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Exchange Rate Regimes and Foreign Direct Investment Flow in West African Monetary Zone (WAMZ)

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Abstract

This study examines the effect of exchange rate regimes on Foreign Direct Investment (FDI) flow for WAMZ. The Arellano Panel Correction for Serial Correlation and Heteroskedaticity option of the Within Estimator for fixed effect panel data model as well as the Dynamic Panel Data Instrumental Variable Approach by Anderson and Hsiao (1981) for the countries selected based on data availability for the period 1980-2016 were used. The fixed exchange rate regime was found to hamper FDI flow in the zone while intermediate policy had a significantly positive effect in facilitating FDI flow during periods of declining foreign reserves and narrowing current account balance in WAMZ. This implies that the transmission of the effect of exchange rate regimes on FDI inflows depends on the positions of the foreign reserves and current account balance in the zone. Consequently, the fixed regime is not a good policy in periods of narrowing current account balance and depleting foreign exchange reserves. The study therefore recommends the need for monetary authorities to be cautious in managing their exchange rates especially in periods of depleting foreign reserves and narrowing current account so as not to deter the much needed FDI inflow.

Keywords: Exchange Rate Regimes; Inflationary Expectation; Exchange rate uncertainty; Foreign Direct Investment Flow; Panel Data Analysis.

JEL Classification: E310, F210, F310.

1. Introduction

Foreign Direct Investment (FDI) is a main source of much desired capital flow as it is capable of facilitating technological spillovers, job creation and improved managerial skills and productivity in recipient countries (Blomstrom and Kokko, 1997; Jensen, 2003). Experts argue that FDI has the ability to augment the two gaps (the savings gap and the foreign exchange gap) as identified in the literature, but a number of hindering or facilitating factors have also been acknowledged in the literature (Dunning, 1977; Funke and Nsouli, 2003; Adams, 2009).

Theoretically, Dunning (1977) posited for the OLI framwork, Ning and Reed (1995) argued for the supply and demand sides factors, Montiel (1996) and Calvoet et al. (1996) opined for the push and pull factors while Fedderke and Romm (2006) put forward the policy and non-policy factors argument. Specifically on the policy factors, Aiznman (1992) and Benassy-Quere et al. (2001) showed exchange rate regimes' role as either a driving or hindering factor depending on the economic situation while Goldberg and Kolstand (1995), Sung and Lapan (2000), Brzozowski (2006), Bailey and Tavlas (2007) and Schmidt and Broll (2009) are among those that showed theoretically the role of exchange rate and its uncertainty among the factors. This indicates that FDI inflows are affected not only by the exchange rates and/or its volatility but also by the exchange rate regime as these factors could either serve as incentive or disincentive to investment across borders (Azam, 1999; Buss et al. 2010).

There is plethora of empirical studies on exchange rate and/or its volatility on FDI inflows. Among them are Baily and Tavlas (1991), Goldberg and Kolstad (1995), Chakrabarti and Scholnick (2002), Kiyota and Urata (2004), Brzozowski (2006), Schiavo (2007), Udoh and Egwakhide (2008), Ogunleye (2009) and Schmidt and Broll (2009). But, the empirical literature on exchange rate regimes and FDI inflow nexus is still a budding one and ambiguous. For instance, Aizenman (1992), Benassy-Quere et al. (2001), Busse et al. (2010), Abbott et al. (2012) and Russ (2012) are among those that found a positive and negative effects from fixed and flexible regimes respectively but Asiedu and Lien (2004) found negative and positive effect for unity and multiple exchange rates respectively, Nyako et al. (2011) on the other hand found a positive effect from liberalized exchange rate while Cushman and De Vita (2017) found relatively fixed regimes to encourage FDI as against the relatively floating.

A closer look at the literature showed that only Nyako et al. (2011) is a specific African study and it is a country specific study on Ghana. Our study intends to bridge this gap by focusing on the West African Monetary Zone (WAMZ).The zone has continued to encounter immense macroeconomic challenges in achieving the necessary criterion for single currency and formulating a realistic exchange rate policy for economic stability. The reason is not farfetched as these economies' export sectors are dominated by primary products exposing them to exogenous shocks that transmit into their foreign reserves and current account balances. The study also contributes to the literature by accounting for the transmission of narrowing current account balance and declining foreign reserves on the exchange rate regimes-FDI nexus as a common phenomenon in the zone due to commodity price shock. In fact, the Breusch-Pagan LM cross-sectional dependence test showed the presence of cross-sectional dependence in WAMZ FDI inflow which is indicative of a common shock transmitted through the current account to the foreign reserves as they are commonly exposed to commodity price shock. The WAMZ treats positive commodity price shock as permanent hence, in periods of negative shock, fiscal discipline is always difficult as commodity exports form a major part of their export earnings and revenue since the capacity for domestic resource mobilization is low. This transmits into the domestic economy through the current account balance and foreign reserves via exchange rate and countercyclical fiscal response which invariably deter FDI flow.

