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### **A Short-run Schumpeterian Trip to Embryonic African Monetary Zones**

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#### **Abstract**

With the spectre of the Euro crisis looming substantially large and scaring potential monetary unions, this study is a short-run trip to embryonic African monetary zones to assess the Schumpeterian thesis for positive spillovers of financial services on growth. Causality analysis is performed with seven financial development and three growth indicators in the proposed West African Monetary Zone (WAMZ) and East African Monetary Zone (EAMZ). The journey is promising for the EAMZ and lamentable for the WAMZ. Results of the EAMZ are broadly consistent with the traditional discretionary monetary policy arrangements while those of the WAMZ are in line with the non-traditional strand of regimes in which, policy instruments in the short-run cannot be used to offset adverse shocks to output. Policy implications are discussed.

## 1. Introduction

It is now an economic fact that, the spectre of the European Monetary Union (EMU) crisis is looming substantially and scaring potential monetary zones. With renewed interest in the economics of monetary union following this EMU crisis, very few papers have recently examined the feasibility of the proposed African monetary zones (Tsangarides & Qureshi, 2008; Asongu, 2012ab; Alagidede et al., 2011). Moreover, studies on the proposed West African Monetary Zone (WAMZ) (Debrun et al., 2005; Celasun & Justiniano, 2005) and the embryonic East African Monetary Zone (EAMZ) (Mkenda, 2001; Buigut & Valev, 2005) over the past decade are scarce. Hitherto, the focus of these studies has been on the optimality of the proposed currency areas (Mkenda, 2001; Asongu, 2012a; Buigut & Valev, 2005), costs and benefits of candidate countries (Debrun et al., 2005) and adjustments to shocks (Celasun & Justiniano, 2005; Alagidede et al., 2011; Asongu, 2012b). Results of the works are broadly consistent with one fact: the need for greater improvements in structural and institutional characteristics (that will facilitate convergence) in light of a paramount lesson of the EMU crisis<sup>1</sup> (Willet, 2011; Willet & Srisorn, 2011).

In spite of the substantially documented role finance plays in the economic growth of a monetary union (De Avila, 2003), little (if nothing) is known about evidence of the finance-growth nexus in the proposed WAMZ and EAMZ. According to De Avila, the analysis of the main channels through which policy changes may affect growth indicate that, the harmonization process has impacted growth (via increase in the level of efficiency of financial intermediation) and the liberalization of capital controls has principally affected growth through improvements in the degree of efficiency in financial intermediation (p.4). In the experience of the EMU (Vickers, 2000), embryonic African monetary zones constitute ideal scenarios to analyze the finance-growth nexus. They also present the opportunity of shedding light on some of the unresolved issues on causality between finance and growth in sub-Saharan Africa (SSA)<sup>2</sup>. In light of the above, this study is a short-run trip to the proposed monetary unions in Africa. We assess the Schumpeterian thesis for the positive spillovers of financial services on growth. Causality analysis is performed on seven financial development and three growth indicators. Schumpeter postulated that an efficient financial system greatly helps in economic prosperity. As emphasized by King & Levine (1993), Schumpeter disputed that, well-functioning banks spur technological innovation by offering funding to entrepreneurs that have the best chances of successfully implementing innovative products and production process.

Opposed to this mainstream consensus are sympathizers of Andersen & Tarp (2003) who have concluded that, contrary to what Schumpeterian authors claim, the positive link between financial development and growth has not been sufficiently documented in recent empirical works. Andersen & Tarp have vehemently argued that, turning to the empirical evidence, the alleged first-order effect whereby financial development causes growth is not adequately supported by econometric work. Hence, they conclude that the empirical evidence on the finance-growth nexus does not yield any clear-cut picture (p. 1). This second school of thought has recently been supported by Asongu (2011a) in a meta-study of 186 papers on the finance-growth nexus. It will therefore be interesting to examine the positions of the embryonic African monetary zones in light of the above debate. The rest of the paper is organized as follows. Section 2 presents the data and discusses the methodology. The empirical analysis is covered in Section 3. Section 4 concludes.

<sup>1</sup> Serious disequilibria in a monetary union result from arrangements not designed to be robust to a variety of shocks.

<sup>2</sup> See "Finance and Growth: A Schumpeterian Trip to Africa" by Baonza (2011) for more details.

## 2. Data and Methodology

### 2.1 Data

We examine a sample of 4 West and 5 East African countries with data from African Development Indicators (ADI) and the Financial Development and Structure Database (FDSD) of the World Bank for the period 1980-2010. Guinea is left-out of the WAMZ due to data constraints. The summary statistics of the variables and details on the countries investigated are presented in Panel A and Panel B respectively of Appendix 1. Variable definitions and corresponding sources are presented in Appendix 2.

