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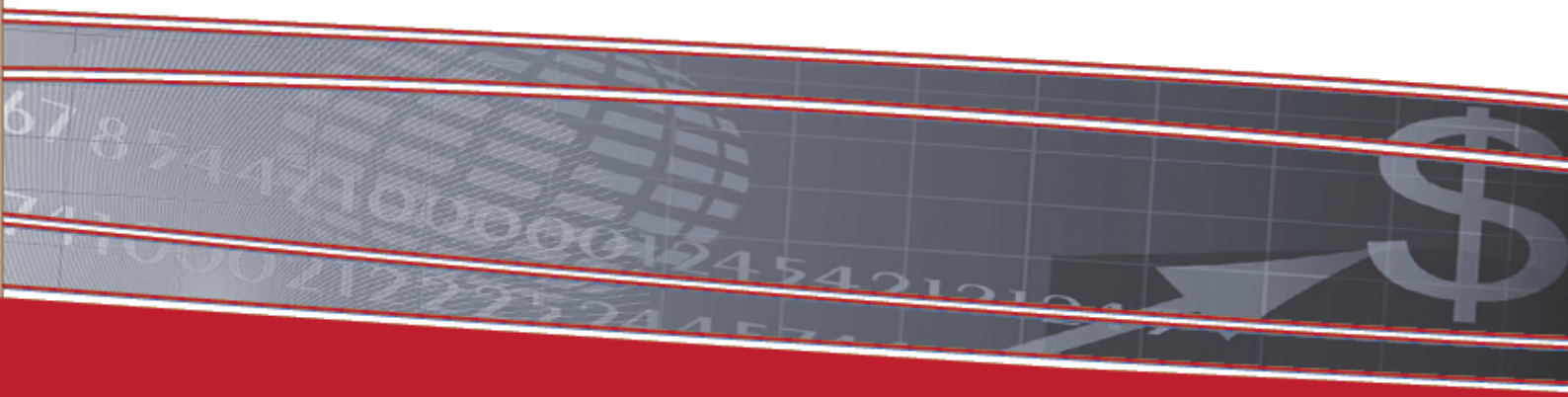

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OPEN ACCESS ARTICLE

ON THE ROLE OF CONTAGION EFFECTS IN TOTAL RESERVES IN SOUTH AMERICA

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Abstract

With the growth of international reserves in the last decades, the existence of contagion and financial integration between Argentina, Brazil, Chile, Colombia and Peru is found by Matos et al., (2014). We add to the international reserve literature using the Frenkel and Jovanovic (1981) buffer stock model. Our fundamental innovations are the consideration of the cross-effects of conditional volatilities, spreads and imports on the model. The joint estimation of this framework allows a considerable increase in the explanatory power in addition to detecting the relevant role of the volatility of the Colombian reserves, Argentine spreads and imports from Brazil and Chile in the modeling of reserves in other countries. In this period, too, one can see oscillation between a more daring and a conservative stance on the accumulation of international reserves in these countries.

Key words:

South America; International Reserves; Buffer Stock; Cross-Effects; VEC.

INTRODUCTION

The reserve stock of a country is the sum of all the net assets in foreign currency held by the central bank as a guarantee for the payment of the obligations of that nation. According to Souza and Triches (2013), reserves are instruments of security for the direction of a monetary and exchange rate policy, providing an interventionist capacity and aiming to achieve the desired exchange rates. Therefore, international reserves serve as a buffer against crises or emergencies.

According to Jeanne (2007), the emerging market international reserves have increased since the 1990s; for example, China has the largest stock of international reserves in the world, having surpassed Japan at the end of 2005 and being responsible for part of the accumulation of reserves in emerging markets. Alfaro and Kanczuk (2009) argue that this reserve increase is not unique to China or the East Asian

countries but is a widespread phenomenon among emerging markets, including countries with a large amount of external debt.

The cost and benefit of these reserves from emerging countries are a point of discourse among policy makers, such as Jeanne and Rancière (2011), and Hur and Kondo (2016). These large reserve balances are necessary to avoid or mitigate the impacts of a financial crisis, and their cost is negligible in the face of a crisis. However, Aizenman and Marion (2003), Soto and García (2004), and Rodrik (2006) conduct a cost–benefit analysis of the accumulation of reserves, in which they evaluate the impact of these reserves on a probable default and compare it with the opportunity cost, noting that, for a country to have a high level of reserves, it requires a high maintenance cost.

An important aspect of the discussion is to note that emerging and developed countries are affected by crises in different ways and thus seek different solutions. The database constructed by Lane and Ferreti (2007), and Pina (2015) shows clear divergence in the relationship between the international reserves and the GDP for emerging and developed economies. In 1987, the average of 24 developed countries was approximately 10%, very close to the 11% obtained as the average of 154 emerging countries.

In this scenario, the following question arises: what is the optimal level of international reserves for a developing country? Many authors, such as Jeanne and Rancière (2011), Summers (2006), and Matos (2016), consider this question as a puzzle in international finance. Faced with this question, we add to this debate by proposing a methodological innovation aiming to model the optimal time path of the amount of international reserves in Argentina, Brazil, Colombia, Chile and Peru, which enables us to answer the question of whether there is excess conservatism or not and thus whether there is a puzzle in South America or not.

More specifically, this article aims to contribute to the theoretical–empirical literature on international reserves, following conceptually and in theoretical terms the basic notions of Heller (1966). It is aligned with Ben-Bassat and Gottlieb (1992), and Chakravarty (2009), aiming to propose an innovative framework based on idiosyncratic extensions to the model developed by Frenkel and Jovanovic (1981), entitled the buffer stock model. This model considers the associated adjustments to the exchange rate and monetary policy, besides the opportunity cost of holding such a volume of reserves. In terms of application, we follow Jeanne (2007), Pina (2015), Ford and Huang (1994), and Ramachandran (2004), whose related studies analyze reserves in emerging economies, and especially Matos et al., (2016), who apply the buffer stock model with an extension to the BRICS.

Our methodological innovation in relation to the other studies, which empirically address the question of these reserves in each of these individual emergent economies, is based on Frenkel and Jovanovic's (1981) buffer stock framework. However, we

consider the significant cross-effects of conditional volatilities, spreads and imports given the strong financial and trade relationship between Argentina, Brazil, Colombia, Chile and Peru. In addition, we especially consider the evidence reported by Mejía-Reyes (2000), Hecq (2002), and Matos et al., (2014) that, despite their heterogeneity, the financial markets and commercial transactions of these emerging countries have strong relationships in the short and long term.

The article is organized as follows. Section 2 provides a historical discourse about the reserve levels of Argentina, Brazil, Chile, Colombia and Peru. Section 3 reviews the buffer stock literature and its extensions. In Section 4, we present the variables used and the methodology adopted, while in Section 5 we perform the empirical exercise and discuss the results. Finally, the conclusion of the work is outlined in Section 6.

SOUTH AMERICAN RESERVES

There is a trend for the accumulation of international reserves in the economies of the world. Steiner (2013) notes in his study that, between 1970 and 2010, the official reserves worldwide grew at an average annual rate of 15% and finds that this accumulation of reserves was mainly due to developing economies and economies in transition. The share of these economies in the total world reserves increased from 22% in 1970 to 65% in 2010, and the phenomenon of reserve accumulation is not restricted to some isolated places but occurs in most countries. Furthermore, Steiner (2013) notes that, from 1982 to 1996, on average 58% of countries increased their reserves in real terms and that this share increased to 67% in the period from 1997 to 2010.

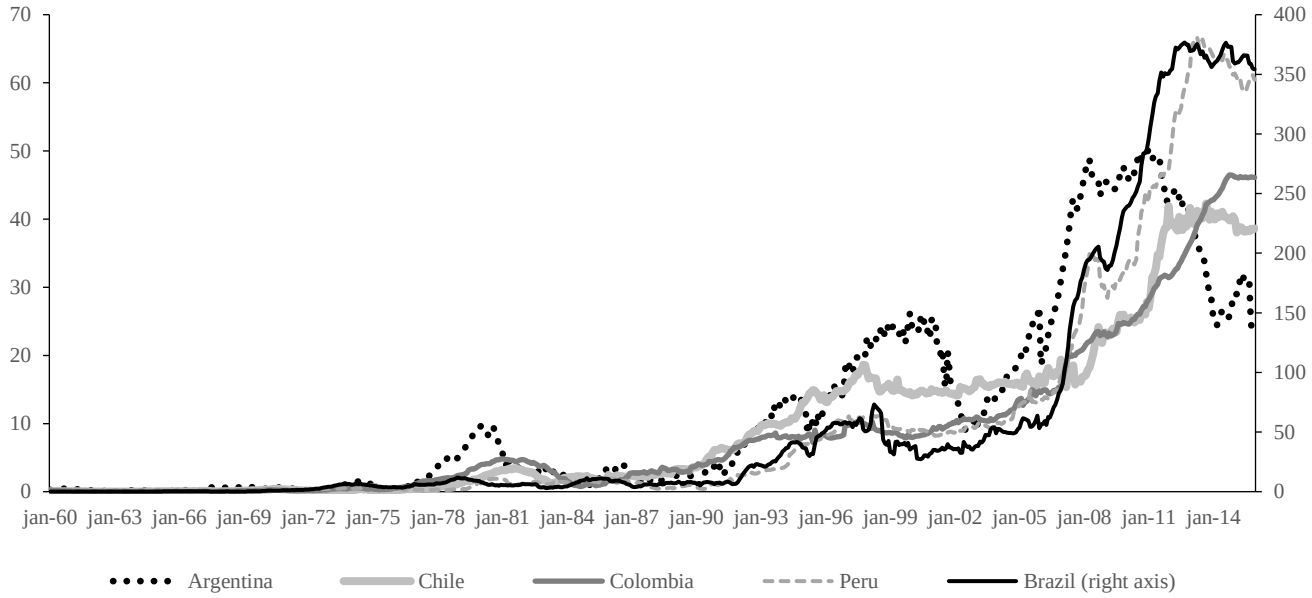


FIGURE 1. TOTAL RESERVES EXCLUDING GOLD (US$ MILLION)
Data Source: FRED

In South America, the stock of reserves does not differ. Figure 1 shows the stock of reserves in billions of dollars of Argentina, Brazil, Chile, Colombia and Peru from January 1960 to December 2015. Based in Figure 1, we identify stability in the first decade, and from the 1970s and with the end of the Bretton Woods system, there was an increase in the international reserves in these countries. This growth has become much more pronounced since the 1990s, which, according to Rodrik (2006), is the decade identified as the beginning of the era of globalization.

From the 1990s, there was a considerable drop in the South American international reserves, which may have been influenced by the international financial crisis. Bandeira (2002) reports that the crisis began in Asia in 1997 and reached Brazil in 1999, more strongly in 2002 in Argentina, and with it political instability, the fall of the president and the request for default. This may be one of the factors contributing to the fall in the Argentine reserves between 2000 and 2002.

Figure 2 shows the monthly evolution of the absolute volume of reserves in millions of dollars for Argentina, Brazil, Chile, Colombia and Peru over the period from January 2004 to December 2015. With the exception of Argentina, we can see an apparently growing movement of countries, with average growth rates ranging from 0.44% in Argentina to 1.4% in Brazil. The discrepancies are due to the order of magnitude of the Brazilian reserves, which in total for this period was more than ten times the Peruvian volume; however, this evidence is expected due to the size of this economy vis-à-vis the others.

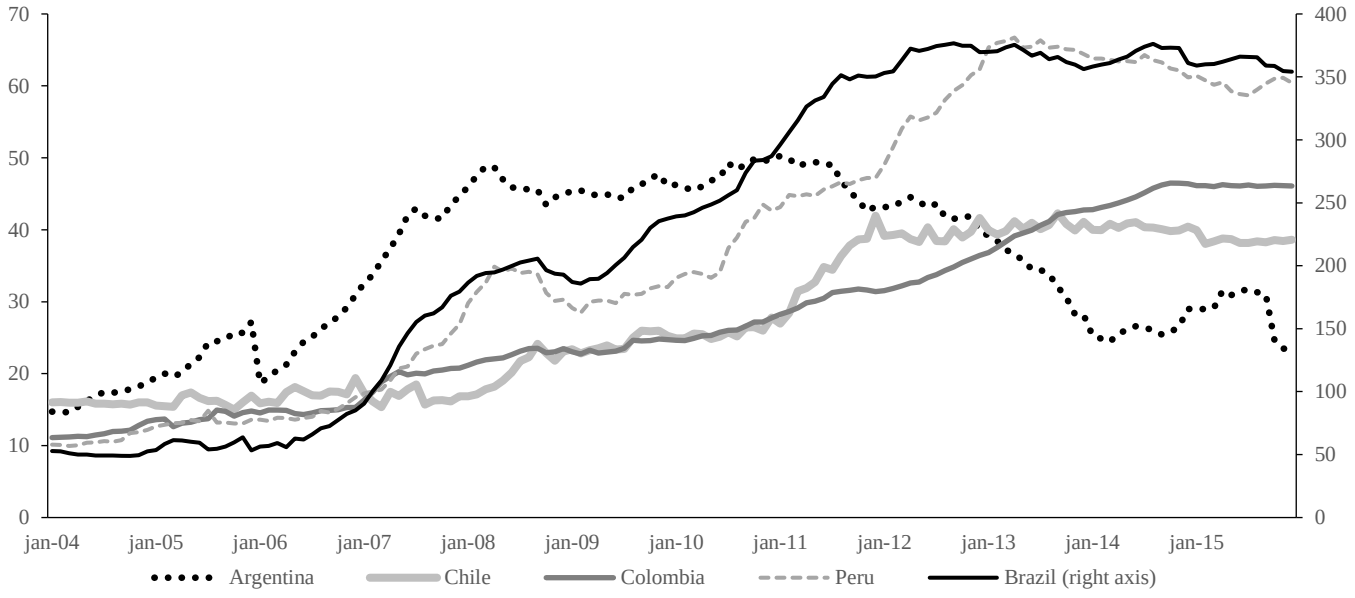


FIGURE 2. TOTAL RESERVES EXCLUDING GOLD (US$ MILLION)
Data Source: FRED

Scale discrepancies can be removed when we use other indicators, considering the level of reserves in ratio to the other important variables, such as imports and GDP. Figure 3 shows the annual international reserves of the same economies in ratio to the

GDP from 1965 to 2014, which also shows a tendency to increase the reserves. A small decline is apparent in the late 1990s and early 2000s, which agrees with Dominguez et al., (2012), who observe that the countries that suffered crises and a loss of reserves in the late 1990s were in the process of recomposing their reserves in the years before the global crisis of 2008.

In comparison with the G7 country reserves, according to Luna (2016), the reserves declined continuously from 1989, when they accounted for 43.2% of the world's total reserves, and in 1999, they reached 29% and in 2010 beat the level of 15%. According to Matos et al., (2016), the G7 countries' reserves remained below 10% of the GDP with the exception of Italy, which reached 25% of its GDP at the end of 2014.

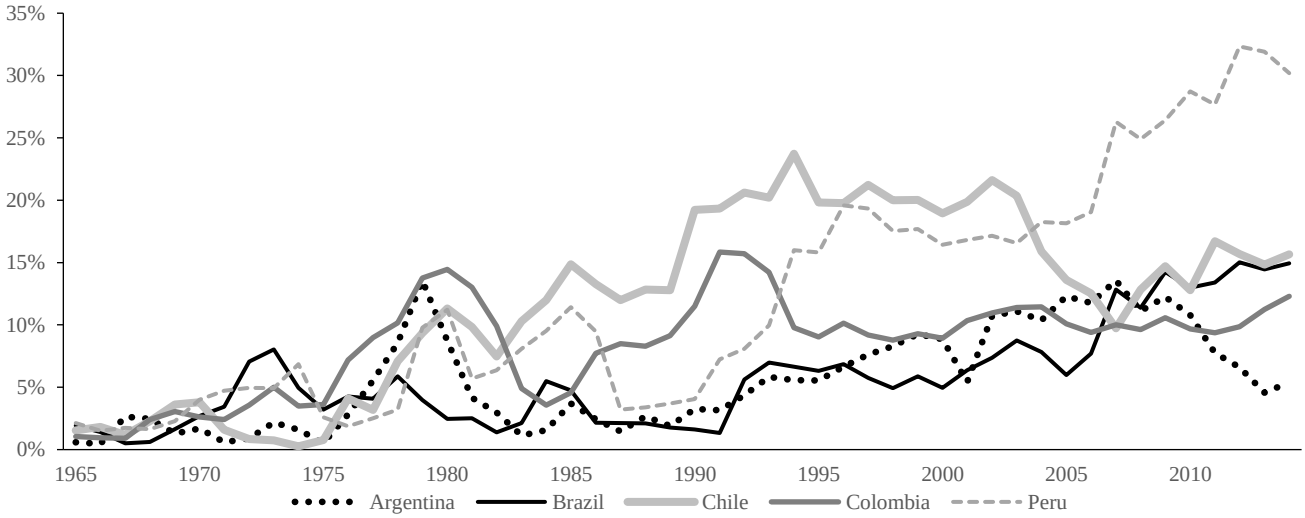


FIGURE 3. TOTAL RESERVES EXCLUDING GOLD (PERCENTAGE OF GDP)
Data Source: FRED

Another indicator for the accumulation of international reserves takes into account the participation of each country in international trade. According to Rodrik (2006), and Bird and Rajan (2003), the reserve accumulation in ratio imports equivalent to three months of imports is considered an adequate level. Rodrik (2006) finds that this proportion oscillated around three during the 1990s in almost all developing countries.

Figure 4 shows the accumulation of reserves in ratio for the last 3 months of imports from January 2005 to December 2015. In the beginning, we observe behavior close to 3 times the imports and in 2007 a highlight for the growth of Brazil that comes close to 6 due to the growth in imports and GDP. In 2008, with the crisis, all the countries suffered a decrease, with Chile reaching in October 2008 the level of 1.2 times the volume of imports and Brazil and Peru registering approximately 5 times the imports at the beginning of 2008 and almost 3.7 times their reserves in relation to imports.

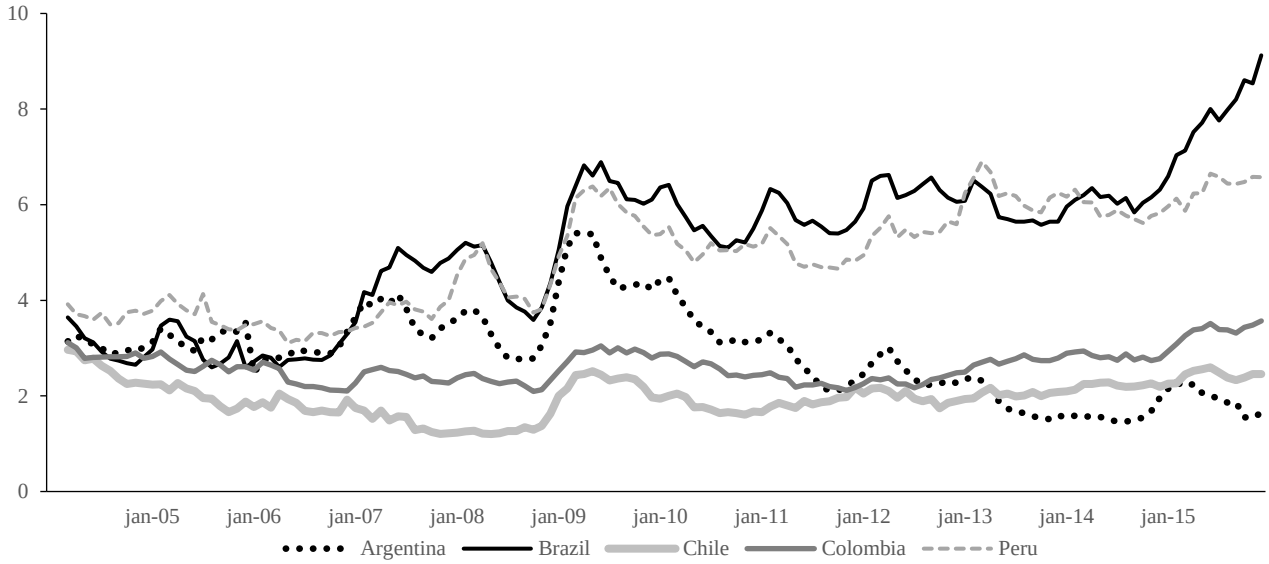


FIGURE 4. TOTAL RESERVES EXCLUDING GOLD (PERCENTAGE OF 3 MONTHS OF IMPORTS)
Data Source: FRED

After this period, we observe a recovery of reserves by the year 2009, with Brazil and Peru reaching almost 6.5 times, Argentina 5 times and Chile and Colombia almost 3 times. All of them maintained these levels until the end of 2014 and registered an increase during the year 2015 with the exception of Argentina, which is the only one to reduce its reserves in ratio to 3 months of imports (1.6 times).

