IOSR Journal of Economics and Finance (IOSR-JEF)
e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 6, Issue 4. Ver. II (Jul. - Aug. 2015), PP 68-74
www.iosrjournals.org

Macroeconomic Determinants of Investment Decision in Nigeria: IS-LM-BP-RP Approach

Ogunsakin Sanya (Ph.D) Saliu Mojeed Olanrewaju
Department Of Economics, Faculty Of The Social Sciences, Ekiti State University, Ado-Ekiti, P.M.B. 5363, Ado-Ekiti, Ekiti State, Nigeria.

Abstract: *The paper examines the macroeconomic determinants of investment decision in Nigeria using IS-LM-BP-RP approach. The data series employed were gathered from various sources such as National Bureau of Statistics, Central Bank of Nigeria statistical bulletin and World Bank data base. The study employs the theoretical propositions of IS-LM-BP-RP which was developed by Gray and Melone (2008). Considering the backward bending of BP curve, the empirical results in the study confirm the validity of the backward bending of BP curve in the Nigerian economy. The result equally indicates that if Mundell-Fleming model is used to formulate policies in Nigeria, the risk factors will be significant enough to affect the validity of the policy. Based on the policy responses to backward bending of BP curve analyzed in this paper, we recommend that moderate expansionary monetary policy should be adopted and this will reduce the high risk premium brought about by the high increase in the level of interest rate and thus increase the level of output.*

Keywods: *Mundell-Fleming model, risk premium, monetary policy, fiscal policy, BP curve*

I. Introduction

In Keynesian terminology, investment refers to real investment which adds to capital equipment. It leads to an increase in the level of income and production by increasing the production and purchase of capital goods. Investment, thus, includes new plants and equipment, construction of public works, net foreign investment, inventories, stock and shares of new companies. Investment is the most important macroeconomic variable that can impact the economic growth. Investment spending makes direct contribution to economic activity, because it is the most volatile component of GDP (Ahmed, 2012).

Strong and robust investment decisions depend on a good policy design that determines whether investments pay off in greater competitiveness for firms and in sustained growth for the economy. Among the policy areas that deals effectively with investment decision analysis is the IS-LM-BP framework which is popularly referred to as the Mundell-Fleming (M-F) model. This model has enjoyed wide popularity since the early 1960s and still plays a prominent role in shaping policy decisions till today most especially, in the area of investment decision making.

Over the years, this model has proven very useful in drawing conclusions about the impact of policy actions on output, interest rates and the balance of payments adjustment process under alternative exchange rate regimes. Also, since it distinguishes between current and capital transactions in the balance of payments, it deals with the effects of policy shifts on a country's current account balance. Basically, Mundell-Fleming model is an extension of classic IS-LM analysis to an open economy, assuming international capital mobility, imperfect substitutability between domestic and foreign goods, a fixed aggregate price level and variable real output, (Daniels and Vanhoose, 2002).

However, because of the fact that the world economies are integrated financially, the world economic downturn which started in United State of America and United Kingdom in 2007 had a significant impact on the Nigerian economy. The channel of impact includes the indirect effect of volatile and falling commodity prices particularly crude oil, low inflow of capital, low remittance from abroad, decline in foreign aids, low foreign direct investment and portfolio investment. This in turn has brought about weaker export revenue, pressures on current account and balance of payment with negative effect on investment, growth rates and employment (IMF, 2008)

A lot of policy designs have been put forward by the Nigerian government and economic analysts to fight against the menace brought about by the advent of economic depression in Nigeria. But these policies have been proved unfruitful as policy-related costs are responsible for a high percentage of firms' operational downfall which arises from outmoded and ill-conceived policies on the part of the Nigerian government. Omotola (2008) identifies weak, poor and inconsistent government policies as a major factor constraining investment and trade decision in Nigeria. No wonder the position of Nigeria among some West African countries with respect to some investment performance indicators remain poor in the Global Competitiveness Report 2007-2008. Nigeria ranked 88 in 2007 and 101 in 2009 in the global competitiveness ranking while Botswana ranked

48 and 81 and Mauritius 52 and 55 in the same period. Ghana ranked 45 against Nigeria's 76 under the Business Competitiveness Index in 2007 (Africa Competitiveness Report, 2008).