A number of theoretical papers on finance and growth that emerged following the insights of the early endogenous growth models (Romer, 1990; Grossman & Helpman, 1991; Lucas, 1988) have documented three main channels to growth: 1) the rise in the rate of private savings; 2) increase in the efficiency of the financial intermediation process and; 3) the rise in the social productivity of capital (Pagano, 1993). Within the framework of our study, only the first two points are taken into consideration. For organizational purposes, the financial variables are presented in terms of financial intermediary dynamics of depth (money), activity (credit), efficiency and size. Firstly, from a financial depth standpoint, we are consistent with the FDSD and recent African finance literature (Asongu, 2012c) in measuring financial depth both from overall-economic and financial system perspectives with indicators of broad money supply ( $M2/GDP$ ) and financial system deposits ( $Fdgd$ ) respectively. Whereas the former represents the monetary base plus demand, saving and time deposits, the latter denotes liquid liabilities of the financial system. It is interesting to distinguish between these two aggregates of money supply because, since we are dealing exclusively with African countries, a great chunk of the monetary base does not transit through the banking sector. Secondly, financial activity is appreciated in terms of credit allocation. Thus, the paper seeks to appreciate the ability of banks to grant credit to economic operators. We use measurements of both banking-system-activity and financial-system-activity in terms of “private domestic credit by deposit banks:  $Pcrb$ ” and “private credit by deposit banks and other financial institutions:  $Pcrbof$ ” respectively. Thirdly, financial intermediary size is measured in terms of deposit bank assets as a proportion of total assets (deposit bank assets plus central bank assets). Fourthly, financial efficiency<sup>3</sup> appreciates the ability of deposits (money) to be converted into credit (financial activity). This fourth measure appreciates the fundamental role of banks in transforming mobilized deposits (savings) into credit for businesses or the private sector (Asongu, 2011b). Accordingly, we adopt indicators of banking-system-efficiency and financial-system-efficiency (respectively ‘bank credit on bank deposits:  $Bcbd$ ’ and ‘financial system credit on financial system deposits:  $Fcfd$ ’). The correlation analysis presented in Appendix 3 shows that, employment of two variables in almost every financial dynamic category is a form of robustness check. Hence, we are able to cross-check financial system results with those of the banking system for the most part. Three measures of economic growth are employed: GDP growth, GDP per capita growth and real GDP output. While the first two are in growth rate, the last is in natural logarithm.

### 2.2 Methodology

The estimation technique typically follows mainstream literature on testing the short-run effect of financial variables on economic activity (Starr, 2005). The approach entails unit tests to examine the stationarity properties of the variables before a Granger causality approach is used to examine the short-term effects (Engle & Granger, 1987). Impulse response functions are used to further assess the tendencies of significant Granger causality results.

<sup>3</sup> By financial efficiency here, we neither refer to the profitability-related concept (notion) nor to the production efficiency of decision making units in the financial sector (via Data Envelopment Analysis).

### 3. Empirical analysis

#### 3.1 Unit root tests

The assessment of stationarity is based on two types of first generational panel unit root tests. When the variables exhibit unit roots in levels, we accordingly test for stationarity in their first differences. Employment of the Granger causality approach requires that the variables do not have a unit root (or are stationary). Two main types of panel unit root tests have been documented: first generational (that is based cross-sectional independence) and the second generational (which supposes cross-sectional dependence). A necessary condition for the employment of the latter generational test is a cross-sectional dependence test which is only applicable if the number of cross-sections (N) in the panel is above the number of periods in the cross-sections (T). Given that we have 31 periods (T) and 5(or 4) cross-sections (N), we are limited to the first generational type. Therefore, both the Levin, Lin & Chu (LLC, 2002) and Im, Pesaran & Shin (IPS, 2003) tests are employed. While the former is a homogenous based panel unit root test (with a common unit as null hypothesis), the latter is a heterogeneous oriented test (with individual unit roots as null hypotheses). In case of conflicting results, IPS (2003) takes precedence over LLC (2002) in decision making because, consistent with Maddala & Wu (1999), the alternative hypothesis of LLC (2002) is too powerful. In line with Liew (2004), goodness of fit (or optimal lag selection) for model specification is ensured by the Hannan-Quinn Information Criterion (HQC) and the Akaike Information Criterion (AIC) for the LLC (2002) and IPS (2003) tests respectively.

**Table 1: Panel unit root tests**

<b>Panel A: Unit root tests for the WAMZ</b>											
		Finance						Economic Growth			
		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		GDP growth rates		Real	
		M2	Fdgdg	BcBd	FcFd	Pcbr	Pcbof	Dbacba	GDPg	GDPpeg	Output
<b>LLC tests for homogenous panel</b>											
Level	c	0.879	1.252	-0.738	<b>-2.89***</b>	2.150	2.142	3.028	<b>-6.24***</b>	<b>-6.16***</b>	3.229
	ct	-0.828	0.200	0.691	-0.125	2.390	2.612	0.047	<b>-6.23***</b>	<b>-6.71***</b>	-1.024
First difference	c	<b>-5.01***</b>	<b>-2.81***</b>	<b>-6.65***</b>	<b>-3.80***</b>	<b>-2.10**</b>	-1.130	<b>-8.82***</b>	n.a	n.a	<b>-6.61***</b>
	ct	<b>-3.58***</b>	<b>-4.14***</b>	<b>-6.20***</b>	<b>-3.46***</b>	<b>-2.82***</b>	<b>-2.30**</b>	<b>-4.57***</b>	n.a	n.a	<b>-6.49***</b>
<b>IPS tests for heterogeneous panel</b>											
Level	c	0.103	0.647	0.101	<b>-1.52*</b>	2.513	2.398	1.844	<b>-5.77***</b>	<b>-5.62***</b>	3.865
	ct	-0.828	-0.121	1.616	<b>-1.34*</b>	3.685	3.840	-0.799	<b>-5.89***</b>	<b>-6.10***</b>	-0.159
First difference	c	<b>-6.47***</b>	<b>-4.71***</b>	<b>-6.79***</b>	<b>-4.10***</b>	<b>-3.33***</b>	<b>-2.39***</b>	<b>-9.36***</b>	n.a	n.a	<b>-7.36***</b>
	ct	<b>-5.54***</b>	<b>-5.52***</b>	<b>-6.42***</b>	<b>-3.86***</b>	<b>-3.15***</b>	<b>-2.98***</b>	<b>-9.05***</b>	n.a	n.a	<b>-7.93***</b>
<b>Panel B: Unit root tests for the EAMZ</b>											
		Finance						Economic Growth			
		F. Depth (Money)		Fin. Efficiency		F. Activity (Credit)		GDP growth rates		Real	
		M2	Fdgdg	BcBd	FcFd	Pcbr	Pcbof	Dbacba	GDPg	GDPpeg	Output
<b>LLC tests for homogenous panel</b>											
Level	c	4.969	5.386	-0.461	-0.774	2.478	2.009	0.912	<b>-5.25***</b>	<b>-6.26***</b>	1.459
	ct	3.126	2.463	0.304	1.517	2.778	2.631	0.566	<b>-5.17***</b>	-0.861	1.730
First difference	c	<b>-3.36***</b>	<b>-2.86***</b>	<b>-9.25***</b>	<b>-1.86**</b>	-0.135	<b>-2.80***</b>	<b>-9.67***</b>	n.a	n.a	<b>-7.03***</b>
	ct	<b>-3.74***</b>	<b>-3.08***</b>	<b>-9.10***</b>	1.054	-0.888	<b>-6.60***</b>	<b>-4.63***</b>	n.a	n.a	<b>-5.40***</b>
<b>IPS tests for heterogeneous panel</b>											
Level	c	4.028	5.061	<b>-1.324*</b>	<b>-1.70**</b>	2.234	1.817	1.192	<b>-4.94***</b>	<b>-6.09***</b>	2.358
	ct	2.126	2.289	0.002	<b>-2.49***</b>	-0.227	-0.430	0.260	<b>-4.54***</b>	<b>-3.15***</b>	-0.026
First difference	c	<b>-3.71***</b>	<b>-3.66***</b>	<b>-8.73***</b>	n.a	<b>-3.16***</b>	<b>-3.62***</b>	<b>-10.7***</b>	n.a	n.a	<b>-6.88***</b>
	ct	<b>-3.29***</b>	<b>-3.20***</b>	<b>-8.94***</b>	n.a	<b>-3.26***</b>	<b>-4.95***</b>	<b>-6.15***</b>	n.a	n.a	<b>-4.80***</b>