2. Literature Review

There are several empirical literatures that examined the effect of exchange rate and expected exchange rate levels as well as the influence of exchange rate uncertainty on foreign direct investment flow. However, the literature on the connection between exchange rate regimes and FDI inflow is still a budding one and the results are still imprecise depending on the methodology and the choice of control variables. In the empirical literature, most of the studies controlled for price distortions with inflation because it is viewed that exchange rate regimes' effect on FDI might go through the price distortion channel. For instance, Aizenman (1992) analyzed the factors determining the effect of exchange rate regime on the behavior of domestic and foreign investment as well as the link between exchange rate variability and investment. The study used the analytical approach with a standard equilibra macro model that allows for the

presence of a short run Philip Curve under fixed and flexible exchange rate regimes. The model assumed that producers diversify internationally so as to boost the flexibility of production since being a multinational allows producers to reallocate employment and production towards the more efficient plant. The study showed that a fixed exchange rate regime is more conducive to attracting FDI compared to the flexible exchange rate regime for both real and nominal shocks. The study further showed that the correlation between investment and exchange rate volatility under flexible regime depends on the nature of the shocks and that if the dominant shocks are nominal, there is a negative correlation but if they are real there is a positive correlation.

However, Benassy-Quere et al., (2001) investigated the impact of exchange rate polices specifically with control for exchange rate volatility on foreign direct investment model. The study first developed a theoretical model with the case of a risk-averse multinational firm which contemplates relocating two alternative foreign locations so as to re-export. The model showed that the firm will consider both locations as substitute or as complements depending on whether the two exchange rates against the investing country's currency are directly or inversely related. The study further analyzed the theoretical model empirically with a panel of 42 developing countries that received foreign direct investment from 17 OECD countries for the period 1984-1996. The results indicated the importance of exchange rate regime and found nominal exchange rate variability induced by a free floating regime to affect FDI.

Asiedu and Lien (2004) on the other hand examined the effects of three different types of capital control policies vis-a-vis; the existence of multiple exchange rates, controls on capital account and the inflexibility of requirements for repatriation on foreign direct investment flows. The study covered the period 1970-2000 for75 developing countries and employed the fixed effect panel data modeling approach and the results showed capital controls to deter foreign direct investment flow in these countries. Specifically, the study found that unitary exchange rate system improves the ratio of FDI flow to GDP by 0.54% however; multiple exchange rate system had detrimental effects on FDI flow.

Busse et al., (2010) also analyzed the effect of exchange rate regimes on foreign direct investment flows for both developed and developing countries for the period 1980-2004. The study used dummy variables to capture the different exchange rate regimes based on the Reinhart and Rogoff (2004) classifications. The study controlled for macroeconomic distortions like price

distortion from inflationary expectations due to exchange rate regimes and proxy that with inflation, with the inclusion of exchange rate volatility and the levels in the model. The fixed effect model was estimated with the standard OLS method but for robustness check the maximum likelihood estimator was also used. The results showed that macroeconomic distortions had a negative effect on FDI flow, however for exchange rate level, a negative effect was found for developing countries while a positive effect was found for developed countries, though the effect was not significant. The exchange rate volatility variable in the model was however positive but not significant. The study showed that fixed exchange rate regimes dummy had a positive and significant effect for developed countries but it was not significant for developing countries.

Nyako et al., (2011) examined the impact of exchange rate regime on FDI inflow in Ghana for the period 1970-2008. The study used the error correction modeling approach estimated with the OLS technique. A dummy variable was used to capture exchange rate regime from where Ghana liberalized their exchange rate from the fixed rate. The results showed that the liberalized exchange rate regime had positive effect on FDI flows to Ghana but it was found to be insignificant.

Abbott et al., (2012) examined the effect of exchange rate regimes on Foreign Direct Investment flows to developing countries. The study covered the period 1985-2004 for a panel of 70 developing countries and employed the system Generalized Method of Moment approach due to possible endogeneity problems in the model. The results showed that developing countries adopting fixed or intermediate regimes significantly outperform those under flexible exchange rate system in attracting foreign direct investment. Specifically, the study found that under the de facto classification schemes fixed and intermediate regimes are associated with significantly higher FDI inflow than the floating policy regime. The study further controlled for exchange rate volatility separately and found the coefficient of the fixed regime dummy to be bigger than intermediate regime dummy.

Russ (2012) also investigated the dynamic linkages between exchange rate volatility and FDI inflows for 28 OECD countries for the period 1980-2005. The study employed panel data analysis using the OLS, FGLS and GMM techniques. The study showed fixed exchange rate regime to increase FDI inflow from partners in the peg.

Cushman and De Vita (2017) examined the exchange rate regimes effect on FDI in a panel of 70 developing countries. The de facto regimes classification was used for their study and a logit equation that estimates propensity scores, which is the probability of regime choice, was employed. The study also used the general-to-specific parsimonious modeling approach as an alternative and results showed that relatively fixed regime influences positive FDI flow than the relatively floating regime in the panel of these developing countries.