Graphically, there is very similar behavior in these economies with small differences in magnitude, given the size of the reserves and the volume of the imports in some periods. This behavior can be explained by the contribution of Lewis (1980), which suggests that the growth engine of underdeveloped countries is trade; moreover, while most Latin American countries have weak domestic markets, the only option for these countries to grow would be increased interregional cooperation through trade in underdeveloped countries.

RELATED LITERATURE

Most of the initial studies about international reserves indicate that the demand for international reserves is attributable to the necessity of softening trade balance instability. However, with the changes in the global financial environment, in which there is increasing capital mobility, greater exchange rate flexibility, rapid growth in financial market innovations and increased global financial integration, a buffer stock approach to international reserves emerges. In this context, Heller (1966) is possibly one of the pioneers in promoting the debate on the topic. He associates the optimal level of reserves with a protection instrument to cushion imbalances in the balance of payments and incorporation of variables related to the adjustment cost and opportunity cost of reserves.

Some related contributions at this time include Kenen and Yudin (1965), who introduce the use of econometric techniques. At the beginning of the 1970s, with the end of the Bretton Woods system, there was renewed interest in the theme, with the contribution of Kelly (1970) highlighting the differences in the demand for reserves between economies that are more and less open. Frenkel (1974) emphasizes the differences in developed and developing nations. Further contributions include those by Heller and Kahn (1978), Saidi (1981), Edwards (1983), Frenkel (1984), and Lizondo and Mathieson (1987). The third moment of greater intensity in the literature arises only as a consequence of the exchange crisis, the crisis of the European Monetary System and the crisis of the "

Asian tigers" in the 1990s.

Based on this literature, we stratify the models into first, second and third generations. The first generation is exemplified by Krugman (1979), and Flood and Garber (1984), who emphasize the role of reserves as a tool for postponing crises. The second generation of models is known as exchange rate crises, instituted by Obstfeld (1994). The third generation, inaugurated by Furman et al., (1990) with Ben-Bassat and Gottlieb (1992), is a model aligned with that developed by Frenkel and Jovanovic (1981) to base the optimum level on the balance between the costs of macroeconomic adjustment and the opportunity costs.

The derivations of these frameworks and their respective empirical applications are numerous, so this discussion about the adequacy of the models in each situation or economy is extensive and not consensual. It is common sense that all frameworks are grounded in some cost–benefit relationship based on macroeconomic variables, like the financial ones by Krugman (1979), exchange by Calvo and Reinhart (2002) or politically and institutionally aligned with Cheung and Ito (2009).

In this context, this article follows the approach proposed by Frenkel and Jovanovic (1981) of a denominated buffer stock. They consider the adjustments associated with exchange and monetary rate policies as a counterpart to the opportunity cost measured by alternative options vis-à-vis the composition of the volume of international reserves. Among the recent applications of this framework, it is worth mentioning Ramachandran (2004), Flood and Marion (2002), and Luengo-Prado and Sörensen (2004), who associate this model with the use of panel data.

Methodologically, the present article is aligned with Cifarelli and Paladino (2009), who use the model to analyze the dynamics of the countries of South America with Asian countries, and Chakravarty (2009), who makes a simple, more relevant extension of the model buffer stock. More recently, Matos (2016) makes use of the model with an extension of breaks for Brazil. Specifically, we follow Matos et al., (2016), who follow the buffer stock model with cross-effects for the BRICS.

METHODOLOGY

Assuming that the balance of payments of economy i is in equilibrium and that the reserves follow a stochastic Wiener process, one can derive the optimal path, $R^*_{i,t}$, to minimize the macroeconomic adjustment costs and opportunity costs. Assuming that $R^*_{i,t}$ follows a second-order Taylor approach suggests that the optimal level of reserves held by economy i at time t (in log) depends linearly on the standard deviation of the change in reserves (in log), given by $ln(\sigma_{i,t})$, on the opportunity cost of holding reserves (in log), given by $ln(r_{i,t})$, and on the imports (in log), given by $ln(I_{i,t})$. This optimal level can be described as:

$$ln(R^*_{i,t}) = \beta_0 + \beta_1\, ln(\sigma_{i,t}) + \beta_2\, ln(r_{i,t}) + \beta_3\, ln(I_{i,t}) + \varphi_{i,t} \quad (1)$$

In this relation $\varphi_{i,t}$ means the residual. Although simple, the implementation and possible extensions are not consensual, motivating some routes in this literature. Frenkel and Jovanovic (1981) report estimated elasticities close to the theoretical predictions of the model, $\beta_1 = 0.5$ and $\beta_2 = -0.25$, and Cifarelli and Paladino (2009) initially assume $\beta_1 > 0$, $\beta_2 < 0$ and $\beta_3 > 0$, but many studies, such as Ramachandran (2004) and Flood and Marion (2002), obtain different values for the elasticities. Chakravarty (2009) argues that the reason is that these estimates are highly sensitive to the proxy used to represent the opportunity cost, model specification, estimation methods and additional variables included in the original equation.

The most promising route, following Frenkel and Jovanovic (1981), suggests extensions to their benchmark framework in the sense of incorporating some idiosyncratic additional variables, which are important in the determination of the level of reserves for specific emerging economies. Chakravarty (2009), for instance, takes into account the positive correlation between the reserve holdings and the size of international transactions, while Matos (2016) adds the expectations of the most relevant macroeconomic variables in Brazil. We follow them by proposing an extension that incorporates contagion effects on the reserves in Argentina, Brazil, Chile, Colombia and Peru by estimating a joint buffer stock benchmark model for these economies. To summarize, we propose a joint estimation model for the reserves of the country that can be described as follows:

$$ln(R^*_{i,t}) = \varphi_0 + \gamma_{i,i}\, ln(\sigma_{i,t}) + \delta_{i,i}\, ln(r_{i,t}) + \emptyset_{i,i}\, ln(I_{i,t}) + \sum_{j\neq i} \gamma_{i,j}\, ln(\sigma_{j,t}) + \sum_{j\neq i} \delta_{i,j}\, ln(r_{j,t}) + \sum_{j\neq i} \emptyset_{i,j}\, ln(I_{j,t}) + \varepsilon_{i,t} \quad (2)$$

$$\varepsilon_{i,t}|\psi_{t-1} \sim N(0, \sigma^2_{i,t}) \quad (3)$$

$$\sigma^2_{i,t} = \theta_0 + \sum_{l=1}^{q} \theta_l \varepsilon^2_{i,t-l} + \sum_{s=1}^{p} \tau_s \sigma^2_{i,t-s} + \xi_{i,t} \quad (4)$$

Regression (2) suggests that the optimal level of reserves held by economy i at time t depends not only on the respective standard deviation of the change in reserves and the opportunity cost of holding reserves but also on the standard deviation,

opportunity cost and imports of all the other countries, given by $ln(\sigma_{j,t})$, $ln(r_{j,t})$ and $ln(I_{j,t})$.

In this sense, to incorporate these effects, the intuition that they are not negligible lies in the recent empirical evidence that there is contagion and financial integration in the countries of South America. The estimation is suggested here of relation (1), in a system for the five emerging economies following a vector auto regressive (VAR) model or its natural extension, in the case of cointegration in the time series in question, that is, a vector error correction model (VEC).

The second step is the adoption of a framework for modeling the volatility. Engle (1982) suggests conditional variance heteroskedasticity as a linear function of the square of past innovations, giving rise to the famous framework entitled autoregressive conditional heteroskedasticity (ARCH). Aiming to obtain a more parsimonious framework, no major problems with signal parameters and both a long memory and a more flexible lag structure, we follow the extension suggested by Bollerslev (1986) entitled generalized ARCH (GARCH).

Here, we follow West and Cho (1995), who show that, for short time horizons, exercises following the GARCH family of frameworks are more accurate and appropriate to predict volatility than a constant standard deviation or even compared with other frameworks of conditional volatility. A recent application of this very interesting framework for Brazil and other Latin American countries is reported by Hegerty (2014).

Concerning the GARCH model, $\varepsilon_{i,t}$ is the demeaned series of reserves, which follows a normal distribution, and of which the conditional variance $\sigma_{i,t}^2$ is expressed by equation (4). Regarding this equation of variance, as is usual in the GARCH specification, we have that $p > 0, q > 0, \theta_0 > 0, \theta_l \geq 0, \tau_s \geq 0$ and $0 \leq \sum_{l=1,s=1}^{\max(p,q)}(\theta_l, \tau_s) < 1$. As reported in this literature, low-order GARCH is used in most applications. Therefore, we have to find the best specification for GARCH by defining the number of lags, p and q, respectively. $\xi_{i,t}$ is the residual of the variance equation.

EMPIRICAL EXERCISE

The data used in this study consist of time series of monetary, financial and exchange rate variables with monthly frequency for the economies of Argentina, Brazil, Chile, Colombia and Peru, according to their original formation. In the case of reserves, aiming at uniformity, all the series are converted into US dollars using the official spot exchange on the last business day of the month.

The series of spreads is the ratio of the gross nominal returns of the respective domestic interest rates, a proxy for which is given by the ratio between the heading immediate interest rate. These data are available from the Organization for Economic

Co-operation and Development (OECD Statistics) and the US rate, calculated through the open parity applied to the monthly series of Treasury bills (T-bills).

The data for these countries are restricted to the sample from January 2004 to December 2015 in the 144 monthly observations. The sources of these data, the series of spot exchanges of international reserves in the domestic currency, imports of goods and the interest rate in the US economy were extracted from the Federal Reserve Economic Data (FRED), International Monetary Fund (IMF)/International Fund Statistic (IFS). The rates set by central banks in the very short term were extracted from the OECD Statistics.

A basic condition to guarantee the reliability of the autoregressive vector method (VAR) is the performance of specific tests for stationarity, which are based on the unitary root test. These can be analyzed through different tests, including the augmented Dickey–Fuller (ADF) test. The results reported in Table 1 are obtained through the augmented version (ADF) of the test originally proposed by Dickey and Fuller (1979, 1981).

TABLE 1. UNIT ROOT TEST[a,b]

Variable	Test	Level		First difference	
Ln(Reserves)		Test statistic	p-value	Test statistic	p-value
Argentina	ADF	-2.207	0.204	-10.280	0.000
Brazil	ADF	-1.904	0.330	-5.057	0.000
Chile	ADF	-0.772	0.824	-13.562	0.000
Colombia	ADF	-1.609	0.476	-9.847	0.000
Peru	ADF	-2.072	0.256	0.256	0.000

[a]Unit root tests of the time series of the Naperian logarithm of international reserves in US dollars during the period from January 2004 to December 2015. [b] Results based on the Dickey–Fuller unit root test, for which the reported t statistics refer to the specification with trend and intercept. These results are robust to changes in this specification. The critical values reported at 5% follow McKinnon (1996). The choice of lags follows the Schwarz criterion.

We observe that all the time series (in log) of the reserves in this block of emergent countries are non-stationary, and they are stationary in the first difference, a result that is robust to a change in technique, since each is more adequate due to the power of the test. Because of this result, we can proceed to the estimation of the econometric vector error correction (VEC) framework.

Besides this result, the accumulation of international reserves adopted by a country is questioned by its maintenance cost, which is linked to the spread between the interest received with the application of reserves in the international markets and the abdicated returns for not investing in some alternative applications of these resources.

If there are costs and benefits, it is very probable that there is an optimal volume of international reserves, which equals the marginal costs and benefits of asset maintenance, so the variable of the buffer stock model seeks to capture the social cost associated with this maintenance of international reserves. In addition, the spread is nothing more than the interest difference.

Rodrik (2006) observes two types of costs involved in accumulating international reserves. First is the spread between the cost of short-term private sector loans abroad and the yield that the Central Bank earns on its net foreign assets, such as T-bills. Second is the loss from buying T-bills instead of increasing the capital stock or social expenditures like programs to combat poverty.

The series for this spread from January 2004 to December 2015 in South America are reported in Figure 5.

The Argentine spread, unlike that of the other economies, clearly shows increasing behavior over the period, rising from a value close to zero, 0.19% in March 2004, to reach 22.65% in December 2015. It is also important to highlight that, after the application of exchange control on October 31, 2011, there was a jump in the spread charged by the Government.

In the other economies, we observe that apparently similar behavior occurs, only with different magnitudes, whereby, after the American subprime crisis in 2008, there was a strong reaction of the economies in this period. As international investors withdrew their investments from several emerging countries at that time, followed by an increase in the spreads, Brazil and Argentina arrived at the beginning of 2009 at approximately 13%, Chile and Colombia at around 8% and Peru at around 6%.

The empirical literature based on this model commonly makes use of the techniques that make up the autoregressive conditional heteroskedasticity (ARCH) family, introduced by Engle (1982), to extract the volatility series of the reserve variation. This family ranges from simple and parsimonious specifications to others, such as the exponentially weighted moving average (EWMA) and other extensions, like the generalized ARCH, exponential GARCH and threshold GARCH models.

Table 2 reports the main results based on the estimate of the buffer stock model, including the cross-effects. In the first step are the results of the estimation of the volatility frameworks of the reserve variations of Argentina, Brazil, Chile, Colombia and Peru, in which all the GARCH specifications are estimated up to two residual lags and variance lags.

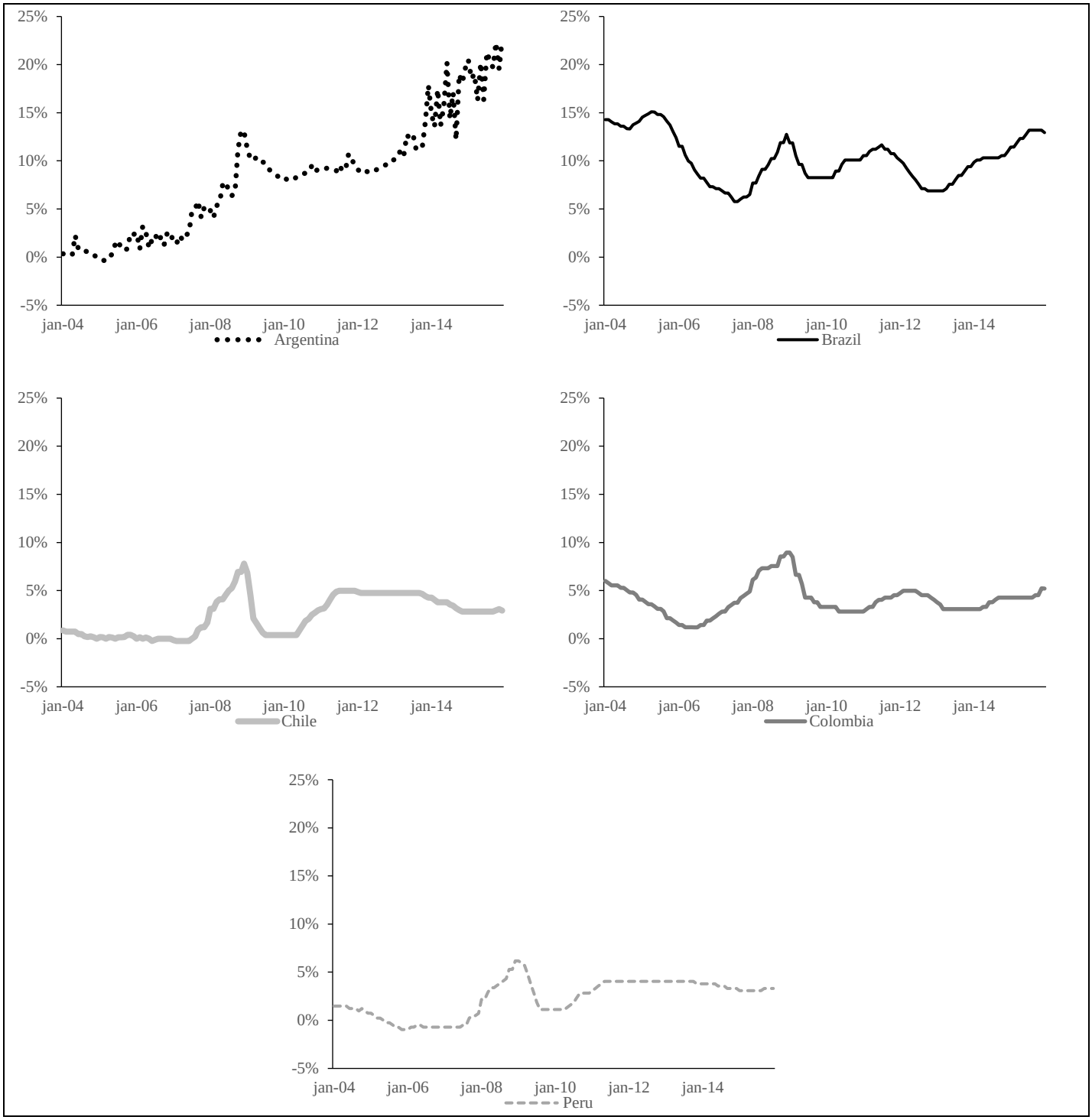


FIGURE 5. SPREAD OF INTEREST FROM SOUTH AMERICAN COUNTRIES[a]

[a]The series consist of the Naperian logarithm in the ratio between the gross interest of the emerging economy in question and the US economy.

As observed in Table 2, for all the countries, the specifications present individual significance for the parameters at the 5% level, except for only two coefficients, these

being significant at the 10% level, highlighting the most parsimonious specification possible for the economy of Colombia.

