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Mogaji, Peter Kehinde

University of Sunderland in London

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Tests for Fiscal Dominance in the Anglophone West Africa and Guinea: A Quantile Regression Approach

by

Peter Kehinde Mogaji

(University of Sunderland in London)

Abstracts

Fiscal policy is dominant (over monetary policy) when the stability of the price level has turned to be fiscal policy's concern, thus making monetary policy redundant in the pursuit of the crucial price stability objective. This is a point of reversal of monetary policy and fiscal policy roles. By giving room to a high level of public debt, fiscal policy takes over the role of stabilising the price level from monetary policy. In effect, a fiscal dominance regime therefore connotes a system in which monetary tools are applied to guarantee the solvency of the government. This paper examined fiscal dominance in the Anglophone West Africa (The Gambia, Ghana, Liberia, Nigeria and Sierra Leone) and Guinea. These six countries were known as the West African Monetary Zone – WAMZ. This study is significant because of the need for the stability of the future monetary union which would be characterised by a single monetary policy in the West African sub-region while the fiscal policy governance would be at the national levels. The huge implication of fiscal dominance is that its absence is one of the conditions for the optimal functioning of monetary policy in achieving its objectives. The paper considered the view-points in Fiscal Theory of Price Level (FTPL) as put forward by Leeper (1991). Dynamic quantile regressions within the context of the autoregressive distributed lag (ARDL) specification were applied. This allowed for necessary dynamic adjustments with the ARDL modelling in which inflation rate as the response (dependent) variable was regressed on the lagged value of itself and lagged value of fiscal ratios as the independent variables in the study covering the period between 1980 and 2014. Evidence gathered from this research work led the broad suggestion that fiscal dominance could not be 'statistically' established in the Anglophone West African countries and Guinea (the WAMZ). The implications this has for the future monetary union is that there are evidence to suggest that price stability in each of the WAMZ countries were achieved through the use of fiscal policy instruments at national levels and that monetary policy is not dormant in these economies. These results suggest that the common monetary policy would be active in achieving its desired goals, whereas, national fiscal policy would have no effects in this respect as six different fiscal policies would be left at individual national levels.

1. Introduction

There are views within the economics world that monetary authorities are too fanatical with the price level and inflation. This view may be correct if one considers the risky and hurting effects of high public debt level on inflation and economic growth. This is the underlying factor affecting such fascination to inflation if the management of fiscal control is outside the confine of the monetary authority. Therefore, at the national level, sound fiscal policy is a necessity for the achievement of the monetary policy objectives. For a country, if public debt is increasing, the monetary policy would be put under pressure to react to this development accordingly so as to avert inflationary pressures. However, this may be cumbersome in a monetary union where fiscal policies are under different national authorities. It may occur that such expected reaction is made by fiscal policy, meaning that the stability of the price level has turned to be fiscal policy concern, thus making monetary policy redundant in the pursuit of the crucial price stability objective. This is a point at which fiscal policy is 'dominant'. It is a point of reversal of monetary policy and fiscal policy roles. In such situation, the main focus of fiscal policy is the determination of inflation level, just as public debt in real terms is stabilised by monetary policy, just to safeguard government solvency. By giving room to a high level of public debt, fiscal policy takes over the role of stabilising the price level from monetary policy. A fiscal dominance regime therefore connotes a system in which monetary tools are applied to guarantee the solvency of the government.

This paper examined if fiscal policy is dominant (over monetary policy) in the Anglophone West Africa (comprising of The Gambia, Ghana, Liberia, Nigeria and Sierra Leone) and Guinea (hereinafter referred to as the West African Monetary Zone – WAMZ). This study is of significance because of the need for the stability of the future monetary union which would be characterised by a single monetary policy in the West African sub-region while the fiscal policy governance would be at the national levels. The huge implication of fiscal dominance is that its absence is one of the conditions for the optimal functioning of monetary policy in achieving its objectives. Therefore, the expected results and findings from this research study would have implications for the future common central bank in West Africa, in the efforts of the African sub region towards inflation targeting, inflation moderation (price stability) and exchange rate management in the proposed monetary union.