Notes: \*\*\*, \*\*, \* denote significance at 1%, 5% and 10% respectively. 'c' and 'ct': 'constant' and 'constant and trend' respectively. Maximum lag is 8 and optimal lags are chosen via HQC for LLC test and AIC for IPS test. LLC: Levin, Lin & Chu (2002). IPS: Im, Pesaran & Shin (2003). M2: Money Supply. Fdgdg: Liquid Liabilities. BcBd: Banking System Efficiency. FcFd: Financial System Efficiency. Pcbr: Banking System Activity. Pcbof: Financial System Activity. Dbacba: Deposit Bank Assets on Total Assets. GDP: Gross Domestic Product. GDPg: GDP growth. GDPpeg: GDP per capita growth. WAMZ: West African Monetary Zone. EAMZ: East African Monetary Zone.

Table 1 above shows results for the panel unit root tests. While Panel A presents the findings for the WAMZ, those of Panel B are of the EAMZ. For both monetary zones, while the financial variables are overwhelmingly integrated in the first order (i.e: they can be differenced once to be stationary), the economic variables are stationary in levels (with the exception of real output).

### 3.2 Granger causality for finance and growth

Let us consider the following basic bivariate finite-order VAR models:

$$Growth_{i,t} = \sum_{j=1}^p \lambda_{ij} Growth_{i,t-j} + \sum_{j=0}^q \delta_{ij} Finance_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (1)$$

$$Finance_{i,t} = \sum_{j=1}^p \lambda_{ij} Finance_{i,t-j} + \sum_{j=0}^q \delta_{ij} Growth_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (2)$$

where, *Growth* denotes economic prosperity (GDP growth, GDP per capita growth or real GDP output) while, *Finance* represents financial development dynamics (of depth, efficiency, activity and size).

Simple Granger causality is based on the assessment of how past values of a financial indicator could help past values of a growth indicator in explaining the present value of the growth indicator (Eq. 1). In the same vein, it also implies investigating how past values of growth variables are significant in helping the past values of financial variables to explain the present value of financial variables (Eq. 2). In mainstream literature, this model is applied on variables that do not exhibit unit root (in levels for the most part). Within our framework, we are applying this test to all ‘finance and growth’ pairs in both ‘first difference’ and levels for three reasons: (1) ensure comparability; (2) consistency with application of the model to stationary variables and; (3) robustness checks in case we might have missed-out something in the unit root test specifications.

In light of the above, the resulting VAR models in first difference are the following:

$$\Delta Growth_{i,t} = \sum_{j=1}^p \lambda_{ij} \Delta Growth_{i,t-j} + \sum_{j=0}^q \delta_{ij} \Delta Finance_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (3)$$

$$\Delta Finance_{i,t} = \sum_{j=1}^p \lambda_{ij} \Delta Finance_{i,t-j} + \sum_{j=0}^q \delta_{ij} \Delta Growth_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (4)$$

The null hypothesis of Eq. (4) is the position that, ‘*Growth* does not Granger cause *Finance*’. Accordingly, a rejection of the null hypothesis is captured by the significant F-statistics, which is the Wald statistics for the joint hypothesis that estimated parameters of lagged values equal zero. Optimal lag selection for goodness of fit is in accordance with Liew (2004).