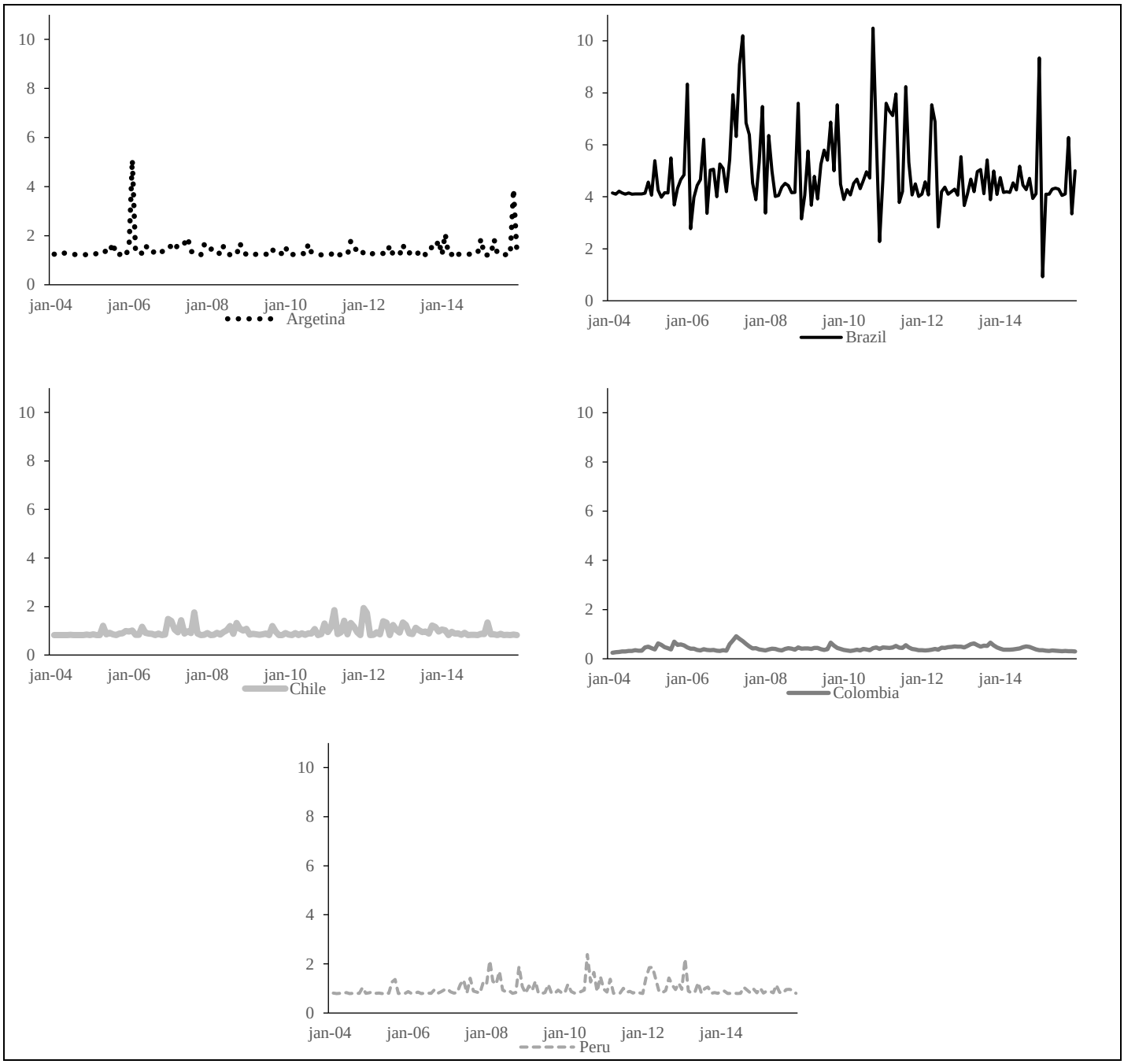


FIGURE 6. CONDITIONAL VOLATILITY OF RESERVES' VARIATION (02/2004–12/2015)[a]

[a] Methodology: the series are extracted using the procedure of identification of the best specification, according to the Akaike criterion, among the parsimonious specifications until GARCH (2,2), in which the variables with a greater lag are significant individually.

As a consequence, these estimates can be visualized in a more concrete and comparative way through Figure 6. We perceive a great difference in the behavior of the curves. The first and most notable observation is that the curve of Brazil shows

several periods of volatility, the orders of magnitude of which are greater than those in the other countries, by the order of magnitude of the Brazilian reserves. This volatility in part depends on the aid that this potential economy offers to the other economies of South America and on the contagion of external crises in emerging partners of this economy. The volatility of the Argentine reserves shows a "softer" behavior in relation to Brazil, mostly oscillating close to 1, with a strong variation in February 2006, leaving the level of 1.1 and reaching 5.1. The Colombian reserves have the lowest oscillations in their volatility around zero; this small oscillation is due to the policy adopted by the Colombian Bank of the Republic, which, according to Gómez (2006), has a type of intervention that is called accumulation or disaccumulation of reserves following a volatility control rule. According to the same author, the bank buys international reserves when the exchange rate is below the moving average of the last twenty days minus 4% and sells reserves when the exchange rate is above the moving average of the last twenty days beyond 4%.

The estimation of the system of equations that compose the modeling of the monthly evolution from 2004 to 2015 of the reserves in US dollars of Argentina, Brazil, Chile, Colombia and Peru via restricted VEC, based on the premise of exogeneity of the explanatory variables of the buffer stock model, which are shown to be stationary, are reported in the second step of Table 2. Initially we consider the explanatory power, an important factor in our research. We observe an improvement over the buffer stock model with no cross-effect for all the countries. It is important to observe an increase in the adjusted R^2, for which the explanatory power of Argentina leaves 7% in the buffer stock model with no cross-effect for approximately 12% in the buffer stock with cross-effects, which is still a low level for the specification of the model, and the same is true for Colombia, which reaches 11% for the model with cross-effects.

TABLE 2. ESTIMATION OF THE BUFFER STOCK MODEL WITH CROSS-EFFECTS[a,b,c]

	Endogenous variables: reserves (in log)				
Exogenous	Argentina	Brazil	Chile	Colombia	Peru
First step: estimations					
Variance equation based on the parsimonious GARCH model					
Constant	1.47e+18	1.69e+19	6.76e+17	3.87e+16	6.33e+17
	(0.000)	(0.000)	(0.000)	(0.070)	(0.000)
ε_{t-1}^2	0.339	0.696	0.301	0.248	0.441
	(0.000)	(0.015)	(0.039)	(0.059)	(0.014)
ε_{t-2}^2		0.558			

		(0.037)			
σ_{t-1}^2			0.558		
			(0.000)		
Second step: estimations and complementary results					
Joint buffer stock model: cointegration vector					
Constant	0.443	-1.361**	1.100 **	-0.606**	-0.221
	[0.523]	[-2.052]	[1.651]	[-1.842]	[-0.473]
Coint. #1	-0.029 ***	-0.010 *	-0.044***	-0.007 *	-0.034***
	[-2.396]	[-1.292]	[-4.589]	[-1.477]	[-5.063]
Joint buffer stock model: spread					
Argentina	-0.375 ***	-0.140 *	-0.578 ***	-0.096 *	-0.458***
	[-2.375]	[-1.351]	[-4.646]	[-1.566]	[-5.257]
Brazil	-0.052	-0.327 ***	0.090	-0.038	-0.235**
	[-0.280]	[-2.701]	[0.619]	[-0.530]	[-2.305]
Chile	-0.188	-0.335	0.960***	-0.108	-0.144
	[-0.359]	[-0.978]	[2.332]	[-0.531]	[-0.500]
Colombia	0.159	-0.057	-0.551**	-0.075	-0.381**
	[0.433]	[-0.238]	[-1.914]	[-0.523]	[-1.891]
Peru	0.061	0.047	0.873*	0.165	0.888***
	[0.088]	[0.105]	[1.609]	[0.615]	[2.340]
Joint buffer stock model: conditional volatility					
Argentina	-0.015	0.007	-0.003	-0.001	0.002
	[-0.670]	[0.478]	[-0.143]	[-0.056]	[0.138]
Brazil	-0.0280**	0.0129*	0.002	-0.007	-0.002
	[-1.847]	[1.297]	[0.178]	[-1.259]	[-0.253]
Chile	0.014	0.016	-0.065***	0.016**	-0.001
	[0.571]	[1.047]	[-3.497]	[1.765]	[-0.100]
Colombia	0.018	0.015	0.0357**	0.0145**	0.012
	[0.859]	[1.118]	[2.187]	[1.801]	[1.066]
Peru	-0.004	0.006	-0.020*	0.009	0.004
	[-0.240]	[0.518]	[-1.447]	[1.242]	[0.434]

Continued on the next page…

Joint buffer stock model: imports					
Argentina	0.078*	0.049	-0.060	0.005	-0.107***
	[1.322]	[1.254]	[-1.271]	[0.230]	[-3.262]
Brazil	-0.070*	-0.009	-0.023	0.029*	0.057**
	[-1.315]	[-0.263]	[-0.544]	[1.420]	[1.961]
Chile	-0.038	0.045*	-0.048	-0.057***	0.065***
	[-0.758]	[1.387]	[-1.215]	[-2.975]	[2.382]
Colombia	0.060	-0.026	-0.004	0.038**	-0.041
	[1.007]	[-0.664]	[-0.086]	[1.666]	[-1.239]
Peru	-0.045	-0.012	0.097**	-0.005	0.009
	[-0.827]	[-0.348]	[2.283]	[-0.238]	[0.332]
Adj. R-squared	0.116	0.229	0.200	0.106	0.288
F-statistic	2.170	3.650	3.231	2.057	4.595

[a] Estimate based on results over the period from February 2004 to December 2015. [b] GARCH models estimated through ARCH with normal distribution errors, using the Bollerslev–Wooldridge robust heteroskedasticity coefficient of covariance of residues. P-values are in brackets, while t-statistics are bracketed. [c] The Newey and West method (1987) covariance coefficients aim to obtain robustness to heteroskedasticity in the averaged equation based on the MQO method estimates. * indicates significance at the 10% level. ** indicates significance at the 5% level. *** indicates significance at the 1% level.

However, for Brazil, Chile and Peru, the explanations reach higher levels for the buffer stock model with cross-effects of the order of magnitude of almost 23%, 20% and 28%, respectively. Regarding the cointegrating vectors, for all the economies in question, according to the maximal eigenvalue test, the null hypothesis of a cointegrating vector is not rejected; that is, there is significance of the parameters, in all these cases with a negative sign. The most relevant analysis, however, lies in the significance of individual effects and cross-effects. It is shown in the second stage of Table 2 that the Argentine economy reacts negatively to the spread and positively to the imports from its own country and reacts negatively to fluctuations in volatility and imports from Brazil, which is to be expected.

Brazil's reserves react negatively to oscillations in its own spreads and those from Argentina, and it reacts positively to movements in its volatility and Chilean imports. The Chilean economy is influenced by the spreads of all the other countries, with the exception of the Brazilian spread, reacts negatively to fluctuations in its own reserves and Peruvian reserves and reacts positively to fluctuations in Colombian reserves and imports. The Colombian economy reacts negatively to the spread of Argentine and Chilean imports and positively to its own volatility and imports, and it reacts to Chilean volatility and Brazilian imports. The Peruvian economy, counterintuitively, is not influenced by any one fluctuation in reserves; however, it is influenced negatively by the Brazilian, Argentine and Colombian spreads and positively by its

own spreads, and it is affected by imports from Argentina (negatively) and from Brazil and Chile (positively).

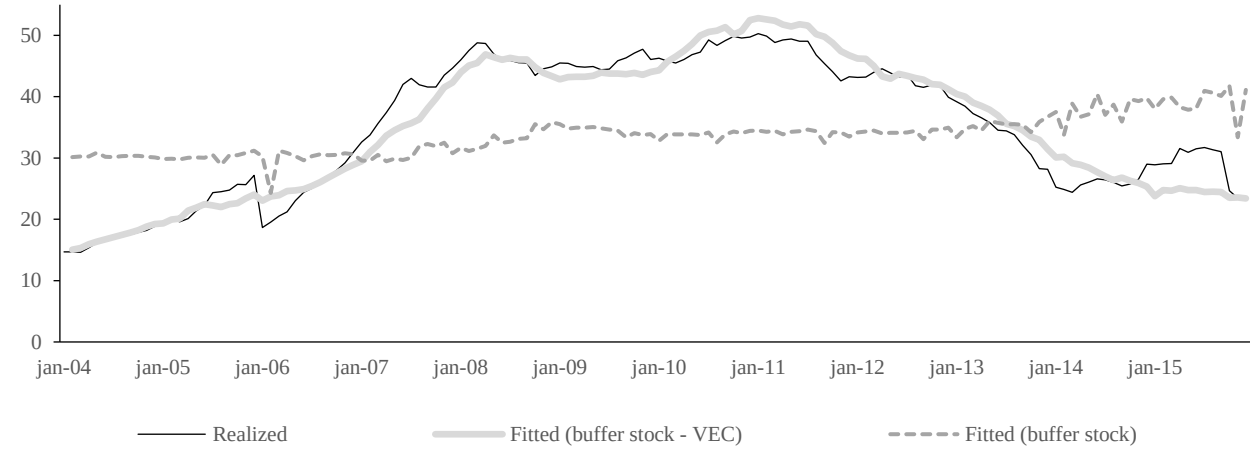
The results of the estimations and inferences of this framework can be visualized in the graphs reported in Figure 7. In these graphs the stock of reserves in each economy is considered at the end of January 2004 as a starting point, and from this month the optimal trajectory is based on the accumulated theoretical variations suggested by the buffer stock model with cross-effects.

Chang (2008) observes a policy of reserve accumulation as one of the measures used by the Brazilian Government to deal with the problem of increasing appreciation of the real despite growth observed since 2004. This Brazilian reserve policy presents a phase very close to the optimum that extends from the beginning of the period until March 2011; from that date onwards, it has more international reserves than the optimum until April 2013, during the fiscal instability of the European countries, when it adopts a conservative stance until the end of 2015.

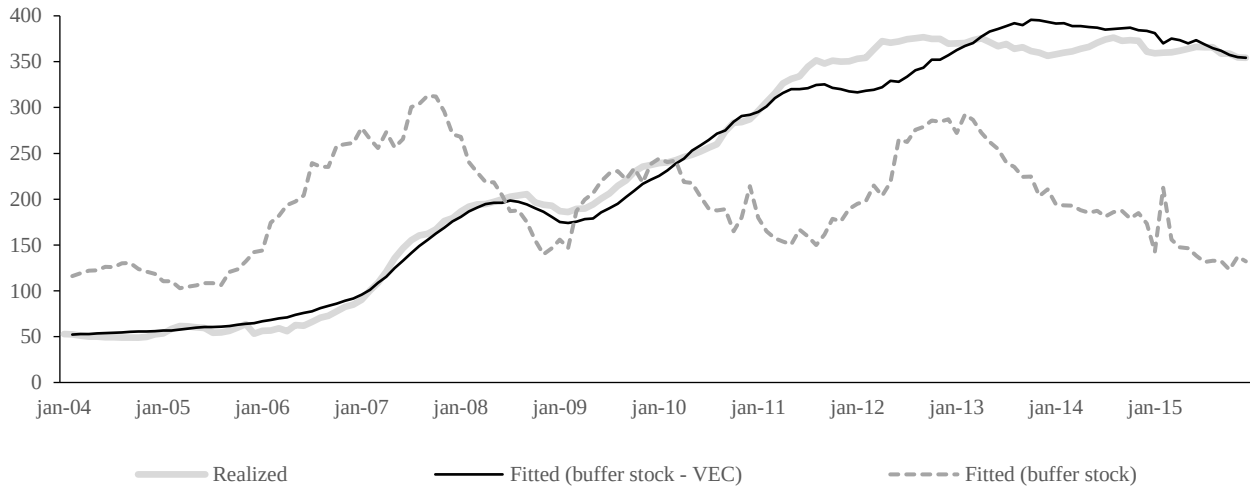
The Argentine reserves up to 2010 show an oscillation in the posture in relation to the optimum; from this date until the end of 2014, there is a conservative relationship in its reserves that may be related to the policy adopted by the Government. According to Schincariol and Fernandez (2014), this policy had as its objective the containment of the dollar price, restricting its official commercialization, with the intention of controlling inflation, thus producing an illegal market of dollars and in turn causing an escape of the international reserves. From 2014 onwards, it returned to a greater amount of reserves in relation to the optimum, which can be explained by the government policy that in January 2014 managed a resumption of the appreciation of the dollar against the local currency, thus bringing a strong preference for the dollar as the reserve currency.

The reserve policy practiced by Colombia is very close to the composition of optimal reserves, oscillating in a conservative stance until March 2006, followed by a sequence up to April 2009 characterized by a lower than optimal protection level and returning to conservatism until 2014. This closeness to the optimum can be explained by the type of intervention of the central bank, the prior announcement of the accumulation or depletion of reserves mentioned by Echavarría et al., (2010).

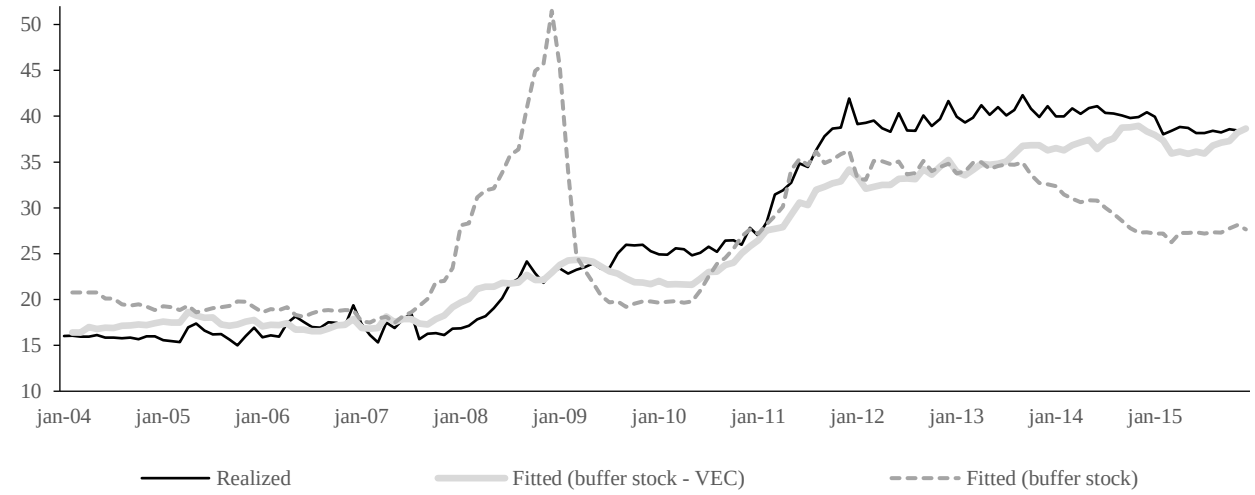
a. Argentina



b. Brazil



c. Chile



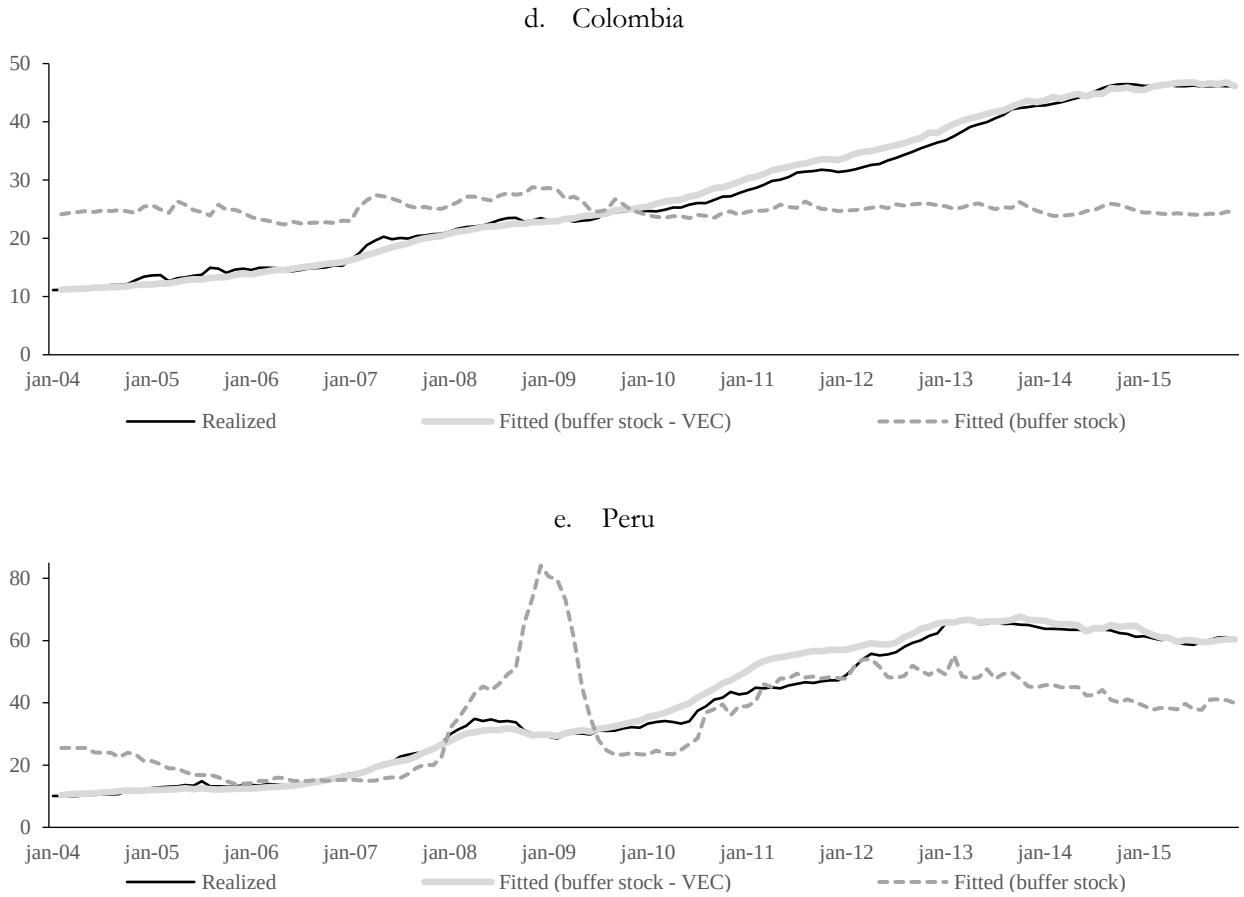


FIGURE 7. MONTHLY REALIZED AND FITTED TOTAL RESERVES (US$ BILLION) FOR THE SOUTH AMERICAN ECONOMIES[a]

[a] This figure plots the series of monthly realized reserves and the predictions based on the original buffer stock model and its extended version, taking into account cross-effects, during the period from January 2004 to December 2015.