2. Theoretical Background

Behaviours of fiscal and monetary authorities could be classified as: (i) 'passive behaviour' and (ii) 'active behaviour' (Leeper (1991)). In general terms, Leeper (2016) connotes 'active' as a situation where the policy authority has the freedom to pursue its objective while 'passive' means the policy authority generates constraints through the active authority's behaviour and the price sector. These are his view-points in his Fiscal Theory of Price Level (FTPL) that highlights the two fundamental basic tasks of macroeconomic policies as: (i) the determination of inflation; and (ii) ensuring debt stability. Leeper (2016) stressed the two different mixes of the interplay of monetary and fiscal behaviours that can guarantee the delivery of these two fundamental tasks as: (i) active monetary policy combined with passive fiscal policy (which depicts monetary dominance); and (ii) active fiscal policy combined with passive monetary policy (which reflects fiscal dominance).

In a fiscal dominance situation when active fiscal policy is combined with passive monetary policy, policy makers set surplus largely independent of the levels of government debt and inflation condition. The fiscal behaviour eventually determines the price level. Debt would then be stabilised when the monetary authority allows the surprise changes in inflation and prices of bonds to adjust the value of government debt (revaluation of government debt). This results in government debt's market value being equal to the present value of future surplus. Here, the monetary authority does not attempt to fight inflation. In a fiscal dominant regime, monetary policy is tasked with debt stabilisation while the price level determination is left to fiscal policy, thus altering the roles of the two policies.

The fiscal theory of price level (FTPL) countered the conventional position that changes in price level are driven by monetary factors. The theory states that public debt (a fiscal variable) determines the price level, meaning that the determination of inflation or price level stems from the need to achieve fiscal solvency. This implies a relationship between inflation and fiscal variables. In his contribution to the development of FTPL, Woodford (2001) opines that there is the manifestation of fiscal dominance when the monetary authority is under pressure to apply monetary policy tools in stabilising the market value of debt. Furthermore, there is fiscal dominance in a situation where the path of government revenue, expenditure and public debt are independently fixed by the fiscal authority

while the monetary authority (in order to satisfy the GIBC conditions) are left with influencing the path of money creation revenue. These positions reflect the theoretical relationship between government deficit and seigniorage revenue. According to the FTPL, the GIBC is an equilibrium condition and therefore, in situation of an exogenously determined order of future budget surplus, the only economic variable that brings consistency between past value of nominal bonds and the present value of primary surpluses is the price level. This makes the GIBC to be the determinant of the price level. The simple illustration of this process is that: if there is reduction in the present value of the future primary balance (caused by governments' tax cut) after which aggregate demand and price level are enhanced due to increase in real household wealth. There would be decline in real value of government debt with a resultant effect of the restoration of balance in the GIBC.

There are many channels through which monetary and fiscal policies could be linked together. In an instance, there is the macroeconomic argument that inflation comes from budget deficits because money creation is adopted as a tool commonly applied by government to offset fiscal deficits.¹ Thus, the consolidated government intertemporal budget constraints (GIBC) provides a link between fiscal and monetary policy. In fiscal period, government expenditure are financed by government revenue (taxes, commodity windfalls etc.), new issue of debt and seigniorage revenue. If the GIBC reflects that seigniorage revenue and present value of current and future monetary balance both back-up the outstanding public debt, then an investigation of fiscal dominance would reveal how significant the back up by these variable in determining the price level is. Leeper (2016) clearly distinguished between a monetary dominance and fiscal dominance regimes as highlighted in Table 1 below.

¹ This however serves as a drawback to monetary policy in the achievement of its objectives stabilising the price level.

Table 1: Distinction between Monetary Dominance and Fiscal Dominance

<u>In Monetary Dominance:</u> *Fiscal policy exhibits 'Ricardian equivalence'; *Monetary policy follows its inflation target path.	<i>Active Monetary Policy</i>	Monetary authority pursues its inflation target independent of fiscal policies. Tight, contractionary monetary policy
	<i>Passive Fiscal Policy</i>	Fiscal authority determines tax and spending levels, independent of GIBC consideration. Loose and expansionary fiscal policy
<u>In Fiscal Dominance:</u> *Fiscal policy exhibits 'non-Ricardian equivalence'; *Fiscal policy significantly affects inflation and price stability; *Monetary policy ensures public debt stability; FTPL holds.	<i>Active Fiscal Policy</i>	Fiscal authority effects tax and expenditure changes in order to balance the budget intertemporally. Fiscal policy allows long run unsustainable and excessively budget deficit higher than the sustainable budget deficit. Loose and expansionary fiscal policy.
	<i>Passive Monetary Policy</i>	Monetary authority sets interest rates to accommodate fiscal policy. Loose, expansionary monetary policy