**Table 2: Short-run Granger causality analysis for the WAMZ**

<b>Panel A: Finance and GDP growth</b>							
Null Hypothesis: Finance does not cause GDP growth							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	0.331	0.378	0.152	0.185	0.628	0.623	1.044
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Perbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.108	0.030	1.050	0.893	0.988	0.963	0.016
Null Hypothesis: GDP growth does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	0.392	0.365	0.808	1.177	0.912	0.793	<b>3.324**</b>
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Perbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.405	0.302	1.418	1.738	0.017	0.027	2.160
<b>Panel B: Finance and GDP per capita growth</b>							
Null Hypothesis: Finance does not cause GDP per capita growth							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	0.171	0.222	0.054	0.031	0.331	0.341	0.880
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Perbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.134	0.029	0.839	0.631	0.934	0.904	0.015
Null Hypothesis: GDP per capita growth does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	0.291	0.249	1.024	1.341	1.024	0.909	<b>3.405**</b>
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Perbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.412	0.305	1.431	1.825	0.019	0.029	2.233
<b>Panel C: Finance and Real GDP Output</b>							
Null Hypothesis: Finance does not cause Real GDP Output							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	0.242	0.115	0.068	0.032	0.210	0.197	0.952
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Perbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.118	0.054	0.120	0.033	0.112	0.156	2.151
Null Hypothesis: Real GDP Output does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Perbof	Fin. Size Dbacba
Levels	1.531	1.512	<b>8.126***</b>	<b>9.216***</b>	<b>9.742***</b>	<b>10.35***</b>	0.779
	M2	Fdgdg	BcBd	FcFd	Pcrb	Perbof	Dbacba
1 <sup>st</sup> Difference	1.215	1.297	<b>2.370*</b>	<b>2.675*</b>	<b>7.351***</b>	<b>8.01***</b>	2.070

M2: Money Supply. Fdgdg: Liquid liabilities. BcBd: Bank credit on Bank deposit (Banking System Efficiency). FcFd: Financial credit on Financial deposits (Financial System Efficiency). Pcrb: Private domestic credit from deposit banks (Banking System Activity). Perbof: Private domestic credit from deposit banks and other financial institutions (Financial System Activity). Dbacba: Deposit bank assets on Total assets (Banking System Size). Fin: Financial. WAMZ: West African Monetary Zone.

**Table 3: Short-run Granger causality analysis for the EAMZ**

<b>Panel A: Finance and GDP growth</b>							
Null Hypothesis: Finance does not cause GDP growth							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	0.021	0.074	<b>3.732**</b>	<b>7.306***</b>	1.174	1.912	1.404
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.032	0.052	0.571	<b>2.864*</b>	<b>2.801*</b>	2.088	0.015
Null Hypothesis: GDP growth does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	1.249	1.333	0.048	<b>3.050*</b>	<b>2.399*</b>	<b>2.506*</b>	0.695
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.172	0.042	0.522	2.319	2.175	1.311	0.617
<b>Panel B: Finance and GDP per capita growth</b>							
Null Hypothesis: Finance does not cause GDP per capita growth							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	0.258	0.087	<b>6.269***</b>	<b>8.292***</b>	2.227	<b>3.551**</b>	1.245
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.248	0.297	0.891	<b>2.810*</b>	<b>3.715**</b>	<b>3.042*</b>	0.082
Null Hypothesis: GDP per capita growth does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	1.589	1.675	0.016	2.342	<b>3.232**</b>	<b>2.935*</b>	0.797
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1 <sup>st</sup> Difference	0.211	0.146	0.416	2.040	1.671	0.937	0.926
<b>Panel C: Finance and Real GDP Output</b>							
Null Hypothesis: Finance does not cause Real GDP Output							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	0.175	0.163	<b>3.387**</b>	<b>4.183**</b>	0.368	1.338	0.581
	D[M2]	D[Fdgdg]	D[BcBd]	D[FcFd]	D[Pcrb]	D[Pcrbof]	D[Dbacba]
1 <sup>st</sup> Difference	1.486	1.357	0.764	<b>3.256**</b>	0.949	1.516	0.390
Null Hypothesis: Real GDP Output does not cause Finance							
	Financial Depth (Money) M2	Fdgdg	Financial Efficiency BcBd	FcFd	Fin. Activity (Credit) Pcrb	Pcrbof	Fin. Size Dbacba
Levels	0.608	0.675	0.707	1.368	0.359	0.143	<b>3.055*</b>
	M2	Fdgdg	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
1 <sup>st</sup> Difference	0.279	0.464	1.687	1.809	0.472	0.415	<b>3.764**</b>

M2: Money Supply. Fdgdg: Liquid liabilities. BcBd: Bank credit on Bank deposit (Banking System Efficiency). FcFd: Financial credit on Financial deposits (Financial System Efficiency). Pcrb: Private domestic credit from deposit banks (Banking System Activity). Pcrbof: Private domestic credit from deposit banks and other financial institutions (Financial System Activity). Dbacba: Deposit bank assets on Total assets (Banking System Size). Fin: Financial. Fin: Financial. EAMZ: East African Monetary Zone.

Table 2 and Table 3 above present Granger causality results for the WAMZ and the EAMZ respectively. Regardless of tables, Panel A, Panel B and Panel C show 'Finance and GDP growth', 'Finance and GDP per capita growth' and 'Finance and real GDP output'

causality estimations respectively. The Schumpeterian thesis is based on the top-half of each panel which has a null hypothesis of: ‘Finance does not Granger cause Growth’. The bottom halves (with null hypotheses: ‘Growth does not Granger cause Finance’) are relevant complementary assessments of tendencies in the finance-growth nexus.

From the results in Table 2, the following could be established: (1) there is overwhelmingly no evidence of finance causing growth; (2) real GDP output causes financial allocation efficiency and financial activity and; (3) the scanty evidence of GDP growth and GDP per capita growth causing financial size is not very robust because of ‘level significance’<sup>4</sup>. The following conclusions could be derived from Table 3: (1) financial allocation efficiency is instrumental in GDP growth, GDP per capita growth and real GDP output, while financial activity causes only GDP growth and GDP per capita growth and; (2) the evidence of growth causing financial development can only be validated for financial size (Panel C) with respect to real GDP output because it is both significant in levels and first difference<sup>5</sup>. The simple fact that we have seen evidence of Granger causality flowing from some financial variables to growth dynamics is not enough to draw any economic inferences. Hence, the impulse-response functions (IRFs) of such relationships should provide additional material on the scale and timing of a one standard deviation shock in the financial variables and the responses of the growth dynamics.

