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Some Stylised Facts for the Economies of Anglophone West Africa and Guinea

by

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Abstracts

This paper investigated some macroeconomic and financial stylised facts in the context of the developing economies of the Guinea and the five Anglophone West Africa countries, consisting of The Gambia, Ghana, Liberia, Nigeria and Sierra Leone. These six countries were collectively known as the West African Monetary Zone (WAMZ) up till 2014. The informal economies of the WAMZ countries, some macroeconomic stylised facts in respect of theoretical propositions like Phillips curve, Lucas output-inflation trade-off and International parity conditions (purchasing power parity (PPP) conditions, international Fisher effect - IFE, and uncovered interest parity - UIP) were evaluated. Also, the relationships between domestic cyclical output and some macroeconomic variables were considered in the assessments of business cycles from the view-point of the developing economies of the WAMZ and the developed economies of Germany, the United Kingdom and the United States. Some empirical regularities in exchange rates and the behaviours of foreign exchange markets were also evaluated. This paper covered the period of time spanning between 1991 and 2015 on the average. Findings and results revealed that variabilities of the cyclical components of seven selected macroeconomic variables examined were lower in the developed economies of Germany, the UK and the US than the developing economies of the WAMZ, thus supporting this stylised fact that the cycles of macroeconomic variables are more volatile in developing economies than in developed economies. There were evidences to infer that the validity of both absolute and relative PPP could not be established in the WAMZ, thus making PPP to be irrelevant in the exchange rate determination throughout the WAMZ. Results generated also suggested that IFE failed to hold for the WAMZ's bilateral relationships. These results yielded supports for the conjecture that if PPP fails to hold, IFE will not hold. Evidences were also gathered towards drawing conclusions that UIP does not hold across the WAMZ. From the empirical evaluation performed, it is evident that the Phillip curve relationship does not hold in the WAMZ (apart from Ghana) over the period covered by this study. There were inferences that the Lucas output-inflation trade-off hold better in the formal economies of the WAMZ than the informal economies. Results generated through the evaluation of seven stylised facts of exchange rates and foreign exchange markets behaviour were mixed.

1. Introduction

Stylised facts are consistent empirical findings which are accepted as truth and basis for theories. Nevertheless, there are usually, inaccuracies in these empirical regularities. This paper examined some macroeconomic and financial stylised facts in the context of the developing economies of Guinea and the five Anglophone West Africa countries comprising of The Gambia, Ghana, Liberia, Nigeria and Sierra Leone (hereinafter referred to as the West African Monetary Zone, the WAMZ), in order to determine if these facts hold in these economies.

Over time, large body of literature in macroeconomic quantitative analytical research had established a good number of stylised facts in macroeconomic fluctuations and business cycles in many countries. These empirical regularities have been adapted as empirical basis for the formulation of many related theoretical models. This work established some regularities in macroeconomic fluctuations in the WAMZ as a matter of significance and necessity for these countries coming together in monetary integration. This is significant in highlighting the characteristics of the behaviours of the economies evaluated as precursor to empirical assessments of the feasibility of monetary integration of West Africa.

The major objective of this research work was to reveal some macroeconomic and financial characteristics and behaviours of the WAMZ member countries from the view-points of some relevant stylised facts and theories while simultaneously testing the validity of the stylised facts and theoretical proposition within the context of the developing economies of the WAMZ. This paper evaluated the informal economies of the WAMZ countries, some macroeconomic stylised facts, the relationships between domestic cyclical output and some macroeconomic variables and some theoretical propositions (Phillips curve, Lucas output-inflation trade-off and International parity conditions). Further efforts were made at looking into some empirical regularities in exchange rates and the behaviours of foreign exchange markets.

2. Informal Economic Activities in the WAMZ

Informal economic activities are those market-based production of goods and services (legal or illegal) that are hidden from official authorities, and thus, escape detection in the official estimates of national income/products for regulatory, institutional and monetary

reasons. Generally, the avoidance of governmental bureaucracy or regulatory burden are some of the regulatory reasons for informal economic activities. Monetary reasons may be about the avoidance of the payment of taxes and levies while institutional reasons may be weak legal system, weak rule of law, poor quality of political institutions and corruption.

For an economy, the degree of unreported/unrecorded economic activities causes lots of concerns because the high extent of the involvements of firms and households in activities that are hidden from government, the more the distortions in fundamental economic analyses. For instance, informal activities limits tax revenues as well as create bureaucratic and regulatory burdens. Apart from these, informal economic activities can have negative effects on the efficiency and effective functioning of the formal economic sector as there is bound to be discrepancies between national expenditure and national income as well as discrepancies between official and actual labour force. Going by these attributes of an informal economic activities, it suffice to state that the WAMZ countries exhibit significant traces of informal economy which is concentrated in services, commerce, distribution, construction or locally sourced food production or raw materials. This informal sector provided a large proportion of employment and income for the WAMZ countries.

Although, it is believed widely that firms operating in informal sectors are usually small (family-operated) businesses, a striking feature of the West African informal sector is the presence of large informal firms/enterprises which are hugely successful in various weak business environments characterised by absence of regulations enforcement that encourages and allows these large firms in the informal sector to operate with impunity in many cases. There are cases of tax evasion and payment of pre-emptive tax within the informal sector. Because of lack of improvement in the African business environments in the real sense, many people prefer to operate in the informal sphere of the economy. It is suffice to add that it is expensive to be legal within African economies.

The incidence, size and magnitude of the informal economic activities in the WAMZ economies have serious economic (and political) consequences for the proposed monetary zone and its member economies. Some of these implications could be summarised as: declining tax revenue (owing to untaxed transactions), bias of social, economic and financial information, efficiency and productivity losses (arising from the

competitive advantage of these informal activities), underreporting of income (due to large number of poor people which declare low income, but have substantial expenditure), distortions in the allocation of resources and significant welfare losses. However, some literature argued in favour of some potential benefits of informal economic activities which are apparent within the developing economies of the WAMZ where around 66% of income generated from the informal economic activities is spent instantly in the formal economies (Schneider and Enste, 2002). Nevertheless, for the WAMZ economies, informal activities are sources of overall economic growth.

Worldwide, with the avoidance of government regulations (on minimum wages, taxation), the informal economy is more flexible and is better able to respond to market conditions and rapid changes than as obtained within the formal economy (Smith, 1994). Informal activities propel structural changes necessary for economic development because of the informal economy's quick adaptation to changes in economic situations. Furthermore, lower prices of goods and services within the informal economy may likely have some positive distributional effects when such informal activities are in favour of low-income earners (Portes et al, 1989). Because of deficiency in planning for reallocation of resources, some jobs are only available because their full cost (income tax) are too expensive to balance-off their consistently low level of productivity (Reyneri, 2003; Prager, 1983; and Carter, 1984).

Commonly, informal economy depicts small and unorganised producers operating on the fringes of the formal economy. However, in the case of Africa in general and the WAMZ specifically, reverse are the cases in which informal economies dominate the stagnant and static formal economies. In the WAMZ, informal economic activities play dominant roles (particularly in the area of employment) where small operators co-exist with very large politically well-connected informal enterprises that operate with impunity, as well as organised networks, with very little information on who is involved and the nature of involvement or business.

Due to the prominence of informal economic activities in the WAMZ, some of the discrepancies that manifests are: (i) underground hidden production (within the sphere of legal activities) that create value-added but are deliberately hidden from government in order to avoid tax payments or to avoid meeting certain legal standards (minimum wages, maximum labour hours, health and safety issues and so on), or to avoid

compliance with administrative procedures (completion of administrative forms and statistical questionnaire); (ii) illegal production which are productive activities that generate goods and services whose sales, distribution or possession are forbidden by law, or productive activities which are usually legal, but are illegal when performed by unauthorised procedures/producers; (iii) production by household (for own final use) which are productive activities that result in goods or services consumed or capitalised by the households that produce them. It is therefore suffice to state that the WAMZ's informal sector is a symptom of institutional deficiencies. Specifically, the large informal activities within the monetary zone are caused by failure of government to enforce regulation appropriate for large firms involved as well as the burden-some nature of regulation and taxation that inhibit compliance.

The reality of the informal economy in Africa holds constantly as the sector plays a central role in African economies. Studies revealed that sub-Saharan Africa (where informal activities account for around 80% of non-agriculture labour and nearly half of the GDP) is the most informal continent of the world. This sector accounts for a large share of GDP and huge share of employment. ILO (2014) estimation revealed that the sector employs around 90% of rural African employees, accounts for 80% of total labour force in African countries and 77.2% of workers in the sub-Saharan Africa were self-employed or own-account workers or contributing family workers while 66% are in non-agricultural employment.

Most key sectors of the WAMZ economies which are within the 'informal sector' are: commerce, handicrafts (artisans), agriculture, most manufacturing and transportation etc. Specifically, in the WAMZ, informality drives employment. Some largest and fastest growing sectors are informal economic sector as reflected in wholesale trade, retail trade (the largest locus of informal activities), real estate, transportation, hospitality, construction, agriculture, artisan activities (carpentry, mechanics, painting, tailoring *etc*) as key. Most informal economic activities are highly mobile without fixed place of work, particularly, in the cases of street hawkers, traders on street pavements, travelling salesmen, including carpenters, mechanics, small scale business owners who generally, do not own or rent their workplace but occupy unused spaces and vacate whenever such spaces are needed by the rightful owners. This predominant nature of informal economic activities in the WAMZ serves as major factor inhibiting development in the sub-region.

However, the informal sector only contribute as low as 3% of total tax collection, despite its economic relevance. The existence of large informal firms (which, though, meet the criteria for formal status) manifests the WAMZ's state failures as evident by corruption, weak enforcement capabilities of government, adverse business environment etc. These factors, among others, increase the costs (thus reduce the benefits) of businesses that operate formally within the monetary zone. Nonetheless, it is difficult to accurately determine how the informal sector drives the economies of the WAMZ countries. This is due to lack of data and absence of critical understanding of self-manifestation of informal activities in the region. Data on informal employment in Africa in general are scarce or not even available For instance, in the WAMZ, commercial motorcyclists are very core part of the whole economy, but there have been difficulties in capturing their value-added as well as harnessing their potentials. These and other factors thus make compilation of data of on these informal activities difficult and not properly handled as the trade hawker has no trading permit, many firms do not have regular and up-to-date books of account for the purposes of easy monitoring and taxation. According to Smith (1994), many large informal firms are skilful in producing falsified financial statements, misleading accounting certificates and several versions of financial statements (differently for banks, government, their businesses) with the assistance of dubious accounting firms that specialise in these versions of accounting reports.[1]

Furthermore, from the financial services perspective, the WAMZ's informal sector is characterised by limited access to bank credit facilities and this causes operators in this sector to resort to informal credits from families and friends; and the critical factor causing this is the demand by banks for loan documents before loan applications are considered as it is practically difficult for operators in the informal sector to make those required documents available.

Discrepancies that are usually created by informal economic activities in the WAMZ countries are: (a) gaps between statistics on national expenditure and national income of the WAMZ countries if for tax purposes, operators in the informal sector can hide their income but not their expenditure. Large tax burden can likely encourage economic activities in the informal sector); (b) gaps between figures for official labour forces and

[1] Versions of these accounts are evolved according to specific uses and they are easily certified by accounting firms who are usually part of the arrangement.

actual labour force if official labour force participation declines while the total labour force participation is assumed constant. Unemployment (which is the lack of work in the formal sector) would prompt or force some people to work in the informal economic sector; (c) gaps between cash payment and increase in currency demand. This can be reveal in the currency outside bank/narrow money fraction of broad money because those involved in informal economic activities usually conduct their activities in cash.

Apart from domestic informal activities, informal cross border trade (which are international flows of goods that are not reported (or incorrectly reported) by customs authorities of a country) is a major form of overall informal economic activities in the WAMZ countries where goods pass through border posts with false customer declarations. Goods cross borders (either through border posts or elsewhere along the borders) without the knowledge of custom authorities. Within the WAMZ, casual observations reveal that informal cross border trade (ICBT) is thriving.

As it affects Africa continent generally and the WAMZ specifically, Golub (2014) established that a significant component of ICBT activities are re-exports in which goods are imported formally into a low-tax/low cost country with the intent of clandestinely trans-shipping them thereafter into the neighbouring countries with higher taxes, restrictive import quotas, costly trade facilitation services or higher regulatory standards. It is a long-time tradition to trade local primary products across borders in order to balance local shortages and stabilise prices, due to the need for livelihood and life sustenance caused by limited and shrinking formal employment opportunities. Generally, in West Africa, recorded intra-regional trade is small, but ICBT is pervasive, with re-export being particularly significant form of intra-regional trade. In recent days, ICBT in the WAMZ is viewed to be around 50% of intra-regional trade (Benjamin, Golub and Mbaye 2015). More often, estimates of ICBT is in multiples of official cross-border trade. For instance, World Bank (2013) reported that in 2011 the bilateral trade of domestically-produced goods between Nigeria and Cameroon was $230 million, in comparison with officially-recorded flows of $10 - $40million.

Two features of African national boundaries (which as well, reflect in WAMZ's national boundaries) from which ICBT can be fully understand are: (i) the huge divergence in economic policies between neighbouring countries; and (ii) the ease of cross-border shipment of goods by informal operators. Consequently, due to these factors, smuggling

flourishes in the WAMZ as a result of the contradictions between hugely unchallenged state authorities over borders and the ease with which informal operators evade borders. In West Africa, common re-export goods which are banned or are subject to high taxes in some countries within the sub-region are cars, clothes and clothing materials, cigarettes, sugar, rice, vegetable oil, frozen poultry etc. Significantly, Benin and Togo are hubs for unofficial and illegitimate cross-border trade (due to their proximity to Nigeria, the largest economy in the region), serving as gateway to other countries within the sub-continent.