Source: Leeper, (2016)

In fiscal dominance regime, whenever there is a rise in price level due to expansionary fiscal shock, monetary growth would passively increase equally because the monetary authority is compelled to accommodate the fiscal shock. If the long term government budget balance is to be maintained under this regime in which fiscal policy allows long run unsustainable and excessively high budget deficits, the proposition of Leeper's model is that inflation target of central bank would be abandoned, and the central bank gives room for the emergence of higher inflation (that is, expansionary monetary policy). This consequently causes the monetary authority to either inflate the public debt or work towards generating seigniorage revenue that could be transferred to the fiscal side (budget). This therefore reflects fiscal dominance as a phenomenon of government's long term sustainability (when primary balance is not kept at equilibrium) and higher inflation is generated (than warranted) and original target of monetary policy is abandoned when loose (passive) monetary policy is adopted.

It should be noted that it is an underlying assumption of the FTPL that government's actions are not constrained by budgetary issues; and according to FTPL (which holds in a fiscal dominance regime), fiscal policy determines prices when there are no budgetary adjustments in response to fiscal shocks affecting the government intertemporal budget constraints (GIBC) thus reflecting the 'non-Ricardian' behaviour in which price is made to adjust to balance the budget constraints. Hence, fiscal policy plays a more important role than monetary policy in ensuring price stability and in determining inflation in a fiscal dominance regime. Therefore, under such regime, fiscal policy changes must impact

the price level regardless of the degree of monetary authority's commitment to price stability. In this 'non-Ricardian' fiscal policy situation, there could be high inflation and price instability. This appears not to be the best option for monetary unions. However, there had been huge criticisms of the FTPL: (a) for its clear lack of empirical relevance, and (b) about how it treats the government solvency condition. (However, for monetary unions, the FTPL gives reasons for putting fiscal restrictions in place).

The fiscal dominance issue is more complex in monetary union cases where the conduct of monetary policy is in the hands of a common central bank while fiscal authorities at the national levels determine the fiscal policy. In this respect, there may be conflict of views and ideas, policy and actions as dictated by the specific macroeconomic situation in individual member countries. This necessitates the investigation of fiscal dominance in the context of feasibility study of the monetary integration of West Africa so as to establish if the West African economies under study here exhibit fiscal dominance towards the achievement of price stability and inflation moderation; and if so, this points to the possibility of a redundant future common monetary policy within the future West African monetary integration.

Nevertheless, in the event of monetary integration when the monetary policy formulation will be transferred to a supra-national level and the formulation of fiscal policies (of members states) remains at national levels, the competing views or rather, the interactions of monetary and fiscal policies and how they affect inflation under two conflicting fiscal dominance and monetary dominance regimes are very crucial and relevant for policy makers at both national and supra-national levels within such monetary integrated bloc. Specifically, FTPL could be of interest to existing and prospective monetary unions because it will contribute in revealing and explaining the pattern of price level evolution across such monetary unions, particularly in member states.²

3. Model Specification and Methods

Fiscal policy dominance in the WAMZ was investigated here applying dynamic quantile regression within the context of the autoregressive distributed lag (ARDL) specification,

² There are fiscal limitations imposed on existing and proposed members of monetary unions in order to ensure that the 'fiscal dominance' and 'monetary dominance' are appropriately and justifiably institutionalised.

allowing for necessary dynamic adjustments where inflation rate as the response (dependent) variable was regressed on the lagged value of itself and lagged value of budget expenditure/GDP ratio as the fiscal variable.

In econometric modelling, it is possible not to have predictive or strong relationship between the mean of the dependent variable and the independent variable distribution because many factors affecting a dependent variable may be omitted in the modelling. In spite of this, there may still be some vital predictive relationship with some other components of the dependent variable distribution. Since most regression models analyse the conditional mean of the response variable, there are now growing interests in the modelling of other portion of the dependent variable conditional mean. Quantile regression employed in estimation in this study, is a method that does this by modelling the quantiles of the response variables, giving the linear relationship between explanatory variables and a given dependent variable quantile. Quantile regression was initially developed by Koenker and Bassett (1978) to allow for the influence of the independent variable on the median or other quantiles/percentiles of the dependent variable.