### 3.3 Impulse response for the EAMZ

Using a Choleski decomposition on a VAR with ordering: 1) financial variable, 2) growth dynamic; we compute IRFs for the finance-growth nexus. We know from intuition that the Schumpeterian thesis advocates for positive spillovers of financial services on growth. Hence, we expect positive shocks in financial services (financial system efficiency, banking system activity and financial system activity) to improve growth dynamics at least in the short-run because of the long-run neutrality of money. Appendix 4-9 show graphs corresponding to the IRFs. The dotted lines are the two standard deviation bands, which are used to measure the significance (Agénor et al., 1997, p. 19). It could be observed that, but for the responses of GDP growth (GDP per capita growth) to financial system efficiency in Appendix 4 (6)<sup>6</sup>, there is an overwhelming significant positive short-run impact on the temporary components of the growth dynamics. Convergence of the effect to zero towards the 10<sup>th</sup> year confirms the long-run neutrality of monetary policy variables on real output (growth).

### 3.4 Robustness checks

In order to ensure that our results and estimations are robust, we have checked and performed the following. (1) For almost every financial variable (depth, efficiency or activity), two indicators have been used. Hence, the findings have broadly encapsulated measures of financial development dynamics both from banking and financial system perspectives. (2) Three measures of economic growth have been employed as well to capture growth both from overall economic, per capita and real output standpoints. (3) Both homogenous and heterogeneous assumptions have been considered in the unit root tests. (4) Optimal lag selection for model specifications has been consistent with the goodness of fit

<sup>4</sup> It should be recalled that financial size for the WAMZ is stationary only in first difference (see Panel A in Table 1).

<sup>5</sup> Financial size for the EAMZ is also stationary only in first difference (see Panel B of Table 1).

<sup>6</sup> A possible explanation for these initial negative responses is the substantially documented evidence of surplus liquidity issues in African financial institutions (Saxegaard, 2006; Fouda, 2009).



recommendations of Liew (2004)<sup>7</sup>. (5) Granger causality has been performed both in level and first difference equations. (6) Impulse response functions have been used to further assess the tendencies of significant Granger causality results and correspondingly, the Schumpeterian thesis.

### 3.5 Monetary policy implications

The traditional discretionary monetary policy arrangement favors a short-run effect of changes in monetary policy variables on economic activity (especially real output). This favors arrangements such as international economic integration (monetary unions and inflation targeting for example). Results of the EAMZ are broadly consistent with this traditional strand. The significant absence of any short-run effect of monetary policy on output in the WAMZ is consistent with the non-traditional strand of policy regimes that limit the ability of monetary authorities to use policy to offset output fluctuations. Thus, the inability of monetary policy to affect short-run real GDP is in line with the stance of Week (2010) who views this International Monetary Fund (IMF) oriented approach as absurdly inappropriate because a vast majority of SSA countries lack the instruments to make monetary policy effective. Hence, the monetary authority in the potential WAMZ may not use policy instruments in the short-run to offset adverse shocks to output by pursuing either an expansionary or a contractionary policy.

## 4. Conclusion

With the spectre of the Euro crisis looming substantially large and scaring potential monetary unions, this study has been a short-run trip to embryonic African monetary zones to assess the Schumpeterian thesis for positive spillovers of financial services on growth. Causality analysis has been performed with seven financial development and three growth indicators in the proposed West African Monetary Zone (WAMZ) and East African Monetary Zone (EAMZ). The journey has been promising for the EAMZ and lamentable for the WAMZ. Results of the EAMZ are broadly consistent with the traditional discretionary monetary policy arrangements while those of the WAMZ are in line with the non-traditional strand of regimes in which policy instruments in the short-run cannot be used to offset adverse shocks to output.

## Acknowledgement

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<sup>7</sup> "The major findings in the current simulation study are previewed as follows. First, these criteria managed to pick up the correct lag length at least half of the time in small sample. Second, this performance increases substantially as sample size grows. Third, with relatively large sample (120 or more observations), HQC is found to outdo the rest in correctly identifying the true lag length. In contrast, AIC and FPE should be a better choice for smaller sample. Fourth, AIC and FPE are found to produce the least probability of under estimation among all criteria under study. Finally, the problem of over estimation, however, is negligible in all cases. The findings in this simulation study, besides providing formal groundwork supportive of the popular choice of AIC in previous empirical researches, may as well serve as useful guiding principles for future economic researches in the determination of autoregressive lag length" (Liew, 2004, p. 2).

## Appendices

### Appendix 1: Summary Statistics and Presentation of Countries

			Panel A: Summary Statistics									
			West African Monetary Zone (WAMZ)					East African Monetary Zone (EAMZ)				
			Mean	S.D	Min.	Max.	Obser.	Mean	S.D	Min.	Max.	Obser.
Economic Growth	Growth	GDPg	3.459	5.499	-19.01	27.462	124	4.077	6.606	-50.24	35.22	143
	Rates	GDPpcg	0.740	5.108	-18.63	22.61	124	1.208	6.246	-46.89	37.83	143
	Real Output		9.521	0.855	8.248	11.31	124	9.581	0.456	8.774	10.49	147
	Fin.	M2	0.226	0.116	0.091	0.796	114	0.224	0.118	0.046	0.498	134
	Depth	Fdgd	0.154	0.093	0.045	0.600	114	0.171	0.110	0.026	0.414	134
Finance	Fin.	BcBd	0.625	0.347	0.173	2.103	117	0.676	0.282	0.070	1.609	146
	Efficiency	FcFd	0.629	0.326	0.209	1.812	114	0.819	0.357	0.139	1.968	134
	Fin.	Pcrb	0.096	0.066	0.014	0.350	114	0.112	0.074	0.011	0.255	134
	Activity	Pcrbof	0.099	0.068	0.014	0.368	114	0.137	0.097	0.011	0.349	134
	Fin. Size	Dbacba	0.502	0.273	0.054	1.350	117	0.628	0.198	0.110	0.999	141

#### Panel B: Presentation of countries

West African Monetary Zone (WAMZ)

The Gambia, Ghana, Nigeria, Sierra Leone

East African Monetary Zone (EAMZ)

Burundi, Kenya, Rwanda, Uganda, Tanzania

S.D: Standard Deviation. Min: Minimum. Max: Maximum. Obser : Observations. Fin: Financial.