A cursory look at the review shows that non-African studies dominated the empirical literature, except for the Nyako et al., (2011) study on Ghana to the best of my knowledge. The Nyako et al. (2011) however captured only period of exchange rate liberalization. Consequently, a study that concentrates on a specific Africa region of this sort is imperative especially on the WAMZ.

3. Data and Methodology

3.1 Theoretical Considerations in Modeling Foreign Direct Investment

The eclectic paradigm of Dunning (1977) was the first theoretical consideration providing framework for FDI determinants. The framework actually grouped FDI determinants into micro- and macro-level determinants on why multinational companies invest abroad. The theory opined that firms' investment abroad is based on three advantages: Ownership (O), Location (L) and Internalization (I). Hence, the framework is referred to as the OLI framework[1]. However, Fernandez-Aria (1996), Ferandez-Arias and Montiel(1996) and Calvaoet al.,(1996) categorized factors driving FDI into push and pull factors while Fedderke and Romm (2006) classified these factors as policy and non-policy factors. Tsai (1994), Ning and Reed (1995) group them into either supply or demand sides factors. However, Aizenman (1992) and Benassy-Quere et al., (2001) provided theoretical underpinning to the link between exchange rate policies and FDI flow. Aizeman (1992) demonstrated in a standard model accounting for Philip curve and exchange rate volatility under fixed and flexible exchange rateregimes that thefixed regime is more conducive than the flexible regime in attracting FDI. Benassy-Quere et al., (2001) on the other hand, in the case of a risk-averse firm with exchange rate regimes showed that the firm will consider location as substitute or as complement depending on whether the two exchange rates against the investing country's currency are directly or inversely related, implying that the link is

[1]For details about the OLI framework and other groupings (see also, Anyanwu and Yameogo, 2015).

ambiguous. Theoretically, on accounting for exchange rate volatility in FDI model, Goldberg and Kolstad (1995), Sung and Lapan (2000), Kiyota and Urata (2004), Brzozowski (2006), Bailey and Tavlas (2007) and Schmidt and Broll (2009) provided frameworks for exchange rate volatility as a key determinant of FDI flow under different assumptions by demonstrating that exchange rate volatility deters investment decisions on both production and returns.

3.2 Model Specification

Based on the above theoretical consideration and following the specifications by Busse et. al., (2010)[2] on the nexus between exchange rate regimes and FDI flow with a view to accounting for uncertainty and inflationary expectation, the baseline empirical model is thus;

$$FDI_{it} = \theta_0 + \delta FDI_{it-1} + \theta_1 \log(GDPPC)_{it} + \theta_2 Growth_{it} + \theta_3 EXR_{it} + \theta_4 OPENX_{it} + \theta_5 INFE_{it} + \theta_6 EXRVOL_{it} + \theta_7 MPFW_{it} + \theta_8 WAMZ_{it} + \theta_9 INST_{it} + \theta_{10} Resource_{it} + \varepsilon_{it} \quad (1)$$

Where, FDI= FDI inflow as percentage of GDP; lagged FDI captures effect of FDI inflow persistency; GDPPC=GDP per capita as a measure of market size; Growth= economic growth rate as a measure of economic track record; EXR=nominal exchange rate; OPENX= trade openness to capture trade policy measured as total trade to GDP ratio; MPFW= dummy to capture monetary policy framework pursued in these countries which in this case, is the monetary-targeting framework; Institution[3]= captures institution and governance from the polity IV project. The polity2 which captures political and regime type ranging from -10 to +10 indicating fully institutionalized autocracy to fully institutionalized democracy is used for the INST variable; Resources= dummy value of 1 for countries which are oil resource exporters and zero otherwise; WAMZ= dummy for the periods of belonging to WAMZ; INFE= inflation expectation is included as a proxy for macroeconomic distortions like price distortion as used in Busse et al., (2010). Statistical method[4] of measurement is used here for the inflationary expectation variable which is an autoregressive model of inflation and the predicted value is used. This is because in a simple form of rational expectation, agents' expectations equal their true statistical expected values and in fact, Azam (1999) showed that inflationary expectation

[2]Busse et. al., (2010) considered source and host country characteristics which in this case is not considered because the FDI flow is not bilateral flows.

[3] Institutional variable included here is due to the data coverage as other measures have shorter time series.