In Chile, we observe two stages in the accumulation of reserves, one before 2008 characterized by the oscillation of the optimal reserves with those practiced by the Government and one after 2008 with a conservative stance characterized by a surplus of its reserves in relation to the optimal one until 2015. This oscillation can be explained by the two programs adopted by the Central Bank in 2008 and in 2011, which, according to De Gregorio (2011), had as a priority the purchase of reserves and the issuance of foreign currency readjustable bonds.

In contrast to this race, the reverse applies to Peru, with a slightly more conservative moment before 2008 and after the crisis with a stance resulting in its reserve accumulation being less than optimal. In practice, this was due to the policy of the Peruvian Central Bank, which adopted the position to reduce the degree of dollarization of the economy as it attempted to recover the value of the Peruvian

currency, causing domestic institutions to substitute foreign currency assets and liabilities for domestic currency.

To confirm the results of Table 2, we determine the impulse response effect of the VEC method based on the cross-effect buffer stock model for the same countries, reported in Figure 8. We can confirm that apparently the contagion effects of the countries of South America do not seem to be relevant to the Brazilian and Colombian reserves. Already the reserves in Argentina, Peru and Chile are more dependent on the impacts of the other South American economies.

DISCUSSION

We believe that our framework is useful for supporting Argentine, Brazilian, Chilean, Colombian and Peruvian policy makers' decisions about driving the stock of international reserves because of the good performance of fitting, the assumptions of our micro-fundamented model and the results based on the individual and joint significance. We can infer, based on the trajectories reported in Figure 7 and the forecasting errors, which the behavior of the monetary authority in practice has been close to that provided by the theoretical framework.

Firstly, according to Lanteri (2013), from the second term of President Cristina Kirchner in 2010, Argentina introduced a policy of restrictions on the purchase of foreign currency in the official foreign exchange market, limitations on turning profits abroad, increasing payments made by Argentine tourists abroad, import barriers, government bond sales in dollars and others. This policy was aimed at accumulating reserves and limiting the outflow of capital. However, the Argentine reserves declined in net terms, and, according to our model, in this period the economy was in a process of conservatism. We believe that this event was due to the distrust of the economic agents and the monetary and fiscal policies, which were expansionist and fed the inflation in that period.

In Chile economic interventions were implemented in the years 2008 and 2011; mainly the second intervention had the objective of bringing the reserves from 13% to 17% of the GDP to affect the exchange rate. We believe that these policies were crucial for the reserves to be above the optimum for 78 months, generating an average conservative excess of US$3.71 billion. At this time the Chilean Government could be less conservative in its accumulation of reserves, seeking an alternative with lower costs, to reach the exchange rate, for example using commodity hedges, which would be a more convenient financial instrument.

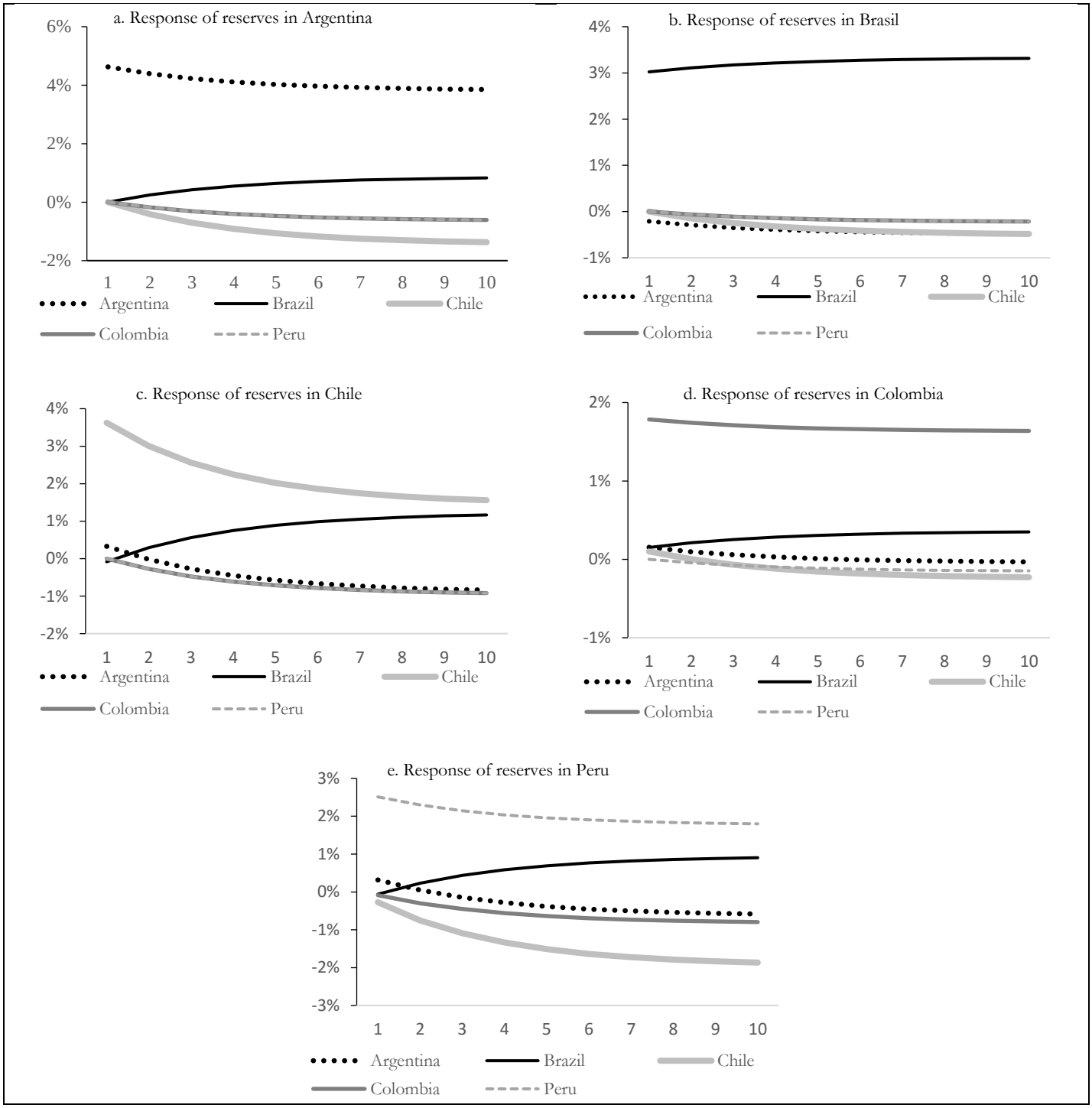


FIGURE 8. IMPULSE AND RESPONSES OF THE TOTAL RESERVES (US$ BILLION) FOR SOUTH AMERICAN ECONOMIES[a]

[a] This figure plots the series of monthly impulse responses based on the extended version of the buffer stock model, taking into account cross-effects, during the period from January 2004 to December 2015.

Following the crisis of 2008, our model observes that in the Peruvian economy there was an excess of reserves for 81 months, with a monthly average of R$1.09 billion dollars. This excess can be explained by the policy of the Central Bank of Peruvian Reserves, which actively intervened in the foreign exchange market to reduce the exchange rate fluctuations and build international reserves. According to Rossini, Armas and Quispe (2014), as of 2008 this accumulation of reserves was used as a monetary control tool and was intended to contain the impact of capital flows on internal credit conditions, both in the national currency and in foreign currencies. In addition, as a tool to address liquidity and foreign currency credit risk, a high level of mandatory reserves on liabilities in foreign currencies was also established.

Colombia, during the analyzed period, generated a very small excess of reserves of an average of R$382 million monthly dollars; we find that the accumulation of reserves realized was very close to the optimum. The policy for the purchase of reserves was due to the Board of Directors of the Banco de la República, which is responsible for the exchange rate policy in Colombia and is chaired by the finance minister, who is the government representative in the council that is responsible for the interventions. This Government adopted automatic and explicit rules of intervention, and we believe that this closeness to the optimum was caused by the transparent interventions made by the council. According to Ramírez (2004), it is possible to estimate the number of interventions, because each week the reserve levels are published along with the monetary base.

Brazil was the economy that suffered the least from the changes in the other South American economies at the significance level of 5%. In the Brazilian reserves, we observe that, during the period from January 2014 to December 2015, it is possible to evidence more than six months without interruption, characterized by a conservative sequence in excess or a sequence of reserve deficiency. This evidence may support decisions on the use of Brazilian reserves for which, according to the Brazilian press, there are recent signs that the Brazilian Federal Government intends to make use of this indispensable level of for-profit reserves to deal with deficits or debts.

However, we maintain that the policy of the Central Bank of Brazil is the way indicated for the maintenance of reserves along with the trajectory of the current indicators involving transactions with external agents. For in our model during the months of January 2011 to December 2015 there was an average value of excess reserves of R $ 2.02 billion and if we consider all periods there will be an average value of excess reserves of R $ 1.61 billion, Which are very distant from the primary deficit of R $ 111 billion (1.88% of GDP) and insignificant compared to the nominal deficit, R $ 613 billion (10.34% of GDP), which corroborates the results found by Matos (2016).

CONCLUSION

In the last two decades, the central banks of the emerging countries have accumulated an unprecedented level of reserves. This stock of international reserves should be seen as a useful public good to ensure the continuity of economic activity and preserve financial stability, especially for emerging economies.

In this article, we explore the discourse of the theoretical–empirical literature regarding the optimal level of international reserves, conceptually following the basic notions of Heller (1966). We innovate in the methodological buffer stock through the significant cross-effects of conditional volatilities, their respective spreads and the imports among the countries of South America, given the strong financial and commercial relationship existing between these emerging economies.

One of the main results of our research is the increase in the explanatory power of the model in relation to the buffer stock model without cross-effects. That is, there is an increase in the adjusted R^2 for all the countries. Other results are the strong influence of the Argentine spreads on the reserves of the South American countries and the fact that the Brazilian reserves are less affected by the other economies.

In short, it is not possible to infer from these figures whether or not the level of reserves for the countries of South America is appropriate given the cross-stock buffer model unless an optimum theoretical path can be drawn considering the relevant and robust idiosyncrasies of the behavior of the monetary authority. In this context, due to the adequate performance, the assumptions of our model and the results based on the individual and joint meaning, we believe that our microfinance framework is useful for supporting the decisions of South American politicians on the conduct of international reserves.

Our contribution is especially relevant to the discussion on the ideal level of reserves for South America, especially for Brazil, given its independence from the other South American countries and the recent context that was characterized by a severe local crisis and a nominal deficit in December 2015 of R$613 billion, more than 10% of the GDP, and given the lack of prospects for improvement of the main economic fundamentals, such as inflation, GDP, employment and investment. In this scenario we affirm that Brazilian society needs to be protected by the current level of caution in international reserves, a conquest of the Brazilian people through the efforts of the Brazilian monetary authority.

REFERENCES

Aizenman, J. & Marion, N. (2003). The high demand for international reserves in the Far East: What is going on?. Journal of the Japanese and International Economies, 17(3), 370-400.

Alfaro, L. & Kanczuk, F. (2009). Optimal reserve management and sovereign debt. Journal of International Economics, 77(1), 23-36.

Bandeira, L. A. M. (2002). Neoliberal policies and the crisis in South America. Brazilian Journal of International Politics, 45(2), 135-146.

Ben-Bassat, A. & Gottlieb, D. (1992). Optimal international reserves and sovereign risk. Journal of International Economics, 33(3), 345-362.

Bird, G. & Rajan, R. (2003). Too much of a good thing? The adequacy of international reserves in the aftermath of crises. The World Economy, 26(6), 873-891.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics, 31(3), 307-327.

Calvo, G. & Reinhart, C. (2002). Fear of floating. Quarterly Journal of Economics, 117(2), 379-408.

Chakravarty, S. (2009). The optimal level of international reserves: The case of India. Journal of Social and Management Sciences, 38, 81-98.

Chang, H. J. (2008). Bad Samaritans: The guilty secrets of rich nations and the threat to global prosperity. Random House, Business books.

Cheung, Y. & Ito, H. (2009). A cross-country empirical analysis of international reserves. International Economic Journal, 23(4), 447-481.

Cifarelli, G. & Paladino, G. (2009). The buffer stock model redux? An analysis of the dynamics of foreign reserve accumulation. Open Economies Review, 20(4), 525-543.

De Gregorio, J. (2011). Acumulación de reservas internacionales en economías emergentes. Cuadernos de Economía, 30(55), 77-89.

Dickey, D. A. & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica: Journal of the Econometric Society, 1057-1072.

Dickey, D. A. & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427-431.

Dominguez, K. M., Hashimoto, Y. & Ito, T. (2012). International reserves and the global financial crisis. Journal of International Economics, 88(2), 388-406.

Echavarría, J. J., Vásquez, D. & Villamizar, M. (2010). Impact of exchange rate interventions on the level and volatility of the exchange rate in Colombia. Essays in Economic Policy, 28(62), 12-69.

Edwards, S. (1983). The demand for international reserves and exchange rate adjustments: the case of ldcs, NBER Working Paper No. 1063, 1964-1972.

Engle, R.F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Econometrica: Journal of the Econometric Society, 987-1007.

Flood, R. P. & Garber, P. M. (1984). Collapsing exchange-rate regimes: some linear examples. Journal of International Economics, 17(1), 1-13.

Flood, R. & Marion, N. (2002). Holding reserves in an era of high capital mobility. IMF working paper, No. 62.

Ford, J. & Huang, G. (1994). The demand for international reserves in China: An ECMmodel with domestic monetary disequilibrium. Economica, 61, 379-397.

Frenkel, J. A. (1974). The demand for international reserves by developed and less developed countries. Economica, 41, 14-24.

Frenkel, J. A. (1984). The demand for international reserves under pegged and flexible exchange rate regimes and aspects of the economics of managed float. Floating exchange rates and the state of world trade payments, Beard Books, 161.

Frenkel, J. A. & Jovanovic, B. (1981). Optimal international reserves: a stochastic framework. Economic Journal, 91(362), 507-514.

Furman, J., Stiglitz, J. E., Bosworth, B. P. & Radelet, S. (1998). Economic crises: evidence and insights from East Asia. Brookings papers on economic activity, No. 2, 1-135.

Gómez, J. (2006). Monetary policy in Colombia. Economy drafts, 394, 1-33.

Hecq, A. (2001) Common cycles and common trends in Latin America. Medium Econometrische Toepassingen, 10(3).

Heller, R. (1966). Optimal international reserves. Economic Journal, 76(302), 296-311.

Heller, H.R. & Kahn, M.S. (1978). The demand for international reserves under fixed and floating exchange rates. IMF staff papers, 25, 623-649.

Hegerty, S. (2014). Output volatility in Latin America, evidence from a multivariate Garch model. International Journal of Applied Economics, 11, 10-18.

Hur, S. & Kondo, I. (2014). A theory of rollover risk, sudden stops, and foreign reserves. FRB International Finance Discussion Paper, (1073).

Jeanne, O. (2007). International reserves in emerging market countries: too much of a good thing?. Brookings papers on economic activity, No. 1, 1-55.

Jeanne, O. & Ranciere, R. (2011). The optimal level of international reserves for emerging market countries: a new formula and some applications. Economic Journal, 121(555), 905-930.

Kelly, M. G. (1970). The demand for international reserves. American Economic Review, 60(4), 655-667.

Kenen, P. B. & Yudin, E. B. (1965). The demand for international reserves. Review of Economics and Statistics, 242-250.

Krugman, P. (1979). A model of balance-of-payments crises. Journal of Money, Credit and Banking, 11(3), 311-325.

Lane, P. R. & Milesi-Ferretti, G. M. (2007). The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004. Journal of International Economics, 73(2), 223-250.

Lanteri, L. N. (2013).Vulnerabilidad externa y reservas internacionales. Evidencia para Argentina. Análisis Económico, 28(69), 37-54.

Lewis, W. A. (1980). The slowing down of the engine of growth. American Economic Review, 70(4), 555-564.

Lizondo, J. & Mathieson, D. J. (1987). The stability of the demand for international reserves. Journal of International Money and Finance, 6(3), 251-282.

Luengo-Prado, M. J. & Sorensen, B. E. (2004). The buffer-stock model and the aggregate propensity to consume: a panel-data study of the US states. Discussion paper series n. 4474.

Luna, V. M. I. (2016). Brics' bank: possibilities and constraints. Economía informa, 398, 3-22.

MacKinnon, J. G. (1996). Numerical distribution functions for unit root and cointegration tests. Journal of Applied Econometrics, 601-618.

Matos, P. (2016). On the forward-looking behavior of Brazilian central bank regarding the total reserves. Caen working paper nº.3.

Matos, P., Rebouças, M. & Jesus Filho, J. (2016). On the relationship between total reserves and contagion effects of BRIC financial markets. Empirical Economics Letters (forthcoming).