### Appendix 2: Variable Definitions

Variables	Signs	Variable Definitions	Sources
Economic Prosperity	GDPg	GDP Growth (Annual %)	World Bank (WDI)
Per Capita Economic Prosperity	GDPpcg	GDP Per Capita Growth (Annual %)	World Bank (WDI)
Real Output	Output	Logarithm of Real GDP	World Bank (WDI)
Economic financial depth (Money Supply)	M2	Monetary Base plus demand, saving and time deposits (% of GDP)	World Bank (FSDS)
Financial system depth (Liquid liabilities)	Fdgd	Financial system deposits (% of GDP)	World Bank (FSDS)
Banking system allocation efficiency	BcBd	Bank credit on Bank deposits	World Bank (FSDS)
Financial system allocation efficiency	FcFd	Financial system credit on Financial system deposits	World Bank (FSDS)
Banking system activity	Pcrb	Private credit by deposit banks (% of GDP)	World Bank (FSDS)
Financial system activity	Pcrbof	Private credit by deposit banks and other financial institutions (% of GDP)	World Bank (FSDS)
Banking System Size	Dbacba	Deposit bank assets/ Total assets (Deposit bank assets plus Central bank assets)	World Bank (FSDS)

Infl: Inflation. M2: Money Supply. Fdgd: Liquid liabilities. BcBd: Bank credit on Bank deposits. FcFd: Financial system credit on Financial system deposits. Pcrb: Private domestic credit by deposit banks. Pcrbof: Private domestic credit by deposit banks and other financial institutions. WDI: World Development Indicators. FSDS: Financial Development and Structure Database. GDP: Gross Domestic Product.

### Appendix 3: Correlation Matrices

**Panel A: West African Monetary Zone (WAMZ)**

Economic Growth			Financial Depth		Fin. Efficiency		Financial Activity		F. Size
GDPg	GDPpcg	Output	M2	Fdgdg	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
1.000	0.985	0.080	0.097	0.109	0.069	0.062	0.101	0.100	0.183
	1.000	0.124	0.050	0.065	0.055	0.043	0.057	0.057	0.127
		1.000	-0.175	-0.105	0.294	0.238	0.108	0.150	0.079
			1.000	0.990	0.020	0.022	0.646	0.634	0.478
				1.000	0.062	0.056	0.682	0.675	0.537
					1.000	0.966	0.746	0.745	0.528
						1.000	0.731	0.735	0.547
							1.000	0.994	0.780
								1.000	0.766
									1.000

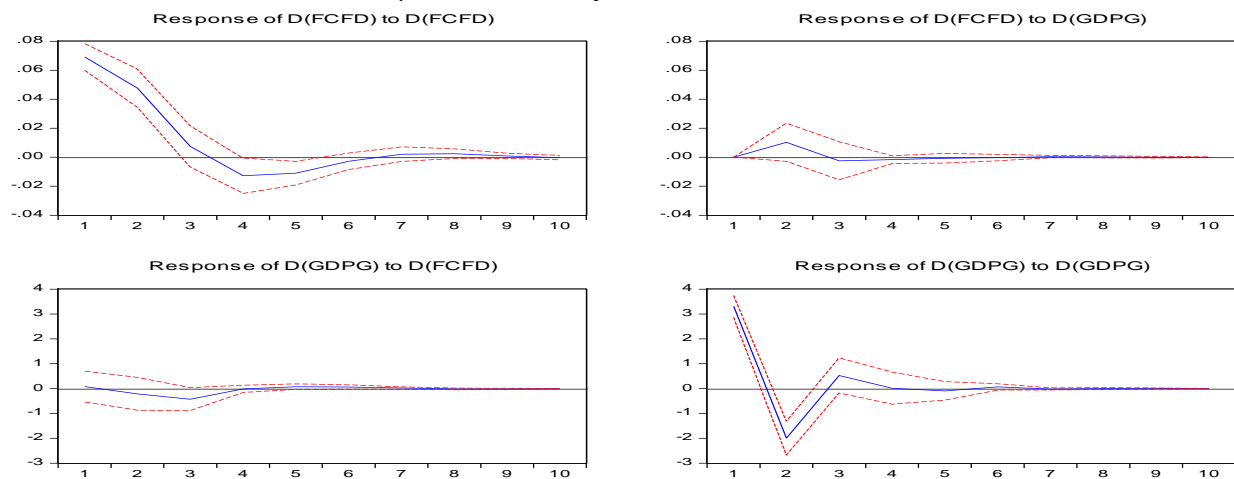
**Panel B: East African Monetary Zone (EAMZ)**

Economic Growth			Financial Depth		Fin. Efficiency		Financial Activity		F. Size
GDPg	GDPpcg	Output	M2	Fdgdg	BcBd	FcFd	Pcrb	Pcrbof	Dbacba
1.000	0.951	0.205	-0.115	-0.072	-0.162	-0.357	-0.199	-0.243	0.008
	1.000	0.173	-0.150	-0.110	-0.162	-0.344	-0.224	-0.276	-0.012
		1.000	0.427	0.497	-0.447	-0.665	0.215	0.152	0.374
			1.000	0.989	0.148	0.010	0.893	0.912	0.583
				1.000	0.106	-0.057	0.884	0.900	0.576
					1.000	0.870	0.450	0.461	0.234
						1.000	0.278	0.344	0.079
							1.000	0.953	0.600
								1.000	0.533
									1.000

M2: Money Supply. Fdgdg: Liquid liabilities. BcBd: Bank credit on Bank deposit (Banking System Efficiency). FcFd: Financial credit on Financial deposits (Financial System Efficiency). Pcrb: Private domestic credit by deposit banks (Banking System Activity). Pcrbof: Private credit from deposit banks and other financial institutions (Financial System Activity). Dbacba: Deposit bank asset on Total assets (Banking System Size). Fin: Financial. Fin: Financial.