[4] There are other methods like the Survey Method and the Market-Based Method which are not used due to data limitations in these countries especially with the market based method.

equal inflation if expectation is strictly less than unity. EXRVOL= Exchange rate uncertainty measure. This study used the Brozozowski (2006) measure of exchange rate uncertainty[5] as the study emphasized the need to distinguish between volatility and uncertainty and that exchange rate innovations are unanticipated hence exchange rate uncertainty measure is better but volatility measures are basically for anticipated exchange rate innovations. To quantify exchange rate uncertainty following the Brozozowski (2006) approach, our study constructed sample-based measure of dispersion of unpredictable innovation through the conditional variance of the innovation using the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) specification of Bollerslev (1986). The estimated variance using exchange rate monthly data with equations (2) and (3) is thus;

$$EXR_t = \alpha + \sum_{i=1}^{p} \varphi_i \, EXR_{t-i} + v_t; \; v_t \sim IID(0, \delta^2) \qquad (2)$$

$$\sigma_t^2 = \vartheta_0 + \sum_{i=1}^{p} \vartheta_i \, v_{t-i}^2 + \sum_{j=1}^{q} \omega_j \, \sigma_{t-j}^2 \quad (3)$$

Equations (2) and (3) are estimated for each country separately and for each year 12 values of σ_t^2 will be obtained, then a simple mean of fitted values from equation (3) was taken as the measure of exchange rate uncertainty for a given country in a given year.

To account for exchange rate regimes[6] in the above specifications, equation (1) becomes;

$$FDI_{it} = \varphi_0 + \delta FDI_{it-1} + \varphi_1 \log(GDPPC)_{it} + \varphi_2 Growth_{it} + \varphi_3 EXR_{it} + \varphi_4 OPENX_{it} + \varphi_5 INFE_{it} + \varphi_6 EXRVOL_{it} + \varphi_7 MPFW_{it} + \varphi_8 WAMZ_{it} + \varphi_9 INST_{it} + \varphi_{10} Resource_{\,it} + \varphi_{11} Fixregime_{it} + \varphi_{12} Intermregime_{\,it} + \epsilon_{it} \qquad (4)$$

[5] Details on the theoretical discussion of the differences on the effects of volatility and uncertainty measures on FDI (see, Brozozowski, 2006).

[6] Based on the IMF classifications and reports, the fixed and intermediate policy regimes are the most common in these countries, hence this study considered only these two (See also, Abbott et al., 2012).

Where, Fix regimes= dummy value of one for periods of fixed exchange rate regime and zero otherwise; intermregime= dummy value of one for periods of intermediate regimes and zero otherwise;

Also, during periods of narrowing current account balances coupled with the existence of parallel market rate, the exchange rate premium might be widened in creating more distortions as foreign reserves are depleted in such situations making foreign exchange to be scarce. Theoretically, narrowing current account balance is an avenue for attracting more FDI as it is an evidence of widening output gap, but distortions and expectations created through the parallel market existence in periods of narrowing current account balances and declining foreign reserves might undermine FDI flow. Consequently, a dummy variable value of 1 for periods of narrowing current account balances for each of the countries is created and interacted with change in foreign reserves is controlled for in the above specification since parallel market exchange rate statistics for all the countries are unavailable. Brzozowski (2006) study accounted for foreign exchange reserves and this also informed the inclusion of the interaction variable. Thus, equation (4) becomes;

$$FDI_{it} = \omega_0 + \delta FDI_{it-1} + \omega_1 \log(GDPPC)_{it} + \omega_2 Growth_{it} + \omega_3 EXR_{it} + \omega_4 OPENX_{it} + \omega_5 INFE_{it} + \omega_6 EXRVOL_{it} + \omega_7 MPFW_{it} + \omega_8 WAMZ_{it} + \omega_9 INST_{it} + \omega_{10} Resource_{it} + \omega_{11} Fixregime_{it} + \omega_{12} Intermregime_{it} + \omega_{13} Fix * \Delta RSV_{it} + \omega_{14} Interm * \Delta RSV_{it} + \omega_{15} CAdum_{it} + \omega_{16} \Delta RSV * CAdum_{it} + \mu_{it} \quad (5)$$

Where, $Fix * \Delta RSV$= interaction variable between fixed regime dummy and changes in foreign exchange reserves; Interm$* \Delta RSV$=interaction variable between intermediate regime and changes in foreign exchange reserve; $CAdum$ =current accountdummy taking the value of 1 for periods of narrowing current account balance and zero otherwise; $\Delta RSV * CAdum$=interaction variable between changes in foreign reserve and the current account dummy.

Trade and FDI data were extracted from the UNCTAD Statistical database online, the institutional variable was extracted from the Polity IV project while the remaining data were extracted from the IMF World Economic Outlook Database online. Three variations of the panel data models were estimated: the pooled OLS, fixed effect and random effect models. The fixed

effect model was estimated with the within estimator also called Entity Demeaning estimator while the random effect model was estimated with Swamy-Arora GLS approach. In these three models, the right test to determine the appropriate model was also conducted. We used the Ramsey-Reset omitted variable test to determine if there were omitted variables with regards to the pooled OLS. We also employed the F-test to test between pooled OLS and fixed effect model. The Breusch-Pagan test is employed to determine that of pooled OLS and random effect model, while the Hausman test is employed to determine between random effect and fixed effect models. But, for the purpose of robustness check and the lagged FDI that made the specification a dynamic panel data model, the Anderson and Hsiao (1981) Instrumental Variable Approach for estimating dynamic panel data model is adopted. The choice of this approach over the GMM approach by Arellano and Bond is because of a short N(5 Countries) and Long T (1980-2016). By the inclusion of the lagged dependent variable, the error term will correlate with this variable in the model violating the usual assumption of OLS, hence the study used the second lag of FDI inflow as the instrument as suggested by Anderson and Hsiao (1981).