Matos, P., Siqueira, A. & Trompieri, N. (2014). Analysis of integration and financial contagion in South America. Brazilian Journal of Economics, 68(2), 277-299.

Mejía-Reyes, P. (2000). Asymmetries and common cycles in Latin America: evidence from Markov switching models. Economía Mexicana. Nueva Epoca, 189-225.

Newey, W. K. & West, K. D, (1987). A simple positive semi-definite heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica, 55, 703-708.

Obstfeld, M. (1994). Evaluating risky consumption paths: the role of intertemporal substitutability. European Economic Review, 38(7), 1471-1486.

Pina, G. (2015). The recent growth of international reserves in developing economies: a monetary perspective. Journal of International Money and Finance, 58, 172-190.

Ramachandran, M. (2004). The optimal level of international reserves: evidence for India. Economics Letters, 83(3), 365-370.

Ramírez, J. M. (2004). Foreign Exchange Market Intervention through Options: the Case of Colombia. Document presented during the Congress on Practical Aspects of Inflation Targets conducted by the National Bank of the Czech Republic.

Rodrik, D. (2006). The social cost of foreign exchange reserves. International Economic Journal, 20(3), 253-266.

Rossini, R., Armas, A. & Quispe, Z. (2014). Global Policy Spillovers and Peru's Monetary Policy: Inflation Targeting, Foreign Exchange Intervention and Reserve Requirements. Foreign Exchange Intervention and Reserve Requirements (August 2014). BIS Paper, No. 78p.

Saidi, N. (1981). The square-root law, uncertainty and international reserves under alternative regimes: Canadian experience, 1950–1976. Journal of Monetary Economics, 7(3), 271-290.

Schincariol, V. E. & Fernandez, R. G. (2014). Economic Growth and Government Policies in Argentina, 2003-2014. Paranaense Development Magazine, 35(127), 59-78.

Soto, C. & García, P. (2004). Large Hoardings of International Reserves: Are They Worth It?. Documentos de Trabajo (Banco Central de Chile), (299), 1.

Souza, R. G. & Triches, D. (2013). Analysis of the level of international reserves of emerging countries from 2000 to 2010. Electronic Journal in Environmental Management, Education and Technology, 16(16), 3200-3212.

Steiner, A. (2013). How central banks prepare for financial crises–an empirical analysis of the effects of crises and globalisation on international reserves. Journal of International Money and Finance, 33, 208-234.

Summers, L. H. (2006) Reflections on global account imbalances and emerging markets reserve accumulation. Harvard University.

West, K. D. Cho, D. (1995). The predictive ability of several models of exchange rate volatility. Journal of Econometrics, 69(2), 367-391.

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OPEN ACCESS ARTICLE

CORRECTION OF STRUCTURAL IMBALANCES EXPERIENCE OF SUDAN

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Abstract

This paper investigates the magnitudes of structural imbalance in Sudan economy, measures taken to tackle the problem, and the outcome of those remedies i.e. structural adjustment programs (SAPs). Sudan has been implementing SAPs for four decades none of the objectives has been achieved. Inference statistics has been used to identify the imbalances accompanied by econometric tools i.e. the spline regression, and vector error correction to quantify the effects on economic growth as the ultimate target of SAPs. The main findings are that real effective exchange rate (REER) as a summary index of pricing policy and competitiveness has a negative impact on economic growth contrary to the growth of labor productivity (LPGR). The paper recommends the taking on of alternative programs.

Key words:

Growth; Impact; Objectives; SAPs; Structural Imbalances.

INTRODUCTION

Developing countries including Sudan have been suffering from several interrelated and mutually effective structural imbalances, and this fact has had economic, political and social reasons. Economic reasons relate to the reliance on the production and exportation of primary goods exploiting obsolete technology, unskilled labor, insufficient and low quality inputs (Ibrahim, 2015; Arabi, 2012). The political reasons rest on the collapse of the Soviet Union and the disintegration of the Socialist system which was a blow to the third world countries where such aid had stopped, the experience one-party State doomed to failure and most of LDCs lost their strategic importance by the end of the cold war combined with low commodity prices and unfulfilled aspirations of economic development, others descended to low levels of backwardness (Alhayaly & Ali, 2010). However, the two-gap model is considered as a better interpreter on structural imbalances (Muhannah, 2014). It postulates that

developing economies face two gaps in their economy i.e. the saving-investment gap, and export–import gap. The first gap is the outcome of low level saving compared to massive amount of investment required for economic development. This gap is financed mainly by aid, external borrowing and trade surpluses. Concerning the second gap developing countries produce and export only primary goods, while importing consumer and capital goods leading usually to current account deficits. Adopting the notion of the free market would only mean that it would get LDCs locked in to the agricultural sector and their manufacturing sector would never grow, thereby ruling out a structural transformation in the nature of the economy (https://www.quora.com/What-is-the-two-gap-model-in-development-economics).

In early 1980's the World Bank (WB) and International Monetary Fund (IMF) engaged on imposing structural adjustment programs (SAPs) on many developing countries including Sudan. Most countries applied SAPs has been suffering from poverty, unemployment, income inequality, desertification, environment degradation, displacement, the reluctance of political participation, and loss of legitimacy of political systems through military coups and civil war and the influx of refugees.

Sudan inherited a dual economy from the colonial rule in 1956 consisting of traditional and modern sector. Even with series of short term, medium and long term development plans, the majority of the population still depends on the traditional sector for their living. The development process and the inappropriate economic policies led to internal and external imbalances. The first attempt to correct imbalance was the devaluation of the exchange rate by 43% in September 1978 as recommended by IMF. Then the six year plan (1976/77 - 1981/82) has been replaced by rolling development programs constructed by World Bank experts. The plans designed typically on SAPs framework to require Sudan to keep concentration on the production of cash crops and minerals at the expense of food crops; eliminate subsidies to reduce government spending; pay less attention to social programs and wellbeing; frequently devaluate the local currency; liberalize trade; and privatize public enterprises.

The motivation for this paper is the persistence of those in power in Sudan to adhere to the directives of the World Bank and IMF and reject to admit alternative programs in spite of the apparent failure of SAPs. Many Sudanese scholars wrote about, and criticized SAPs, the prominent of who is Ali Abdel Gadir (1992, 1992, 2003, and 2007). SAPs entail sacrifice of present pain for future hope. Many questions require answers i.e. did SAPs improve Sudan's foreign investment climate? Did they boost foreign exchange earnings? Did they reduce government deficits? How long will the pain and hope last?

This paper differs from others in its methodology which use suitable Spline regression and error correction model instead of the typical employment of dummy variable to assess the role SAPs to arrive at the determinants of their ultimate target i.e. economic

growth spanning for four decades. The paper is organized as follows: introductory section, literature review in the second section, theoretical background and methodology occupy the third and fourth sections respectively, results and discussion are in the fifth section and finally the conclusion.

LITERATURE REVIEW

Ibrahim (2015) examined the impact of the SAPs on the agricultural finance in Sudan and identified the role of the Agricultural Bank in financing the agriculture sector as the sole primary finance for the agricultural projects in Sudan. Many negative results were appeared in terms of GDP declining which had affected the investment programs. Shah (2013) cited that many developing nations are in debt and poverty partly due to the IMF and the World Bank policies which led to the dependency of the developing or third world countries, on the richer nations despite claim of the IMF and World Bank that they will reduce poverty. Abdulmuneim (2012) identified the ups and downs that affect general Arab economies during the 1990's period compared to the 2000's period. Trend analysis showed that Arab economies have been affected by a number of ups and downs during the second period compared to the first period. Nevertheless the Arab economies' recovery from these fluctuations was faster during the second period compared to the first one, reflecting the positive impact of economic reform programmes and policies, in addition to the impact of fiscal and monetary policies that have been adopted for price stability and the government budget deficit and reduce fluctuations in exchange and interest rates, which helped to lay the foundations of economic stability in the short and medium term.

Hassan (2012) investigated the relationship between inequality, poverty and growth reaching the conclusion that, in the long- run the causality runs from inequality, poverty to growth, and to poverty, while in the short-run causal effects, runs from poverty to growth. Thus, there is unidirectional relationship, running from growth to poverty, both in the long- run and short run. Almaghrabi (2010) specified that the experience of many countries that were implementing such programs explained that the latter has negative implications for the standard of living in these countries. They contribute in determining the evolution of national output and income redistribution, and affect employment and prices, overhead, etc. Affecting the poor strata of the society, as well as low income and led entire communities to serious positions, as they touched the lowest conditions of their lives and their livelihoods.

Ali (2007) believed that the empirical evidence on the impact of public policies on poverty can best be characterized as mixed. Alshamari (2007) considered the effects of SAPs in Yemen presenting a low effect on growth by general budget deficit ratio to GDP, and the current account deficit ratio to the GDP compared to positive effects of the inflation rate, and the exchange rates. He established that the reason of the problem in Yemen wills not monetary imbalances but real imbalances. Ogbimi (2001) reached the conclusion that after implementing SAPs many African countries have

still not made measurable progress. Nigeria has implemented SAP for almost a decade now, but none of the objectives has been achieved, and there is no indication that any of them can be achieved using the chosen program instruments. Indeed, all that is still obviously present in Nigerian foreign exchange market and the ceremonies associated with it. The situation is not different in Ghana, Zambia, and other African nations implementing SAPs. Sharabi (1997) recognized that the phenomenon of lack of improvement in employment levels and worsening unemployment is seen in the Maghreb countries and other developing countries that implemented structural adjustment measures since the beginning of the 1980s.

Alhabab (1997) observed that the group of countries that traditionally applied to macroeconomic policies aimed at stabilizing the economy, most notably begin to reduce currency exchange rate, cut government spending, reduce liquidity Algeria and Egypt were the exception centering reform policies in institutional reforms and incentives in agriculture in the first place. Noorbakhsh and Paloni (1997) set up that SAPs do not seem to have had a lasting or significant impact on supply capacity and diversification of production. If this interpretation is correct, the growth in exports may not be sustainable. Thus, while structural adjustment policies seem to work in the short-run to medium, the sustainability of trade policy reforms requires an explicit targeting of capacity and production diversification. Ali (1992) presented the impact of SAPs on the dispersion of poverty in the Sudan establishing that SAPs policies affect income distribution, inflation, and cause an increase in the number of poor.

THEORETICAL BACKGROUND

The first principle economic and financial adjustment should pave the way to financial reform i.e. to treat budget weakness before financial repression (Alkawaz, 2009). Structural adjustment is the set of free market economic policy reforms imposed on developing countries by the World Bank and International Monetary Fund (IMF)) as a condition for receipt of SAPs to improve a country's foreign investment climate by eliminating trade and investment regulations, to boost foreign exchange earnings by promoting exports, and to reduce government deficits through cuts in spending. The necessary measures to ensure economic recovery and growth are: specialization in the production of cash crops; abolishing subsidies; cuts in government expenditure; devaluation of local currency; foreign investment; and privatization of government enterprises. The process of adjustment, as described by many World Bank and IMF officials to developing countries, is one of "sacrifice" of "present pain for future hope". Currency devaluation is assumed to increase the country's competitiveness which can be captured by real effective exchange rate (REER) which is defined as the weighted average of a country's currency relative to an index or basket of other major currencies, adjusted for the effects of inflation. The weights are determined by comparing the relative trade balance of a country's currency against each country within the index (Investopedia, 2017).

METHODOLOGY AND DATA

Data sources

The model consists of four variables; real GDP growth (GR) that is the dependent variable and three independent variables i.e. growth of labor productivity (LPGR), growth of general price (PGR), and real effective exchange rate. Data of the first three variables were collected from the Central Bureau of Statistics; the forth was obtained from the database of real effective exchange by the World Bank (RRER). Data sample covers the period 1960-2014. The selection of the start period is due to the fact that it represents the beginning of first comprehensive development Plan and the establishment of the Central Bank of Sudan.

Methodology

Regression models in which the function changes at one or more points along the range of the predictor are called splines, or piecewise polynomials, and the location of these shifts are called knots. The polynomials join the knots $\{\varphi_j; j = 1,2,\cdots,m\}$ obeying continuity conditions for the function itself and its first $n-1$ derivatives. Most commonly n equals three; a cubic spline function is defined as:

$$y = S(x) = P_i(x) = a_j + b_j x + c_j x^2 + d_j x^3$$

Spline Ordinal will be selected since the order of the categories of the observed variable is preserved in the optimally scaled variable. Category points will be on a straight line (vector) through the origin. The resulting transformation is a smooth monotonic piecewise polynomial of the chosen degree. The pieces are specified by the user-specified number and procedure-determined placement of the interior knots.

RESULTS

Means and variances of major economic indicators have been compared during two sub-periods i.e. before and after implementation of SAPs. Major indicators include economic growth, unemployment, saving ratio, investment ratio, labor productivity, total revenue, total expenditure, budget deficit, trade balance, money supply, general price growth rate, the inflation rate saving-investment gap; and export-import gap. The comparisons revealed the rejection of equal variances hypothesis of all variables except labor productivity, and the rejection of equal means of all variables except unemployment and real effective exchange rate (Annex 1).

The mean ratios of Sudanese gross domestic saving and total investment to GDP on the one hand and total export and total import on the other hand during the periods before the application of SAPs were 7.56% against 16.22% for first set compared to 15.32% and 18.62% for second set showing apparent resource gap dominance over external gap. After the application of SAPs the mean ratios were 4.97% against 23.87% for first set compared to 7.30% and 11.2% for second one. The bright side of the application was considerable increase in investment ratio and decrease in import ratio,

while the dark one was the decline in saving and export ratio, the consequence was a rise in the internal and external gap from 8.7% to 18.9% and from 3.3% to 3.9% respectively. Sudan similar to other developing countries started off with very low savings as engaging in a big push by investing heavily in development projects. The financing of the internal gap through foreign trade dwindled forcing the government to resort to external borrowing taking into account that Sudan by definition produces only primary goods, whereas it would require large imports of consumer and capital goods. Investment increase was financed mainly by foreign borrowing lead to the accumulation of external debt which rose from 4.1 billion USD before SAPs to 46.6 billion in 2014.

TABLE 1. SUMMARY OF ERROR CORRECTION RESULTS

Variable	Long-run	Short-run
REER(-1)	-15174.9**	
D(REER(-1))		-1024.7
D(REER(-2))		-781.968
D(TB(-1))		-0.27545*
D(TB(-2))		1.585924***
Y(-1)	471.3253***	
D(Y(-1))		2.292119
D(Y(-2))		749.5657
Speed of Adjustment	-0.45565*	
R-squared	0.561465	

***, **,* significance at level 1%, 5% and 10% respectively

The signs of real effective exchange rate and real growth domestic product are as expected sign and are significantly different from zero in the long-run indicating their effect on trade balance. The only significant variable in the short-run is the trade balance lagged twice demonstrating low adjustment process.

Spline Regression Results

TABLE 2. MODEL SUMMARY

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
.752	.565	.530	.435
Dependent Variable: Growth Rate of Real GDP Predictors: Labor Productivity Growth Rate Real Effective Exchange Rate			

The proportion of the variance in the independent variables real effective exchange rate and growth of labor productivity is almost 57% indicating model adequacy.

TABLE 3. ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	31.077	4	7.769	16.238	.000
Residual	23.923	50	.478		
Total	55.000	54			
Dependent Variable: Growth Rate of Real GDP Predictors: Labor Productivity Growth Rate Real Effective Exchange Rate					

The influence of explanatory variables was apparent by analysis of variance whereas the null hypothesis of no effect has been rejected at 1% level of significance.

Bootstrapping is a method used below for deriving robust estimates of standard errors for regression estimates. It is most useful as an alternative to parametric estimates when the assumptions of those methods are in doubt (as in the case of regression models with heteroscedastic residuals fit to small samples.

TABLE 4. COEFFICIENTS

	Standardized Coefficients		df	F	Sig.
	Beta	Bootstrap (1000) Estimate of Std. Error			
Labor Productivity Growth Rate	.642	.084	2	58.431	.000
Real Effective Exchange Rate	-.331-	.125	2	7.003	.002
Dependent Variable: Growth Rate of Real GDP					

Real effective exchange rate has a negative impact on economic growth in contrast to the effect of labor productivity.

TABLE 5. CORRELATIONS AND TOLERANCE

	Correlations			Importance	Tolerance	
	Zero-Order	Partial	Part		After Transformation	Before Transformation
Labor Productivity Growth Rate	.676	.695	.638	.768	.989	.988
Real Effective Exchange Rate	-.397	-.446-	-.329	.232	.989	.988
Dependent Variable: Growth Rate of Real GDP						

Labor productivity is an important factor in the growth of the economy besides its strong correlation with it. Real effective exchange has less importance in the growth of the economy reflected by negative moderate correlation.

DISCUSSION

Imposition of SAPs on Sudan led to increase unemployment, rise in number of poor, widening saving-investment, and export-import gaps, frequent devaluation of the local currency, continuous internal and external deficits, shrinking role of manufacturing sector manifested in sharp decline in utilized capacity, increased import of consumer goods, continuous rise in consumer and general prices, depletion of middle class, decline in total factor productivity, increased share of services at the expense of agriculture. To sum the pain has been lasting for four decades without hope for better future. Despite these shortcomings there's an abnormal persistence on continuing to implement structural adjustment programmes regardless of the existence of alternatives that have been proposed by international parties.

Foreign direct investment is thought to boost economic growth due to the availability of pulling factors. Pulling factors that attract foreign direct investment (FDI) to Sudan

are many of which are its location linking Arab countries with Africa, huge mineral reserves, fertile arable land, plenty of water resources, and introduction of Investment Encouragement Acts eliminating trade and investment regulations and offer concessions. On the other hand there are many obstacles hamper FDI inflow of which are the oscillations of major macroeconomic indicator responding to internal factors such as bureaucracy, shortage of energy, civil war, and external factors i.e. economic sanctions. Less effort has been exerted to attract FDI before 1990 since then much attention has been devoted to attract FDI. Most FDI were in oil, agriculture, and services (Ibrahim & Hassan, 2012). Even with huge amount of FDI inflow Sudan suffered from foreign exchange shortage, technology still lagging behind, and the number of unemployed has been growing.

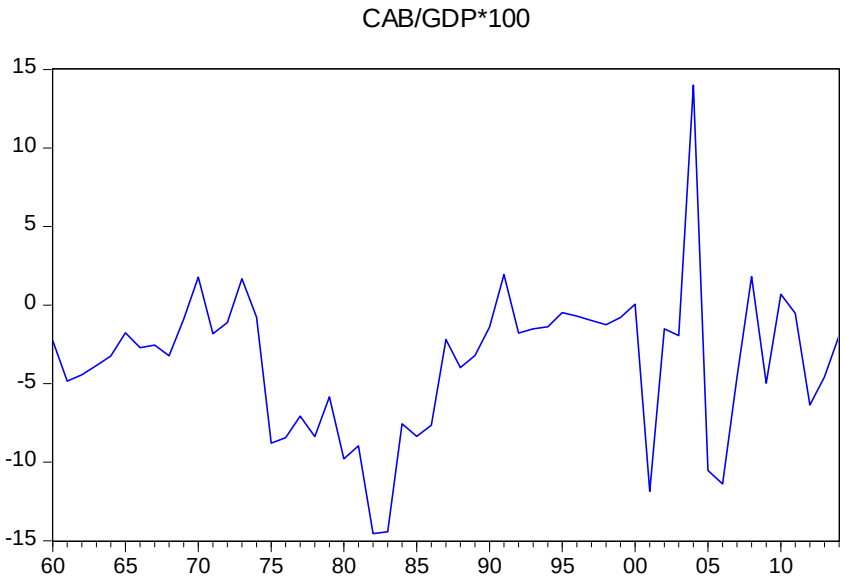

FIG. 1. CURRENT ACCOUNT BALANCE RATIO TO GDP

Sudan involved in endless devaluation. The J-curve hypothesis has been rejected ever since the long-run effect of the effective exchange is negative and significantly different from zero (Annex 2) confirming results obtained by Arabi and Abdalla (2014) for the period 1979-2006. The devaluation of the exchange rate was assumed by SAPs to cause the current account to deteriorate in the short-run and improve in the long-run empirical results reveal that the year preceding the implementation the current account ratio to GDP was -8.4 improved to -5.8 immediately one year after, then showed downward trend to reach -14.6 four years, then showed an upward trend to reach 1.9 ten years later declined slightly to 0.1 eight years after that, followed by period of sharp oscillations to rest at -1.9 at the end period. The period before SAPs was relatively stable compared to SAPs period i.e. long-run improvement is still lacking (Figure 1).