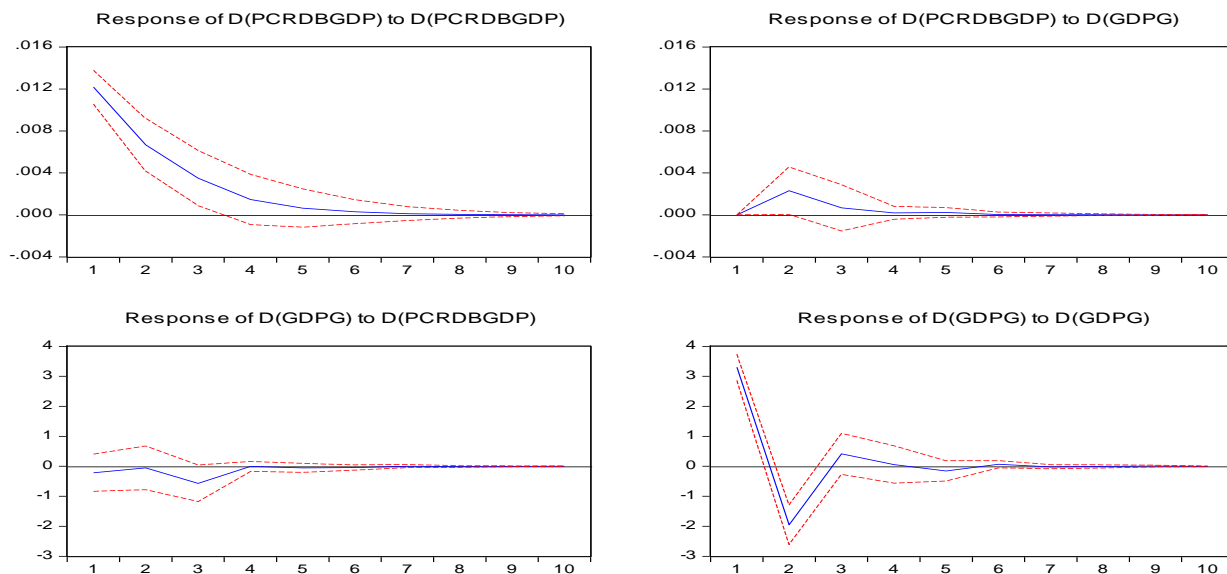
### Appendix 4: Financial System Efficiency and GDP growth (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



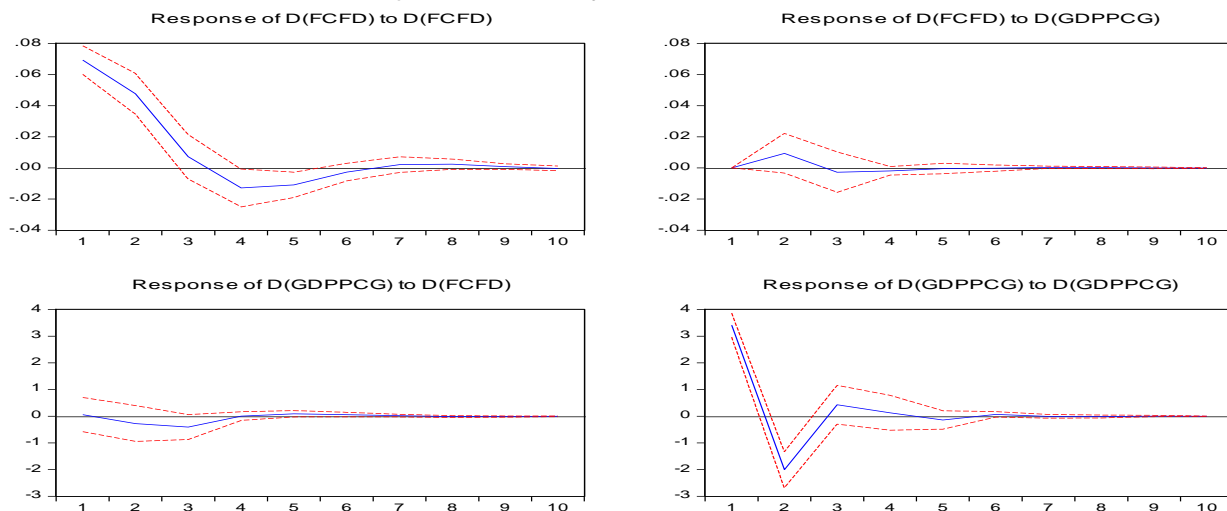
### Appendix 5: Banking System Activity and GDP growth (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