Series of research works have made use of Mundell-Fleming model by the Nigerian and Overseas researchers for the analysis of investment decision making. However, in Nigeria, only an overview of the importance of Mundell-Fleming framework in the decision making analysis has been given but no suggestion has been made on how to incorporate risk into the model. A striking flaw of Mundell-Fleming model is the omission of risk factors. This omission is a serious one, because risk impacts the decision to spend, save and invest (Flyvbjerg, 2012). Consequently, an increase in the risk premium could destroy many investment already planned and reduce the number of new feasible projects if not monitored. Therefore, the objective of this research work is to correct the above anomalies by incorporating risk factors into the Mundell-Fleming model and to test its applicability in the Nigerian economy. These will thus, form new macroeconomic policy and decision making mechanism suitable for investment decision making in Nigeria. The rest of the paper is organized as follows, in the next section, we provide a brief review of the relevant literature. In section 3, we set out a theoretical model to link risk factors into the macroeconomic model. A discussion of data and relevant variables construction is provided in section 4. Following this is the section 5, where a brief conclusion and policy recommendation is provided.

II. Literatures Review

Great attempts have been made by different researchers to provide evidences on the linkages between investment and risk. The work of Lettau and Ludvigson (2002) focuses on investment decision and their relationship with the risk premium. They use Q theory and a consumption-wealth ratio as proxy for the future risk premium and then analyze the link between this proxy and future long-term investment.

Fuerst (2004) measures the dynamic multifactor risk premiums directly using the Fama and French asset pricing model and test whether these premiums have implications for future real economic activity including new durable goods. The results of which drive corporate managers' financial decision making. Wachter (2007) links the changing equity risk premiums in the United States to shifting volatility in the real economy. They attribute the lower equity risk premiums of the 1990 to a reduced volatility in real economic variables including employment, consumption and GDP growth.

Ursua (2009) modeled the catastrophic risk as both a drop in economic output (an economic depression) and partial default by the government on its borrowing. They use panel data on 24 countries over more than 100 years to examine the empirical effects of catastrophic risk. Investigating the asset pricing implications, they conclude that the consequences for equity risk premiums will depend upon investor utility functions.

Hampton and Sutton (2012) suggested the need for enterprises to imbibe a culture of managing risk. They state that risk management involves aligning financial risk management with the business strategy. Elinner and Walker (2012) suggested further that managing risks, integration into the wider business and boosting innovation and growth is where the future of overcoming uncertainties in financing and other business decision lies. Wellisz (2012) opined that the entrepreneur's risk and the lender's risk increase with the size of the loan. They stated further that with the investor's limited capital, the size of loan is limited. Therefore basing investment on the investor's own capital may mean a decrease in potential risk to finance even as the size of the business increases. The risk involved shows that the rate of growth of the business under different risk conditions will create a difference in the capital structure of the firm.

III. Theoretical Model

The aim of this research work is to link risk factors into the macroeconomic model which is rested on the theoretical propositions developed by Gray and Malone (2008) and revised by Yonggang, Jiaqi, Lingfeng and Pei, (2013). The macroeconomic model is a new open macroeconomic IS-LM-BP model and the introduction of the risk factors is based on the risk premium.

The new open macroeconomic IS-LM-BP model was developed by Mundell and Fleming (1962). In the model, there are three equilibriums of commodity markets, money markets and the international balance of payments.

3.1 Output equation: Commodity market equilibrium is reached when the total output is equal to the total supply. The total supply includes consumption, investment, government spending and net exports. Therefore, the IS curve is given by:

IS: $y^S = y^D$

Where $y^D = C(y) + I(r) + G + NX$

Money market equation: The money market equilibrium is reached when money supply is equal to the money demand. The money supply, (M), and price index, (P), are exogenously given variables and the currency demand is a function of the interest rate and aggregate income. Therefore, the LM equation is given by:

LM: $M^S = M^D$

Where $M^S = {}^{M}/_{P}$ and $M^D = L(r, y)$

$\therefore \ {}^{M}/_{P} = L(r, y)$

Balance of payment equation: The BP function reflects the balance of international payments, including the balance of current account and capital account, net exports and net inflow of foreign capital.