Quantile regression (QR) is prudent regression method (an alternative to the traditional OLS method) characterised by reduced sensitivity to the violation of the classical model assumptions (BLUE- best, linear unbiased estimators). A fundamental limitation of the OLS is the concentration of its approach on the estimation of mean value of the dependent variable, conditional on the given values of the independent variables. The observation is that most of the econometric estimations are averagely based on mean, whereas, many variables are characterised by continuous distribution which are bound to change (either by compression or expansion) in a way that could not be revealed by the analysis of the mean, thus preventing the knowledge of how the whole distribution behaves. Quantile regression (QR) attends to this shortcoming by assessing fuller description of the conditional distribution of the variables rather than just the conditional mean as we have in the OLS method (Gujarati, 2015). The QR approach reveals how median as an alternative to mean, as a measure of central tendency (central probability distribution) is impacted by independent variables. For the fact that in high skewed distribution, the median provides more information and is less-sensitive to outliers (unlike the mean). In QR, the median (or the selected quantile) of the dependent variable is estimated

conditional on independent variable values, but the OLS estimates the mean of the dependent variable. While the OLS method finds the regression plane that minimises the sum of the square residuals, the QR finds the regression plane that minimises the sum of the absolute residuals. The least absolute deviation (LAD) estimator is a special form of the quantile regression in which the effects of independent variables on different parts (not only the median or the mean) of the dependent variable distribution are estimated; and it came up because of the distortions of the OLS estimates by outliers.

LAD is an estimation approach that guides the effects of outliers as a result of the lower extent of sensitivity when compared with the OLS estimations. It reduces the rate at which econometricians are concerned with 'undue influence' of observation in OLS estimates. The objective function of LAD is linear, implying that the LAD objective function would increase by one unit as a positive residual increases by one unit; but in contrast there is increasing importance given to large residuals by the OLS objective function, thereby making OLS to be more sensitive to outlying observations (Wooldridge, 2014). The less-sensitivity of LAD to data extreme value changes (compared to the OLS) caused LAD not to give increasing weight to disturbance terms that are larger. The design of LAD is in a way that it estimates parameters of the conditional median (rather than the conditional mean) of the dependent variable, given the independent variables. This causes LAD to be resilient to outliers since large changes in outliers have no effects on the median. Drawing from these, LAD is advantageous over the OLS in that partial effects (predictions) can be obtained easily, particularly, when data are transformed.

It is also important to add that the conditional quantile function is the basic underlying principle of the quantile regression model which can model any quantile. The approach requires no strong distributional assumption about the disturbance term unlike the requirements of error term normality in the OLS modelling. Quantiles indicate where an observation lies within an ordered series of dependent variable. The median is at the middle, 10th percentile (for instance) is lower in value and below the median (which is the 50th percentile) thus placing 10% of the value above the median and 90% of the value below it, and so on. Therefore, in this case, given the independent variable, we can determine the quantile of a random dependent variable y having cumulative distribution $F(y)$ as:

$$Q(\varphi) = \text{infimum } y: F(y) \geq \varphi$$

In this function, in satisfying the inequality, infimum denotes the ‘greatest lower bound’ smaller than the value of the dependent variable y .

The ARDL (p, q) modelling is employed here because of the dynamic correlation of inflation and fiscal balance. In order to characterise the stylised fact of price level changes in the WAMZ, the ARDL (1, 1) specification of the dynamic quantile regression model is expressed as:

$$INF_t = \sum_{k=1}^p INF_{t-k} \alpha_k(\varphi) + \sum_{s=0}^r BB_t \beta_s(\varphi) + \sum_{j=0}^q BB_{t-1} \beta_j(\varphi) + \varepsilon_t \quad 1$$

where π_t is inflation rate, π_{t-k} , $\alpha_k(\varphi)$, $\beta_s(\varphi)$ and $\beta_j(\varphi)$ are the estimated parameters at the φ th quantile, representing various effects of explanatory variables on different levels of inflation, being functions of the quantiles while ε_t is the disturbance term. This model gives information about the differing inflationary impacts of the explanatory variables. Because the fit are not always good for values of quantiles (φ) close to the two extremes of 0 and 1, this study chooses (φ) = 0.25 (the twenty fifth percentile), (φ) = 0.50 (the median) and (φ) = 0.75 (the seventy-fifth percentile) as the comparative quantiles of interest. The bootstraps covariance estimation option (with 100 bootstrap replications) is applied in the simultaneous quantile regressions to derive the parameter coefficients and standard errors.