The transformation of the economy as envisaged by SAPs has not been achieved agricultural sector contributed to GDP by 47.1% before SAPs declined to 26.1% after. The contribution of the manufacturing sector rose slightly from 7.26 to 7.4%, the

services sector took the lead. One of cornerstone of SAPs is the fiscal policy manifested in cuts in expenditure and increase in tax both have negative effects on social services and the poor. Number under the poverty line has been increasing since the implementation of SAPs (Ali 1992, 1997 and 2007).

Budget deficit ratio to GDP increased to 4.7% after the implementation of SAPs compared to 3.3% before due to the financing of civil war security, and public administration. Cuts in government spending initiated by SAPs to reduce budget deficit were at the expense of poor.

Empirical Result shows that the long–run effect of SAPs on economic growth is negative meaning the continuation of the pain and loss of hope. However the situation has been aggravated by the loss of oil revenue and devaluation by more than 130% of the local currency since July 2009 the succession of Southern Sudan into independent country.

REER determines the competitiveness of the country relative to its trade partners reflecting on the one hand the fitness of the economic policies towards the external sector, and the pricing policy on the other hand. Labor productivity is essential in terms of economic growth it shows the effect of economic active population. Real effective exchange rate has been showing an upward trend except the year 1992 indicating a negative impact on economic growth due to the loss of competitiveness. On the labor productivity affects growth positively in terms of increased production but the other side of the story is that the economically active population supports 83% of the population.

The UN Economic Commission for Africa (ECA) provided a comprehensive and credible alternative to SAPs in 1989. The African Alternative Framework called for "adjustment with transformation" which called for a reduction in the continent's reliance on external trade and financing, the promotion of food self-sufficiency and greater popular participation in economic planning and decision-making. The Third World Network and Freedom from Debt Coalition have proposed numerous alternative policies: promoting diversification in the products; facilitating the diversification away from traditional commodities, take into account environmental impacts; land reform, institutional reforms; at the international level, measures to reduce the debt problems of poorer countries, regulate capital markets and address unfair trading practices.

CONCLUSION

Sources, causes, and magnitude of structural imbalances in Sudan have been scrutinized via descriptive and econometric tools during the period 1960-2014. Real effective exchange rate affects real growth rate negatively in contrast to the growth of labor productivity. Sudan should exert more effort to reschedule external debt; draw high and low limits for debt; expand loans for more borrowers rather than confining

to a limited number; checking the records of debtors to demonstrate actual need for money; international institutions should take into account the need for the State's economic situation without regard to the political aspects; international institutions should not lend corrupt governments. LDCs including Sudan should redirect loans to productive development projects; eradicate administrative corruption; redistribution of the budget for agricultural, industrial and health projects rather than purchasing of weapons; launch reform programmes at the banking and finance and tax and customs by encouraging investment by increasing production. UNDP (1997) underlines good governance, among other things, is "participatory, transparent and accountable, effective and equitable," and promotes the rule of law. It ensures that political, social, and economic priorities are based on broad consensus in society and that the voices of the poorest and the most vulnerable are heard in decision-making over the allocation of development resources

REFERENCES

Abdulmuneim, H. (2012). Performance of Arab Economies during the Last Two Decades: Features and Stability Policies: Arab Monitory Fund Working Paper (http//www.amf.org.ae/sites/default/files/Research%20and%20Studies/Articles%20and%20Speeches/ar).

Alhabab, M. S. (1997). Structural Adjustment of Arabic Agriculture under Economic Reforms. Forum on Structural Adjustment Programs in Arab Countries Algeria, 24-28 April.

Alhayaly, A-A. & Ali, J. T. (2010). Effects of Structural Adjustment on Democracy in Third World Countries, University of Diyala, Iraq, 414-430 (http://humanmag.uodiyala.edu.iq/uploads/pdf/aadad/2010/a43/18.pdf).

Ali, A. & Shenggen, F. (2007). Public Policy and Poverty Reduction in Arab Countries (http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.141.3527 &rep=rep1&type=pdf).

Ali, A. G. A. (2003). Can the Sudan Reduce Poverty by half by the Year 2015, Arab Planning Institute -Working Paper (http://www.arab- api.org/images/ publication/pdf/ 260/260_wps0304.pdf).

Ali, A. G. A. (1992). Child Poverty: Concept and Measurement. Arab Planning Institute (API) -Working Paper, 139-154.

Ali, A. G. A. (1992). Structural Adjustment Programs and Poverty Creation. Evidence from Sudan' Eastern Africa Social Scientific Research Review, 8.

Alkawaz, A. (2009). Sequencing of Reforms. Arab Planning Institute (http://www.arab-api.org/images/training/programs/1/2009/14_C40-5.pdf).

Almaghrabi, M. A. (2010). Report on Structural Adjustment Policies and Economic Adjustment. Local Development Management Forum (https://www.geniusdisplay.com/a/display.php).

Al-Muhannah, H. G. M. (2014). Structural Imbalances and the Developmental Treatment Methods in Arab Selected Countries with Special Reference to Iraq for (1994-2010). Master Thesis, University of Kufa, Iraq.

Alshamari, M. S. (2007). The Role of Adjustment Economic Policies in Correcting Structural Imbalances in Yemen. Scientific Journal of Karbala University, 4, 11-25.

Arabi, K. A. M. & Abdalla, S. Z. S. (2014). Is there evidence of a J-curve for the Sudanese trade data?. International Journal of Social Sciences and Entrepreneurship, 1(10), 154-167.

Arabi, K. A. M. (2012). Two Gap Analysis: Case of Sudan Scientific Journal for Humanity Sciences. Sudan Academy of Science.

Hassan, H. M. (2012). Cointegration growth, poverty and inequality in Sudan. Munich Personal RePEc Archive (https://mpra.ub.uni-muenchen.de/36651).

Ibrahim, N. M. A. (2015). The Impact of Structural Adjustment Programs on Agricultural Finance in Sudan: a Case Study Agricultural Bank of Sudan 1992-2012. University of Sudan for Science and Technology (Investopedia http://www.investopedia.com/terms/r/reer.asp#ixzz4Z3ZOUPNd).

Noorbakhsh, F. & Paloni, A. (1997). Assessing the Effect of Structural Adjustment Programmes on Export Performance in Developing Countries. Centre for Development Studies University of Glasgow.

Ogbimi, F. E. (2001). Structural Adjustment is a Wrong Policy. African Technology Forum, 8(1).

Shah, A. (2013). Structural Adjustment Programs a Major Cause of Poverty.

Sharabi, A. (1997). Structural Adjustment Programs and the Problem of Unemployment in Maghreb countries Forum on Structural Adjustment Programs in Arab Countries Algeria 24-28 April.

UNDP. (1997). Conceptualizing Governance: Discussion Paper 2. New York: Management Development and Governance Division, Bureau for Policy and Programme Support.

Annex 1. Tests of Equality of Variances and Means

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Unemployment Growth Rate	= Variances	.263	.610	-.920-	53	.362
	≠Variances			-1.090-	52.191	.281
General Price Growth Rate	= Variances	12.859	.001	-3.369-	48	.001
	≠Variances			-3.978-	37.458	.000
Saving Ratio to GDP	= Variances	2.891	.095	3.679	49	.001
	≠Variances			3.489	33.667	.001
Investment Ratio to GDP	= Variances	6.838	.012	-3.635-	47	.001
	≠Variances			-4.121-	41.443	.000
Import Duty Ratio to GDP	= Variances	55.291	.000	11.305	53	.000
	≠Variances			8.485	19.001	.000
Labor Productivity Growth Rate	= Variances	2.159	.148	-1.982-	53	.053
	≠Variances			-2.364-	51.749	.022
Money Supply Growth Rate	= Variances	4.532	.038	-3.329-	53	.002
	≠Variances			-4.161-	45.766	.000
Real Effective Exchange Rate	= Variances	10.310	.002	.594	53	.555
	≠Variances			.766	39.840	.448
Export of Goods	= Variances	33.182	.000	-3.050-	53	.004
	≠Variances			-4.052-	34.000	.000
Import of Goods	= Variances	18.728	.000	-2.668-	53	.010
	≠Variances			-3.543-	34.000	.001
GDP growth rate	= Variances	19.211	.000	-2.724-	53	.009
	≠Variances			-3.618-	34.000	.001
Trade Balance ratio to GDP	= Variances	7.253	.009	2.952	53	.005
	≠Variances			3.368	52.837	.001
Total Central Expenditure	= Variances	38.380	.000	-3.045-	53	.004
	≠Variances			-4.045-	34.000	.000
Total Central Revenue	= Variances	38.256	.000	-2.976-	53	.004
	≠Variances			-3.953-	34.000	.000
Budget Deficit Ratio to GDP	= Variances	22.226	.000	2.139	53	.037
	≠Variances			2.841	34.000	.008
Inflation Rate	= Variances	17.107	.000	-3.455-	53	.001
	≠Variances			-4.422-	41.436	.000
Growth Rate of Real GDP	= Variances	.668	.417	-2.342-	53	.023
	≠Variances			-2.248-	34.998	.031
General Price Growth Rate	= Variances	9.050	.004	-3.272-	53	.002
	≠Variances			-4.087-	45.924	.000
CAB	= Variances	23.327	.000	2.481	53	.016
	≠Variances			3.295	34.000	.002
GAP1	= Variances	34.987	.000	3.146	52	.003
	≠Variances			4.118	33.000	.000

Annex 2

Dependent Variable: LOG(GDP)				
Method: Least Squares				
Date: 02/22/17 Time: 06:55				
Sample: 1979 2014				
Included observations: 36				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXPORT)	0.652885	0.150435	4.339997	0.0001
LOG(IMPORT)	0.285491	0.156056	1.829414	0.0764
C	3.778743	0.629817	5.999751	0.0000
R-squared	0.916679	Mean dependent var		14.71363
Adjusted R-squared	0.911629	S.D. dependent var		4.051622
S.E. of regression	1.204433	Akaike info criterion		3.28955
Sum squared resid	47.87175	Schwarz criterion		3.42151
Log likelihood	-56.2119	Hannan-Quinn criterion.		3.335608
F-statistic	181.5298	Durbin-Watson stat		0.256159
Prob(F-statistic)	0.000000			

Vector Error Correction Estimates			
Date: 02/22/17 Time: 07:54			
Sample: 1979 2014			
Included observations: 36			
Standard errors in ( ) & t-statistics in [ ]			
Cointegrating Eq:	CointEq1		
TB(-1)	1		
REER(-1)	-15174.9		
	-6116.13		
	[-2.48112]		
Y(-1)	471.3253		
	-69.6414		
	[6.76789]		
Error Correction:	D(TB)	D(REER)	D(Y)
CointEq1	-0.45565	1.71E-06	0.000341
	-0.28653	-3.30E-06	-7.10E-05
	[-1.59024]	[0.51275]	[4.81238]
D(TB(-1))	-0.27545	-4.17E-07	-0.0003
	-0.39096	-4.60E-06	-9.70E-05
	[-0.70455]	[-0.09171]	[-3.13187]
D(TB(-2))	1.585924	-1.36E-06	-0.00019

	-0.34412	-4.00E-06	-8.50E-05
	[4.60870]	[-0.33837]	[-2.17889]
D(REER(-1))	-1024.7	-0.36365	3.753219
	-15771.1	-0.18362	-3.90578
	[-0.06497]	[-1.98049]	[0.96094]
D(REER(-2))	-781.968	0.007717	3.259191
	-15706.4	-0.18286	-3.88976
	[-0.04979]	[0.04220]	[0.83789]
D(Y(-1))	2.292119	-0.00699	-0.56702
	-786.475	-0.00916	-0.19477
	[0.00291]	[-0.76377]	[-2.91120]
D(Y(-2))	749.5657	0.002894	-0.34798
	-772.364	-0.00899	-0.19128
	[0.97048]	[0.32181]	[-1.81920]
R-squared	0.561465	0.180304	0.323739
Adj. R-squared	0.470734	0.010711	0.183823
Sum sq. resids	6.04E+14	81880.72	37049021
S.E. equation	4563989	53.13636	1130.289
F-statistic	6.188221	1.063159	2.313813
Log likelihood	-599.203	-190.213	-300.278
Akaike AIC	33.67796	10.95627	17.071
Schwarz SC	33.98586	11.26417	17.37891
Mean dependent	-1201770	-0.25556	733.7744
S.D. dependent	6273467	53.42325	1251.115
Determinant resid covariance (dof adj.)		7.27E+22	
Determinant resid covariance		3.80E+22	
Log likelihood		-1089.1	
Akaike information criterion		61.83876	
Schwarz criterion		62.89444	

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OPEN ACCESS ARTICLE

THE IMPACT OF INTERNATIONAL RELATIONS ON INFLOW OF FOREIGN DIRECT INVESTMENT: A CASE STUDY OF SUDAN

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Abstract

This paper examines the role played by international relations on attracting foreign direct investment (FDI) into Sudan using a qualitative exploratory case method. It depends on two sources of data (secondary and primary), which work in a complementary manner. First, secondary data is collected from scientific articles, journals, government and international organizations reports, while primary data is collected by interviewing diplomats, decision makers and politicians. According to empirical results, international relations is key factor in attracting FDI into Sudan. Sudan's good international relations with US during Nimairi's regime, and China, Malaysia, and India during Bashir's regime have resulted in a heavy FDI inflow into oil sector in Sudan. Contrary, the worsening of Sudan's international relations with US and other Western Europe countries has resulted in withdrawal of many multi-national companies from directly investing in Sudan.

Key words

International Relations; Economic Diplomacy; FDI; Sudan.

INTRODUCTION

Foreign Direct Investment (FDI) is very important for a developing country like Sudan where domestic saving is law and fall short of the country needs for investment to attain economic development. The importance of FDI is well established in literature and being recognized by most of the countries of the world. Nowadays, no country can deny its needs for FDI or the benefit it could bring for its economy. The FDI is believed to be an important factor that generate economic growth and enhance development. Since it helps accumulating capital and expands production capacity in the host countries. In addition, it increases the productivity by transferring advanced technology and best management

practices from the FDI exporting countries to the FDI host countries through what is known by technology spillover effect. Moreover, the FDI is believed to be an important source of employment for host countries workforce. Furthermore, it is believe that FDI brings, *inter alia,* efficient management practices, a culture of competition, and access to global markets (Tembe & Xu, 2012; Zhang, 2014).

The FDI flow varies greatly from a country to another and it varies over times for the same country. Many studies have been undertaken to explain the phenomenon of FDI and to identify the main factors behind its variations. One of the most important studies undertaken by Dunning in 1993 that ended up with establishment of what is so called the eclectic paradigm theory.

According to this theory the main factors that determine the multinational enterprises' FDI are the premise of ownership, internationalization and location advantages. The first two factors related to the firm willingness to poses asset abroad by expanding its activities to foreign countries. While the third factor represents the host countries, business environment which is also known by country specific advantages. This includes economic, political, and institutional factors. Among these, the political factors are considered as of vital importance Gangi, et al 2013). In general, foreign investors prefer to invest in countries with well-established infrastructure, stable political situation, sound economic policies, well-developed financial institutions and greater economic freedom in terms of political rights and civil liberties (khan 2011). The international relations of a host country with the FDI exporting country is believed to be one of the important factors that can play a significant role in attracting FDI. International relations have usually been ignored as an important factor that affect FDI and as a result often overlooked (Mun et al., 2010).

The present paper tries to answer this question by employing a case study methodology on Sudan to investigate the role of international relations on FDI attraction. Qualitative analysis is used to explain the primary data collected through semi-structured interviews. It is found that international relations are among the most important factor that affects FDI inflow to the countries. Economic and other factors are necessary factors in attracting FDI, and international relations is the sufficient factor.

LITERATURE REVIEW

Like any other economic variable FDI varies across regions and time. In order to understand its main drivers scholars have tried to get answers for two main questions, what are the main factors that determine FDI inflow to and outflows of countries? And

what are the appropriate policies that a country should adopt in order to attract the largest share of FDI? Throughout the last four decades the most influential model that has been used to get answers for these questions and undertake empirical study for FDI determinants is the Dunning's (1977, 1993) Eclectic Paradigm. This model provides a framework that groups the factors that drive multinational companies (MNCs) to invest abroad into three types of advantages. These are: Ownership (O), Location (L), and Internalization (I) advantages; hence it is called the OLI framework. The ownership-specific advantages refers to intangible assets, which are, at least for a while exclusive possesses of the company and may be transferred within transnational companies at low costs, leading either to higher incomes or reduced costs. This advantage may arise from the firm's ability to coordinate complementary activities such as manufacturing and distribution, and the ability to exploit differences between countries. The location advantages refer to the benefit that MNCs can obtain when investing in a certain country. These benefits may arise from differences in country natural endowments, government regulations, transport costs, macroeconomic stability, and cultural factors. Internalization advantages arise from exploiting imperfections in external markets, including reduction of uncertainty and transaction costs in order to generate knowledge more efficiently as well as the reduction of state-generated imperfections such as tariffs, foreign exchange controls, and subsidies (Stefanović, 2008; Anyanwu, 2011).

FDI is determined by many factors such as economic, political, cultural and social. While all of these factors have been intensively studied in different regions, little work have been undertaken on political factors as general and international relations as specific. Researchers have examined the relationship between FDI flows and most of these factors using different methodologies and regions at length. However, few studies have been undertaken to examine the effect of the political factors on FDI flow (Buthe & Milner, 2008). Even these few studies focused mostly on political instability and political institutions and much less on international relations. One of the possible explanations for this situation is that international relations were ignored as one of the significant factor that may contribute in attracting FDI. Recently some theoretical and empirical literature was developed on this issue. For example, Wang et al. (2012) have developed a conceptual framework that theorizes for the role of government in directing emerging-market enterprises to invest in specific countries, which is the good relation-country. This model based on institutional theory which claims that firms are affected by institutions – defined as regulative, normative, and cognitive structure and activities. Based on this, they found it logical to extend the FDI determinants beyond the economic factors to include other factors such as political, legal, social and the broader political context that govern the decision to invest abroad. This study emphasizes the role of government on influencing enterprises decision to invest abroad. It affects the volume and direction of

outward foreign investment using its involvement in these enterprises through ownership of large share or taxes and other incentives.