Table 1
Summary Statistics of MIMIC Estimations of Sizes of Informal Economy (as Percentages of GDP) in the WAMZ (1991-2015)

Year	*Gambia*	*Ghana*	*Guinea*	*Liberia*	*Nigeria*	*S/Leone*	*WAMZ*
1991	50.60	46.07	41.22	42.08	56.95	38.20	45.85
1992	49.38	46.12	41.34	43.89	58.17	41.77	46.77
1993	49.46	47.71	41.16	44.70	58.82	43.77	47.60
1994	53.55	46.18	41.88	45.25	66.61	43.67	49.52
1995	56.73	44.98	41.75	45.55	62.21	44.51	49.29
1996	55.31	46.87	42.03	46.67	61.09	46.36	49.72
1997	54.35	44.65	41.32	45.12	60.69	46.60	48.79
1998	51.61	45.70	39.73	45.95	62.33	45.96	48.55
1999	48.35	44.58	40.14	44.64	59.87	48.49	47.68
2000	45.10	41.90	39.70	43.20	57.90	48.60	46.07
2001	43.36	42.62	39.12	42.23	57.64	50.14	45.85
2002	51.76	42.66	38.09	41.84	59.93	47.76	47.01
2003	42.85	42.60	39.01	43.02	57.19	45.34	45.00
2004	38.90	42.90	28.77	42.31	56.72	43.88	42.25
2005	45.77	43.16	37.54	42.47	55.84	43.45	44.71
2006	48.19	41.68	37.41	39.95	51.95	42.96	43.69
2007	47.90	41.51	38.30	42.71	54.96	40.92	44.38
2008	45.28	41.41	38.94	43.09	53.06	40.87	43.76
2009	39.78	40.61	42.16	43.45	53.98	40.60	43.43
2010	35.17	40.03	43.89	41.57	52.80	39.34	42.13
2011	48.57	40.64	39.60	41.52	51.51	36.12	42.99
2012	42.64	40.99	37.51	42.23	51.56	32.36	41.21
2013	40.95	39.25	38.32	42.37	51.70	25.69	39.71
2014	43.81	38.50	38.18	42.45	50.64	26.47	40.01
2015	43.64	39.37	41.58	43.67	52.49	34.18	42.49
Average	***46.88***	***42.91***	***39.95***	***43.24***	***56.67***	***41.50***	***45.19***

Source: Medina and Schneider (2018).

Medina and Schneider (2018), in a study on 'shadow economy' of 158 countries of the world over the period between 1991 and 2015, came up with robust estimates of the sizes of informal economic activities of the countries covered by the research study, adopting the new macro methods of Currency Demand Approach (CDA) and the Multiple Indicator Multiple Cause (MIMIC) approach. The results of the statistical estimations of

the sizes of informal economies of the WAMZ, as percentages of the formal GDP, using the MIMIC method is as presented in Table 1 above.

To generate these estimates, the predictor variables employed in the structural equation model of MIMIC were fiscal freedom, cash (currency), unemployment, rule of law, corruption control, per capita income growth, labour force participation, government stability, and trade openness in these countries. For the WAMZ member economies, the inclusion of these variables are justified. All things being equal, for instant, on per capita growth, a bigger informal economy can be associated with more economic activities getting off the formal economy thus resulting in decrease in economic growth. Lower official labour force participation signals higher informal activities while the more the cash (currency) used, the greater the extent of informal economic activities. The possibility of increased informal economic activities could also be caused by high unemployment rate. Corrupt practices are always associate with unofficial/informal activities while good rule of law enhances formal economic activities and reduces the level of informal activities.

3. Stylised Facts of Macroeconomics

For the WAMZ countries, this section considers some macroeconomic stylised facts and theoretical propositions. These are: (i) some macroeconomic fluctuations in relation to business cycles from the view-point of the developing economies of the WAMZ and the developed economies of Germany, the UK and the US; (ii) international parity relationships ; (iii) Phillips curve; (iv) Lucas short-run output-inflation trade-off.

3.1. Stylised Facts of Macroeconomic Fluctuations and Business Cycles

In this study, fluctuations in macroeconomic variables were examined at the frequency of business cycle. This necessitated decomposing of these variables into trend (non-stationary) and cyclical (stationary) components. The reason for this is that specific empirical features of these data (such cross-correlation) can only be valid if data are stationary. To de-trend the variables used here, and decompose these series into trend and cyclical components so as to remove long term trend and derive cyclical components which are stationary, the Hodrick-Prescott (HP) filtering method (with lambda=100 for annual data) was applied. The cyclical components of the variables of interest were applied to estimate volatility and co-movements (correlation) towards verifying the

relevant stylised facts. These are meant to establish pro-cyclicality, a-cyclicality and counter-cyclicality in these variables. Within the context of the assessment here, volatility was taken to be aggregate fluctuations measures by standard deviation, while co-movement measure was by the magnitude of correlation coefficients. Positive correlation indicate pro-cyclicality while counter-cyclicality was deduced from negative correlation. Acyclicality is the situation of zero correlation.

Six major areas of stylised facts considered here for the WAMZ countries (as developing economies) and Germany, United Kingdom and the United States (as developed economies) are for: (1) output and income (real GDP and nominal GDP); (2) fiscal variables (government expenditure and revenue and fiscal impulse); (3) money and credit (money supply and velocity of money); (4) price (consumer price, inflation and nominal interest rates); (5) exchange rates (nominal US dollar exchange rates, nominal effective exchange rates and real effective exchange rates); and (6) foreign trade (merchandise trade balance). Velocity of broad money supply was derived by dividing nominal GDP by money supply (M3) while government expenditure was divided by government revenue to derive fiscal impulse. Merchandise trade balance was taken to be the difference between imports and exports of the countries evaluated. Variables evaluated were generally over the period between 1991 and 2015.

The results of the correlation of business cycles and the cyclical component of some monetary and exchange rates, fiscal and external trade variables in the nine countries assessed are as exhibited in Table 2 below.

Table 2: Results of Correlation of Cyclical Components of Macroeconomic Variables and Business Cycles in the WAMZ and Three Developed Economies

	Gambia	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***	***Germany***	***UK***	***US***
Government Expenditure	0.33	0.78	0.19	0.93	0.03	0.27	0.14	0.17	0.55
Government Revenue	0.50	0.76	na	0.03	0.007	0.69	0.61	0.73	0.82
Fiscal Impulse	0.19	-0.14	na	-0.68	0.11	-0.09	0.13	0.05	0.11
Broad Money Supply (M3)	0.13	0.62	0.25	0.41	0.21	0.64	na	0.12	0.09
Velocity of Money	0.44	0.11	0.61	0.66	0.09	0.68	na	0.08	-0.41
Domestic Credits	0.35	0.31	0.61	0.99	0.39	0.30	0.05	0.33	0.59
Price (CPI)	0.02	0.004	0.46	0.66	0.006	0.46	0.35	0.64	0.05
Inflation Rate	0.35	0.09	0.08	0.22	0.03	0.76	0.03	0.17	0.64

Nominal Interest Rate	0.43	-0.30	0.19	0.98	-0.28	-0.08	0.72	0.67	0.55
Nominal (USD) Exchange Rate	0.15	0.28	0.20	0.70	0.20	0.42	na	0.66	na
NEER	0.02	0.47	na	na	0.36	0.37	0.35	0.73	0.13
REER	0.09	0.44	na	na	0.30	0.83	0.36	0.73	0.24
Imports	0.41	0.52	0.45	0.62	0.09	0.14	0.50	0.47	0.60
Exports	0.53	0.72	0.63	0.97	0.12	0.93	0.53	0.37	0.13
Merchandise Trade balance	0.47	0.17	0.16	0.91	0.12	0.80	0.45	0.34	0.83

Source: Author' Estimation, EIU Database and EViews 9.5Output

For the fiscal variables, the results for all the WAMZ countries revealed pro-cyclicality of fiscal variables of government expenditure and government revenue. However, both variables appeared acyclical in the case of Nigeria. Similar results were obtained for the three developed economies assessed. Although, the economic intuition here is that fiscal policy should be countercyclical, there have been evidences of fiscal policy pro-cyclicality being a stylised fact. When the fiscal impulse measure was analysed to reveal the net effect of government expenditure and revenue on real output, the correlation coefficients were negative (counter-cyclicality) only for Ghana, Liberia and Sierra Leone while other WAMZ countries, Germany, UK and the US exhibited pro-cyclicality. These indicate that during economic boom, governments of these countries increase expenditure and reduce tax revenue and in recession reduce expenditure and increase revenue. The correlation of monetary variable (broad money) were pro-cyclical for all the countries evaluated, suggesting positive transmission of monetary shock to real economic activities. Pro-cyclicality of monetary variables is, however, a stylised fact. For the evaluation of velocity of money, the results showed pro-cyclicality for all countries, with the exemption of the US. The postulation of the QTM is that, given the pro-cyclicality of broad money, velocity of money is expected to be counter-cyclical. However, this holds only for the US which tended towards a-cyclicality in broad money. There was positive correlation in the cases of domestic credit for all the WAMZ developing economies and the three developed economies. This was expected as it indicated that domestic credits were made available for domestic economies in these countries, though very low (and tending towards a-cyclicality) for Nigeria.

In literature, the results of the tests of correlation between price and output have been mixed. In this respect, estimations in this study yielded positive correlation of domestic real output and both price and inflation rates, thus depicting pro-cyclical variations of price in the WAMZ countries and the developed economies under assessment. These

showed that supply shocks dominantly influenced macroeconomic fluctuations in these economies. However inflation appears to be closely a-cyclical in Ghana, Guinea Nigeria and Germany. Nominal interest rate was expectedly pro-cyclical in the advanced economies of Germany, UK and the US and also in The Gambia, Guinea and Liberia. While the nominal US dollar exchange rate was pro-cyclical for all the countries examined; and both NEER and REER were equally positively correlated with domestic real output for the four WAMZ countries whose data for these analyses were available. This same result was obtained for the three developed economies examined. The positive correlations of these exchange rate variables are stylised facts. Nevertheless, the positive correlation for The Gambia in NEER and REER were low and tending towards a-cyclical status for these variables. For the foreign trade variables of imports and exports, the relationships with domestic output were positive for all the nine countries. However, merchandise trade balance is deemed to be an adequate measure of foreign trade transactions; and the correlation of this series with real domestic output for all the WAMZ countries and three developed countries were pro-cyclical. There might be a link between domestic output and exports or this might be due to the insensitivity of imports of these countries to fluctuations in domestic demands. This positive relationship is very strong in Liberia, Sierra Leone and the US.

Table 3: Results of Volatility (Standard Deviations) of Cyclical Components of Macroeconomic Variables of the WAMZ and Three Developed Economies

	Gambia	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***	***Germany***	***UK***	***US***
Nominal Interest Rate	4.34	5.06	2.51	0.38	3.11	10.41	1.02	1.10	1.42
Nominal (USD) Exchange Rate	3.24	0.10	401.74	8.47	15.57	175.17	na	0.04	na
NEER	25.79	144.44	na	na	113.40	66.67	2.88	7.41	0.52
REER	13.74	13.48	na	na	45.49	10.74	3.90	7.57	5.04
Velocity of Money	63.09	8.50	5.05	26.39	10.63	30.13	na	2.11	1.67
Price (CPI)	2.76	4.06	4.49	2.54	2.59	2.27	0.86	1.10	0.76
Inflation Rate	20.50	13.69	7.72	6.17	68.56	19.19	0.72	1.56	0.52

Source: Author' Estimation and EViews 9.5Output

Table 3 above highlights the results of the assessment of the stylised facts on the volatility of cyclical components of seven selected macroeconomic variables estimated for the WAMZ countries and the developed economies of Germany, the UK and the US. In this

context, it is a stylised fact that the cycles of macroeconomic variables are more volatile in developing economies than in developed economies.

It is apparent and clear from the results displayed above that variabilities of the macroeconomic series examined were lower in the developed economies of Germany, the UK and the US than the developing economies of the WAMZ, thus supporting this stylised fact.

On the overall, results generated through estimations and analyses here were mixed, however, there some appreciable volumes of supports for the stylised fact assessed in this sub-section.

3.2. International Parity Relationships – PPP, IFE and UIP

Parity condition gives intuitive explanations of the movements in price and interest rates in different markets in relation to exchange rate. Theoretically, exchange rate (spot and forward) are influenced by interest rates and inflation. Therefore, international parity conditions (which are core to international finance) are economic theories linking exchange rate, price levels and interest rates together. They are key relations applied in predicting movements in exchange rates. Four (4) parity conditions exhibiting interlinkages are: (i) Relative Purchasing Power Parity, (ii) Fisher Effect (close); (iii) International Fisher Effect (open); and (iv) Interest Rate Parity. Commodity market inflation (changes in price level) affect market interest rate which in turn, through interest rate parity, affect exchange rates. Though, to some degree, these theories logically explain exchange rate fluctuations, however, they are not too strong as they based on some assumptions that could be challenged. Some of these assumptions are: free flow of goods, services and capital which do not hold true in the real world. Nevertheless, parity conditions are expected to hold in the long run, but not always in the short run.