Data employed in this estimation are the inflation rate, money supply (M1), budget expenditure and fiscal budget balance of the six WAMZ countries assessed in this study, covering the 15-year period between 1980 and 2014. The focus of the assessment of fiscal dominance in the WAMZ is on the results of the regression of inflation on budget expenditure. The choice of budget expenditure as the fiscal variable in this study is borne out of the external influence of commodity windfall on the fiscal revenue, and the eventual distorting effects on fiscal balances in these West African primary commodity exporting countries. Inferences based on the expenditure side of the fiscal policy structure is reasonable and meaningful in giving clearer picture of national control of fiscal stance within a monetary integrated system. The estimation employed budget expenditure/base money (M1) ratio as fiscal variable and the independent variable while inflation is the dependent variable. Because of data constraints Liberia was left out of this

estimation. Robustness check was performed with of models in which budget expenditure/GDP and budget balance/GDP ratios serve as fiscal policy variables.

4. Results and Findings

This study applied the ARDL modelling of fiscal policy dominance because the responses of macroeconomic variables in developing economies are usually sluggish. Consequently, the interest here is in the parameters of one-period lagged fiscal policy variables.

**Table 1: Results of Fiscal Dominance Assessment of the WAMZ Countries
(Budget Expenditure/Money Base)**

	<i>25th Quantile Bootstrap Coefficient and Standard Error</i>	<i>50th Quantile Bootstrap Coefficient and Standard Error</i>	<i>75th Quantile Bootstrap Coefficient and Standard Error</i>
<u>Gambia:</u>			
<i>Lagged Inflation:</i>	0.2048 (0.2380)	0.0336 (0.2105)	0.7892 (0.1977)
<i>Budget Expenditure (t):</i>	-1.2874 (0.9467)	-0.7790 (0.8298)	-1.2200 (0.9909)
<i>Budget Expenditure (t-1):</i>	-0.7711 (0.6424)	0.2625 (0.6878)	0.4364 (0.5938)
<i>Intercept:</i>	3.7581 (1.2807)	3.3100 (1.2800)	3.5875 (1.1532)
<i>Pseudo R²:</i>	0.17	0.33	0.53
<i>Observations:</i>	13	13	13
<u>Ghana:</u>			
<i>Lagged Inflation:</i>	0.5644 (0.5859)	0.2694 (0.6935)	0.5457 (0.8801)
<i>Budget Expenditure (t):</i>	0.8089 (0.9646)	0.7131 (1.1052)	0.5546 (1.3843)
<i>Budget Expenditure (t-1):</i>	-1.1836 (0.9116)	-2.0800** (0.9540)	-1.4288 (0.9885)
<i>Intercept:</i>	-0.0171 (3.3622)	3.2255 (3.9810)	2.2808 (5.1548)
<i>Pseudo R²:</i>	0.16	0.19	0.20
<i>Observations:</i>	32	32	32
<u>Guinea:</u>			
<i>Lagged Inflation:</i>	1.1896 (0.7484)	0.3909 (0.4431)	0.4037 (0.3159)
<i>Budget Expenditure (t):</i>	-2.2019 (1.4632)	-2.1479** (1.1806)	-1.8395*** (1.0627)
<i>Budget Expenditure (t-1):</i>	2.2749 (1.7573)	1.0352 (1.3055)	0.7276 (0.9651)
<i>Intercept:</i>	-1.2947 (2.9565)	2.6791 (1.7037)	3.9950* (1.4229)
<i>Pseudo R²:</i>	0.16	0.37	0.35
<i>Observations:</i>	20	20	20
<u>Nigeria:</u>			
<i>Lagged Inflation:</i>	-0.0022 (0.2739)	0.2141 (0.1629)	0.0645 (0.3449)
<i>Budget Expenditure (t):</i>	-0.6062 (0.8299)	0.4678 (0.6884)	1.2248 (1.1727)
<i>Budget Expenditure (t-1):</i>	1.1277* (0.3897)	0.6758 (0.4913)	0.2767 (0.8413)
<i>Intercept:</i>	1.5686** (0.8053)	0.8431 (0.7289)	1.3780 (1.2535)
<i>Pseudo R²:</i>	0.16	0.21	0.17
<i>Observations:</i>	28	28	28
<u>Sierra Leone:</u>			
<i>Lagged Inflation:</i>	0.5245** (0.2834)	0.3819*** (0.2280)	0.3097 (0.2181)
<i>Budget Expenditure (t):</i>	-1.3004 (0.5564)	0.2124 (0.4173)	-0.0884 (0.4298)
<i>Budget Expenditure (t-1):</i>	-0.9011 (0.6782)	-1.0820 (0.5911)	-0.6002 (0.6250)
<i>Intercept:</i>	2.9082** (1.4671)	3.4984 (1.1997)	3.8023* (1.0729)
<i>Pseudo R²:</i>	0.37	0.34	0.37
<i>Observations:</i>	30	30	30

Source: Author's Estimation and Stata 14 Output

Note: The bootstrap standard error coefficients are in parenthesis.

