DYNAMICS OF FOREIGN EXCHANGE RESERVES ACCUMULATION AND MACROECONOMIC STABILITY: THE GHANAIAN PERSPECTIVE

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This study examines the impact of Ghana's foreign exchange reserves on improving the investment climate of the economy through stabilizing the macroeconomic environment. According to the Maastricht criteria, the stability of the macroeconomic environment is assessed by five variables: inflation, interest rate, exchange rate stability, the ratio of public debt to GDP and government budget deficit. The study adopted the VAR-Vector Auto Regression method to examine the relationship between foreign exchange reserves and selected variables that measures the macroeconomic stability. Annual data on these variables were taken from the Central Bank of Ghana and World Bank websites for the period from 2000 to 2016 inclusive. The result obtained from the analysis showed that the dynamics of foreign exchange reserves of Ghana has a significant statistical impact only on the exchange rate (GHS/USD) among all the macroeconomic variables. The paper concludes that the continued accumulation of foreign exchange reserves by the Central Bank of Ghana will steer the depreciation of the Ghanaian cedi, increase revenues and profits of the export sector and increase investment and economic growth based on higher exports. Ghana's foreign exchange reserves, via the channel of preventing the appreciation of the Ghanaian cedi, will reduce the risk premium of foreign investments and, by inference, help to attract a higher share of foreign investments.

Keywords: Ghana, foreign exchange reserves, Maastricht criteria, macroeconomic stability, investment climate, exchange rate, depreciation

The attraction, stimulation and retention of foreign investment are a challenge, especially for emerging markets. Foreign investors can create jobs, transfer technology and knowledge to help local companies integrate into global value chains and to stimulate economic growth in these countries. But these potential benefits do not occur automatically and are not guaranteed in a market economy.

Many macroeconomic factors can play a role in the change of direction of foreign investment influencing the movement of capital from one economy to another. For example, the difference in GDP growth rates between developed and developing countries may be the reason for a change in the direction of foreign investment from developed countries to developing countries. In addition to such factors, the significance of the investment climate of countries cannot be disregarded, especially while explaining long-term inflow of foreign investments.

Investment climate is the environment in which investment processes take place. It is formed under the influence of a complex of interrelated legislative and regulatory, organizational, economic, social, political and other factors that determine the conditions of investment activities in a particular country, region or city. The assessment of the investment climate is based on analysis of the factors determining the investment climate, which promotes economic growth. It usually involves looking at the output parameters of the investment climate in the country (inflation and interest rates, inflow and outflow of capital, the share of savings in GDP), as well as input parameters that determine the values of output characteristics, development potential of the investment and risk of their implementation [11]. The Global Competitiveness Index of the World Economic Forum of the World Bank has many bases for assessing the competitiveness of the economy.

These include: Macroeconomic stability, Efficient goods markets, Good health and primary education, Innovation institutions, Appropriate infrastructure, Higher education and training, Efficient labor markets, Developed financial markets [20].

Since macroeconomic stability was one of the main factors in assessing the competitiveness of the economy, in this article we will research the influence foreign exchange reserves have on the macroeconomic stability of the Ghanaian economy, thereby improving the investment climate of the Ghanaian economy to attract more foreign investment inflow. Macroeconomic stability acts as a buffer against currency and interest fluctuations in the world market [12].

According to the Maastricht criteria, macroeconomic stability is assessed by five variables: inflation, interest rate, exchange rate stability, the ratio of public debt to GDP and government budget

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deficit. Maastricht criteria are the rules that determine whether a country is ready to adopt the euro as a national currency. Agreed in Maastricht by EU member states in 1991 in preparation for the introduction of the euro, convergence criteria are formally defined as a set of macroeconomic indicators that measure [3]:

Price stability, to show inflation is under control;

Reliability and sustainability of public finances, by limiting government borrowing and public debt, in order to avoid excessive deficits;

Exchange rate stability by participating in the exchange rate mechanism (ERM II) for at least two years without strong deviations from the central ERM II course;

Long-term interest rates to assess the strength of the credit system.