4. Empirical Results

Table 1 presents the fixed effect results for the baseline model. In the analysis, the variables were first tested for panel data unit root[7] using both the homogeneous and heterogeneous panel data unit root tests and only real GDP per capita could not pass the test but its log value passed the test hence, real GDP per capita entered the model as logged. Three different panel data models were estimated vis-à-vis; the Pooled OLS, Fixed effect and Random Effect Models. In the Pooled OLS estimation, the Ramsey-RESET[8] test for omitted variable bias indicates that there are unobserved individual effects omitted as the null hypothesis of no omitted variable is rejected as deduced from the test statistics. Therefore, it is imperative that the study proceed to estimate the other variations of the panel data models. Similarly, the F-statistics values in all the estimations are significant at 1% confirming evidence of omitted variables making the fixed effect and random effect models more appropriate than the Pooled OLS. However, the Hausman test statistic values are also significant; hence the study rejects the null hypothesis of the appropriateness of GLS estimates thereby favouring the fixed effect model as the most

[7]The result is not presented since it is of no use to proceed for cointegration test and also to conserve space.
[8] The result of the Ramsey Test is not presented here since the Pooled OLS was dropped and since the F-test (2) also confirmed its rejection.

appropriate. But due to the discovery of serial correlation and heteroskedasticity with the fixed effect estimation using the Wooldridge LM test and the Modified Wald test respectively, the Arellano Panel Correction for serial correlation and heteroscedasticity within estimator for fixed effect model is employed.

The results show that the coefficient of the resource endowment which is a proxy for resource seeking hypothesis is positive and significant in facilitating FDI flow confirming the resources seeking hypothesis. This further confirms previous findings by Asiedu (2006) and Anyanwu and Yameogo (2015) on this connection. The institutional measure was found to negatively influence FDI inflow though it was not significant. This implies that the quality of institutions in these countries discourages FDI flow which is indicative of inhospitable regulatory environment in these countries. Anyanwu and Yameogo (2015) found similar results also. The coefficient of real GDP per capita which captures market size was found to be negative and significantly influenced FDI flow. This contradicts a priori expectation and the intuition is that per capita GDP in these countries are relatively low and could not provide the platform for attracting FDI which might be indicative of a non-linear relationship as also confirmed by Anyanwu and Yameogo (2015) for ECOWAS. This implies a threshold of per capita GDP that could attract FDI in this zone. This confirms the market seeking hypothesis of FDI flow in developing countries but indicative of a higher threshold for the case of WAMZ since the present GDP per capita is low. For the growth rate variable in this zone, the results show the effect to be positive and significant in facilitating FDI flow which implies that good economic track record; specifically higher growth rates are sine-qua-non for FDI flow as it underscores indication of profitable investment opportunities. Similarly, trade openness was significant and a positive factor in attracting FDI to the zone. This is confirmed by all the estimated models alluding to the significance of trade policy in influencing the direction of foreign investment. Nominal exchange rate was also found to be significant and positively influenced FDI flow.

Table 1: Fixed Effect Results on Baseline Model
Dependent Variable: FDI inflow as share of GDP

Regressors	(1)	(2)	(3)	(4)
Constant	-2.90 (-1.69)*	-3.38 (-2.12)**	-3.06 (-1.70)*	-3.52 (-2.07)**
Resource Abundance	0.92 (3.60)***	0.93 (3.42)***	0.91 (3.51)***	0.91 (3.32)***
Institution	-0.03 (-0.92)	-0.03 (-0.63)	-0.03 (-0.94)	-0.03 (-0.64)
Monetary Policy Framework	-0.51 (-1.68)*	-0.48 (-1.58)	-0.49 (-1.60)	-0.47 (-1.51)
Log GDP Per Capita	-0.85 (-4.37)***	-0.82 (-3.91)***	-0.85 (-4.35)***	-0.82 (-3.91)***
Growth	0.02 (2.27)**	0.02 (1.83)*	0.02 (2.29)**	0.02 (1.83)*
Exchange Rate	0.002 (2.27)**	0.002 (2.26)**	0.002 (2.43)**	0.002 (2.42)**
Trade Openness	1.91 (4.19)***	1.92 (4.04)***	1.94 (4.23)***	1.95 (4.01)***
WAMZ	1.75 (8.62)***	1.79 (8.95)***	1.77 (8.43)***	1.81 (8.67)***
Inflationary Expectation		0.01 (0.80)		0.01 (0.78)
Exchange Rate Uncertainty			-0.01 (-2.48)**	-0.01 (-1.78)*
		Diagnosis		
R^2	0.58	0.58	0.57	0.58
F-Statistics (1)	16.82 [0.00]	15.68 [0.00]	15.48 [0.00]	14.51 [0.00]
F-Statistics (2)	11.11 [0.00]	11.49 [0.00]	11.06 [0.00]	11.43 [0.00]
Hausman Test	73.45 [0.00]	72.68 [0.00]	71.63 [0.00]	68.56 [0.00]
Breusch-Pagan LM Test	9.32 [0.58]	9.48 [0.53]	9.72 [0.48]	9.86 [0.42]
Modified Wald Test	51.61 [0.00]	50.84 [0.00]	52.43 [0.00]	53.87 [0.00]