The results in Table 1 above reflect a mix of positive and negative signs of the coefficients which are generally statistically insignificant at 5% level of significance across the three quantiles estimations for the six countries.

**Table 2: Results of Fiscal Dominance Assessment of the WAMZ Countries
(Budget Expenditure/GDP Ratio)**

	25th Quantile Bootstrap Coefficient and Standard Error	50th Quantile Bootstrap Coefficient and Standard Error	75th Quantile Bootstrap Coefficient and Standard Error
Gambia:			
<i>Lagged Inflation:</i>	-0.3919 (0.1860)	-0.1181 (0.1827)	0.1158* (0.3127)
<i>Budget Expenditure (t):</i>	0.3062 (0.6063)	0.4226 (0.6755)	0.0906 (0.8233)
<i>Budget Expenditure (t-1):</i>	-0.2096 (0.7084)	0.1483 (0.8477)	0.8453 (0.9573)
<i>Intercept:</i>	3.5462 (1.2516)	4.8080 (1.2462)	5.8942 (1.7777)
<i>Pseudo R²:</i>	0.16	0.19	0.20
<i>Observations:</i>	23	23	23
Ghana:			
<i>Lagged Inflation:</i>	1.0841 (0.7132)	0.4788 (0.6543)	0.4501 (0.7032)
<i>Budget Expenditure (t):</i>	0.6327 (2.4178)	0.8491 (1.6917)	0.9985 (2.0584)
<i>Budget Expenditure (t-1):</i>	-1.4279 (2.1830)	-0.4614 (1.7602)	0.1266 (1.7537)
<i>Intercept:</i>	-4.2793 (4.5131)	1.4558 (4.269)	4.0180 (4.6467)
<i>Pseudo R²:</i>	0.10	0.16	0.18
<i>Observations:</i>	32	32	32
Guinea:			
<i>Lagged Inflation:</i>	0.8708**(0.3898)	0.6103*** (0.3263)	0.5218 (0.3085)
<i>Budget Expenditure (t):</i>	1.9865 (1.8891)	2.0578 (1.3486)	2.0654 (1.4650)
<i>Budget Expenditure (t-1):</i>	-1.3215 (2.7861)	-2.4031 (2.0072)	-2.1950 (2.2458)
<i>Intercept:</i>	1.6995 (6.1167)	0.1583 (5.4807)	1.1073 (4.9240)
<i>Pseudo R²:</i>	0.35	0.26	0.17
<i>Observations:</i>	20	20	20
Liberia:			
<i>Lagged Inflation:</i>	-0.0692 (0.3933)	-0.2709 (0.2777)	-0.2194 (0.2166)
<i>Budget Expenditure (t):</i>	-0.8639 (1.1745)	-0.1119 (1.0465)	0.1659 (0.9288)
<i>Budget Expenditure (t-1):</i>	0.9728 (1.1620)	0.2666 (1.0100)	0.0488 (0.9286)
<i>Intercept:</i>	1.5934 (1.5836)	3.1798 (1.1619)	3.6612 (0.8326)
<i>Pseudo R²:</i>	0.08	0.12	0.20
<i>Observations:</i>	24	24	24
Nigeria:			
<i>Lagged Inflation:</i>	0.1619 (0.3096)	0.1914 (0.1946)	0.3288 (0.3086)
<i>Budget Expenditure (t):</i>	-0.1382 (0.8443)	0.2010 (0.6653)	0.3266 (1.0627)
<i>Budget Expenditure (t-1):</i>	-1.2302 (0.7729)	-1.4491 (0.8901)	-2.4553 (1.3233)
<i>Intercept:</i>	-1.2509 (2.1537)	-0.7869 (1.4407)	-2.4726 (1.8725)
<i>Pseudo R²:</i>	0.24	0.33	0.29
<i>Observations:</i>	27	27	27
Sierra Leone:			
<i>Lagged Inflation:</i>	0.7839* (0.2882)	0.6260** (0.3051)	0.3038 (0.3006)
<i>Budget Expenditure (t):</i>	0.6355 (1.3151)	0.4127 (0.9708)	0.5067 (0.9361)
<i>Budget Expenditure (t-1):</i>	0.8446 (1.3452)	0.4681 (1.1173)	0.6994 (0.9362)
<i>Intercept:</i>	4.5249 (4.1865)	3.7457 (3.1513)	6.1760*** (3.2559)
<i>Pseudo R²:</i>	0.23	0.27	0.26
<i>Observations:</i>	30	30	30

Source: Author's Estimation and Stata 14 Output.