The law of one price (LOOP) states that in a competitive market (free of transportation costs and official trade barriers – tariffs), identical goods sold in different countries must sell for same price when their prices are expressed in terms of the same currency. This law buttresses the important principle in trade theory that in a situation of 'open trade' and 'costless trade', identical goods must trade at same relative prices regardless of where they are sold (Krugman, Obstfeld and Melitz, 2015). The tendency of identical

goods to sell for identical prices globally generates a link between exchange rate and prices. As prices change globally, it is necessary to exchange rate to also change in order to keep the prices measured in a common currency equal across countries. This adjustment of exchange rate to offset differing inflation rates between countries is the reason for exchange rate changes (Husted and Melvin, 2013). This relationship between exchange rate and price level is the purchasing power parity (PPP) which explains the movement in the exchange rate between currencies of two countries by price level changes in these countries.

Purchasing Power Parity: The PPP theory states that the exchange rate between two countries' currencies equals the ratio of the countries' price levels. The prediction of PPP is that an increase (decrease) in the purchasing power of the domestic currency (as depicted by decrease (increase) in the domestic price level) will be associated with a proportional currency appreciation (depreciation) in the foreign exchange market. The PPP theory can be expressed in an equation as:

$$E = P - P^* \qquad 1$$

where E is exchange rate, P and P^* are price levels in the domestic and foreign countries respectively. The assertion of PPP is that there is equality in price levels of all countries when measures in terms of same currency.[2]

Although, the PPP equation may reflect the idea of LOOP, they are however, different. While LOOP applies to the individual commodity, PPP relates to the general price level. For every commodity, if LOOP hold true, PPP must hold automatically so far the reference basket of goods that estimates price levels in different countries are the same. An affirmation of PPP is that even when the LOOP is true literally, economic forces behind it will assist it to equalise purchasing powers in all countries (Krugman et al, 2015).

There is absolute PPP and there is relative PPP. Absolute PPP (which is the strong-form-PPP) is the expression in Equation 3.1 that exchange rate is equal to relative price levels where the variables involved are transformed into logarithmic forms. This version of PPP holds that by comparing prices of a bundle of goods in two different countries (with

[2] This is a crucial assertion for an economic bloc aiming at monetary integration and a common currency.

conversions by exchange rate into a common currency measure), the price will then be equal.

Drawing from Equation 1, the algebraic expression of the absolute PPP is:

$$E = \frac{P}{P^*} \qquad 2$$

where the variables are not transformed into logarithm. Relative PPP (which is the weak-form PPP) states that the percentage change in the exchange rate between two currencies over a period of time equals to the difference between the percentage changes in national price levels. What this denotes is that that relative PPP begins with absolute PPP and then transform Equation 2 into percentage changes thus:

$$\%\Delta E = \%\Delta P - \%\Delta P^* \qquad 3$$

Relative PPP accounts for market imperfections. As acknowledged by the proponents of the PPP theory, the absolute PPP is not likely to hold because of the existence of transport costs, trade impediments, distortion effects of tariffs, quotas and protections, imperfect information and competition etc., while it is argued that relative PPP can hold even in the presence of these highlighted problems. The argument of relative PPP is that exchange rate will adjust by the amount of inflation differentials between two economies. In the consideration of market imperfection, relative PPP, which is the long run path on which exchange rate moves with inflation is tested in this chapter.

Many empirical studies have reached the conclusion that PPP hold better in the long run than in the short run and that there can be prolonged and substantial deviations in the long run (Ardeni and Lubian, 1991). On the overall, it was argued that PPP holds better for traded goods than for non-traded goods (Officer, 1976). A stylised fact and major empirical regularity is that non-traded goods are usually more expensive in rich countries than in poor countries once the prices are converted into a common currency (Pilbeam, 2018). This is a vital point. Furthermore, the PPP theory holds better for relatively high inflation countries and underdeveloped capital markets. High-inflation countries' currencies (relative to their trade partners) tend to experience rapid depreciation that reflects such high inflation, thus suggesting that PPP is a dominant foreign exchange rate determinant in such countries. PPP may not hold generally because of confounding effects through other factors that are determinants of exchange rate.

Husted and Melvin (2013) stressed that developing economies have very low prices for many goods and services when measured in terms of developed countries' currencies (such as the US dollar). In these developing economies, when overall economic activities are measured at market exchange rate, domestic products are understated. Furthermore, common findings show that PPP holds better for countries having high trade openness and perform poorly for countries with significant trade barriers. Because of the postulation that PPP holds better when countries concerned are geographically close and trade linkages are high (according to Frankel, 1981), in testing the validity of international parity relationships, this study generates thirty (30) pairs of bilateral nominal exchange rates in which all the six WAMZ countries, each serves as home economies to each other five member countries.

Because price level data are non-existing, the available consumer price indices (which is index numbers whose value is 100 during the base year of the data) are commonly used. For both domestic and foreign countries, consumer price index (CPI) are constructed as:

$$CPI_t = \frac{P_t}{P_0} \qquad 4$$

where P_t and P_0 are the consumer price level at time t and the base year respectively. If the home country's CPI is divided by foreign country's CPI, this results into:

$$\frac{CPI_t}{CPI_t^*} = \left(\frac{P_t}{P_t^*}\right) X \left(\frac{P_0^*}{P_0}\right) \qquad 5$$

where $*$ depicts the foreign country. Assuming the absolute PPP in Equation 2 holds in the base year, the actual exchange rate in the base year equals to the PPP exchange rate for the base year. An empirical measure of PPP exchange rate by cross multiplying terms in Equation 5 thus:

$$E_t = E_t PPP = E_0 \left(\frac{CPI_t}{CPI_t^*}\right) \qquad 6$$

As a commonly used technique which involves the correlation of the actual exchange rates movements and the PPP counterpart, Equation 3.6 allows for the test of the validity of PPP (Husted and Melvin, 2013). This PPP exchange rate which re-establishes PPP relative to the base period offsets the relative inflation between a pair of countries, in consideration of the base period.

A further way of assessing long run PPP is to investigate the stationarity of real exchange rate (RER). The assumptions of absolute PPP is that RER is constant. The RER is nominal exchange rate adjusted for national prices. If the RER is stationary, any percentage change in price levels would be offset by equal magnitude of nominal exchange rate depreciation/appreciation. If RER contains unit roots, this then means that RER shocks are permanent with a further implication that PPP does not hold. For this purpose, bilateral RER were estimated for the WAMZ countries as:

$$q = s\left(\frac{p}{p^*}\right) \qquad 7$$

where q is real exchange rate.

Here, PPP is tested under the null hypothesis that RER is a random walk (that is, RER contains unit root and not stationary) against the alternative hypothesis that RER is stationary (Messe and Rogoff, 1988 and Mark, 1989). Although, the unit root tests of RER were performed 'with and without time trend', it is more appropriate to apply the model without trend in determining the stationarity of RER. This is because the inclusion of linear time trend is not theoretically consistent with long run proposition of PPP. Some empirical studies also suggested the inconsistency of time trend in RER with the PPP hypothesis (Culver and Papell, 1999; Holmes, 2002; Zhang and Lowinger, 2006; Acaravci and Acaravci, 2007)

International Fisher Effect: According to the Quantity Theory of Money (QTM), in the long run, money supply growth causes changes in price, while it is a general consensus among economists that money supply growth does not affect real variables in the long run. Consequently, real interest rate should not be impacted by money supply growth. If this holds, all inflation changes must be reflected in the nominal interest rate. The explanations of the 'Fisher Effect' is on how the nominal interest rate is affected by changes in inflation, in response to money supply growth. This thus reflects the effect of money supply growth on the nominal interest rate as clearly expressed in the QTM and Fisher equation. Fisher effect is therefore an expression that allows for the impact of inflation on nominal interest rate, in which increasing inflationary expectations causes increasing nominal interest. The Fisher equation is expressed as:

$$r = i - \pi^e \qquad 8$$

Where r is real interest rate, i is nominal interest rate and π^e is expected inflation. 'Fisher Effect' depicts one-to-one relationship between nominal interest rate and inflation rate. This was brought to the fore by Irving Fisher who theorised a direct relationship between inflation rate and nominal interest rate. According to this postulation, all things being equal, a rise in a country's expected inflation rate will eventually cause an equal rise in interest rate, and vice versa. A currency with high rate of inflation should also bear interest rate higher than a currency with lower rates of inflation. This is the one-to-one relationship between nominal interest rate and inflation in 'Fisher Effect' expressed thus:

$$i = \pi^e \qquad 9$$

This Fisher effect for a domestic economy while the foreign version of this equation can be stated as:

$$i^* = \pi^{e*} \qquad 10$$

From the UIP condition and the Fisher hypothesis, there is a theoretical suggestion that currencies with higher interest rates depreciate because higher nominal interest rate reflects higher expected inflation. This is what the international Fisher effect (IFE) suggests. In order to clearly understand how relative nominal exchange rates changes among countries affect a country's currency, it is necessary to recollect and consider the implications of the theories of PPP and Fisher effect. The implication of PPP is that exchange rate will move in order to offset changes in inflation rate differential. Therefore, a rise in a domestic inflation rate relative to that of a foreign country should associate with a fall in the value of the home country's currency. Secondly, this should also associate with a rise in the domestic country's interest rate. When these two conditions are put together, there will be IFE which is also known as Fisher effect (open). It can therefore be stated that IFE equals to the combination of the PPP and Fisher effect (closed).

International Fisher Effect (IFE) hypothesises that interest rate differentials in based on inflation differences. The higher the interest rate, the higher the inflation rate which subjects a currency to the weaker condition of depreciation. IFE therefore portends that differences in nominal interest rate between two countries should be proportional to depreciation or appreciation of the currencies of the two countries. The international Fisher effect (IFE) is an economic and exchange rate model applied in predicting nominal exchange rate movements between two or more foreign currencies based on the relationship between the prevailing interest rate in these countries.

Just like the PPP theory, IFE conjectures that interest rate differentials (and not inflation differential) influences exchange rate changes. IFE also states that an estimated change in the current exchange rate between any two currencies is directly proportional to the difference between the nominal interest rate of these two countries as a particular time. As earlier indicated, there is the hypothesis is that the real interest rate in an economy is independent of monetary variables and with the assumption that rates are calculated across countries, it can be inferred that a country experiencing lower (higher) interest rate will also experience lower (higher). Consequently, IFE estimated exchange rate are equally based on nominal interest rates relationships. If IFE theory explains the relationship between interest rates and exchange rate, it impliedly proposes interest rate differential as a prediction of the future changes in spot exchange rate.

Automatically, nominal interest rate differentials reflects inflation differential by a no-arbitrage system or by a PPP. This depicts that there is close relationship between PPP and IFE due to the high degree of correlation between interest rate and inflation rate. What IFE is therefore saying is that the currency of a country reflecting lower (higher) interest rate should experience appreciation (depreciation) relative to the currency of the country bearing higher (lower) interest rate. These show that there is proportional relationship between depreciation/appreciation of currency, prices and nominal interest rate differential. This link between interest rate, inflation and exchange rate is provided by IFE.

However, the validity of IFE depends largely on capital market integration which implies free flows of capital across markets. This is however problematic in developing economies like the WAMZ economies (unlike developed economies). Given the foregoing explanations, international Fisher Effect can be expressed as:

$$\%\Delta e = \left(\frac{1+i_d}{1+i_f}\right) - 1 \qquad 11$$

or

$$\%\Delta e = \left(\frac{i_d - i_f}{1+i_f}\right) \qquad 12$$

where Δe is the percentage change in exchange rate, i_d and i_f are the domestic and foreign nominal interest rates respectively. Δe will be positive if $i_d > i_f$, implying that domestic

currency will depreciate relative to the foreign currency due to high inflationary expectations in the domestic country. On the other hand, if $i_d < i_f$, Δe will be negative. These therefore connote positive relationship between exchange rate changes and interest rate differentials.

The position of IFE is that the nominal exchange rate between two countries should adjust for nominal interest rate differentials. These adjustment can occur either through (i) international capital flow (international money market) or trade and flow of goods. Therefore, free capital mobility is a condition for IFE to hold. Because the IFE theory is based on the PPP theory, the IFE theory might not hold due to the same reason that caused the PPP theory not to hold in the presence of other factors (other than inflation) affecting exchange rate movements and thus prevent exchange rate from adjusting according to the dictates of inflation differentials

Going by the foregoing analyses and the interconnectivity of the parity conditions and with the consideration of model Equations 9 and 10 above, IFE can be expressed and estimated as the relationship between relative nominal interest rates and relative inflation thus:

$$(i - i^*) = (\pi - \pi^*) \qquad 13$$

where * indicate the foreign variables.

Interest rates parity is state that interest rate differential between two countries is equal to the difference between the spot and forward exchange rates. The covered interest rate parity (CIP) is a condition that the price of risk-free asset having an identical maturity should be equal across countries after being translated into a common currency. This is arbitrage condition. The uncovered interest rate parity (UIP) occurs when the difference between interest rates equals to the difference in the spot exchange rate. If IFE states that change in exchange rates have to do with expected differences in interest rate, which means that the market will react in trying to achieve the UIP.