Thus, the Maastricht criteria are an important indicator of macroeconomic stability and sustainable economic growth.

The stability of the macroeconomic environment in an economy is influenced by many different factors that have both economic and non-economic origins. Since the topic of the research is connected with foreign exchange reserves of the country, the focus is on the influence of accumulation of these assets on the macroeconomic stability.

LITERATURE REVIEW

Foreign exchange reserves are a very important macroeconomic mechanism, especially in developing countries. Foreign exchange reserves are accumulated in order to maintain and preserve the credibility of monetary policy and exchange rate policy, limiting external shocks that can adversely affect the financial stability of the economy, increasing confidence in the ability of the state to pay its external obligations, ensuring financial stability, etc. We analyze some relevant research related to the topic of this article.

Steiner A. (Dr. of Economics at the University of Groningen), in 2010 studied the relationship between the accumulation of foreign exchange reserves and inflation. He believes that the dynamics of foreign exchange reserves affects the domestic prices of goods and services. He adds that the inflationary consequences of the accumulation of foreign exchange reserves can depend on the exchange rate of the national currency - be it a fixed or floating exchange rate. Steiner adds that the effect of the accumulation of foreign exchange reserves on inflation will also depend on the degree of monetary sterilization used by the monetary authorities. His work concluded that the accumulation of global reserves leads to global inflation and inflation in each country [17].

Lin M. and Wang J. (Department of Public Finance, Chengchi University, Taiwan) studied the effect of foreign reserves on inflation in East Asian countries. They came to the conclusion that an increase in foreign exchange reserves leads to a rise in the inflation rate [10].

Khan M.T. (University Mardan (AWKUM), PAKISTAN) studied the relationship between the exchange rate and foreign exchange reserves in Pakistan. His study concluded on the existence of a long-term relationship between foreign exchange reserves and exchange rates. He also examined the causality relation between them and concluded that causality direction goes from Nominal and Real Exchange rate to foreign exchange reserves [9].

Polterovich V. and Popov V. (Russian Academy of Sciences, Central Economics and Mathematics Institute, Laboratory of Mathematical Economics) in their cross-country study reported that the accumulation of foreign exchange reserves contributes to economic growth and increases the ratio of foreign direct investment to GDP, and the share of exports to GDP. In their opinion, the accumulation of foreign exchange reserves affects economic growth through two mechanisms [16].

Firstly, when the manufacturing sector is created and industrialization has taken place, foreign exchange reserves accumulation causes real exchange rate to achieve underestimation. This then allows the economy to take full advantages of export externality and trigger export-led growth.

Secondly, the accumulation of foreign exchange reserves attracts foreign direct investment, as it increases confidence in the host country and increases its solvency. Fukuda S. and Kon Y. (Shin-ichi Fukuda is a professor at the University of Tokyo. Yoshifumi Kon is a PhD candidate at the University of Tokyo. Asian Development Bank Institute, Tokyo) investigated the macroeconomic effects of the accumulation of foreign exchange reserves in developing countries. The results of their research showed that the increase in foreign exchange reserves influences a constant decrease in consumption, a decrease in real exchange rates and a temporary improvement in the current account [4].

Pina G. (Assistant Professor of Economics in the Leavey School of Business at Santa Clara University, California) argued that the accumulation of foreign exchange reserves can be explained using a simple model in which the Central Bank smoothes inflation and stabilizes the exchange rate [15].

Osuji C. and Ebiringa O. (Lecturers - Department of Accounting, Banking and Delta state University, Asaba Campus, Nigeria) reviewed the analysis of the impact of foreign exchange reserves on macroeconomic stability in Nigeria from 1981 to 2010. The study established a direct statistical relationship between the foreign exchange reserves and the independent variables that were involved in the calculations, while it was revealed that the foreign exchange reserves directly affect macroeconomic stability [14].