At a theoretical level, some researchers start to provide strong scientific argument for the role that international relations could play in attracting FDI through what is known by economic diplomacy. They believe that economic diplomacy help to provide information on business climate and investment opportunities to foreign firms. It may also increase FDI inflow by eminent personalities and reducing barriers that may face foreign investors. Moreover, a country good relation with other countries could enhance the relations between enterprises working in these countries and build trust between the involved parties. Through the trust built up between enterprises the probable political country risk would be reduced up to the affordable level. Moreover, they argue that from the macroeconomic point of view, international relations between countries, could lead to smooth movement of capital and thus encourage transnational corporations to establish braches for their companies in good-relationship countries. Further, international relations could help to reduce adverse selection, in which it allows investors to better distinguish between good and bad investments. This can lead to higher expected revenues for the foreign investors and also increase the confidence of the investors toward the countries.

Few empirical studied have been carried out to examined the relationship between FDI inflow and International relations. Dauda and Bako (2012), examined the impact of shuttle diplomacy on foreign direct investment in Nigeria. They have established that the shuttle diplomacy conducted by the Nigerian government during the period 1999-2007 contributed positively in FDI inflow to Nigeria. Mun et al. (2010) investigated the effect of Malaysia's international relations on FDI inflow from Japan, United States, Singapore and Germany. They found that FDI inflow from these respective countries is positively related to Malaysia's total FDI. This result supports the views that international relations can play a significant role in attracting FDI. Thus, foreign policy is one of the policy options to be employed to enhance FDI inflow to any country.

Najafi and Askari (2012) examined the effect of political relations with the US on the performance of four economic indicators in 16 developing countries. Their results suggest that when a country improves its diplomatic relations with the USA this will have generally a positive effect on capital inflow to this country. This results support the belief that once a country improves its political relations with the USA, eventually, it will become an attractive country for FDI. Desbordes and Vicard (2005) investigated the effect of the impact of diplomatic relationships on the FDI flow to the developing countries

using a new political events dataset and a dynamic panel data model. His result supports the findings of the previous studies in this area that establish the good diplomatic relations play essential role in attractive FDI to hosting countries. In his discussion for this result he argued that the good diplomatic relationship between countries encourage the signing of bilateral treaties that enhance the flow of FDI and facilitate firms mobility between the countries. Based on this result they recommended that countries in their attempt to design policies for attracting FDI need to take into account both intra-state and international FDI determinants. Khan (2011) investigated the role of international political relations on FDI inflow to Pakistan using regression techniques on data covering the period 1972-2009. The main focus of his study was on the political relations of Pakistan with major international powers, particularly the United States. His findings suggest that Pakistan political relations with United States influences only economic and military aid flows but not private foreign direct investment in the long-run. Zhang et al (2014) examined the impact of Chinese diplomatic activities on outward FDI. They estimated outward FDI function using panel data for 131countries. Their results indicate that the friendly bilateral diplomatic activities provide effective support to some sensitive and important investment in hosting countries where institutions are absent or poor in quality.

A study by Debordes and Vicard (2005) shed light on the importance of diplomatic relations on the location of FDI in developing countries. It indicated that good diplomatic relations have a positive impact on FDI in developing countries. In addition, it indicated that good diplomatic relations stimulate economic cooperation between the host country and its FDI partners, through the signature of binding international agreements. Ramasamy and Yeung (2016), identify the promotion of international relations with China as one of the top five policy measures that policy makers should implement to attract a portion of the Chinese FDI outflow. They argue that Chinese managers are very much concerned about the political relations between their country and the host country, because of the role the state plays in the Chinese economy, especially in promoting the outward expansion of Chinese enterprises and the engineering of selected industries at home.

RESEARCH METHODOLOGY AND DATA SOURCES

The literature on FDI contains many studies on the determinant of FDI and the factors that cause its variations across regions and times. Most of these studies used quantitative methods to estimate FDI equation using panel data from different countries. In this study, we use a case study method to provide answer for the following questions: How important are international relations to FDI inflow? Do the international relations affect FDI inflow? If yes, how it affects FDI? Had the Sudanese government used the

international relations to attract more FDI? Had the Sudan's international relations with USA, China and other western countries affected the FDI inflow throughout the last four decades?

These questions are addressed in this paper via an exploratory case study method adopting qualitative analysis rather than quantitative one. The selection of this method is justified by three things: First, many studies have been undertaken to examine the determinants of FDI in Sudan using a quantitative method and none of them have used qualitative analysis. All these studies excluded the international relations as explanatory variable from their studies. One reason which was introduced to justify the omission of the international relations was the difficulty to quantify it and to get time series data for it (like: Abd Alla et al. 2015; Ebaidalla, 2013; Ibrahim & Hassan, 2013).

The second justification for the use of the case study method is the need for holistic and in-depth explanations for the role of international relations on the FDI inflows in the context of Sudan. The third justification for the uses of this method is its various advantages over the quantitative statistical results in this topic, since it includes both quantitative and qualitative data that can be analysed thoroughly to get answers for the research questions. Given that, a case study helps explaining how the international relations affect the FDI inflow, and on what capacity. This task is accomplished by analyzing the relationship between the international relations of Sudan and the inflow of the FDI to Sudan.

For the purpose of this study, the case study analysis is limited to the Sudan's international relations with the countries that are considered as potential sources for FDI. These countries include the United States, China, India, Malaysia, and Arab countries. The chosen of Sudan is justified by the fact that FDI inflow to Sudan is rapidly variedly to the extent that, give us the chance to classify Sudan among the highly volatile countries of the world. The inflow of FDI to Sudan has increased from almost a negligible amount of less than half a billion in 1980s and 1990s to an average of about 3 billion an year during the period 2000 – 2010 and again to less than one billion after South Sudan secession in 2011. This high variation in FDI can hardly be explained by the Dunning three advantages approach. Sudan's location advantages are at place at all these different periods. What cause variation is something different than the location advantages? Although it is a recently failed to attract sufficient FDI in the past it had attracted a substantial amount of FDI. The study timeframe covers the period from 1970 to 2015 during which Sudan has passed three regimes.

The present study depends on two sources of data, which work in a complementary manner. First, secondary data is collected from scientific articles, journals, government and international organizations reports and other publications to examine the role of international relations on FDI in general. In addition, the secondary data will help to frame the Sudanese FDI situation from the perspective of its international relations with FDI exporting countries. Moreover, primary data are collected through interviewing diplomats working in selected Sudanese embassies. Ten face-to-face interviews with diplomats are conducted. This took the form of semi-structured interviews where the interviewer maintains the right to intervene with diplomats while allowing their opinions to emerge as they answer the questions.

THE FDI INFLOWS TO SUDAN

The data in Figure 1 indicates that the FDI inflows to Sudan increased rapidly from less than 10 million US dollars in 1989 to more than 2.6 billion US dollars in 2011. The noticeable increase in FDI inflow into Sudan started in 1997 with the investment in petroleum products. By the year 1999, Sudan exported the first batch of crude oil and since then Sudan was turned up into an oil exporting country. This achievement could not have been realized without the technology and capital brought about by the multinational corporations with their foreign direct investment in Sudan. Then the export of oil during the early 2000s contributed significantly in stabilizing the Sudanese economy and enhancing the foreign reserve. Consequently, the it erodes the foreign investors' confidence in Sudanese economy. The highest increased in FDI inflow into Sudan had happened during the period 2004-2007. The year 2007 embarks the highest FDI inflow to Sudan that put it in the advanced position among the least developed African Countries.

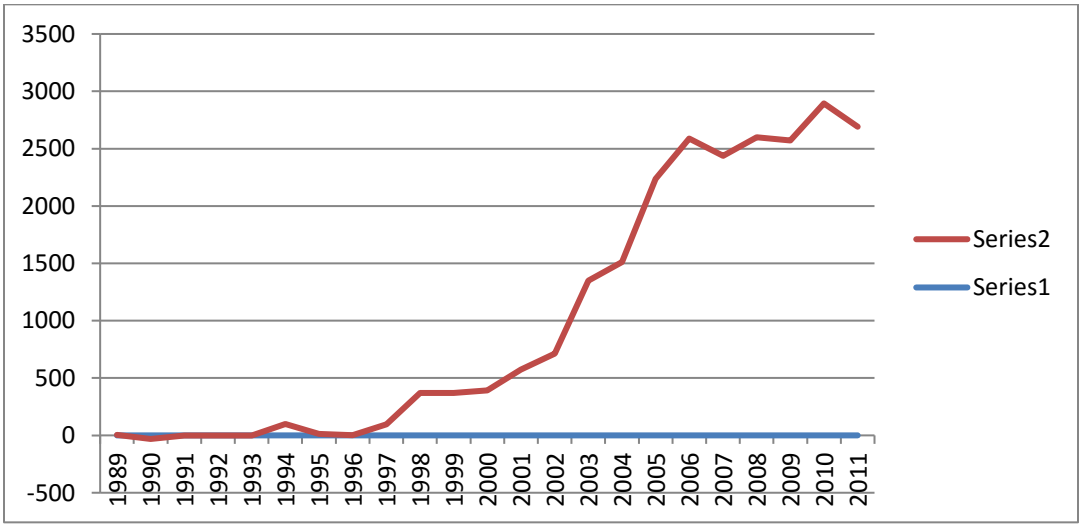

FIG. 1. SUDAN'S INWARD FDI IN MILLION US DOLLARS
Source: UNCTAD, http://stats.unctad.org/fdi/

With regard to the geographical breakdown of the inward FDI to Sudan by sources there is no enough information in the UNCTAD data base, the most reliable source of information on FDI. In Table 1, the data available from UNCTAD sources are presented, but it is very meager compared to the total FDI inflow to Sudan for the same period. This may be due to the fact that some of the inward FDI from Arab countries during this period were not included because there was a lack of information about these investments.

TABLE 1. GEOGRAPHICAL BREAKDOWN OF INWARD FDI BY SOURCE, 2003-2009 (IN MILLIONS OF US DOLLARS)

Country	2003	2004	2005	2006	2007	2008	2009	Total 2003-2009
Malaysia	157.8	65.6	140.4	114.3	38.7	88.7	-	605.6
China	-	146.7	91.1	50.8	65.4	-63.1	19.3	310.2
Germany	14.7	1.2	2.5	1.3	1.4	2.9	-	**24**
Turkey	-	-	-	2.0	4.0	4.0		10
United States	-2.0	1.0	1.0	1.0	-	-	-	1
South Korea	-	-	-	1.0	-	-		1

Source: UNCTAD. (2011).

Table 1 indicates the main sources of Sudan's inward FDI during the period 2003 - 2009. The selection of this period is justified by the availability of data. This was the only period during which the data from UNCTAD data base was available. As it can be observed from the table that Malaysia and China were the main sources of FDI inflow to Sudan. The two countries together directly invested a total amount of one billion USD during the period 2003-2009. Taking them separately, Malaysia was the main source of inward FDI to Sudan for 2003-2009. Its total FDI outflow to Sudan during this period stood at about 605 mill USD with an annual average of about 86 mill USD. The second largest source of FDI inflow to Sudan was China with total amount of 310 mill USD and annual average of 44 mill USD. The FDI inflow from the rest of the listed countries was very meager.

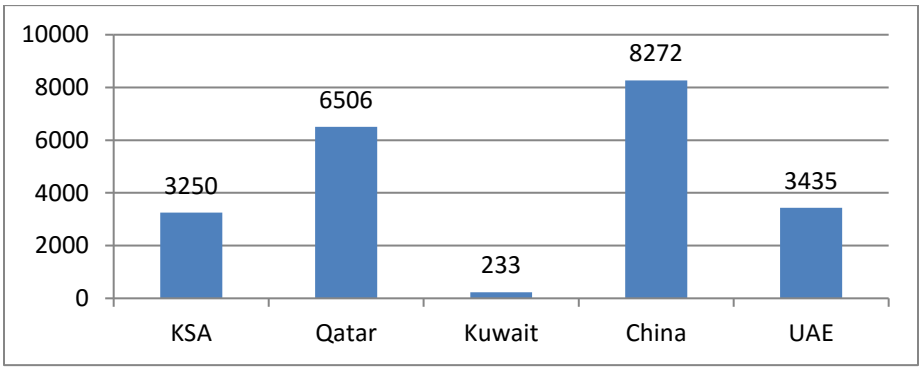

FIG 2. SUDAN'S TOTAL INWARD FDI BY SOURCE, 2000-2013 (MILL USD)
Source: Central Bank of Sudan

The data obtained from the Central Bank of Sudan and is presented in Appendix (Table 1) and Figure 2, indicates that China was the largest investor in Sudan during 2000-2013. Qatar comes in second position with total sum of about 6.5 billion USD. The two countries together two countries directly invested in Sudan total amount of 14.8 billion US dollars representing around 68 percent of the total FDI inflow to Sudan.

OVERVIEW OF SUDAN'S INTERNATIONAL RELATIONS

In this section an overview for Sudan foreign relations is provided. The paper looks into the political circumstances that evolved in Sudan in different periods of time and its implications for other powers and hence on their decision as to invest in Sudan oil sector or not. The research will namely compare the FDI coming from US to Sudan oil sector during various regimes and the Chinese FDI for the same sector and tries to reach some conclusions with regard to the relation between the foreign policy and decisions, by other powers to transfer FDI to that country.

Historically, the Sudanese foreign relations during the period following the independence had been designed to reflect Sudan position of non-aligned country. Therefore, Sudan acted in international issues in such way that reflect its position by supporting the liberation movements across the Third World countries. Along this line, it joined all African, Asian and the third world Organization established in the WWII. Its representatives were active in the African Union (AU), the Non-Alignment Movement (NAM) and the United Nations (UN).

During the four years after Sudan's independence, and until the present the evolvement of Sudanese international relations has passed through different stages of development and it has faced with different challenges. During the last four decades Sudan's had been governed by three different regimes.

Numirie's Era (1968-1985)

Numirie took power through a military coup in 1969; the coup came at a time of a cold war escalation between the two superpowers, though through détente. In July 1970, the communist party plotted against Numirie but Numirie survived the coup and soon as he regained power, he purged the leadership of the communist party and moved away from the Soviet-led Block moving thus, very close to the US-led block. As a result, many advantages were reaped by Numirie's regime; first of all, he soon found help with the first civil war through the Ethiopian-brokered peace in 1972. The deal, which was brokered by the then pro US Ethiopian Monarch, the emperor, Haile Selassie was not successful without the support of western circles. The US ambassador to the UN at the time, George Bush, disclosed to Numirie the results of the aerial mapping that indicated good oil reserves in Sudan. Chevron was soon to be invited to Sudan. In 1975 Chevron

was granted a concession in the south and south-west of the country despite the fact that economic conditions of Sudan during that time was evidently started to deteriorate due to the effect of the rise in oil prices following the Saudi embargo on exports in 1973 (Metz, 1991).

The deterioration of Sudan balance of payments was to become worst by 1979 when Saudi Arabia stopped its oil subsidies to Sudan due to Sudan's support of Sadat 1979 peace agreement with Israel, however, who also supported the US-backed Camp David Accord hence the US administration did not want to leave him vulnerable at a time when north-east Africa and the Horn are divided over their loyalties to the cold war super powers.

By the 1980s, the Sudan economy was in clear shambles, even the civil service lost its intactness due to the massive outward movement by the civil servants who headed to the Gulf rich countries seeking a better life following the deterioration of economic life. The first oil discovery in Sudan was made by Chevron in the south of Sudan in 1979, west of the Muglad. Chevron continued its successful exploration and made more significant discoveries in the so called Unity and Heglig fields.

In the decade that followed, Chevron invested between eight hundreds millions to one billion two hundreds millions US dollars therefore, the few signs of energy in Sudan economy at the time were partially because of the Chevron and other western developmental projects dedicated for the assistance of a new cold war ally. Yet there were signs of fatigue on the part of the company by early 1980s and hence nothing was shipped to the market, instead the overall exploration and drilling processes came to a halt by 1984, when Nuer militias attacked the facilities of the company killing some foreign expatriates. The worsening security situation of the renewed civil war was cited as the direct reason for the halt of operations in Sudan, however, upon closer inspection there were policy shifts both nationally and internationally that doomed the fortunes of Numirie's regime with the western countries generally and the US more specifically.

First of all after the National Front's failing coup of 1976, Numirie saw fit to rapproach the opposition and as a consequence a national reconciliation was reached in 1977 through which the internal balance of power among Sudanese political forces shifted once more away from the southerners and the secularists who supported Numirie after the 1972 peace agreement, which offered the south an autonomy and self-rule for the first time since independence, but after 1977 the national politics have once more become under the influences of Arabized and Islamist elements of the Sudanese political spectrum whom their policies and political attitudes alienated the hitherto regime-

supporting elements, such as the secularists in the north and the people of the South, who saw Numirie as the one who had brought the peace to the civil war-torn South Sudan.

Indeed, Numirie's new policies towards the South ultimately contributed to the renewal of the civil war in 1983, when two battalions of the south Sudanese soldiers crossed the border into Ethiopia. In fact, the renewed civil war attracted international attention, especially after Numirie declared the Islamic laws in 1983. In 1984, both Chevron and the French Champagne International suspended their operations in the south due to the worsening security conditions.

The Democratic Period (1985-1989)

This period was more of a continuation to Numirie's era in terms of Chevron procrastination since the fluidity of the local politics made nothing to convince the US circles of any change to its doubtful position towards Sudan. During this period, US reduced the number of staff at its Embassy in Khartoum because of the presence of a large contingent of Libyan terrorists. The relation with the regime was further deteriorated due to the US bombardment of Tripoli on April 1986. Soon after that and at the same month a US Embassy employee at Khartoum was shot dead. Consequently, the US government responded to this incident, by withdrawing all non-essential personnel and their dependents, so they all left Sudan for six months. At this time, Sudan was the single largest recipient of U.S. development and military assistance in sub-Saharan Africa (Metz, 1991; Bang, 2015).

Sadig AL Mahdi came to power following general elections in 1986 in a climate of doubt vis-à-vis the US he was regarded by the US as a close alie to both, Iran and Gadhafi. Moreover, the Sudan civil war was suspected by western circles as a war of Arabs and Muslims' domination over the South, all that reflected itself negatively on the western FDI transfers to Sudan. The lack of security internally and the rising military operations by SPLA against the government also contributed to the stoppage of other FDI transfers.

The National Salvation Revolution era (1989-)

From its inception in June 1989, the Islamist NSR regime was phobic from what it named as "western circles", to the extent that the true character of the coup was not revealed to the outside world up until 1990, where two developments have taken place; internally it was the adoption of the 1990 penal code, which reiterated the Islamic *hudood*, that have had stirred a lot of human rights debate, both internally and externally. The second development was the position of the new regime from the US coalition to liberate Kuwait from the invasion by the Iraqi past President Saddam Husain. In fact, the regime adopted a whole gamut of revolutionary policies in the domestic and external realms. Internally, the more evident policy was the mega Islamist social transformation program, in which

the military effort against the SPLA/M took a new concept as a religious duty. Sub-regionally, Sudan was found complicit in opposing the US-led UN military intervention in Somalia in 1992, where some US soldiers were killed, later on, by the mid of 1990s the attempted assassination of the Egyptian X-president Mohamed Hosni Mubarak in Ethiopia was evidently pin pointed to Sudan, even at the end of the decade Sudan was accused of being behind the explosion of the US embassy in Kenya. Overall, the regional politics of the NSR managed to heighten the insecurity feeling among its immediate neighboring countries, and even to threaten the interest of the US in the region and abroad. The proactive Islamist foreign policy of the regime of its first years had rewarded Sudan with the position of the a rogue state, not only that the international concern was rocketing over the violations of the human rights abuses of the regime but also was accused of slavery and the prosecutions of minorities. Sudan was put on the status of the UN human rights rapporteur on human rights violations since 1993. The US was especially concerned with Sudan harboring of international terrorism and went further to design Sudan as state sponsoring terrorism, with all the implications on the bilateral and multilateral relations of Sudan. Deterioration of relations with US and western powers continued to the extent that Clinton ordered a cruise attacks on medicines facility in the heart of Sudan capital by 1998 and continued to aid the hostile neighbors of Sudan militarily to stand in the face of the threats posed by Sudan terror and extended through them support to the SPLA/M in its war against Khartoum, the US pressure continued to mount during Clinton administration to reach the blocking of Sudan economically and financially in 2007 (Metz, 1991; Bang 2015).