3.2 Is-Lm-Bp Model With Risk Factors

IS-LM-BP model is a static model that is often targeted towards the formulation of fiscal and monetary policy for an open economy. Meanwhile, assets value of firms can be subjected to changes at a given point due to some risk factors. Therefore, the integration of IS-LM-BP macroeconomic model with the risk factor can provide some dynamic analysis for effective policy formulation.

Incorporating risk factors, the system will now become IS-LM-BP-RP model where RP is the Risk Premium and it is specified as follows:

$$\text{IS:} \quad Y = D\underbrace{(y, r)}_{(+)\,(-)} + G + NX\underbrace{(y, e)}_{(-)\,(+)} \quad \ldots\ldots(1)$$

$$\text{LM:} \quad {}^{M}/_{P} = L\underbrace{(r, y)}_{(-)\,(+)} \quad \ldots\ldots(2)$$

$$\text{BP:} \quad BP = NX\underbrace{(y, e)}_{(-)\,(+)} + KA\underbrace{(r - r^*, \rho - \rho^*)}_{(+)\quad(-)} \quad \ldots\ldots(3)$$

$$\text{RP:} \quad \rho = \rho\underbrace{(r, e)}_{(+)\,(+)} \quad \ldots\ldots(4)$$

The sign below the variables indicate the sign of the marginal effect of an increase in the variable on the function of which it is a part.

In the IS equation, the aggregate demand responds negatively to the risk-free rate (r) and positively to a rise in real income (Y).

In the BP equation, the trade flows which is represented by net exports NX depend upon real income (Y) and the exchange rate (e). Capital flows, which is denoted by KA, are positively related to the differential between home and foreign risk-free rates, (r – r*) as in the case of Mundell-Fleming model but are also negatively related to the differential between domestic and foreign risk premium (ρ - ρ*). This assumption is quite justifiable because investors are often attracted to a favorable differential in interest rate, but they also hate the risk of loss (Gray and Malone, 2008).

ρ is used to indicate Risk Premium (RP) which is positively related to both risk-free rate and exchange rate. Based on the above propositions, the rise in the risk-free rate will increase the risk premium, reduce the aggregate demand and net capital inflows which will thus reduce the marginal product. As a result of the structure indicated by the BP and the Risk Premium (RP) equations, the BP curve is backward bending as shown below:

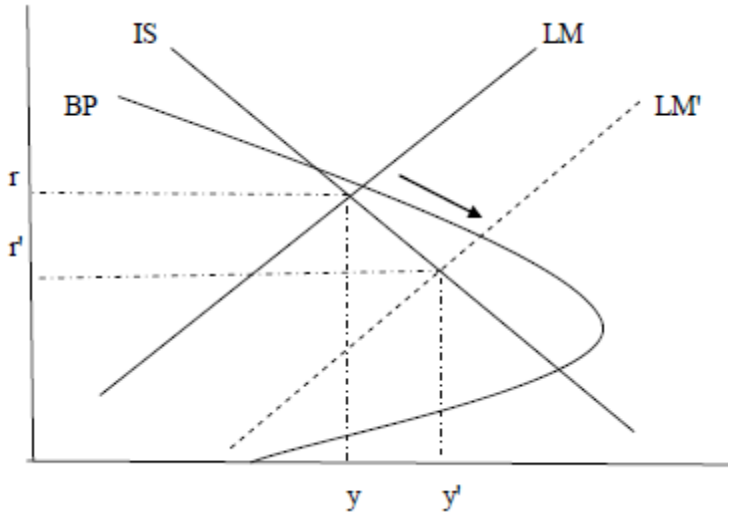
Figure 1:
Backward bending BP curve

Source: Adapted from (Gray and Malone, 2008)