Notes: ***, ** & * indicate 1%, 5% & 10% levels of significance; (1)=Baseline model; (2)= Baseline Model accounting for expectations (3)=Baseline model accounting for uncertainty (4)=Baseline model with both expectation and uncertainty.; F-test(1)=Overall Significance Test; F-Test(2)=Test for Pooled OLS and Fixed Effect Model; ( )=indicates T-statistics; [ ]=indicates probability values.

However, the coefficient of exchange rate uncertainty was negative in all the models influencing FDI flow though it became insignificant when exchange rate regimes variables were included. Previous studies (Udoh and Egwakhide, 2008; Ogunleye, 2009) in sub-Saharan Africa have found the effect to be negative and significant but our results show that when exchange rate regimes are accounted for, the negative effect was insignificant. The intuition is that since these countries never fully allowed free floating regimes but more of fixed and intermediate exchange rate regimes, the exchange rate in these countries might not be as volatile as insinuated in these previous studies (Udoh and Egwakhide, 2008; Ogunleye,2009). One striking thing to note from the result is the coefficient of the WAMZ dummy which was found to be positive. The intuition

is that as the zone was formed with the pursuit of some targeted convergence criteria with exchange rate stability as one, it implies that the formation of the zone alone was not enough in attracting FDI but the exchange rate regimes pursued in this zone is critical in attracting FDI. This confirms Anyanwu and Yameogo (2015) findings that monetary union and integration is a key factor in attracting FDI thereby recommending the quick establishment of a common currency in the zone. The coefficient of monetary targeting policy framework dummy was found to negatively influence FDI flow, however the significance level was weak in the baseline model but became insignificance in the models afterward. This means that, monetary targeting policy framework operated in these countries never delivered the expected monetary targets, indicating a dynamic inconsistency with policy announcement and sending wrong signals to foreign investors

Table 2 presents results for the case of controlling for exchange rate regimes in the baseline model. Here also, the panel data model selection tests supported the fixed effect model as the most appropriate as provided by both the F-statistics values and the Hausman statistics as shown in the table. The results found were similar with the previous result as the coefficients of the variables in the base line model maintained the same signs except for the monetary-targeting policy framework coefficient that became positive when exchange rate regimes were included. The intuition is that, in attempt to achieve price stability through monetary targets, the desired effect and effort cannot be divorced from exchange rate policy in facilitating FDI flow. This implies that monetary-target alone will not deliver the desired result to attract FDI but must be complemented with the right exchange rate policy due to impossibility trinity constraint. Trade openness, growth and nominal exchange rate were still found to be positive and significantly influenced FDI flow while exchange rate uncertainty and GDP per capita had negative but not significant.

On the variables of interest vis-a-vis; the fixed and intermediate regimes as shown in table 3, the results showed that inflationary expectations never had any significant effect on FDI flow but was positive. This implies that higher expectations of inflation influences FDI flow which is not unconnected with the fact that higher expectations are indications of higher prices and consequently higher returns for foreign investors via nominal exchange rate channel. Though, this might discourage domestic production and investors through imports of inputs and via wage

indexation and real money balance channels. However, it was found that fixed exchange rate regime was negative and significant in influencing FDI flow. This is an indication that the negative effect comes via foreign exchange intervention by monetary authority to keep the rate fixed from the limited foreign exchange earnings. This invariably creates exchange rate expectations and thereby making risk-averse investors to change their investment decisions or delay in their decisions. This is because most of these countries experience narrowing current account balance thereby making foreign exchange scarce since they are import dependent economies hence depleting foreign reserves become eminent due to commodity price shock. This results in so much expectations of possible devaluation or depreciation of the rate and signals a declining FDI flow.