Throughout this period, Sudan was trying hard to revive the life to its oil exploration sector. Concorp, a small local oil company; owned by a pro-regime a Sudanese national managed to lull Chevron into a deal whereby the concession and the deserted assets in Sudan were sold to Concorp for 25 million US dollars only, this deal was made at a time when Sudan was extending request to a Canadian company to resume the oil exploration deserted by Chevron since 1984.

By 1999, Sudan was on board with the oil producing countries. That was to be a landmark not only on the economic front for the NSR regime, as its fortunes started to shifts to the better not only financially but also diplomatically, many of the western countries were seen as vying to the lucrative business of oil in Sudan; despite the hitherto antagonizing position visa-a-vise the regime. The Chinese (CNPC) dominated oil consortium, which was erected in 1996 to replace the tiny Canadian Arakis company, decided to invest hugely and as part of this policy, it subcontracted a Chinese subsidiary to finalize a pipeline to export the crude for one billion dollars. Interestingly, that huge investment

program tempted even a western companies such as Rolls Royce and the Scottish Weir to come on board with eastern companies to provide the pumping engines for the pipeline, this was a reflection of a European Union's constructive engagement with Sudan, which was a departure from the US confrontational policy that resulted in both 1996 UN sanctions and 1997 US economic sanctions.

The period following the first shipment of 600,000 oil barrels in August 1999 saw a rising amount of FDI from the eastern and mid-eastern oil companies and countries alike, as a result Sudan saw overall bonanza and a big boost in the economic growth measured by GDP.

For the US there was a new approach towards Sudan which was characterized by a more positive engagement following the internal power struggle within the regime as well as the failure of the regional US-led concert against Sudan as a result of the Ethiopian – Eritrean war in 1998. In 2001, the US decided to end its opposition to the lifting of UN sanctions on Sudan. Diplomatic relations also improved, and the US has increased and upgraded representation in Sudan. Likewise, the United Kingdom has increased representation and upgraded its diplomatic envoy to ambassador. Relations with the European Union have also improved, and the EU announced in 2002 its intention to resume development with Sudan, some 11 years after it was suspended (World Bank Memo, 2003).

In the face of this western split over Sudan, the US tightened its Sudan sanctions even more, in 2007, by starting to impose penalties on third economic entity that is seen dealing with Sudan. Especially, that the rhetoric against Sudan internal policy on Darfur was rising. In 2005, Darfur genocide expression was adopted by the US, accusing Sudan of purging civilians to clear the land for oil investment.

Two development, however, reversed the upward economic blooming in Sudan, firstly, the secession of the oil-rich South Sudan has left Sudan with meager oil resource that can hardly satisfy the domestic consumption and hence the appetite of foreign companies to venture in Sudan, this was coupled with the second reason which was the biting US economic sanctions, by 2015 Sudan was fully isolated internationally

SUDAN'S FOREIGN POLICY'S IMPACT ON THE FDI INFLOW

As it can be seen from the previous section that Sudan international relations with different countries has passed through different stages, and each stage has its own characteristics and impact on FDI flows. In this section the evolvement of Sudan's international relations are linked to the FDI inflow to Sudan. For this purpose, the data collected through the interviews are thoroughly analysed and discussed. As it can be seen the analysis is of Sudan's international relations and their impact on FDI inflows are

undertaken into five sub-sections: internal relations with US and other western countries, international relations with China, international relation with Malaysia, international relation with India, and finally the Arab countries.

Sudan's relations with the USA

On the other hand, relations with the US severely affected FDI from USA and other western countries, because of the listing of Sudan in States Sponsoring Terrorism List and the unilateral USA sanctions on Sudan which hampered FDI through paralyzing the performance of financial and banking transactions with Sudan and thus creating a condition of hesitation and fear in foreign investors (especially Westerns) when considering Sudan since they're not able to perform these vital tasks with the country nor to transfer their capital/revenue outside it.

The worsened US relations with Sudan has two different effects on the FDI inflow to Sudan; firstly, it negatively affected the overall volume of FDI destined to Sudan by stoppage of chevron operations in Sudan and the seizure of other international companies to their business as a result of the US divestment laws of the Sudan such as the Canadian Talisman and the subsequent state petroleum.

Secondly, the US bad diplomatic relations with Sudan made it impossible for western companies to invest in Sudan oil due to the power of the economic sanction 1997 and the renewed version of 2007. Therefore, the Sudan's international relations with US and its western countries allies has contributed significantly in reducing the inflow to Sudan during the last three decades. Had it been good, Sudan could have enjoyed an influx of FDI inflow from U.S. and other western countries. Washington maintains leverage over Khartoum because of the economic sanctions it has already imposed, vitiating Khartoum's attempt to attract FDI from Western countries and their allies. Bilaterally, the US has used its influence over multi-national corporations to ensure that no FDI should inflow into Sudan, and tried to distort the overall environment that motivates them to invest in Sudan.

Given that, the lifting of American economic sanction on Sudan is expected to have a positive impact on FDI. This mainly because, the investors who have been hesitant to directly invest in Sudan will now be encouraged. However, they might not rush to this immediately and may instead be cautious and keep monitoring the situation until the review by the current US Administration is done on this July upon which the decision should be made whether to permanently lift the sanctions or put them back in place. Investors during these upcoming months until July may opt to only explore the general investment atmosphere and prospects in Sudan rather than engaging in real agreements

and commitments. Anyway, Sudan has much to do to improve its internal investment atmosphere such as enhancing its 'single-window' system, countering corruption, etc. after all, remember that there are so many countries in this world that did never suffer from sanctions or tasted them, yet they never succeeded in attracting huge foreign investments.

Sudan's relations with China

Unlike the case with US, Sudan relations with China have always been good. This condition has positively affected the FDI inflow to Sudan, especially through investment in the oil sector. The unilateral American sanctions played a great positive role in attracting the Chinese and East Asian investments to Sudan in this field, plugging, thus, the gap that was created by the American sanctions on Sudan. The overall justification for this has been the Chinese inclination to exploit in any opportunity in the international oil exploration realms in order to feed its rising industrial need for fuel, since there was not a much land to compete over apart from Africa.

Historically Chinese economic ties with Sudan dated back to the 1970s, when China provided a total of 89.3 mill USD in aid and loans to Sudan (Abdalla, 2014). As that time the bilateral relations between the two countries was not specifically geared towards economic ties of the significance that was seen later on very strong because China's leadership policy had focused on domestic development. Since the 1980s, China has adopted a 'going global' strategy that encourages Chinese companies to invest abroad. This strategy has encouraged the Government of Sudan to invest into the relationship with China, which ended up with establishment of close commercial ties. Since then, Sudan has enjoyed a very robust and productive relationship with china. This relationship manifests itself into a large influx of FDI from china into Sudan, and rapid expansion of bilateral trade, that nexus has genuinely started in 1994, when the Government of Sudan (GoS) officially requested assistance from the Chinese government in developing the oil sector in Sudan.

The Chinese government responded to this request by conducting a preliminary survey by the China National Petroleum Corporation (CNPC) and found out that the oil sector is promising. The potential returns from oil sector has been found enough to encourage Chinese investors to take the high risks involved (Gadkarim, 2012). Soon after that, deals to finance oil development were completed in late 1995 following a visit to Beijing by President Bashir. In 1996, CNPC formed a consortium, Greater Nile Petroleum Operating Company (GNPOC), with Petronas from Malaysia and started its investment in Sudan (Patey, 2007; Lee, 2015). After that, huge amounts of capital were poured into Sudan and contributed significantly in developing its oil sector. In 2003, China has become the main trade partner of Sudan and the largest foreign investor in Sudan. By this time, the

Sudanese exports to China represented about 24% of the total Sudanese exports, and imports from china estimated at about 20% and FDI from china stood at 29 % of total FDI. Table 1 depicts the main countries sources of FDI inflow to Sudan.

The good international relationship between China and Sudan has significantly contributed in promoting the FDI inflow to Sudan to the extent that put china as the major sources of FDI to Sudan. The shuttle diplomacy of Sudanese government has succeeded in establishing strong relationship with china. There has been mutual interest between Sudan and China that made it easier for them to establish strong diplomatic relations. China was eager to secure the supply of oil to its expanding industrial sector and Sudan was desperately in need for assistance in development especially for its oil sector. Against this background Beijing has encourage Chinese companies to penetrate Sudan and directly invest in many industries. Flagship enterprises in the energy, construction, engineering and manufacturing sectors receive generous government support in preferential loans and credit through the Chinese Development Bank, the China Construction Bank and Eximbank, as well as in tax deductions (Abdalla, 2014). Oil and gas has been given priority to mitigate anxiety about secure supplies of energy. Moreover, the state-owned companies were encouraged to source their own raw materials abroad, gaining strategic advantages from their investment in Sudan's resources.

Although Chinese diplomatic relations with Sudan have always been described as very good yet it has never reached a position whereby Sudan enjoyed the positive support of the Chinese veto power in the security council. China used to abstain on most Security Council resolutions concerning Darfur and it did not even for a single time blocked any anti Sudan resolution like what was later happened with Russia over Syria. In fact, the relationship between China and Sudan has been negatively affected by the Darfur conflict. China foreign policy is built upon respect for sovereignty and territorial integrity of countries. However, under strong pressure from western countries over the issues of human rights violation in Darfur, china has begun slowly but methodically to alter its position on Sudan. In 2006, President Hu Jintao advised al-Bashir to strengthen dialogue with all parties, coordinate stances, and strive to reach an appropriate solution. By late 2007, China's has reached the stage where it decided to remove Sudan from its list of countries for which it provides financial incentives to Chinese companies to invest there (Shinn, 2009).

An important change in China's Sudan relationship has happened with the initiation of bilateral relations with the Government of South Sudan in 2007, which were converted

into full diplomatic relations in July 2011. Since then, South Sudan has been a new economic destination for Chinese companies. Because the major oil fields located in South Sudan and there are a lot of investment opportunities in oil extraction and developmental projects for the infant state. Thus, many Chinese firms expressed their interest to invest in different sectors such as infrastructure, agriculture, and telecommunications and some of them have already arrived in Juba and begin to set up offices and start operations in the south.

Sudan's relations with India

The Indian economic tie with Sudan dated back to the 1950s, when Indian Liaison Office was set up in Khartoum in April 1955. Sudan supports India's aspirations to become a permanent member of the UN Security Council; in turn, the Indian government agreed in 2005 to assist Sudan in its intention to gain the membership of the World Trade Organisation. Since then, India has played a more significant but, to date less visible, role than the previous countries. Its comparatively recent concerted efforts to expand economic relations with Sudan have been part of a wider scaling up of business engagement with Africa. Indian trade with Sudan has maintained a reasonable volume of around one billion in the last two decades reaching USD by 2016 (Bank of Sudan, 2016).

This cordial political atmosphere aided by the lucrative opportunities made by oil discoveries in Sudan encouraged a range of public and private Indian companies have to enter Sudan, Sudan trade fair was held in Khartoum, featuring some 78 public and private Indian companies and conducting business worth 150 mill USD with emphasis on infrastructure, agriculture, human resource development, information and communications technologies. The Export-Import Bank of India has played a key role in financing and promoting Indian exports to Sudan. A major part of the rationale behind credit lines was to 'provide initial help to kick-start our exports'. India had extended Sudan a line of credit of around 50 mill USD four times by February 2007, when it advanced a 48 mill USD package directed toward solar electrification, railways and other projects ('Indian Bank to Offer 48mill USD Credit to Sudan' 2007).

As evident from the above the positive political bilateral atmosphere between India and Sudan has contributed positively to the abovementioned flows although they hitherto not significant enough like those of Chine, yet they can be put as a prove to the impact of political relations on the FDI inflow.

Sudan relations with Malaysia

Malaysia was evidently share the same ideology with the NSR regime in Sudan and that played a critical role in its decision to invest in Sudan petroleum sector, thus, it came to

shore up Sudan when the International Monetary Fund took the strange step of declaring that Sudan was non-cooperative because of its inability to pay arrears to the Fund a move, which was not without a political context where Sudan was designed as human rights violator by the UN in1993, that when Malaysia was to play major role to support Sudan against the threat from the Western world, especially the US. As part of its effort toward Sudan, Malaysia has encouraged private and public enterprises to directly invest in Sudan. Petronas is one of the companies that responded to its government encourage and undertook large investment in oil sector in Sudan. Then it followed by many other Malaysian companies. Thus Sudan's good relations with Malaysia have played driving role for FDI inflow.

CONCLUSION

The objective of the paper is to examine the state of FDI inflow to Sudan and to examine the role of international relations on shaping that status. It was found that international relations are one of the most important factors that can affect the inflow of the FDI. Sudan good relations with East Asian countries (China, India and Malaysia) have contributed positively to the flow of FDI into Sudan. Contrarily, Sudan's bad relationship with U.S. and other western countries has contributed negatively to the FDI inflow to Sudan.

Based on this, we recommend that countries use their international relations as instrument to attract more FDI. Indeed Sudan has proved this point in its relations with Arab Gulf region, at the time of Sudan adamant hostile foreign policy towards the positions of the Gulf countries meager resources were attracted as FDI from them but since it altered its ideologically oriented foreign policy and become more pragmatic and took favorable steps towards the Gulf such as its bold shift from Iran and the joining of anti-shia Arab concert, Sudan managed to attract huge attention from Arab rich states and received promising FDI to its different sectors such as agriculture irrigation project and electricity generation.

REFERENCES

Abd Alla, O. A. Y., Mohamed, A. A., Abdelmawlla, M. A. & Mudawi, S. K. M. (2015). Evaluation of Foreign Direct Investment Inflow in Sudan. Journal of Business Studies quarterly, 7(2), 149-168.

Anyanwu, J. C. (2011). Determinants of Foreign Direct Investment Inflows to Africa, 1980-2007. Working paper No. 136, African Development Bank.

Bank of Sudan. (2016). Foreign Trade Statistical Digest. (http://www.cbos.gov.sd/sites/default/files/digest_q4_16.pdf).

Bannaga, A., Gangi, Y., Abdrazak, R. & Al-Fakhry, B. (2013). The effects of good governance on foreign direct investment inflows in Arab countries. Applied Financial Economics, 23(15), 1239-1247.

Bang, P. (2015). The Case of Sudan: How the West Lost, and China Gained Influence. Master dissertation, Copenhagen Business School, Denmark.

Buthe, T. & Milner, H. V. (2008). The Politics of Foreign Direct Investment into Developing Countries: Increasing FDI through International Trade Agreement. American Journal of Political Science, 52(4), 741-762.

David, H. & Shinn, D. H. (2009). China and the Conflict in Darfur. Brown Journal of World Affair, 6(1), 85-100.

Desbordes, R. & Vicard, V. (2005). Being nice makes you attractive: the FDI - international political relations nexus, 9th Annual International Conference on 2005 - carecon.org.uk (http://carecon.org.uk/Conferences/Conf2005/Papers/Vicard.pdf).

Desbordes, R. & Vicard, V. (2007). Foreign Direct Investment and Bilateral Investment Treaties, an International Political Perspective. CES Working Paper, Sorbonne Centre of Economics, Paris University.

Dauda, S. & Bado, U. Y. (2012). Impact of Shuttle Diplomacy on Foreign Direct Investment in Nigeria, 1999-2007. International Journal of Advanced research in Management and Social Sciences, 1(6), 1-17.

Ebaidalla, M. E. (2013). Determinants of Foreign Direct Investment Flows into Sudan. Khartoum University Journal for Management Studies, 6(1), 29-54.

Gadkarim, H. A. (2012). Will the Sudanese paradox continue? Insecure investment climate and substantial foreign direct investment inflows. Sudan Report, CMI. CHR. Michelsen Institute.

Ibrahim, O. A. & Hassan, H. M. (2013). Determinants of foreign direct investment in Sudan: an econometric perspective. Journal of North African Studies, 18(1), 1-15.

Khan, M. A. (2011). Foreign Direct Investment in Pakistan: The Role of International Political Relations, TMD Working Paper Series No. 039. Department of International Development, University of Oxford.

Lee, C.Y. (2015). Chinese Outward Investment in Oil and Its Economic and Political Impact in Developing Countries. Issues & Studies, 51(3), 131-163.

Metz, H. C. (1991). A Country Study: Sudan, Library of Congress, Washington, U.S.

Mun, H. W., Ling, L. Z., Leng, C. M., Yi, L. K., Ling, H. E. & Carmen, L. (2010). Malaysia's International Relations and Foreign Direct Investment (FDI): A Structural Change Analysis. Asian Social Science, 6(7), 156-170.

Najafi, A. & Askari, H. (2012). The Impact of Political Relations between Countries on Economic Relations. PSL Quarterly Review, 65(262), 247-273.

Ramasamy, B. & Yeung, M. (2016). Wooing the new Chinese businesses: five short-term policies to attract direct investment. Journal of Business Strategy, 37(5), 3-11.

Ramasamy, B. & Yeung, M. (2017). Attracting direct investment from Chinese businesses Five short-term policies for host governments. Strategic Direction, 33(1), 28-31.

Stefanović, S. (2008). Analytical Framework of FDI determinants: Implementation of the OLI model. Economics and Organization, 5(3), 239-249.

Tembe, P. E. & Xu, K. (2012). Attracting Foreign Direct Investment in Developing Countries: Determinants and Policies - A comparative Study between Mozambique and China. International Journal of Financial Research, 3(4), 69-82.

UNCTAD. (2011). Foreign Direct Investment in LDCs: Lessons Learned from the Decade 2001-2010 and the Way Forward. United Nations New York and Geneva.

Wang, C., Hong, J., Kafouros, M. & Wright, M. (2012). Exploring the Role of Government involvement in outward FDI from Emerging Economies. Journal of International Business Studies, 43, 655-676.

Zhang, J., Jiang, J. & Zhou, C. (2014). Diplomacy and Investment - the case of China. International Journal of Emerging Market, 9(2), 216-235.

Zwan, J. V. D. (2012). Evaluating the EU's role and challenges in Sudan and South Sudan: Sudan and South Sudan Case Study. Initiative for peace building. (http://www.ifp-ew.eu/pdf/092011IfPEWSudan.pdf).

APPENDEX

TABLE 1. FOREIGN DIRECT INVESTMENT IN MILLION US DOLLARS (2000-2013)

Year	KSA	Qatar	Kuwait	China	UAE	Total
2000	78	118	11	130	56	392.21
2001	115	173	16	185	85	574
2002	123	214	8	265	104	713.18
2003	240	390	11	480	228	1349.19
2004	302	420	15	554	220	1511.07
2005	265	430	16	621	230	1561.69
2006	318	553	18	674	279	1841.834
2007	220	451	15	597	221	1504.38
2008	263	496	17	619	258	1653.12
2009	247	522	17	690	250	1726.298
2010	260	619	21	832	332	2063.731
2011	347	707	23	870	367	2313.694
2012	254	698	23	936	401	2312.858
2013	218	715	22	819	405	2179.117
Total	3250	6506	233	8272	3435	21,696

Source: Bank of Sudan data base.