3.3 Monetary And Fiscal Policy Responses To Backward Bending Bp Curve

3.3.1 Monetary Policy

Figure 2:
The effects of expansionary monetary policy

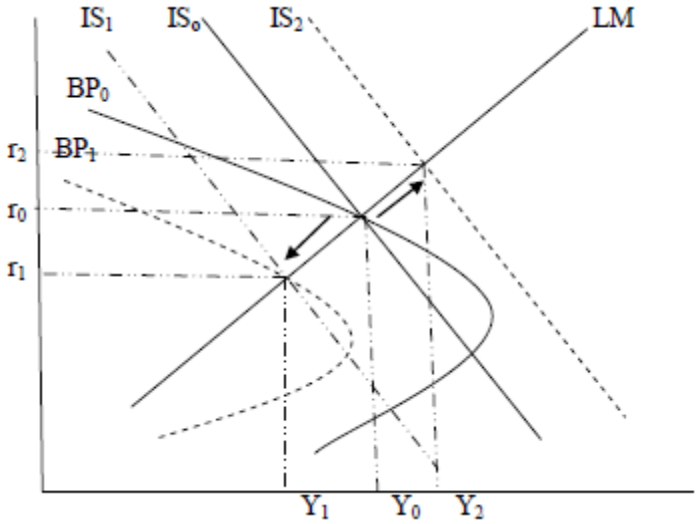


Source: Adapted from (Gray and Malone, 2008)

The LM curve shifts to the right with the increase in the money supply. This leads to a new stable equilibrium in which output is higher and the risk-free rate is lower than before the BOP shock. However, the above analysis is only valid for a moderate expansionary monetary policy, because a large monetary expansion will provoke a higher risk-free rate and lower output on the long-run (Malone and Gray, 2008).

3.3.2 Fiscal Policy

Figure 3:
The effects of expansionary and contractionary fiscal policy



Source: Adapted from (Gray and Malone, 2008)

The fiscal expansion shifts the IS curve to the right, thus leading to a new equilibrium in which both the output and the risk-free rate are higher than before the BP shock. On the other hand, the fiscal contraction shifts the IS curve to the left and this will lead to a new equilibrium in which both output and the risk-free rate are lower than before the BP shock.

Going by the analysis made above, in the economy where BP backward bending is applied in which risk premiums are high and capital flows and investment are backward, then moderate expansionary monetary policy is the appropriate response. Contractionary fiscal policy may be used as a defense as well but at the expense of lower output.

IV. Empirical Analysis

It is quite pertinent to research empirically the backward bending of BP curve which is similar to the study conducted by Yonggang, Jiaqi, lingfeng and Pei (2013). This is done in this research work by using Nigeria data from years 1981 to 2010, so as to test the validity of backward bending of BP curve in the Nigerian economy.

Following from the theoretical propositions of IS-LM-BP-RP model which was developed by Gray and Melone (2008) and considering the backward bending of BP curve, the model used in this work is explicitly specified as follows:

$$GFCF = \alpha_1 + \alpha_2 Exr + \alpha_3 DRFR + \alpha_4 DRP + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$GFCF = \alpha_1 + \alpha_2 Exr + \alpha_3 HRFR + \alpha_4 FRFR + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The first equation signifies a situation where there is introduction of risk factors, while the second equation indicates no risk factors.

Where:
GFCF = Gross Fixed Capital Formation
Exr = Exchange rate
DRFR = Difference of domestic and foreign risk-free interest rate
HRFR = Home risk-free interest rate
DRP = Difference of domestic and foreign risk premium
FRFR = Foreign risk-free interest rate
ε_t = Error term

Gross Fixed Capital Formation is used to capture investment; Treasury Bill Rate is used as proxy for risk-free interest rate. Risk Premium is calculated by deducting Treasury Bill Rate from Lending Rate and United State is used as the foreign economy.

4.1 Sources Of Data

The data set for this paper consist of annual time series spanning 1981 through 2010. The variables under consideration are: Gross Fixed Capital Formation, Domestic and Foreign Treasury Bill Rates, Domestic and Foreign Lending Rate and Exchange Rate. Data on Gross Fixed Capital Formation and Exchange Rate were sourced from National Bureau of Statistics data base while data on other variables were sourced from World Bank data base.

V.Result And Discussion

TABLE 1:Values of estimated parameters with Risk Factors

VARIABLES	COEFFICIENT	STANDARD ERROR	PROBABILITY
EXR	-0.041129	0.0206429	0.057
DRFR	-0.0817873	0.3737796	0.829
DRP	-0.4268364	0.1518531	0.009

R-Squared = 0.4212, Adjusted R-squared = 0.3544
Source: Author's computation

Table 2: Values Of Estimated Parameters Without Risk Factors

VARIABLES	COEFFICIENT	STANDARD ERROR	PROBABILITY
EXR	-0.0037397	0.0264562	0.889
HRFR	-0.1529351	0.2102886	0.474
FRFR	1.326434	0.4914968	0.012