Table 2: Fixed Effect Results on Exchange Rate Policies in the Baseline Model
Dependent Variable: FDI inflow as share of GDP

Regressors	(5)	(6)	(7)
Constant	-8.17 (-3.84)***	-7.89 (-3.64)***	-8.77 (-4.18)***
Resource Abundance	0.68 (2.59)***	0.68 (2.69)***	0.72 (3.56)***
Institution	-0.04 (-1.36)	-0.04 (-1.57)	-0.04 (-1.69)*
Monetary Policy Framework	0.24 (0.93)	0.21 (0.76)	0.38 (1.19)
Log GDP Per Capita	-0.03 (-0.12)	-0.05 (-0.22)	-0.02 (-0.11)
Growth	0.02 (1.52)	0.02 (1.91)*	0.02 (2.15)**
Exchange Rate	0.001 (2.26)**	0.001 (2.26)**	0.001 (1.81)*
Trade Openness	1.67 (13.72)***	1.64 (11.97)***	1.58 (8.83)***
WAMZ	1.49 (6.92)***	1.51 (7.320***	1.52 (6.02)***
Inflationary Expectation	0.02 (1.52)	0.02 (1.63)	0.01 (1.61)
Exchange Rate Uncertainty	-0.007 (-0.71)	-0.006 (-0.60)	-0.001 (-0.76)
Fixed Regime Policy	-0.79 (-2.54)**	-0.83 (-2.89)***	-0.86 (-3.11)***
Fixed Regime*Changes in Reserves		-0.001 (-2.91)***	-0.001 (-12.01)***
Intermediate Regime Policy	0.61 (2.35)**	0.54 (2.52)**	0.43 (2.57)**
Intermediate Regime*Changes in Reserves		-0.0001 (-2.27)**	-0.0001 (-2.19)**
Current Account Imbalances			0.56 (3.33)***
Current account Imbalance* Changes in Reserves			0.01 (26.9)***
	Diagnosis		
R^2	0.65	0.65	0.67
Observations	170	170	170
F-Statistics (1)	16.72 [0.00]	14.86 [0.00]	14.01 [0.00]
F-Statistics (2)	3.88 [0.01]	3.66 [0.01]	4.55 [0.001]
Hausman Test	49.24 [0.00]	48.75 [0.00]	46.92 [0.00]
Breusch-Pagan LM Test	9.89 [0.39]	9.91 [0.33]	10.01 [0.29]

Modified Wald Test	56.12 [0.00]	58.43 [0.00]	59.67 [0.00]

Notes: ***, ** & * indicate 1%, 5% & 10% levels of significance; (5)=Baseline model accounting for exchange rate polices; (6)=Baseline model with exchange rate policies and the interactions; (7)=baseline model with exchange rate policies and accounting for periods of current account imbalances and changing foreign exchange reserves; F-test(1)=Overall Significance Test; F-Test(2)=Test for Pooled OLS and Fixed Effect Model; ( )=indicates T-statistics; [ ]=indicates probability values.

This result is at variance with Busse et al., (2010) and Abbott et al., (2012) studies that found the effect to be positive and significant in developing countries. Though for IMF classification, Abbott et al., (2012) found the effect to be insignificant. The possible explanation is that some of these developing countries export sectors might be more diversified than the WAMZ countries hence, managing fixed regime might be easy and ensure stability thereby providing positive signal for investors. On the contrary, intermediate regime was found to be positive and significant in influencing FDI flow and this is not unconnected with the fact that during intermediate regime the monetary authority intervention is reduced compared to the fixed regime. Abbott et al., (2012) also found similar result.

Other variables included in the model such as the current account dummy and the interaction were found to be positive and significant and this conforms to theory because current account imbalance provides opportunity for capital flows and as destination for foreign investment opportunities because current account imbalances is an indication of output gap where aggregate demand is higher than aggregate supply thereby making importation an augmenting factor.

For robustness check and also accounting for the influence of FDI inflow persistency in the result, a dynamic panel data model where the lagged FDI inflow was included as explanatory variable. The estimation was done with the Anderson and Hsiao (1981) instrumental variable approach due to large time series and short cross section. Table 3 presents the results.

Table 3: Anderson and Hsiao (1981) Dynamic Panel Estimation Results
Dependent Variable: FDI inflow as share of GDP

Regressors	(8)	(9)	(10)
Constant	-1.57(-1.70)*	-1.55 (-1.37)	-2.41 (-1.81)*
Lagged FDI inflow	0.21 (1.65)*	0.25 (1.66)*	0.17 (1.71)*
Resource Abundance	0.72 (1.02)	0.74 (1.03)	0.52 (0.73)
Institution	-0.12 (-2.04)**	-0.13 (-2.26)**	-0.16 (-2.87)***
Monetary Policy Framework	0.49 (1.09)	0.64 (1.49)	0.07 (0.14)
Log GDP Per Capita	-0.06 (-0.09)	-0.07 (-0.39)	-0.04 (-0.19)
Growth	0.02 (0.52)	0.02 (0.34)	0.03 (0.89)
Exchange Rate	0.008 (2.48)**	0.008 (2.54)**	0.009 (2.81)***
Trade Openness	0.05 (3.02)***	0.05 (2.96)***	0.05 (2.91)***
WAMZ	3.45 (5.45)***	3.46 (5.84)***	3.53 (5.09)***
Inflationary Expectation	-0.01 (-0.44)	-0.01 (-0.45)	-0.01 (-0.78)
Exchange Rate Uncertainty	-0.003 (-0.06)	-0.002 (-0.04)	-0.001 (-0.08)
Fixed Regime Policy	0.19 (0.55)	0.13 (0.52)	0.24 (0. 62)
Fixed Regime*Changes in Reserves		-0.003 (-2.02)**	-0.004 (-7.85)***
Intermediate Regime Policy	-0.84 (1.04)	-0.85 (-1.05)	-1.04 (-1.26)
Intermediate Regime*Changes in Reserves		0.005 (0.07)	0.003 (7.01)***
Current Account Imbalances			0.071 (2.83)***
Current account Imbalance* Changes in Reserves			0.003 (4.49)***
Diagnosis			
R^2	0.52	0.54	0.55
Observations	164	164	164
F-Statistics	11.38 [0.00]	9.77 [0.00]	9.32 [0.00]
Instrument	FDI(-2)	FDI(-2)	FDI(-2)