Uncovered interest rate parity (UIP) states that exchange rate will change at a rate that offsets the interest rate differential. The UIP condition is such that expected rate of depreciation or appreciation of an exchange rate is equal to the interest rate differential between two the countries affected. Thus, UIP is expressed as:

$$\%\Delta E = i - i^* \quad 14$$

Where ΔE is the expected rate of depreciation or appreciation of the domestic country's currency in a direct quotation system while i and i^* are the domestic and foreign interest rates respectively. Higher interest rate is expected to cause depreciation while low interest rate leads to currency appreciation. What UIP says is that expected change in foreign exchange price offsets the difference in the nominal rates of returns. Nevertheless, UIP does not imply CIP. The requirements of UIP goes beyond friction-free financial markets. Investors may be indifferent about currency denomination of their financial assets so far these assets have same expected returns, even regardless of the volatility of these returns. Specifically, the investor may care less about currency risks involved. Such risk neutrality stance denotes 'perfect substitutability' of financial assets which is the implication of the UIP. Therefore, UIP is a relationship that must hold when domestic and foreign financial assets are perfect substitute in the situation of capital mobility. This is an assumption of monetary models of exchange rate determination.

Suppose an investor within the WAMZ is considering buying an assets denominated in a foreign currency within the region has options of investing this fund in either Nigerian bonds or Ghanaian bonds having same risk and maturity postures. With these options before the investor, he/she should therefore bear two factors in mind: (i) the interest rate on the Nigerian bonds and the Ghanaian bonds; and (ii) the expectation of what happens to the naira-cedi exchange rate. Because these bonds have equal risks, he/she can instantaneously switch between the two bonds. What make the difference between the two financial assets in this case is the currencies in which they are denominated and the related interest rates. If such international investor is a Nigerian who is contemplating the purchase of a Ghanaian bond while expecting the Nigerian currency (naira) to depreciate (lose its value) against the Ghanaian currency (cedi) as he holds the bonds, this will cause a rise in his expected Nigerian naira returns from holding the Ghanaian bond. These are the ideas of UIP. The real return from holding the Nigerian (domestic) interest bearing asset is the difference between interest rate and inflation $(i - \pi)$. Therefore, this real return from domestic interest bearing assets is transformed into the deviation of domestic inflation from the sum of foreign inflation and expected exchange rate appreciation/depreciation $(i^* + \Delta E - \pi)$. This is what UIP entails.

Data and Methods: To serve as a precursor to the empirical assessments of exchange rate determination in the WAMZ countries, efforts in this section was limited to the test for the validity of the Absolute and Relative PPP as well as the IFE postulations. Investigations of simultaneous validity of these theories in the cases of the six WAMZ countries were performed. In these respects, these necessitated the investigation of both directions of bilateral relationship of the six countries of the WAMZ in which these countries at one point or the other, serve as 'domestic country/currency' against respective 'foreign country/currency'. These constitute thirty pairs or bilateral relationships.

Quarterly data of money market interest rates, consumer price index (CPI) for a period of 21 years between 1995 and 2015 were sourced from the databases of World Bank, IMF and EIU and applied for this study. For the WAMZ countries assessed, absolute PPP should imply cointegration between the nominal exchange rates and relative foreign and domestic prices; relative PPP should connote cointegration of changes in nominal interest rates and changes in relative foreign and domestic prices; while IFE should require cointegration between nominal interest rate differentials and inflation differentials. As an initial step, Equation 7 was estimated to generate the PPP exchange rates for the WAMZ countries in order to investigate the levels of equality of PPP exchange rates and market exchange rates of the WAMZ and further establish the degree of deviations (if any) of these rates from each other and as well establish the degree of association (correlation) of these two exchange rates over the 15-year period (between 2001 and 2015) covered by the validity tests. For the purpose of the cointegration estimations, the Augmented Dicky-Fuller (ADF) and Phillip-Perron (PP) unit root tests were performed at the first stage to check for the order of integration of the variables employed in the cointegration analyses because residual-based cointegration tests require all variables (at least the dependent variable) to be to an integration order of one. Fully modified least square (FMOLS) cointegrating regression were performed for each of the 30 bilateral relationships and the residuals of these FMOLS estimation results were tested for unit root/stationarity under the residual-based single equation cointegration methods which require the residuals to be stationary if the variables are cointegrated to be The econometric variants of Residual-based cointegration tests (Phillips Ouliaris and Park's Added Variables Tests) and the statistical methods of Pearson Moment Correlation and were appropriately applied. While Phillips Ouliaris tests the null hypothesis of no

cointegration against the alternative hypothesis of cointegration, Parks' Added Variable Tests were applied to test null hypothesis of no cointegration. The cointegration tests were performed at 1% level of significance.

Results and Findings: The deviations of the estimated annual PPP exchange rates and market exchange bilateral exchange cross-rates across the WAMZ countries as well as the results of estimates of the strength of association of these two forms of exchange rates over a period of fifteen years are exhibited in Table 4 below.

Table 4
Deviations of PPP Exchange Rates from Market Exchange Rates and Correlation Estimates in the WAMZ (2001-2015)

	Gambia	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
2001	0.22	-2.68	na	12.50	45.51	na
2002	0.23	0.27	na	21.21	47.55	na
2003	0.17	6.05	na	15.64	47.80	na
2004	0.13	5.02	118.72	8.97	41.69	na
2005	0.06	3.22	943.99	7.85	27.31	na
2006	0.00	3.00	1625.19	6.81	19.64	-129.89
2007	-0.04	-0.80	-10.69	5.81	14.12	-371.06
2008	-0.03	-3.63	-196.23	0.46	-1.46	-515.84
2009	0.09	-0.45	-239.52	0.64	14.56	-386.34
2010	0.00	0.00	0.00	0.00	0.00	0.00
2011	0.00	1.00	-77.93	-2.86	-6.75	231.03
2012	0.21	3.01	-618.34	-5.08	-20.05	43.58
2013	0.21	5.67	-1477.43	-5.81	-32.50	-139.75
2014	0.91	10.16	-2038.88	-5.83	-43.29	-81.14
2015	1.35	8.82	-2293.78	-10.20	-27.33	173.00
% Correlation	***95.98%***	***96.65%***	***94.06%***	***96.45%***	***90.11%***	***96.72%***

Source: Author's Estimations

The Pearson Product-moment correlation estimation of the degrees of association of the two classes of exchange rate (reported in percentage translations of the correlation coefficients) were very high (at over 90 percentages) and positivity moved towards same direction. These portend close linear association of the market exchange rates and the PPP theoretically predisposed exchange rates across the WAMZ.

Regarding the investigations of the PPP (absolute and relative) and IFE, results of the various unit roots tests of variables employed in the tests of validity of the international parity conditions are reported in Tables 5-8 below.

Table 5
Results of ADF and PP Unit Roots Tests of Cross Exchange Rates

		ADF		PP	
Home Country	***Foreign Country***	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*
GAMBIA	***Ghana***	-4.253	-4.192*	-4.871*	-3.867**
	Guinea	-1.280	-3.034	-1.359	-2.115
	Liberia	-1.813	-2.275	-1.698	-2.308
	Nigeria	-2.031	-2.012	-2.051	-2.079
	S/Leone	-3.536*	-3.429***	-3.004**	-2.728
GHANA	***Gambia***	0.274	-1.499	-0.796	-0.857
	Guinea	-1.185	-1.018	-1.185	-1.018
	Liberia	-1.478	-0.401	1.309	-0.635
	Nigeria	-0.006	-1.128	-0.206	-1.447
	S/Leone	-0.073	-1.666	-0.399	-1.540
GUINEA	***Gambia***	-1.093	-1.535	-1.209	-1.768
	Ghana	-1.765	-1.517	-1.483	-1.421
	Liberia	-1.204	-1.484	-1.271	-1.484
	Nigeria	-1.655	-2.044	-1.396	-1.481
	S/Leone	-1.986	-1.987	-1.851	-1.609
LIBERIA	***Gambia***	-1.698	-2.009	-1.572	-1.826
	Ghana	-7.720*	-6.356	-6.441*	-3.621**
	Guinea	-1.850	-2.783	-1.187	-1.864
	Nigeria	-1.800	-1.659	-1.775	-1.573
	S/Leone	-2.681***	-2.584	-3.456*	-2.428
NIGERIA	***Gambia***	-2.085	-1.988	-2.248	-2.173
	Ghana	-2.459	-3.840***	-2.460	-3.084
	Guinea	-1.683	-1.075	-1.182	-1.198
	Liberia	-1.932	-1.913	-1.899	-1.925
	S/Leone	-2.150	-2.126	-2.211	-2.189
SIERRA	***Gambia***	-2.730***	-2.698	-2.436	-2.372
	Ghana	-1.802	-3.087	-1.539	-2.499
	Guinea	-2.213	-1.330	-2.180	-1.608
	Liberia	-1.846	-3.952**	-1.794	-2.664
	Nigeria	-2.577	-2.711	-2.771***	-2.920

Source: Author's Estimations and EViews 10

Table 6
Results of ADF and PP Unit Roots Tests of Absolute PPP Term (P-P*)

		ADF		PP	
Home Country	***Foreign Country***	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*
GAMBIA	***Ghana***	-2.704*	-4.723*	-11.524*	-9.780*
	Guinea	-7.200*	-5.171*	-5.688	-2.556
	Liberia	-0.498	-3.913***	-1.402	-2.453
	Nigeria	-3.518*	-7.093*	-8.940	-20.828*
	S/Leone	-1.824	-0.041	-3.792	-1.777
GHANA	***Gambia***	0.995	-2.782	1.268	-2.053
	Guinea	-4.579	-3.143	-3.257**	-1.694
	Liberia	-0.395	-3.311***	0.715	-3.549**
	Nigeria	-0.968	-1.400	-0.505	-2.040
	S/Leone	0.373	-3.228***	1.194	-0.835
GUINEA	***Gambia***	-2.108	-1.496	-1.793	-0.869
	Ghana	-3.049	-1.912	-2.426	-1.125
	Liberia	-1.870	-3.444***	-1.943	-1.551
	Nigeria	-2.898***	-1.350	-2.629***	-1.492
	S/Leone	-0.590	2.165	1.758	-2.161
LIBERIA	***Gambia***	-0.190	-3.255	-0.715	-2.511
	Ghana	-1.845	-4.092**	-0.653	-2.957
	Guinea	-3.312**	-1.827	-3.427	-1.815
	Nigeria	-1.605	-2.814	-1.406	-2.837
	S/Leone	-1.658	-3.329*	-1.577	-3.545**
NIGERIA	***Gambia***	-1.735	-3.079	-1.678	-3.133
	Ghana	-2.595**	1.773	-1.043	-1.524
	Guinea	-4.697*	-3.051	-4.489*	-2.307
	Liberia	-1.564	-2.852	-1.369	-2.880
	S/Leone	-3.471	-0.489	0.281	-2.541
SIERRA	***Gambia***	-1.712	-0.149	-3.389**	
	Ghana	-0.930	-5.532	-0.338	-1.815*
	Guinea	-1.156	-0.904	-3.525**	-4.184
	Liberia	-2.135	-3.594	-1.866	-3.269***
	Nigeria	-4.247	-0.796	0.241	-2.126

Source: Author's Estimations and EViews 10

Virtually all the WAMZ countries' variables for the cointegration tests of relative PPP were stationary, and this makes cointegration tests inappropriate in these respects. Consequently, this study resorted to the application of the Pearson Product-Moment correlation estimations of the terms of relative PPP for the 30 bilateral relationship across the WAMZ in order to establish the strength of linear association between percentages changes in exchange rates and percentage changes in inflation differentials. The stronger the association of these two variables of relative PPP, the closer the Pearson correlation coefficient will be to either +1 or -1 depending on whether the relationship is positive or negative, respectively.