Note: The bootstrap standard error coefficients are in parenthesis.

One common outcome are the similarities in the respective coefficient signs for lagged fiscal variable of interest in each case of the WAMZ countries across the three estimated quantiles (except for The Gambia in the 25th quantile estimation result). Also we can gather that the pattern of changes (increases/decreases) in the magnitude of the influence of fiscal policy on the price level across the three quantiles are not similar.

This study lays particular emphasis is placed on the results at the median (50th quantile) and the 75th quantile in which similarities of the insignificant direction of the fiscal influence are well established. For the lagged fiscal variable, the statistically insignificant coefficients for The Gambia, Ghana and Nigeria show positive signs, while negative signs were reported for Ghana and Sierra Leone. Because of the statistical insignificance of the t-statistics of the coefficients of the variable of interest (as Table 1 above displays), there are evidence to suggest that there is no statistically significant linear influence of fiscal policy on the median and quantiles of changes in prices level (inflation) in the WAMZ. This indirectly implies 'no fiscal dominance' in the WAMZ.

The outcome of the robustness checks in which fiscal variables (budget expenditure/GDP and budget balance/GDP ratios) were applied as the fiscal policy explanatory variables are displayed in Table 2 above and Table 3 below. Equally, these results are equally characterised by the insignificance of the coefficients of parameter of interest, at 5% level of significance across the three estimated quantiles. These results confirm statistical insignificance of the t-statistics of the fiscal variables (budget expenditure/GDP and budget balance/GDP) as obtained in the earlier results of the regression of inflation on budget expenditure/base money.

The pseudo R-squared figures reported by the three quantiles vary. Nevertheless, we cannot interpret pseudo R-squared independently except for the purpose of making comparison across various models derived in making predictions in the same regard. Since pseudo R-squared would have meanings when applied in making comparison with one another, in same data sets and for same purpose, we can infer that the model in which budget expenditure scaled by money supply is fiscal variable comparatively gives the best of the outcomes. In spite of the areas of differences in the three fiscal dominance tests performed, this study abides with the results of the fiscal dominance assessment in which the fiscal expenditure variable is scaled by monetary money base variable whereby the

proportion of government expenditure to money supply is allowed to influence changes in the piece levels in these WAMZ countries.