Notes: ***, ** & * indicate 1%, 5% & 10% levels of significance (8)=Baseline model accounting for exchange rate polices; (9)=Baseline model with exchange rate policies and the interactions; (10)=baseline model with exchange rate policies and accounting for periods of current account imbalances and changing foreign exchange reserves; F-test=Overall Significance Test

The results from the dynamic panel data estimation show that the lagged FDI inflow as included had the correct positive sign and was significant at 10% confirming that FDI inflow in WAMZ exhibits persistency. On the variable of interest, the dynamic model shows that the fixed regime had positive effect on FDI inflow though it was found to be insignificant. But, when period of narrowing current account balance and changes in foreign reserves were accounted for, the results show that the fixed regime had a negative and significant effect on FDI inflow confirming the findings of the fixed effect model. For the intermediate regime, the result shows a negative and insignificant effect on FDI inflow but when the period of narrowing current account balance

and changes in foreign reserves were accounted for in the model, the effect became positive and significant which also confirms the previous fixed effect models. This shows that the transmission of the effect of exchange rate regimes on FDI inflow depends on the level of the current account balance and the amount of foreign reserves in ensuring exchange rate stability. This provided support for the robustness of the results.

The post estimation diagnostic test shows the absence of heteroskedaticity in the results as confirmed by the significance of the modified Wald chi-square test. The Breusch-Pagan LM test for cross-sectional independence failed to reject the null hypothesis of cross-sectional independence in all the estimations implying the presence of a common shock to FDI inflow in WAMZ as these countries are exposed to exogenous commodity price shock that transmit into their foreign reserves through current account balance. This invariably makes exchange rate management difficult sending a discouraging signal to foreign investors.

5. Conclusion

This study examined the effect of exchange rate regime on FDI flow in WAMZ. The study controlled for periods of narrowing current account balance and declining foreign exchange reserves as the transmission of exchange rate regimes to FDI. This was informed by the nature of WAMZ export sectors' exposure to exogenous shock and the transmission to the domestic economy via exchange rate and counter-cyclical fiscal policy response as narrowing current account balance and foreign reserves depletion are ensued. The study covered the period 1980-2016 and both fixed effect and dynamic panel data models were estimated. Available diagnostics tests favoured the fixed effect model which was estimated based on Arellano panel correction for serial correlation and heteroskedaticity option and the Anderson and Hsiao (1981) instrumental variable approach was used for the dynamic panel data model. Generally, the results showed that fixed exchange rate regime hampered FDI flow in the zone significantly during period of narrowing current account balance and declining foreign reserves while the intermediate regime had a significantly positive effect in facilitating FDI flow in the same periods. However, if the period of narrowing current account balance and declining reserves were not accounted for, the fixed and intermediate regimes had positive and negative effects on FDI inflow respectively. This means that the net effect of exchange rate regimes is transmitted through the current

account and foreign reserves positions in the zone. The dynamic panel model also showed that FDI flow to WAMZ exhibited persistency as confirmed by the lagged FDI variable. The Breusch-Pagan LM test for cross-sectional dependence shows the presence of cross sectional dependence indicative of a common shock in WAMZ FDI inflow. The study therefore recommends the need for monetary authorities to be cautious in managing their exchange rates especially in periods of depleting foreign reserves and narrowing current account balance. Efforts should also be geared towards boosting the zone's productive capacity through coordinated structural reforms with a view to diversifying the production and export sectors that could prevent commodity price shock exposure to these economies.

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Appendix

Table A1: Summary Statistics of Variables in the Model for WAMZ

Variables	Mean	Median	Min	Max	SD
Polity	-0.53	-1.00	-9.00	8.00	5.78
RGDPPC	717.58	516.98	211.99	3203.2	576.93
Growth	3.73	3.96	-24.8	26.4	5.43
Openness	61.45	54.59	26.66	133.05	27.25
CPI inflation	22.21	14.03	-3.65	178.70	24.88
Exchange Rate	780.71	22.37	0.0003	7014.1	1559.1
Changes in foreign reserves	195.65	4.32	-10618	14019	2463
FDI inflow (% GDP)	3.10	1.19	-8.02	42.12	5.30

Source: Author's analysis as underlying data from IMF WEO and UNCTAD