Table 7
Results of ADF and PP Unit Roots Tests of Real Exchange Rates

		ADF		*PP*	
Home Country	***Foreign Country***	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*
GAMBIA	***Ghana***	-8.059*	-4.493*	-15.018*	11.576*
	Guinea	-6.448*	-4.457*	-7.897*	-5.285*
	Liberia	-1.847	-3.468***	-1.881	-2.190
	Nigeria	-7.032*	-5.886*	-6.948*	-5.816*
	S/Leone	-2.554	-2.459	-2.306	-2.010
GHANA	***Gambia***	3.441	2.108	4.033	2.173
	Guinea	-3.918*	-4.564*	-2.519	-2.308
	Liberia	2.876	0.395	3.017	0.305
	Nigeria	0.743		1.485	-0.511
	S/Leone	0.473	1.935	0.872	-1.059
GUINEA	***Gambia***	-1.847	-1.499	-1.824	-1.648
	Ghana	-2.414	-2.525	-1.908	-1.837
	Liberia	-2.086	-1.527	2.060	-1.527
	Nigeria	-2.523	-2.342	-2.337	-1.555
	S/Leone	-1.785	-2.492	-2.028	-2.103
LIBERIA	***Gambia***	-1.863	-2.069	-1.951	-2.158
	Ghana	-1.658	-5.991*	-0.243	-3.704**
	Guinea	-4.940*	-3.420**	-5.035*	-3.457**
	Nigeria	-2.805**	-3.221**	-2.850*	-3.282***
	S/Leone	-3.313**	3.416**	-2.181	-2.193
NIGERIA	***Gambia***	-1.585	-2.175	-1.619	-2.295
	Ghana	-2.390	-3.900**	-2.357	-3.076
	Guinea	-6.589*	-8.228*	-7.269*	-4.932*
	Liberia	-3.044**	-3.380**	-3.032***	-3.435***
	S/Leone	-2.871***	4.800**	1.950	-2.401
SIERRA	***Gambia***	-2.361	-2.312	-2.050	-1.950
	Ghana	-1.334	-2.973	-0.580	-1.908
	Guinea	-2.221	-3.614**	2.815***	-3.498***
	Liberia	-3.458**	3.540**	-2.156	-2.101
	Nigeria	-2.743**	3.894**	-1.966	-2.401

Source: Author's Estimations and EViews 10

Table 8
Results of ADF Unit Roots Tests (Exchange Rates Changes/CPI Differentials and IFE Terms)

		Exchange Rate		CPI Differentials		IFE Terms	
Home Country	***Foreign Country***	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*
GAMBIA	***Ghana***	-5.700*	-5.704*	-2.396	-2.584	-2.358	-2.660
	Guinea	-6.366*	-6.305*	-4.524*	-6.149*	-2.022	-1.665
	Liberia	-4.880*	-5.022*	-3.119**	-3.157***	-0.683	-2.308
	Nigeria	-8.426*	-8.392*	-6.038*	-6.303*	-2.324	-2.756
	S/Leone	-6.266*	-2.666*	-3.708*	-3.637**	1.801	1.435
	US	-6.000*	-5.972*				
GHANA	***Gambia***	-5.712*	-5.712*	-2.396	-2.584	-2.223	-3.062
	Guinea	-6.042*	-6.153*	-4.912*	-5.845*	-1.837	-0.185
	Liberia	7.262*	-7.345*	-4.054*	-3.050*	-2.887**	-3.222***
	Nigeria	-6.896*	-6.860*	-8.717*	-8.822*	-3.662*	-3.636
	S/Leone	-5.375*	-5.337*	-2.243	-2.204	0.511	0.100
	US	4.054*	-4.110*				
GUINEA	***Gambia***	-5.819*	-5.768*	-4.524*	-6.149*	-0.705	-0.496
	Ghana	-5.249*	-5.409*	-4.912*	-5.845*	-1.992	-1.866
	Liberia	-7.429*	-7.468*	-6.925*	-7.756*	-1.535	-0.441
	Nigeria	-5.602*	-5.708*	-4.651*	-5.613*	-2.900**	-2.945
	S/Leone	-5.617*	-5.767*	-2.022	-2.157	-2.631***	-3.693**
	US	-5.991*	-6.141*				
LIBERIA	***Gambia***	-5.344*	-5.401*	-3.119**	-3.157***	-0.753	-1.806
	Ghana	-5.154*	-5.318*	-4.054*	-3.051	-2.087	-2.192
	Guinea	-7.238*	-7.192*	-6.925*	-7.756*	-2.527	-1.346
	Nigeria	-8.599*	-8.590*	-7.467	-7.399*	-4.146*	-4.352*
	S/Leone	-2.406	-2.314*	-3.048**	-3.224***	-0.401	-0.378
	US	-5.687*	-5.717*				
NIGERIA	***Gambia***	-9.060*	-9.074*	-6.038*	-6.030*	-1.779	-2.120
	Ghana	-8.829*	-8.820*	-8.717*	-8.822*	-4.036*	-4.076*
	Guinea	-6.223*	-6.283*	-4.651*	-5.613*	-1.450	-1.075
	Liberia	-8.983*	-9.038*	-7.467*	-7.399*	-2.617***	-2.964
	S/Leone	-9.031*	-9.015*	-3.693*	-3.057	-0.928	1.378
	US	-9.056*	-9.086*				
SIERRA	***Gambia***	-5.935*	-5.963*	-3.708*	-3.637**	-2.781***	-3.060
	Ghana	-5.704*	-5.673*	-2.243	-2.204	-3.051**	-2.955
	Guinea	-6.156*	-6.235*	-2.022	-2.158	-1.755	-2.358
	Liberia	-2.159	-6.182*	-3.048**	-3.224***	-1.802	-1.493
	Nigeria	-7.495*	-7.480*	-3.693*	-3.057	-2.410	-2.320
	US	-6.419*	-6.714*				

Source: Author's Estimations and EViews 10 Output

The outcome of the Phillips-Ouliaris and Park's Added variable residual-based cointegration tests for absolute PPP across the WAMZ are highlighted in Table 9 below. For most bilateral absolute PPP relationships (except for The Gambia/Sierra Leone and Nigeria/Liberia). The test statistics (tau and z) yielded by the Phillip-Ouliaris tests failed to reject the null hypothesis of no cointegration (that is, unit roots in the residuals) at 1% level of significance.

Apart from The Gambia/Ghana and Sierra Leone/Guinea relationships, the chi-square statistics produced for all the WAMZ countries revealed that the Park's Added Variable tests reject the null hypothesis of cointegration of the series at 1% level of significance. These two residual based cointegration tests consequently provided evidence to suggest that the absolute PPP does not hold across the WAMZ.

Table 9
Results of Residual-based Cointegration Tests of Absolute PPP in the WAMZ

		Phillips-Oualiaris Tests		*Park's Added Variable Tests*
Home Country	***Foreign Country***	***tau-statistics***	***z-statistics***	***Chi-square***
GAMBIA	***Ghana***	-2.587	-12.845	4.361
	Guinea	-2.631	-9.963	95.023*
	Liberia	-2.450	-9.635	133.507*
	Nigeria	-2.750	-12.999	14.341*
	S/Leone	-2.336	-10.365*	12.748*
GHANA	***Gambia***	-1.756	-9.396	23.709*
	Guinea	-0.682	-2.126	185.207*
	Liberia	-1.766	-6.416	76.931*
	Nigeria	-1.222	-4.560	25.446*
	S/Leone	-2.213	-8.730	32.718*
GUINEA	***Gambia***	-2.205	-7.813	76.586*
	Ghana	-1.568	-5.824	99.751*
	Liberia	-2.693	-12.656	20.389*
	Nigeria	-2.816	-15.684***	9.118*
	S/Leone	-2.857	-15.327***	7.328**
LIBERIA	***Gambia***	-8.634	-2.270	113.668*
	Ghana	-3.218***	-14.280	52.801*
	Guinea	-3.111	-13.590	33.036*
	Nigeria	-3.827**	-21.751**	14.939*
	S/Leone	-1.812	-6.325	21.964*
NIGERIA	***Gambia***	-2.199	-8.990	10.900*
	Ghana	-3.323***	-20.677**	10.627*
	Guinea	-3.169***	-16.066***	8.900*
	Liberia	-4.159*	-24.895*	13.671*
	S/Leone	-2.735	-12.381	6.387**
SIERRA	***Gambia***	-2.331	-10.310	7.311*
	Ghana	-1.893	-6.645	14.412*
	Guinea	-2.846	-15.424**	3.661
	Liberia	-1.773	-6.345	19.971*
	Nigeria	-2.664	-11.481	5.013***

Source: Author's estimation and Eviews 10 Output

The results of further ADF and PP (with constant only) unit roots tests of bilateral RER as exhibited in Table 10 below show that the null hypothesis of unit roots cannot be rejected for virtually all the WAMZ countries at 1% level of significance (except for some cases of three The Gambian-based RER and Liberia/ Guinea RER).

Table 10: Results of ADF and PP Unit Roots Tests of Real Exchange Rates

		ADF		*PP*	
Home Country	***Foreign Country***	*With Constant*	*With Constant & Trend*	*With Constant*	*With Constant & Trend*
GAMBIA	***Ghana***	-8.059*	-4.493*	-15.018*	11.576*
	Guinea	-6.448*	-4.457*	-7.897*	-5.285*
	Liberia	-1.847	-3.468***	-1.881	-2.190
	Nigeria	-7.032*	-5.886*	-6.948*	-5.816*
	S/Leone	-2.554	-2.459	-2.306	-2.010
GHANA	***Gambia***	3.441	2.108	4.033	2.173
	Guinea	-3.918*	-4.564*	-2.519	-2.308
	Liberia	2.876	0.395	3.017	0.305
	Nigeria	0.743	0.935	1.485	-0.511
	S/Leone	0.473	1.935	0.872	-1.059
GUINEA	***Gambia***	-1.847	-1.499	-1.824	-1.648
	Ghana	-2.414	-2.525	-1.908	-1.837
	Liberia	-2.086	-1.527	2.060	-1.527
	Nigeria	-2.523	-2.342	-2.337	-1.555
	S/Leone	-1.785	-2.492	-2.028	-2.103
LIBERIA	***Gambia***	-1.863	-2.069	-1.951	-2.158
	Ghana	-1.658	-5.991*	-0.243	-3.704**
	Guinea	-4.940*	-3.420**	-5.035*	-3.457**
	Nigeria	-2.805**	-3.221**	-2.850*	-3.282***
	S/Leone	-3.313**	3.416**	-2.181	-2.193
NIGERIA	***Gambia***	-1.585	-2.175	-1.619	-2.295
	Ghana	-2.390	-3.900**	-2.357	-3.076
	Guinea	-6.589*	-8.228*	-7.269*	-4.932*
	Liberia	-3.044**	-3.380**	-3.032***	-3.435***
	S/Leone	-2.871***	4.800**	1.950	-2.401
SIERRA	***Gambia***	-2.361	-2.312	-2.050	-1.950
	Ghana	-1.334	-2.973	-0.580	-1.908
	Guinea	-2.221	-3.614**	2.815***	-3.498***
	Liberia	-3.458**	3.540**	-2.156	-2.101
	Nigeria	-2.743**	3.894**	-1.966	-2.401

Source: Author's Estimation and Eviews 10 Output

This consonance hugely confirmed the residual-based cointegration test results that the long run absolute PPP does not hold in WAMZ countries. The relative PPP correlation tests results in Table 11 below generally reflected low and medium linear association between changes in exchange rates and in relative price changes differentials. These results are not encouraging in giving supports for relative PPP across the WAMZ.

On the overall, these PPP tests indicate that the validity of both absolute and relative PPP could not be established in the WAMZ, thus making PPP to be irrelevant in the exchange rate determination throughout the WAMZ.

Table 11
Results of Correlation Tests of Relative PPP (in the WAMZ

Home Country	*Foreign Country*	Correlation	*Home Country*	*Foreign Country*	*Correlation*
GAMBIA	***Ghana***	0.35	***LIBERIA***	***Gambia***	0.36
	Guinea	0.64		***Ghana***	-0.00
	Liberia	0.40		***Guinea***	0.36
	Nigeria	0.07		***Nigeria***	0.20
	S/Leone	0.00		***S/Leone***	0.17
GHANA	***Gambia***	0.33	***NIGERIA***	***Gambia***	0.04
	Guinea	0.56		***Ghana***	0.05
	Liberia	0.01		***Guinea***	0.54
	Nigeria	0.10		***Liberia***	0.23
	S/Leone	0.34		***S/Leone***	-0.21
GUINEA	***Gambia***	0.63	***SIERRA***	***Gambia***	-0.02
	Ghana	0.58		***Ghana***	0.34
	Liberia	0.38		***Guinea***	0.42
	Nigeria	0.56		***Liberia***	0.19
	S/Leone	0.49		***Nigeria***	-0.19

Source: Author's Estimation and Eviews 10 Output

In Table 12 below, the results of Phillips-Ouliaris and Park's Variable Added residual-based cointegration tests for IFE depict that across the WAMZ, the null hypothesis of no cointegration of nominal interest rate differentials and inflation differentials cannot be rejected at 1% significance level in the Phillips-Ouliaris tests which thus produced evidence to infer that IFE failed to hold for these WAMZ's bilateral relationships. It is significant to state at this point that these results yielded supports for the conjecture that if PPP fails to hold, IFE will not hold. However, there were mixed (and contradictory) output yielded by the Chi-square statistics of the Park's Variable Added tests at 1% significance level.

Table 12
Results of Cointegration Tests for International Fisher Effects in the WAMZ

		Phillips-Oualiaris Tests		*Park's Added Variable Tests*
Home Country	**Foreign Country**	***tau-statistics***	***z-statistics***	***Chi-square***
GAMBIA	***Ghana***	-2.273	-10.169	0.346
	Guinea	-1.617	-7.309	0.577
	Liberia	-2.100	-9.110	46.700*
	Nigeria	-2.222	-10.222	5.367**
	S/Leone	-1.061	-4.476	4.405**
GHANA	***Gambia***	-2.273	10.169	0.346
	Guinea	-0.993	-3.134	0.182
	Liberia	-2.208	-10.479	35.007*
	Nigeria	-2.983	-15.925	0.066
	S/Leone	-1.383	-5.803	1.079

GUINEA	***Gambia***	-1.616	-7.309	0.577
	Ghana	-0.993	-3.134	0.082
	Liberia	-1.310	-3.164	26.331*
	Nigeria	-1.593	-4.901	5.348**
	S/Leone	-2.338	-9.626	11.572
LIBERIA	***Gambia***	-2.100	-9.110	46.700*
	Ghana	-2.208	-10.479	35.007*
	Guinea	-1.310	-3.164	26.331*
	Nigeria	-3.165***	-17.105***	9.447*
	S/Leone	-2.399	-12.945	0.001
NIGERIA	***Gambia***	-2.222	-10.222	5.368**
	Ghana	-2.983	-15.925	0.066
	Guinea	-1.594	-4.901	3.673**
	Liberia	-3.165***	-17.105***	9.447*
	S/Leone	-1.477	-5.806	1.483
S/LEONE	***Gambia***	-1.062	-4.476	4.405
	Ghana	-1.383	-5.803	1.079
	Guinea	-2.339	-9.626	11.572*
	Liberia	-2.399	-12.945	0.001
	Nigeria	-1.477	-5.806	1.483

Source: Author's Estimation and Eviews 10 Output

The results of the tests of Pearson moment correlation for UIP in the WAMZ are as exhibited in Table 13 below. The results revealed weak positive and negative correlations between exchange rate changes (appreciation and depreciation) and interest rate differentials across the WAMZ. The strongest of the linear association of 0.56 was recorded in the case of Guinea/Nigeria.