Ibrahim W. (PhD, Department of Economics, Al-Hikmah University, Nigeria) examined the impact of changes in Nigeria's foreign exchange reserves on domestic investment, inflation and the exchange rate from 1986 to 2006. The results show that changes in foreign exchange reserves affect only foreign direct investment and inflation [8].

Umeora C. (Senior lecturer, Banking and Finance Department at Anambra State University, Nigeria) conducted a study on the accumulation of foreign exchange reserves and their impact on macroeconomic stability in Nigeria. The study involves time series data for the period 1986-2011 years. The results show that exchange rate and GDP have positive and significant statistical relationship with the accumulation of foreign exchange reserves, and inflation has negative and insignificant relation to foreign exchange reserves [19].

Terada-Hagiwara A. (Senior Economist, Economic Research and Regional Cooperation Department - Asian Development Bank) analysed the problems associated with the rapid growth of foreign exchange reserves in Asia. He noted that the growth of foreign exchange reserves affects the money supply and monetary policy. Theoretical models and empirical evidence on the relationship between the level of foreign exchange reserves and currency crises shows that reserves reduce the likelihood and seriousness of domestic financial shocks [18].

The accumulation of foreign exchange reserves is considered to be a rational response to the mitigation of the impact of fundamental uncertainty and the various types of risks in international trade and

Table

Data presentation of foreign exchange reserves and macroeconomic variables of Ghana from 2000-2016

Years	FER (USD in million)	EXR (GHS/USD)	INF (%)	MPR (%)	Debt/GDP (%)	BD (% GDP)
	1*	2*	3*	4*	5*	6*
2000	309	0,70	25,19		111,9	-9,7
2001	376	0,73	32,90		87,2	-9
2002	636	0,84	14,82	24,50	81,9	-6,8
2003	1 470	0,88	26,67	21,50	74,2	2,4
2004	1 750	0,9	12,62	18,50	57,6	-3,2
2005	1 897	0,91	15,12	15,50	47,7	-2,4
2006	2 269	0,9	10,91	12,5	26,2	-7,55
2007	2 218	0,97	10,73	13,5	31	-8,10
2008	2 014	1,2	16,52	17	33,6	-11,48
2009	3 692	1,43	19,25	18	36,1	-5,6
2010	5 158	1,5	10,71	13,5	46,3	-6,3
2011	5 914	1,6	8,73	12,5	42,6	-4,0
2012	5 835	1,88	9,17	15	47,9	-11,5
2013	5 588	2,20	11,61	16	57,2	-11,0
2014	5 564	3,20	15,49	21	70,2	-10,3
2015	5 743	3,79	14	26	72,2	-6,3
2016	5 867	4,20	17,47	25,5	73,5	-7,8

* FER - foreign exchange reserves,
EXR - exchange rate,
INF - inflation,
MPR - monetary policy rate,
DG - debt to GDP ratio,
BD - government budget deficit (% of GDP).

Source: World Bank data, Central Bank of Ghana and author's tabulations.

capital flows. Foreign exchange reserves, indeed, play a vital role for smoothing both trade and capital flows in emerging and developing countries whose currencies are not used in international transactions. Observations and calculations have shown that the existing world financial system is highly exposed to various types of risks, such as the currency crisis, capital outflow, financial fragility, sovereign default and interplay among those risks [5]. Ocampo J.A. (Professor at Columbia University School of International and Public Affairs) argues that foreign exchange reserves act as a collective insurance against such risks [13].

METHODOLOGY

To determine the long run impact of increased foreign exchange reserves on macroeconomic stability of the Ghanaian economy to improve the investment climate, the study adopted the VAR-Vector Auto Regression method to examine the relationship between foreign exchange reserves and selected variables that measures the macroeconomic stability. For the analysis, we selected only those variables that meet the Maastricht criterion of macroeconomic stability: inflation, interest rate, exchange rate stability, the ratio of public debt to GDP, the government budget deficit.

