F(EX Def, Risk, r^L, r^M, \pi^e)$				
Brazil	(5,0,1,3,4,5)	5.429***	5.781 (0.216)	27.326 (0.289)
Philippines	(1,0,1,1,0,3)	2.320	2.548 (0.636)	32.432 (0.001)
Turkey	(1,1,0,1,1,1)	2.456	1.265 (0.867)	2.584 (0.995)
$F(\pi^e Def, Risk, r^L, EX, r^M)$				
Brazil	(1,4,3,2,2,4)	9.613***	0.697 (0.951)	9.820 (0.987)
Philippines	(2,0,0,0,3,0)	5.097**	8.556 (0.073)	14.802 (0.191)
Turkey	(6,5,2,4,4,6)	8.785***	3.236 (0.519)	3.249 (1.000)

- Long-run estimations
 - Estimate the long-run effect of fiscal variable on interest rates

$$r_t^L = \hat{\mu}_1 Def_t + \hat{\mu}_2 Risk_t + \hat{\mu}_3 EX_t + \hat{\mu}_4 r_t^M + \hat{\mu}_5 \pi_t^e + u_{1t}$$

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- Testable hypotheses: $\begin{cases} H_0 : \hat{\mu}_1 = 0 \\ H_A : \hat{\mu}_1 < 0 \end{cases}$ and $\begin{cases} H_0 : \hat{\mu}_2 = 0 \\ H_A : \hat{\mu}_2 > 0 \end{cases}$

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 - Similarly, the impacts of fiscal deficits on exchange rates will be given as

$$EX_t = \hat{\sigma}_1 Def_t + \hat{\sigma}_2 Risk_t + \hat{\sigma}_3 r_L^t + \hat{\sigma}_4 r_M^t + \hat{\sigma}_5 \pi_t + u_{2t}$$

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$$\pi_t^e = \hat{\gamma}_1 Def_t + \hat{\gamma}_2 Risk_t + \hat{\gamma}_3 r_L^t + \hat{\gamma}_4 EX_t + \hat{\gamma}_5 \pi_t + u_{3t}$$

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Table: Long-run estimations (Dependent variable: r^L)

	Def	$Risk$	EX	r^M	π^e
Brazil	-1.106**	0.672*	1.376	1.629***	-1.851**
Philippines	-	-	-	-	-
Turkey	-0.146	0.766*	1.606*	0.420***	0.264*

- Brazil: The increase in budget deficits and risk premium is expected to raise the lending rate.

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- Brazil: The increase in budget deficits and risk premium is expected to raise the lending rate.
- Turkey: The effect of fiscal deficits on interest rates is weak.

Table: Long-run estimations (Dependent variable: EX)

	Def	$Risk$	r^L	r^M	π^e
Brazil	-0.081***	0.163***	-0.020	0.086*	0.158**
Philippines	-	-	-	-	-
Turkey	-	-	-	-	-

- Brazil: Fiscal balance and the risk premium are key determinants of the exchange rate

Table: Long-run estimations (Dependent variable: π^e)

	<i>Def</i>	<i>Risk</i>	r^L	r^M	<i>EX</i>
Brazil	-0.242*	0.531***	-0.015	-0.410	0.103
Philippines	0.102	0.452***	0.477***	-0.025	0.102
Turkey	-1.120***	2.898***	-0.476*	1.390	0.347***

- Brazil and Turkey: Higher levels of fiscal imbalance and risk premium put upward pressure on inflation.

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- Granger causality tests to identify the direction of causal effects

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- The ECMs representation for Z_t is given as:

$$\Delta Z_t = c + \phi EC_{t-1} + \sum_{k=1}^{p-1} \psi(k) \Delta Z_{t-k} + v_t$$

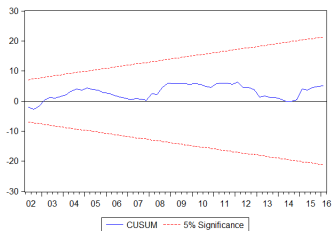
Empirical results

Table: Granger Causality tests

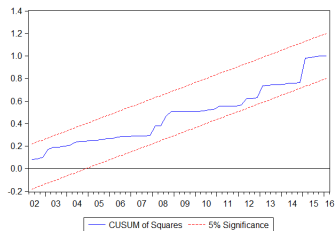
Dep. variable		Regressor						
		<i>Def</i>	<i>Risk</i>	r^L	<i>EX</i>	r^M	π^e	EC_{t-1}
r^L	Brazil	4.968***	1.779*	-	1.176	9.951***	-0.549	-9.451***
	Philippines	1.054	-1.507	-	6.142***	14.913***	1.773*	-
	Turkey	-2.658**	9.786***	-	0.211	15.043***	-9.062***	-7.165***
<i>EX</i>	Brazil	-3.844***	10.403***	5.947***	-	12.739***	3.047**	-7.491***
	Philippines	0.122	4.477***	2.798***	-	-0.141	3.662**	-
	Turkey	-0.958	1.257	2.392**	-	-1.324	-1.252	-
π^e	Brazil	13.497***	10.726***	8.173***	6.212***	5.012***	-	-8.681***
	Philippines	1.020	3.161 ***	2.811***	5.493***	-0.398	-	-5.403***
	Turkey	25.459***	25.418***	16.146***	8.495***	15.426***	-	-9.777***

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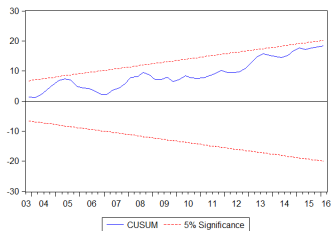
Brazil: Stability tests



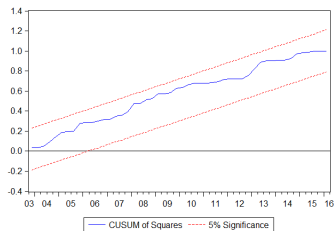
CUSUM- Dependent variable: r^L



CUSUMSQ- Dependent variable: r^L

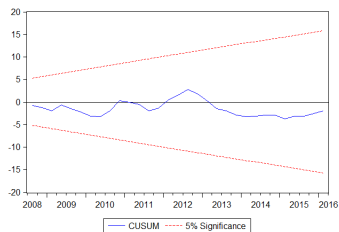


CUSUM- Dependent variable: π^e

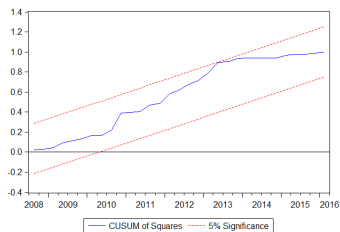


CUSUMSQ- Dependent variable: π^e

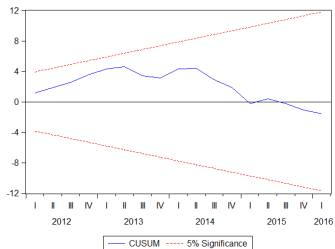
Turkey: Stability tests



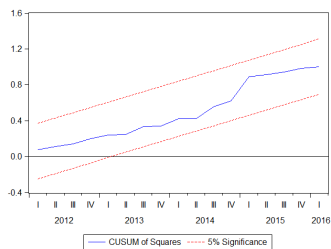
CUSUM- Dependent variable: r^L



CUSUMSQR- Dependent variable: r^L



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- Outlook
 - Sample extension
 - Heterogenous effects across different emerging countries
 - Robustness tests