**Table 3: Results of Fiscal Dominance Assessment of the WAMZ Countries
(Budget Balance/GDP Ratio)**

	25 Quantile Bootstrap Coefficient and Standard Error	50 Quantile Bootstrap Coefficient and Standard Error	75 Quantile Bootstrap Coefficient and Standard Error
Gambia:			
<i>Lagged Inflation:</i>	-0.4326** (0.1823)	-0.2201 (0.2164)	-0.2511 (0.2882)
<i>Budget Balance (t):</i>	-0.0031 (0.0496)	-0.02667 (0.0678)	0.0002 (0.0885)
<i>Budget Balance (t-1):</i>	0.0459 (0.0557)	0.0484 (0.6010)	0.0610 (0.0643)
<i>Intercept:</i>	-3.4771 (0.3489)	3.3510 (0.4342)	3.7889 (0.6574)
<i>Pseudo R²:</i>	0.18	0.11	0.12
<i>Observations:</i>	23	23	23
Ghana:			
<i>Lagged Inflation:</i>	0.5056 (0.4558)	0.6966*** (0.3980)	0.4931 (0.5220)
<i>Budget Balance (t):</i>	0.1586 (0.1114)	0.0908 (0.1410)	0.1164 (0.1420)
<i>Budget Balance (t-1):</i>	-0.1233 (0.8992)	-0.0436 (0.1011)	-0.0416 (0.1310)
<i>Intercept:</i>	0.1296 (1.4917)	0.0975 (1.4785)	1.1627 (1.8831)
<i>Pseudo R²:</i>	0.14	0.15	0.19
<i>Observations:</i>	32	32	32
Guinea:			
<i>Lagged Inflation:</i>	0.7184 (0.4622)	0.4196 (0.3311)	0.4120 (0.3097)
<i>Budget Balance (t):</i>	0.2182 (0.2765)	-0.0675 (0.1662)	0.0198 (0.1425)
<i>Budget Balance (t-1):</i>	-0.0464 (0.3332)	-0.0225 (0.1822)	-0.1363 (0.1727)
<i>Intercept:</i>	-0.0361 (1.2443)	0.8318 (0.8915)	1.2133 (0.8407)
<i>Pseudo R²:</i>	0.28	0.25	0.10
<i>Observations:</i>	20	20	20
Nigeria:			
<i>Lagged Inflation:</i>	0.0526 (0.3356)	0.2612 (0.2724)	0.4504** (0.2335)
<i>Budget Balance (t):</i>	-0.1012 (0.1641)	0.0149 (0.1375)	0.0331 (0.0846)
<i>Budget Balance (t-1):</i>	-0.1667 (0.1321)	-0.1746 (0.1261)	-0.2355* (0.0845)
<i>Intercept:</i>	1.2296 (0.7339)	1.5312* (0.6534)	13312*** (0.7151)
<i>Pseudo R²:</i>	0.27	0.23	0.34
<i>Observations:</i>	27	27	27
Sierra Leone:			
<i>Lagged Inflation:</i>	0.6367** (0.3429)	0.7038** (0.2844)	0.5899** (0.2787)
<i>Budget Balance (t):</i>	-0.0374 (0.0812)	-0.1003 (0.7652)	-0.0912 (0.8034)
<i>Budget Balance (t-1):</i>	-0.0160 (0.0994)	0.0224 (0.0759)	-0.0031 (0.0950)
<i>Intercept:</i>	0.4370 (0.8823)	0.6025 (0.7942)	1.1756 (1.0016)
<i>Pseudo R²:</i>	0.22	0.29	0.27
<i>Observations:</i>	30	30	30

Source: Author's Estimation and Stata 14 Output

Note: The bootstrap standard error coefficients are in parenthesis

Table 4: Results of the Tests of Coefficients Equality

Inflation and Budget Expenditure/GDP Ratio						
	<i>Gambia</i>	<i>Ghana</i>	<i>Guinea</i>	<i>Liberia</i>	<i>Nigeria</i>	<i>S/Leone</i>
Wald F-statistics:	1.22	0.88	0.28	0.26	0.40	0.66
(Prob):	(0.34)	(0.52)	(0.98)	(0.95)	(0.87)	(0.68)
Inflation and Budget Expenditure/Money Supply (M1) Ratio						
	<i>Gambia</i>	<i>Ghana</i>	<i>Guinea</i>	<i>Liberia</i>	<i>Nigeria</i>	<i>S/Leone</i>
Wald statistics:	0.48	0.31	0.69	na	0.79	0.70
(Prob):	(0.81)	(0.93)	(0.66)		(0.59)	(0.65)
Inflation and Budget Balance/GDP Ratio						
	<i>Gambia</i>	<i>Ghana</i>	<i>Guinea</i>	<i>Liberia</i>	<i>Nigeria</i>	<i>S/Leone</i>
Wald statistics:	0.44	0.15	0.21	na	0.62	0.21
(Prob):	(0.85)	(0.98)	(0.97)		(0.71)	(0.97)

Source: Author's Estimation and Stata 14 Output.

Although, the estimated coefficients of the fiscal variables in the three fiscal dominance assessments are different across the three quantiles, in different economic magnitudes, the results of the tests of the coefficient equality in Table 4 above reveal that the F-statistics are insignificant at 5% level of significance. Therefore, we cannot reject the null hypothesis that these coefficients across the three quantiles are equal and this informs that these conditional quantiles are identical in output.

5. Conclusions

The broad suggestions from evidence gathered from this paper is that fiscal dominance could not be 'significantly' established statistically in the countries forming the WAMZ. For the future monetary union this is an indication that there are evidence to suggest that price stability in each of the WAMZ countries are achieved through the use of fiscal policy instruments at the national levels and that monetary policy is not dormant in these economies. Since fiscal policy would be left at national levels (at least at the initial stage of the monetary union), these results suggest that the common monetary policy would be active in achieving its desired goals, whereas, national fiscal policy would have no effects in this respect.

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