Annual data on these variables were taken from the Central Bank of Ghana and World Bank websites for the period from 2000 to 2016 inclusive. The data are represented in *table* below:

FER = f (EXR, INF, MPR, DG, BD μ) (1)

The model can be written in an explicit form thus:

FR = β0 + β1EXR + β2INF + β3MPR + β4DG + β5BD μ (2)

Where,

β0 β1, β2, β3, β4, β5 - coefficient of the variables and represents the degree of change of the dependent variable (FR) as a result of a unit change of the independent variables,

μ - Error term.

MODEL SPECIFICATION

The study employs the single equation econometric simulation. The choice of this technique is because of its theoretical plausibility, explanatory ability, accuracy of the parameter estimate, simplicity and forecasting ability.

Key variables were grouped into dependent and independent variable. Foreign exchange reserves (FER) becomes the independent variable while the dependent variables chosen to represent the Macroeconomic stability variables are the exchange rate (EXR), inflation (INF), monetary policy rate (MPR), debt to GDP ratio and government budget deficit (% of GDP). This selected model shows the degree of relationship between independent variable and dependent variable and it takes the following form:

RESEARCH HYPOTHESIS

The hypotheses are presented only in null form:

Accumulation of foreign exchange reserves has no significant influence on exchange rate.

Accumulation of foreign exchange reserves has no significant influence on inflation.

Accumulation of foreign exchange reserves has no significant influence on monetary policy rate.

Accumulation of foreign exchange reserves has no significant influence on debt-GDP-ratio.

Accumulation of foreign exchange reserves has no significant influence on budget deficit.

DATA PRESENTATION AND INTERPRETATION OF RESULTS

From the analysis, the dynamics of foreign exchange reserves of Ghana has a significant statistical impact only on the national currency among all the macroeconomic variables recommended by the Maastricht Agreement for testing macroeconomic stability in a country.

The regression equation is as follows:

The regression equation is as follows:

$$FER_t = 1{,}001 * EXR_{t-2} + \mu \quad (3)$$

(3)

$$EXR_t = -1{,}88 - 0{,}00067 * FER_{t-1} + \mu \quad (4)$$

(-2) (-2.9)

From the equation it can be concluded that an increase in the level of foreign exchange reserves of Ghana reduces the exchange rate of the national currency against the US dollar and supports the competitiveness of the Ghanaian economy.

POLICY IMPLICATION OF RESULTS

In the context of increasing foreign investment inflows and diversifying investment opportunities for foreign investors at the global level, and also taking into account the higher integration of the modern capital market, investors critically assess the risk of fluctuations in the exchange rate of the national currency, especially when investments are made in developing countries. Since the accumulation of foreign exchange reserves in Ghana has a positive effect on the stability of the Ghanaian cedi, it will enhance the attractiveness of the Ghanaian economy to attract more foreign investors, because foreign investors will try to avoid the risks associated with exchange rate volatility.

SUMMARY AND CONCLUSION

The study examined the impact of Ghana's foreign exchange reserves accumulations on macroeconomic environment. The various literature reviewed shows the importance of foreign exchange reserves on economic growth. From our analysis it is clear that the accumulation of foreign exchange reserves is a necessary macroeconomic mechanism for increasing long-term economic growth rates.

The continued accumulation of foreign exchange reserves by the central bank of Ghana will steer the depreciation of the Ghanaian cedi, increase revenues and profits of the export sector, facilitate investment and economic growth based on higher exports. Ghana's foreign exchange reserves, via the channel of preventing the appreciation of the Ghanaian cedi, will reduce the risk premium of foreign investments and, by inference; help attract a larger share of foreign investments.

The study recommends that the Ghanaian government should accumulate more foreign exchange reserves at a desirable level so as to achieve the goal of preventing the appreciation of the Ghanaian cedi. This will curb spending and imports and stimulate exports, attract foreign capital inflows and economic growth.

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