Table 13: Results of Correlation Tests for Uncovered Interest Rate Parity (UIP) in the WAMZ

Home Country	***Foreign Country***	**Correlation**	***Home Country***	***Foreign Country***	***Correlation***
GAMBIA	***Ghana***	0.14	***LIBERIA***	***Gambia***	-0.01
	Guinea	-0.04		***Ghana***	0.24
	Liberia	0.04		***Guinea***	0.04
	Nigeria	-0.01		***Nigeria***	-0.01
	S/Leone	-0.06		***S/Leone***	-0.06
GHANA	***Gambia***	0.15	***NIGERIA***	***Gambia***	0.08
	Guinea	0.23		***Ghana***	0.06
	Liberia	0.27		***Guinea***	0.07
	Nigeria	0.16		***Liberia***	0.05
	S/Leone	0.11		***S/Leone***	-0.16
GUINEA	***Gambia***	-0.03	***SIERRA***	***Gambia***	-0.07
	Ghana	0.27		***Ghana***	-0.04
	Liberia	0.11		***Guinea***	-0.27
	Nigeria	0.56		***Liberia***	-0.09
	S/Leone	-0.31		***Nigeria***	-0.14

Source: Author's Estimation and Eviews 10 Output

Nevertheless, on the overall these results gave evidences to infer that UIP does not hold across the WAMZ.

3.3 Stylised Facts of Inflation-Unemployment Relationship – Phillips Curves

Philips Curves indicate the relationship between inflation and unemployment rates in an economy. The notion here is that changes in the level of unemployment have direct and predictable effect of price inflation. This was propounded by Philips (1958) in his study of annual wage inflation and unemployment in the United Kingdom between 1860 and 1957 in which Phillips found a consistent and stable inverse relationship between these two variables when he plotted the related scatter diagram. This had since been adopted as macroeconomic tool. Many economists (after Phillips) who performed similar studies based on other economies got similar results thus making Phillip's proposition a stylised fact. The basis of the logical argument behind Phillip curve is that (i) a fiscal stimulus and increase in aggregate demand would sequentially increase demand for labour as government spending grows; (ii) there would be fall in pool of unemployed; (iii) firms would compete for the few workers by increasing nominal wages; (iv) there would be greater bargaining for labour to seek increase in nominal wages; (v) cost of wages will increase; and (vi) the increased cost of wages will be passed on to increases in price levels. This thus became a stylised fact which is verifiable in many economies. To verify if the Phillip curve relationship hold in the WAMZ economies, statistical estimations of Pearson Moment Correlation of the CPI inflation rate and unemployment rates across the WAMZ were performed applying annual data covering the period between 1991 and 2015. The resulting coefficients of correlation revealed the direction (and strength) of the relationship between the two variables involved. Table 14 below displays the results of the correlation estimation to establish if the Phillip curve relationship hold in the WAMZ countries (as developing countries) and the US (as a developed economy).

Table 14: Results of Correlation Analysis of Phillip Curve Relationship in the WAMZ

	Inflation/Unemployment Correlation Coefficient
Gambia	0.05
Ghana	-0.02
Guinea	0.36
Liberia	0.17
Nigeria	0.13
S/Leone	0.006
US	-0.28

Source: Author's Estimation and EViews 9.5 Output

Among the WAMZ countries, the results revealed very weak inverse relationship only for Ghana at -0.02 (apart from the negative relationship in the case of the US at -0.28). These are evidence to conclude that the Phillip curve relationship does not hold in the WAMZ (apart from Ghana) over the period covered by this study.

3.4. Stylised Facts of Lucas Short-run Output/Inflation Trade-off

Lucas (1973) hypothesised that average output will not be altered by the rate of inflation. The Lucas' Phillips Curves Hypothesis' implies that the condition for the output-inflation trade-off was the misinterpretation by economic agents, of their observed price movements. In his cross-country study of 18 countries for the period between 1953 and 1967, Lucas found out that in high inflation countries, there is a quick reflection of changes in aggregate demand on price while the effects on output are relatively small. In countries with low inflation or rather, price instability, the initial effect of increase in nominal incomes on real output are large while the positive effects on inflation rate is small. The simple indication of these is that as there is increase in the variance of inflation, the trade-off between output and inflation will deteriorate because of the ability of economic agents in high inflation countries to distinguish between nominal shocks and real shocks. Lucas (1973) was of the view that unanticipated inflation is the condition upon which there can be a trade-off between output and inflation. His position was that there will be alteration to the behaviours of economic agents if the general price level movements are erroneously taken to be an indication of relative price changes. Such change in the behaviour of economic agents will cause employment and real output to fluctuate around their 'natural' levels. The moment these economic agents are able to know that changes in price are not market specific but general, each of the real variables would be forced to move back to the initial level because of homogeneity of degree zero of the supply functions. What the Lucas model of Phillips curves connotes is the inverse relationship between the real output response and the variability of inflation and aggregate demand. The objective of this section was to test the validity of the Lucas model of Phillips curve and determine if it holds in both the formal economies and the informal developing economies of the WAMZ.

For the assessment of output/inflation trade-off which covers the period between 1991and 2015, annual data for nominal GDP, and real GDP were collected for the six

WAMZ countries. Estimations of output/inflation trade-off for the WAMZ countries were carried the model suggested by Lucas (1973):

$$lny_t = \alpha + \tau\Delta x_t + \lambda lny_{t-1} + \gamma T + \varepsilon_t. \quad 15$$

Where y_t is log of real GDP; Δx_t is first difference of the log of nominal GDP; λy_{t-1} is one-period lag of log real GDP; T is time trend ($0 < \tau < 1$ and $\lambda < 1$). Equation 15 has been widely used by the new classical (Lucas, 1978) and new Keynesian economists (Schultze, 1984; Ball, Mankiw and Romer, 1998 etc.) as an empirical fact. The parameter of interest (which is the trade-off parameter and a measure of the slope of Phillips curve) is the parameter of change in nominal output ($\tau\Delta x_t$). It determines how much of shock to nominal income shows up in real output. A large coefficient indicates that changes in nominal output growth are associated with real output in the short run. A coefficient close to unity indicates a shallow Phillips curve, meaning that all changes in nominal output show up in real output growth while a coefficient value close zero depicts a very steep Phillip curves which indicates that all changes in nominal income show up in price. This theoretical model suggests that in countries experiencing high variances in inflation rate and nominal output growth rate, the trade-off parameter should be low, hence a steeper Phillip curves.

The results of the OLS estimations of output-inflation trade-off in the WAMZ (including the diagnostic tests) are displayed in Table 15 below. Nominal output growth (the parameter interest) reported positive coefficients for all the countries assessed, but significant only for The Gambia and Liberia. The diagnostic tests show that for all the estimations, there are no residual serial correlation and heteroscedasticity problems while normality problem are established in the cases of Ghana, Liberia and Nigeria.

Table 15: Results of the Estimation of Short-run Output-Inflation Trade-Off for the WAMZ Countries 'Formal' Economies

Dependent Variable: Real Output						
	Gambia	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
Constant	13.1839*	1.5221	1.4544	-1.1136	7.0958**	9.1765**
ΔNominal Output	**0.2771***	**0.0183**	**0.0062**	**1.1197***	**0.0415**	**0.1571**
Lagged Real Output	0.4289**	0.9346	0.9516*	1.0592*	0.7665*	0.6779*
Time Trend	0.0193	0.0052	0.0002	-0.0085	0.0170**	0.192*
R2	0.99	0.99	0.99	0.98	0.98	0.95
DW-Statistics	1.92	1.25	2.10	1.52	1.76	1.92
F-Statistics	0.00	0.00	0.00	0.00	0.00	0.00
Diagnostic Tests						
JB Statistics for Normality	0.5637 (0.75)	20.379 (0.00)	0.3581 (0.84)	12.7078 (0.00)	111.974 (0.00)	4.6689 (0.10)
Breusch-Godfrey Autocorrelation	0.0193 (0.98)	1.5417 (0.24)	1.3242 (0.29)	1.3916 (0.27)	0.1267 (0.88)	0.9447 (0.41)
Breusch-Pagan-Godfrey Heteroscedasticity	0.6751 (0.57)	1.2086 (0.33)	0.9109 (0.45)	1.0929 (0.38)	1.3018 (0.30)	0.7230 (0.55)

Source: Author' Estimation and EViews 9.5Output

Note: *, ** and ** denote 1%, 5% and 10% levels of significance respectively. The p-values are in parentheses.

Table 16 below exhibits the rates of variations in inflation and GDP growth as well as the OLS estimated trade-off parameter.

Table 16 Variabilities and Trade-off Parameter in WAMZ Countries' 'Formal' Economies (1991-2015)

Variability& Trade-off Parameter	***Gambia***	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
Nominal Income Growth	5.82	15.60	9.85	23.75	31.31	13.88
Inflation Rate	4.60	14.90	9.84	7.92	31.28	20.23
Trade-off Coefficients	0.28	0.02	0.01	1.12	0.04	0.16

Source: Author's Estimations

To verify the stylised fact of the positive correlation of high output growth/inflation variabilities and low output-inflation trade off parameter over the period covered by this assessment for the formal economies of the WAMZ, it is evident in Table 16 above that this could well be established for Ghana and Nigeria exhibiting high variations in output and inflation and corresponding low output-inflation trade-off coefficients. However, this failed in the cases of Guinea with low variabilities of inflation (9.84) and nominal GDP growth (9.85) displaying the lowest trade-off parameter. For Liberia, reporting the highest significant trade-off parameter of 1.12, the stylised fact holds only for the country's inflation variation of 7.92 and not for the high variability of 23.75 in nominal

output growth. For the Gambia having the WAMZ lowest variabilities in both nominal output (5.82) and inflation (4.60), it is expected that the trade-off parameter be higher than 0.28 generated, if the stylised fact is to hold. On the other hand, for this same reason it is expected that the trade-off parameter for Sierra Leone be higher than the 0.16 yielded.

Further to the investigations of the output-inflation trade-off for the formal economies of the WAMZ, assessments of the informal economies were equally performed. Data for nominal income, real income and inflation were generated for the informal economies of the WAMZ in relation to informal activities estimations as percentages of GDP, derived by Medina and Schneider (2018) and presented in Table 1. The results of the OLS estimations of the trade-off coefficients for the informal economies are presented in Table 17 below, highlighting the trade-off coefficients as significant at 1% level of significance for Ghana and Nigeria respectively. The coefficients for Sierra Leone was not statistically significant. The diagnostic tests revealed residual normality problem only for The Gambia and Guinea. While there were no heteroscedasticity issue for these OLS estimations, autoregression of the residuals was reported only for The Gambia. The goodness-of-fit were reasonable and the estimations are all jointly significant.

Table 17: Short-run Output-Inflation Trade-Off Estimations for the WAMZ's Informal Economies

Dependent Variable: Real Output						
	Gambia	***Ghana***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
Constant	5.1841	2.2468	-4.7285	-3.4909	9.1143*	9.4870*
ΔNominal Output	**0.6641***	**0.2434****	**0.5961***	**1.0683***	**0.2864*****	**0.1342**
Lagged Real Output	0.7229*	0.8979*	1.2226*	1.1744*	0.6307*	0.5270
Time Trend	0.0635	0.0071	-0.0777	-0.0038	0.0243*	0.1561*
R2	0.99	0.93	0.94	0.97	0.98	0.95
DW-Statistics	1.53	1.10	1.76	2.27	2.08	2.02
F-Statistics	0.00	0.00	0.00	0.00	0.00	0.00
Diagnostic Tests						
JB Statistics for Normality	19.5446 (0.00)	0.5018 (0.78)	9.4054 (0.00)	0.2037 (0.90)	6.007 (0.05)	0.3126 (0.85)
Breusch-Godfrey Autocorrelation	6.3929 (0.00)	2.3375 (0.12)	0.5158 (0.61)	1.9757 (0.19)	0.9415 (0.41)	0.3888 (0.68)
Breusch-Pagan-Godfrey Heteroscedasticity	0.7921 (0.51)	1.4194 (0.74)	1.7848 (0.18)	2.6485 (0.10)	3.7680 (0.37)	1.2546 (0.32)

Source: Author' Estimation and EViews 9.5Output

Note: *, ** and ** denote 1%, 5% and 10% levels of significance respectively. The p-values are in parentheses.

Comparative results of the OLS estimated trade-off coefficients, rates of variations in inflation and GDP growth as reported in Table 18 below glaringly reveal that the Lucas output-inflation trade-off conjecture could not hold clearly in the informal economies of the WAMZ.

Table 18: Variabilities and Trade-off Parameter in WAMZ's 'Informal' Economies (1991-2015)

Variability& Trade-off Parameter	*Gambia*	*Ghana*	*Guinea*	*Liberia*	*Nigeria*	*S/Leone*
Nominal Income Growth	9.97	9.66	19.19	11.09	15.51	12.57
Inflation Rate	13.29	6.36	7.61	3.75	17.97	12.29
Trade-off Coefficients	0.66	0.24	0.60	1.07	0.29	0.13

Source: Author's Estimations

Although, the closest, Nigeria and Sierra Leone generated high nominal income growth variabilities of 15.51 and 12.57 respectively and the corresponding high inflation variabilities of 17.97 and 12.29 respectively, these two countries could only yield trade-off coefficients of 0.29 and 0.13 respectively. These results were not as sharp and 'clear-cut' as what were generated for the formal economies.