R- Squared = 0.4937, Adjusted R- squared = 0.4353
Source: Author's computation

The OLS regression above show the results of the estimated parameters with and without the introduction of risk factors into the BP equation. Table 1 has a lower regression level with R^2 and adjusted R^2 of 0.42 and 0.35 respectively compared to the table 2 which has a higher regression level with R^2 and adjusted R^2 of 0.49 and 0.44 respectively. The results in table 1 indicate a negative impact of high-risk premium on investment level in Nigeria. The result in table 1 equally shows that the difference in domestic and foreign Risk Premium has a significant negative impact on the investment level in Nigeria. The result therefore confirms the validity of backward bending of BP curve in Nigeria which is as a result of high-risk premium.

VI. Conclusion And Policy Recommendation

This research work augmented the open economy Mundell-Fleming model to include risk factors which is in line with the propositions of Gray and Melone (2008) and Yonggang, Jiaqi Lingfeng and Pei (2013). In addition to the three equilibriums of product market, money market and the international balance of payments, the equilibrium of the risk factors is also analyzed. This paper therefore concludes that the introduction of risk premium forces the BP curve to bend backward.

The empirical results in this research work equally confirm the validity of the backward bending of BP curve in the Nigeria economy. The results indicate that if Mundell-Fleming model is used to formulate policies in Nigeria, the risk factors will be significant enough to affect the validity of the policy.

Based on the policy responses to backward bending of BP curve analyzed in the theoretical model and the results from this empirical research work, this paper therefore recommends that moderate expansionary monetary policy should be adopted, as this will reduce the high risk premium brought about by the high increase in the level interest rate and thus increase the level of output.

Reference

[1]. Ahmad, N. (2012): Importance of Investment for Economic Growth: Evidence from Pakistan. Interdisciplinary Journal of Contemporary Research in Business, pp 680-684

[2]. Daniels, J. and VanHoose, D. (2002): International Monetary and Financial Economics. Ohio, USA: Southwestern Thompson Learning.

[3]. Elinner, S. and Walker, P. (2012): Enterprise Risk Management: A process for enhanced management and improved performance. Quarterly management accounting, Vol. 13 pp. 28-34.

[4]. Flyvbjerg (2012): Investment risk. Management Journal, Vol. 37, pp. 5-15

[5]. Fuerst, M.E (2004): Investor Risk Premia and Real Macroeconomic Fluctuations. Journal of Financial Economic Vol. 55, pp. 1-19.

[6]. Gray, D.F and Malone, S.W (2008): Mundell-Fleming with a Risk Premium: Twin Crises and the Backward Bending BP curve. IMF working paper, Washington D.C

[7]. Gray, D.F and Malone, S.W (2008): Macrofinancial Risk Analysis, New York, John Wiley and Son.

[8]. International Monetary Fund (2008): De Facto Classification of Exchange Rate Regimes and Monetary Policy Framework. Retrieved from http:/www.imf.org/external/np/mfd/er/2008/1205.htm.

[9]. Lettau, M. and Ludvigson, S. (2002): Time-varying Risk Premiums and the Cost of Capital: An Alternative Implication of the Q Theory of Investment. Journal of Monetary Economics 49, pp. 31-66.

[10]. Mundell, R.A and Fleming, J.M (1962): "Domestic Financial Policies Under Fixed and Under Floating Exchange Rate", IMF staff papers, Vol. 9, pp. 369-379.

[11]. Omotola, D. (2008): Small Scale Enterprises, Economic Reform and National Development in Nigeria. Adejo Publishing, Lagos.

[12]. Sutton, S. and Hampton, T. (2012): The role of enterprise risk management and organization. Strategic flexibility in easing new regulation compliance. International Journal of Accounting information system Vol. 12 pp. 171-188.

[13]. Ursua, J. (2009): Crises and Recoveries in an Empirical Model of Consumption Disasters, Seminal paper. University of Chicago.

[14]. Wachter, J.A (2007): The Declining Equity Risk Premium: What roles does Macroeconomic risk play? Review of Financial studies Vol. 21 pp. 1653-1687.

[15]. Wellisz, S. (2012): Strategies for Managing Global Environmental Risks: The Review of Economic Studies. Vol. 20 pp. 12-18.

[16]. World Economic Forum (2008): The Africa Competitiveness Report 2007/2008.