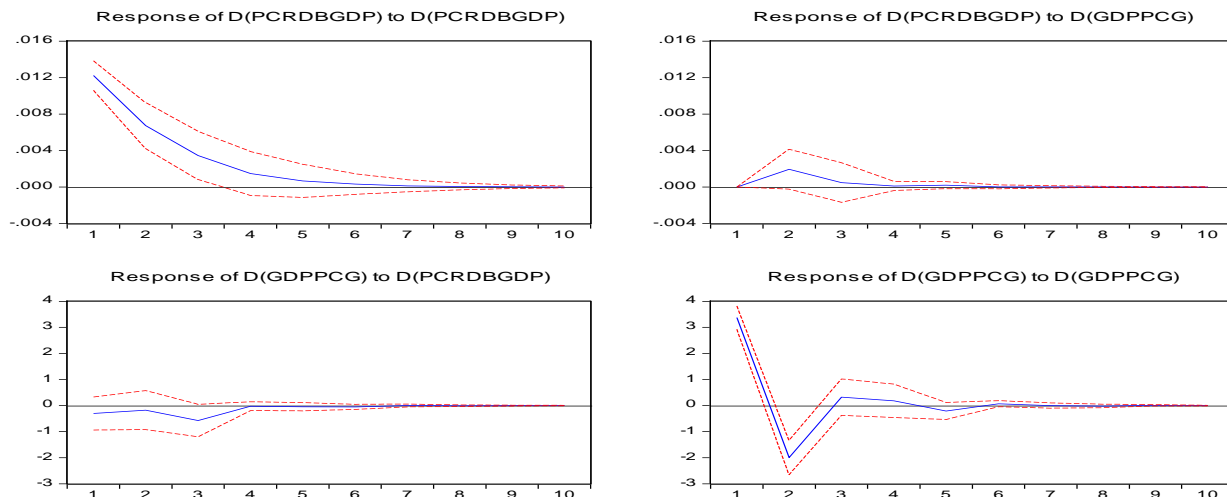
### Appendix 6: Financial System Efficiency and GDP per capita growth (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



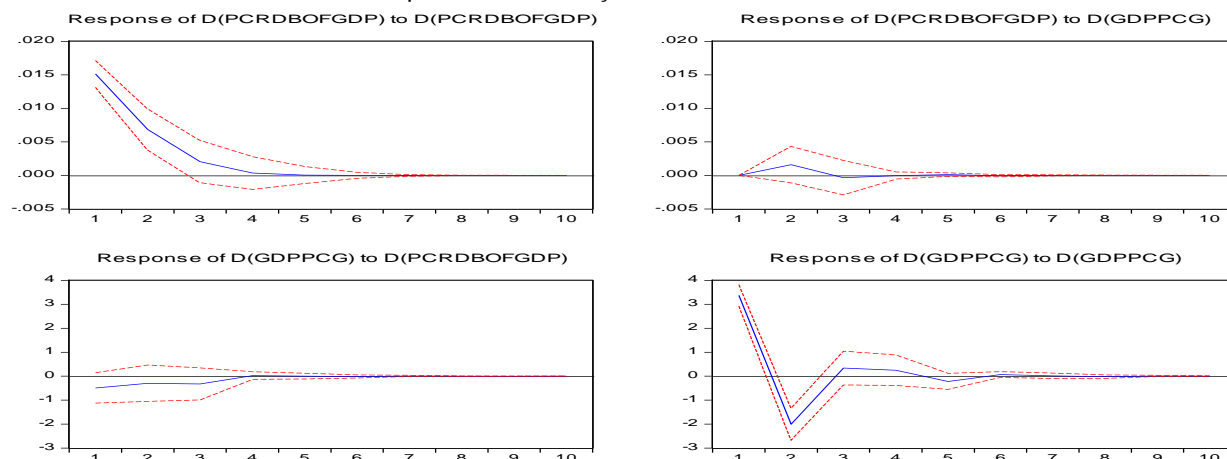
### Appendix 7: Banking System Activity and GDP per capita growth (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



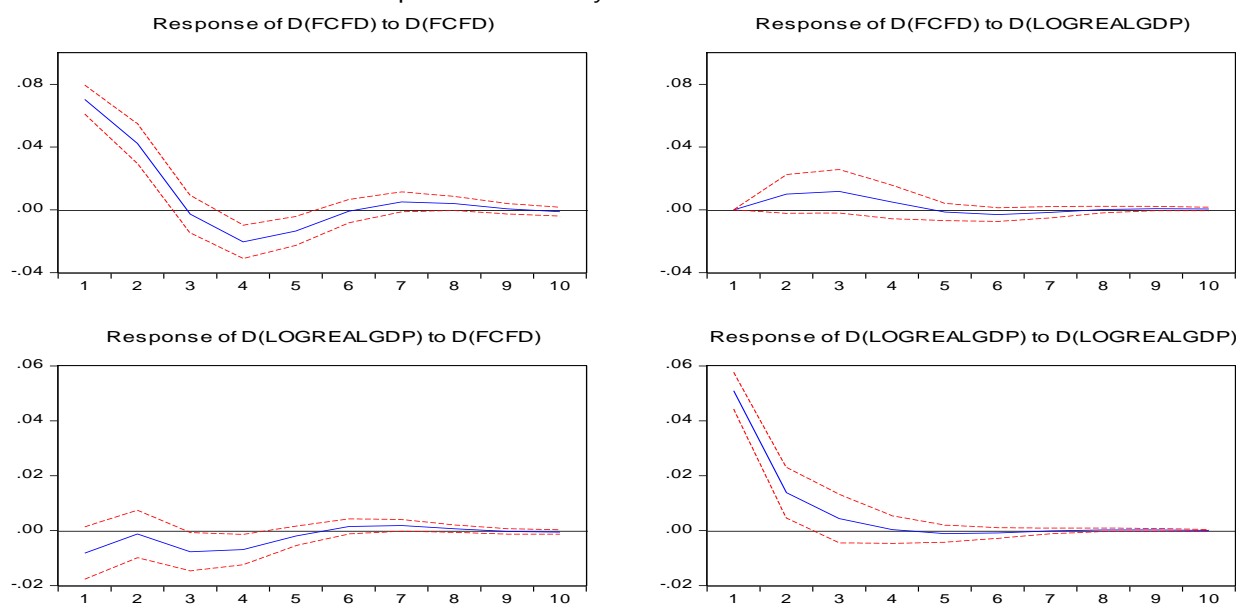
## Appendix 8: Financial System Activity and GDP per capita growth (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



## Appendix 9: Financial System Efficiency and real GDP output (EAMZ)

Response to Cholesky One S.D. Innovations  $\pm 2$  S.E.



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