Consequent upon these, it could be inferred here that the Lucas output-inflation trade-off hold better in the formal economies of the WAMZ than the informal economies.

4. Stylised Facts of Exchange Rates and Foreign Exchange Markets Behaviour

As background to the study of exchange rate and markets behaviours within the WAMZ, it is essential to have initial insights into the trends in the historical developments of foreign exchange markets and regimes with which the six WAMZ countries operated over the years. Table 19 below summarises the historical trend of exchange rate regimes across the WAMZ. The historical developments of exchange rate regimes of the WAMZ countries (as highlighted above) reveal that the WAMZ countries adopted various mixed exchange rate regimes over the years, particularly during the post-1973 floating exchange era. The common feature is that virtually all the WAMZ economies operate floating exchange rate regime (pure, free or managed) over the period covered by various assessments and analyses in this paper.

Financial markets generally trend in manners in which yields or prices of financial market instruments usually show some behaviour, characteristics and features that can be generalised, given the nature of the time series (univariate or multivariate).

Exchange rates are time series of foreign exchange markets within financial markets.

Table 19: Summary of Historical Development of Exchange Rate Determination and Regimes in the WAMZ

The Gambia	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Fixed Exchange Rate System	1955-1985
Floating Exchange Rate System (IFEM)	1990
Introduction of Parallel Market – Bureau de Change (BDC) and dual Exchange System	1990-2003
Dual Exchange Rate System Scrapped	2003
Ghana	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Fixed Exchange Rate Regime (Pegged to British Pound)	1957-1966
Fixed Exchange Rate Regime (Pegged to US Dollar)	1966-1982
Multiple Exchange Rate System	1983-1986
Dual Exchange Rate System – Dual Retail Auction	1986-1987
Dutch Auction System	1987-1988
Foreign Exchange Bureaux	1988-1989
Wholesale and Interbank Systems	1990-1992
Interbank Foreign Exchange Market	1992
Guinea	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Fixed Exchange Rate System (pegged to dollar and SDR)	1958-1985
Creation of Second Foreign Exchange Market/Weekly Auction	1985
Flexible Exchange Rate Regime and IFEM Weekly Auction	1994-2000
Monthly Auction System	2000-2002
Fixed Exchange System (pegged to dollar)	2002-2004
Stoppage of Monthly Auction/Reintroduction of Weekly Auction and Arithmetic Average Exchange Rate System	2005
Liberia	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Dollarised Economy – Extensive use of Foreign Currency	1847-1980s
Fixed Exchange Rate Regime (pegged to US dollar)	1981-1997
Free Floating Exchange Rate System	1998-2000
Managed Floating Exchange Rate Regime	2000
Nigeria	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Fixed Exchange Regime (Pegged to British pound sterling/US dollars)	1960-1986
Floating Exchange Rate System & Second-tier Foreign Exchange Market (SFEM)	April 1987
Creation of Interbank Foreign Exchange Market (IFEM)	January 1989
Autonomous Foreign Exchange Market	1995 - 1999
Interbank Foreign Exchange Market	1999-2002
Dutch Auction System (DAS)	2000- 2006
Wholesale Dutch Auction System (wDAS)	2006-2013
Retail Wholesale Dutch Auction System (rDAS)	October 2013
Interbank Foreign Exchange Market (Closure of Official Window)	February 2015
Sierra Leone	
Exchange Rate Regime/Method of Exchange Rate Determination	***Period***
Fixed Exchange Rate Regime (Pegged to British Pound)	1964-1978
Fixed Exchange Rate Regime (linked to the IMF's Special Drawing Rights)	1978-1982
Dual Exchange Rate Regimes	1982-1983
Fixed Exchange Rate (Unification of the Dual Rates)	1983-1986
Managed/Floating Exchange Rate Regimes	1986-1990
Free Floating Exchange Rate Regime	1990 to date

Source: Author's compilation

Many empirical studies on the behaviour of exchange rate and foreign exchange market across developed, emerging and developing economies have established many regularities which are stylised facts. The common trend in literature is that stylised facts of exchange rates and market development are drawn mainly from empirical findings based on researches on developed and few emerging economies.

The following sub-sections discuss eight of these known stylised facts and empirical regularities of exchange rates and foreign exchange markets as well as what obtain about them in the WAMZ countries.

***(I) Absence of Normality*:** It is a known assertion that percentage changes in nominal exchange rate and exchange rate returns do not exhibit normal distribution.

Table 20: Statistical Properties of US Dollar Nominal Exchange Rate Returns and Percentage Changes for the WAMZ Countries (1995M1-2015M12)

Nominal US Dollar Exchange Rate Returns						
	Ghana	***Gambia***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
Skewness	0.29	-0.67	-0.36	-0.71	13.24	1.28
Kurtosis	14.77	11.01	21.63	13.27	197.48	10.33
JB Stat.(p-values)	0.00	0.00	0.00	0.00	0.00	0.00
Observations	298	298	298	298	298	298
Nominal US Dollar Exchange Rate Percentage Change						
	Ghana	Gambia	Guinea	Liberia	Nigeria	S/Leone
Skewness	0.76	-0.24	0.64	0.13	15.53	1.64
Kurtosis	12.51	10.47	22.45	13.17	254.62	11.31
JB Stat.(p-values)	0.00	0.00	0.00	0.00	0.00	0.00
Observations	298	298	298	298	298	298
Nominal US Dollar Exchange Rate						
	Ghana	***Gambia***	***Guinea***	***Liberia***	***Nigeria***	***S/Leone***
Skewness	1.45	0.36	0.53	0.49	-0.39	0.16
Kurtosis	5.00	1.99	1.69	2.13	1.66	1.89
JB Stat.(p-values)	0.00	0.00	0.00	0.00	0.00	0.00
Observations	299	299	299	299	299	299

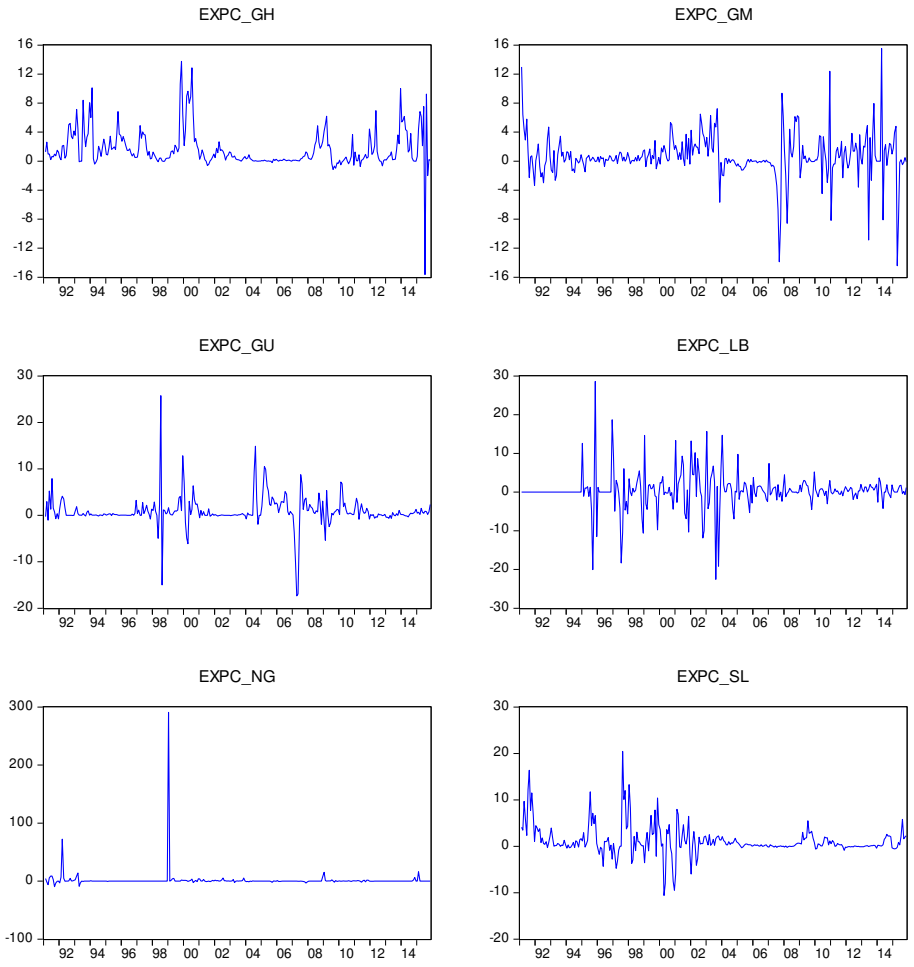
Source: Author's Estimation, EIU Database and Eviews 9.5 Output

The summary statistics of the properties of monthly nominal exchange rates and exchange returns (1995M1 to 2015M12) for the WAMZ countries are shown in Table 20 above.

The J-B statistical tests of normality clearly confirm with the stylised fact in all the cases of the WAMZ countries where they yielded p-value of 0.00 for nominal exchange, exchange rate returns and exchange rate percentage changes in which the null hypothesis of normal distribution is rejected.

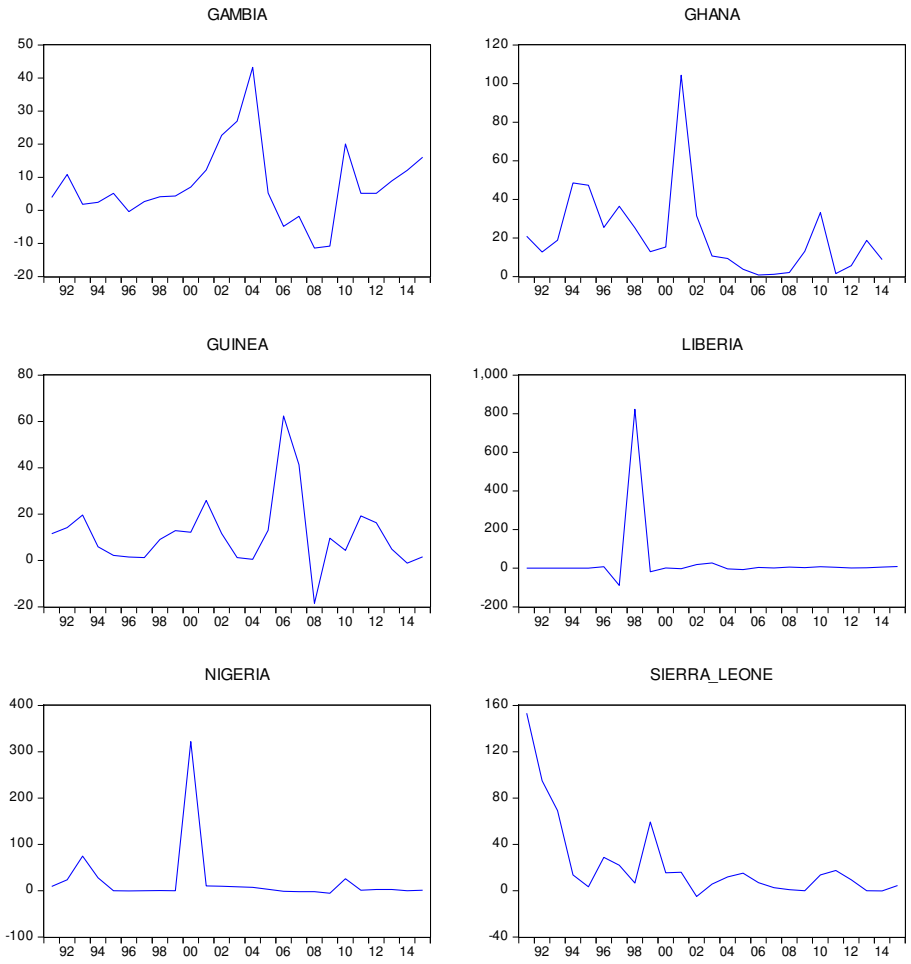
***(II) Persistence and Clustering of Volatility*:** Volatility of exchange rate is persistent. High and low variations in exchange rates can last for some period and this causes volatility clusters which are observed periods of high and low volatility. The reason attributed to volatility clustering in many research studies is 'fat tail distribution' which emanates from excess kurtosis in non-normal distribution, which are on the overall prompted by the nature of the financial data (Clark, 1973) and switch from the ideas of fundamental and technical analysts in times of uncertainties (Lux and Marchesi, 2000). Evidences that this stylised fact holds are apparent in the plots of percentage changes of the WAMZ countries in Figure 1 below.

Figure 1: Plots of Monthly Nominal US Dollar Exchange Percentage Change for the WAMZ Countries (1991M1 to 2015M12)



Source: Authors Estimation and EViews 9.5 Output

Figure 2: Plots of Annual Nominal US Dollar Exchange Percentage Change for the WAMZ Countries (1991-2015)



Source: Authors' Estimation, EIU Database and EViews 9.5 Output

(III) Volatility and Frequency of Data: The nature of volatility of explained by specific frequency of data. Some characteristics of percentage change or exchange rate return as well as volatility clustering show-up in the uncertainties in the market aggregates in low frequency time series (Diebold, 1988). Figure 2 above exhibits annual percentage changes in the nominal US dollar exchange rates of the WAMZ countries over same period covered by higher frequency (monthly data) in Figure 1 above. The fact in this empirical regularity are apparent when comparison is made between the volatility in both plots (covering same period of time), given the different frequencies.

(IV) Asymmetric Effects: Generally in financial markets, it is established that there are always 'leverage effects' which are indications of when high volatilities are always preceded by currency depreciation, which is a downward movement in percentage change in financial data which may be due to financial risks emanating from fall in prices.

These are made very clear in Figure 2 virtually in all the countries except for Nigeria where this is less pronounced.

***(V) Presence of Unit Roots (Non-stationary) in Floating Nominal Exchange Rate*:** For two freely floating currencies, the nominal exchange rate and the logarithm of the nominal exchange rate are non-stationary, but stationary at the first difference.

Table 21: Results of the ADF Unit Root Tests of Annual US Dollar Nominal Exchange Rates of the WAMZ Countries (2000-2015)

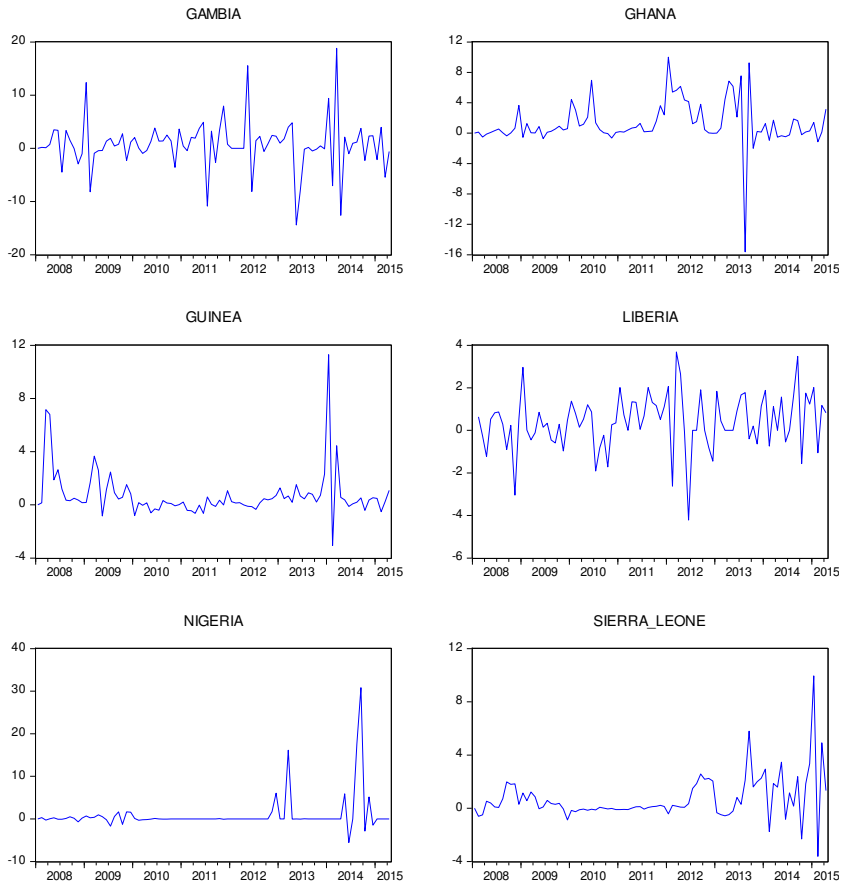
	Nominal Exchange Rate (at Level)	*Log of Nominal Exchange Rate (at Level)*	*First Difference of Log. Nominal Exchange Rate*
Gambia	-2.5618	-0.5374	-5.3469*
Ghana	-1.5119	-0.7038	-5.1798*
Guinea	-1.8510	-0.6442	-4.9862*
Liberia	-2.1408	-3.8378*	-12.1478*
Nigeria	-2.1345	-1.7711	-4.9348*
S/Leone	-1.9765	-7.4731*	-4.3683*
Critical values of ADF Unit Roots Test			
1%	***5%***	***10%***	
-3.9591	-3.0810	-2.6813	

Source: Author's Estimation, EIU Database and EViews 9.5 Output

The output in Table 21 above reflect the stylised facts in point apart from the cases of Liberia and Sierra Leone which have stationary logarithm of their nominal exchange rate. Guinea, Liberia and Sierra Leone were known to have some forms of fixed arrangement in the par relationship with the US dollars in the history of exchange rate system developments trends, up till the 1980s and 1990s. This is a further confirmation of this stylised fact.

(VI) Calendar Effects or Regular Events: Empirical studies have established that the time of trade effects are significant in foreign exchange markets. Weekends and holidays are regular events that impact the volatility of exchange rates. It is empirically established that exchange rate volatility is lower during holidays and weekends than what obtain during trading week days because of the accumulative effects of information during holidays and weekends (Miller, 1988 and Abraham and Ikenberry, 1994). In developing economies (as the WAMZ), exchange rate volatility is commonly influenced by general elections and effects of politics when monetary and fiscal policies are relaxed to appease voters, particularly during an election year.

Figure 3: Plots of Monthly Nominal US Dollar Exchange Percentage Change for the WAMZ Countries (2008-2015)



Source: Author's Estimations, IMF Database and Eviews 9.5 Output

Figure 3 above displays plots of US dollar monthly nominal exchange rate percentage changes across the six WAMZ countries between 2008 and 2015. Seasonal celebrations like Christmas is a regular event as the close of the year in most WAMZ countries. These charts establishes the empirical regularity of seasonal holidays causing exchange rate to witness different degrees of volatility before and beyond the festive period. This are usually caused by high levels of demand for imported goods around this period, thereby causing exchange rate to depart from its equilibrium point due the excess demand for foreign exchange.

(VII) Dominance of the Effects of Macroeconomic News: It is stylised fact that there is link between information and news about macroeconomic fundamentals (like inflation, money supply, interest rate and output) and volatility of exchange rate. The significant connection between German deutschemark/US dollar exchange rate and announcement made on macroeconomic fundamental of the US was established by Andersen and Bollerslev (1998). However, the evidence gathered by Kim, Yoon and Kim (2004) is that

it is the contents of macroeconomic news that influence exchange rate behaviours and market reactions and not the actual release of the news. Findings by Laakkonen (2007) relate to the nature of the macroeconomic news in which evidence was gathered to conclude that exchange rate volatility is increased by bad news than by good news; and that volatility is increased by conflicting news than by consistent news. Furthermore, this stylised fact was verified in the case of the Nigerian US dollar bilateral nominal exchange rate returns by estimating the Threshold GARCH (TGARCH) and the Exponential GARCH (EGARCH) models of this exchange returns.

In the TGARCH (1,1), the conditional variance for the WAMZ countries is specified as:

$$\sigma_t^2 = \delta + \alpha_1 \mu_{t-1}^2 + \beta_1 \mu_{t-1}^2 d_{t-1} + \gamma_1 \sigma_{t-1}^2 \qquad 16$$

where d_{t-1} takes the values of 1 if $\mu_t < 0$, and the value of 0 if $\mu_t \geq 0$. β_1 is the asymmetry or leverage term. The positive shocks (good news) and the negative shock (bad news) have different effects. When there is positive shock, the effect on volatility is α_1, while in the case of negative shock, the effect of volatility is $\alpha_1 + \beta_1$. Therefore, there is larger effect of bad news (negative shocks) on the conditional variance σ_t^2 than positive shocks. If $\beta_1 > 0$, this indicates asymmetry while $\beta_1 = 0$ means the effect of the news is symmetric and the model collapses to the standard GARCH model.[3] Exponential GARCH (EGARCH) allows for asymmetries testing. The specification of EGARCH (1,1) could be modelled as:

$$\log(\sigma_t^2) = \delta + \beta_1 \ln(\sigma_{t-1}^2) + \gamma_1 \left(\frac{\mu_{t-1}}{\sqrt{\sigma_{t-1}^2}} \right) + \alpha_1 \left[\frac{|\mu_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \sqrt{\frac{2}{\pi}} \right] \qquad 17$$

where δ, α, β and γ (the leverage term) are the parameters to be estimated. The left hand side of the equation is the log of the conditional variance series. This makes the leverage effect to be exponential rather than quadratic and thus makes the estimates of the conditional variance to be non-negative. The implications of the signs of the symmetry parameter in these two asymmetric GARCH model (TGARCH and EGARCH) is that there is larger impact of bad news or negative shocks on volatility foreign exchange returns than good news or positive shocks when the asymmetry parameter (γ) yields significant

[3] Another simple extension of GARCH is the GJR model which incorporates additional term to account for possible asymmetries. The conditional variance GJR GARCH (1,1) is expressed as $= \delta + \alpha_1 \mu_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma_1 \mu_{t-1}^2 I_{t-1}$, where I_{t-1} takes the value of 1 if $\mu_{t-1} < 0$ and the value of when otherwise. For the WAMZ countries, the GJR GARCH model is not employed.

positive signs in TGARCH and significant negative signs in EGARCH. Table 22 below displays the results of the GARCH (1, 2), TGARCH (1, 2) and EGARCH (1,2) models estimations for the Nigerian naira/US dollar exchange returns.

Table 22: Results of the Estimations of the TGARCH (1,2) and EGARCH Models for US Dollar/ Nigerian Naira Exchange Rate Returns

Parameters	***TGARCH (1,2)***	***EGRACH (1,2)***
δ	1.26E-06**	1.261*
α	0.334*	0.374*
β (-1)	0.573*	0.825*
β (-2)	0.133	0.082
γ	-0.140**	0.056
Log likelihood:	21149.76	20937.90
No of Observations:	5064	5064

Source: Author's estimations and Eviews 7 Output

Note:*At 1% Significance level; ** at 5% Significance level; *** at 10% Significance level.

The TGARCH (1,2) for the Nigerian naira/US dollar exchange returns estimation results show negative and significant (at 5% level of significance) coefficient of asymmetry (γ) of -0.140 and a positive but insignificant coefficient of asymmetry (γ) of 0.056 in EGARCH (1,2). The inference from these is that there are asymmetries in the news/shocks in the Nigerian foreign exchange markets. Bad news has larger influence on the volatility of foreign exchange returns in Nigeria than good news. This stylised fact holds in this case.

(VIII) Non-isolation of Exchange Rate from Markets Volatility: Economic and political uncertainties as well as volatilities in different financial markets impact exchange rate and exchange market volatilities. This means that there are penetration into and influence on foreign exchange markets, of information and economic disturbances emanating from some other markets. Calvert et al (2006) got evidence of covariance towards the same direction, of exchange rate volatility and prices of gold and oil with a suggestion that these primary commodities are like proxies for worldwide economic risks.

Table 23: Nominal US Dollar Exchange Rate Percentage Changes in the WAMZ (2001-2015)

	Gambia	*Ghana*	*Guinea*	*Liberia*	*Nigeria*	*S/Leone*
2001	22.6	31.4	11.7	18.8	9.4	-5.1
2002	27.0	10.6	1.23	27.0	8.4	5.7
2003	43.2	9.4	0.4	-3.8	7.2	11.9
2004	5.26	3.8	13.0	-7.5	2.8	151
2005	-4.8	0.7	62.4	4.0	-1.2	7.0
2006	-1.8	1.1	41.3	1.6	-2.0	2.5
2007	-11.4	2.1	-18.5	5.6	-2.2	0.8
2008	-10.8	13.1	9.6	3.1	-5.8	-0.1
2009	20.1	33.2	4.3	8.0	25.6	13.6
2010	5.1	1.6	19.3	4.6	0.9	17.5
2011	5.2	5.6	16.3	1.1	2.4	9.3
2012	8.9	18.8	4.9	1.8	2.4	-0.1
2013	12.1	8.8	-1.1	5.5	-0.1	-0.3
2014	16.1	31.4	1.53	8.2	0.8	4.4
2015	22.7	10.6	6.7	2.7	21.4	12.3

Source: Author's Estimations and EViews 9.5 Output

The decline and dwindle in the prices of primary commodities over the last decade may have been the reason for continued depreciation in the currencies of these primary commodity exporting WAMZ countries over same period as exhibited in Table 23 above showing percentage depreciation of the currencies of the WAMZ countries between 2001 and 2015.

Although, The Gambia, Liberia and Nigeria' currencies experienced annual appreciation of currency one year or the other, around 2003 and 2007, the movements in the value of the WAMZ countries' currency during the global financial crisis period between 2008 and 2009 and thereafter reflect significant sharp depreciation, these confirmed that this stylised fact holds in the WAMZ.

5. Conclusions

This paper evaluated some stylised facts for the WAMZ economies. Efforts were made to consider some popular macroeconomic empirical regularities like Phillips curves relationship, Lucas output/inflation trade-off, international parity conditions as well as relationships between domestic cyclical output and some macroeconomic variables in order to determine if there are supports for the stylised facts on co-movements and variability in developing and developing economies. Across the WAMZ and the selected developed economies (Germany, The UK and the US), the results yielded from this exercise were mixed in confirming or refuting the stylised facts evaluated. In spite of this, what was significantly achieved here was the exposure of the relevant nature and

features of salient aspects of the economies of the WAMZ under monetary integration assessments. There are evidences here to draw conclusion that co-movements of cyclical components of macroeconomic series with real output as well as the fluctuations and variability of these macroeconomic variables follow similar patterns in the developing economies (of the WAMZ) and the developed economies sampled in this study. It is also evident in this chapter that virtually all the stylised facts of exchange rates and exchange market behaviour got supports from the WAMZ countries.

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