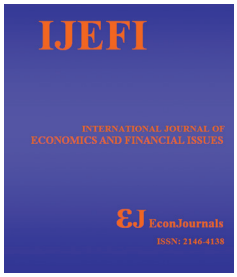

International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2018, 8(6), 30-34.

The Drivers of International Financial Integration and their Implications on the Nigerian Economy: An Error Correction Model Approach

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Received: 30 August 2018 **Accepted:** 17 October 2018 **DOI:** https://doi.org/10.32479/ijefi.7189

ABSTRACT

This study examined the determinants of international financial integration (IFI) and how they impact on the Nigerian economy over the period 1986–2015. The error correction model was employed to regress the key determinants of IFI against GDP growth, and to ascertain the speed of adjustment. The results showed that financial market capitalisation and trade openness both have negative and insignificant influence on economic growth. The real effective exchange rate has positive but insignificant effect on economic growth while inflation exerted positive and significant impact on the economy. The Engel and Granger cointegration test result shows evidence of long-run association between economic growth and the independent variables. The dynamic estimate provided evidence of long-run causality running from IFI determinants to economic growth. The coefficient of the error correction term indicates that the system corrects disequilibrium in the previous period at the speed of 81.43% annually to get at the steady state.

Keywords: Financial Integration, Market Capitalization, Openness, Growth, Cointegration
JEL Classifications: F4, F43, G1

1. INTRODUCTION

Financial integration is a multi-faceted concept. There is no generally accepted definition of financial integration. The term typically embodies the concepts like financial openness, free capital flows, and integration of financial services. Financial integration can be viewed as a multidimensional process that facilitates unrestricted cross-border allocation of financial assets. FINSIA (2015) highlights that financial system Inquiry of 2014 defined financial integration as a country's financial connectedness with other countries, while stressing that greater financial integration will potentially increase capital flows and equalise prices and returns on traded financial assets in different financial centres across the globe. Theoretically, it may be explained by the convergence of the prices of assets with the matching characteristics (law of one price). Perfect integration exists if similar assets have the same price even if they are bought or sold on different markets (IMF, 2016).

In principle, financial globalization and financial integration are different but closely related concepts. Financial globalization is an aggregate concept that refers to increasing global linkages created through cross-border financial flows. Financial integration refers to an individual country's linkages to international capital markets. The two concepts may hardly be separated since, on average, increasing financial globalization is manifestly associated with increasing financial integration (Prasad et al., 2003). In literature, the two concepts are widely used interchangeably.

Financial integration has major channels through which participating countries can benefit from it. The first channel is the consumption channel which eases capital scarcity and

enhances risk sharing. Improvement in terms of trade and portfolio diversification cost of capital may potentially lower the cost of capital thus boosting the rate of economic activities hence increasing the rate of economic growth. Financial integration may also help to advance the economies of countries through the production channel. This entails economic growth stimulation through production efficiency - as countries have greater access to world capital market amplifies specialization in production and productivity growth through enhanced stock market liquidity (Mahajan and Verma, 2015).

Moreover, most empirical discourses have attempted to examine how IFI has impacted on growth (Schularick and Steger, 2007; Dogbey and Dogbey, 2016; Osada and Saito, 2010; Kose et al., 2006; Mahajan and Verma, 2015; Chen and Quang, 2012) while some other studies assessed effect of selected macroeconomic variables on IFI (Arfaouand and Abaoub, 2010; Garali and Othmani, 2015; Arribas et al., 2009; Fakhr and Tayebi, 2009) tthere by creating a gap as to the various IFI indicators affect the economy. The need to fill this vacuum in literature is the major motivation for this study.

2. LITERATURE REVIEW

2.1. Measuring Financial Integration

There are various ways financial integration is measured in the academic and policy literature. Fung et al. (2008) propose two broad measurement categories namely; price-based measures, and quantity-based measures. Price-based measures look at price differentials or correlations across markets. Various studies relate financial integration to the law of one price, which postulates that when assets have similar risk and return profiles then such assets should have identical price. Any divergence or differences in prices or returns on identical assets is evidently indicating that financial markets are not integrated (FINSIA, 2015). Price-based measures of financial integration is normally suitable for markets for tradable securities such as foreign exchange, bonds and equities, characterized by daily price movements which gives room for robust analysis.

The quantity-based analytical approaches are generally expresses in simple ratios with the intention of capturing the level of cross-border activities, like the ratio of foreign assets and liabilities (both portfolio equity and FDI) to GDP (Mahajan and Verma, 2015, Schularick and Steger, 2007), debt assets and liabilities, all as a ratio of nominal GDP (Osada and Saito, 2010), the ratio of capital flows to GDP (Kose et al., 2003, FINSIA, 2015), external debt (Garali and Othmani, 2015). Quantity-based measures are commonly applied for non-tradable financial flows. Such financial flows often do not have high frequency of data collection - they are mostly annualized rather than daily price movement as in the case of equities and bonds.

In addition to price-and-quantity-based measures, Park (2013), Chen and Quang (2012), Lane and Milesi-Ferretti (2012) among others made a case for de jure approach that measures financial openness by quantifying legal and regulatory restrictions on cross-border trade or capital flows. The approach involves taking into account the number of legal restrictions on cross-border capital flows applicable to the economy concerned. According to Park (2013), this would constitute a de jure measure of financial integration, since it is based on legal restrictions currently in force. Such restrictions may include price and quantity-based controls on international capital mobility, and restrictions on equity holdings by nonresidents. The International Monetary Fund reports more than 60 different types of such controls in its Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). The inherent pitfall of this approach is that counting capital controls provides no information whatsoever regarding the extent to which such restrictions are effective in limiting the degree of international capital flows (Quinn et al., 2011). On the other hand, de facto measures assess actual cross-border trade or capital flows.

2.2. Determinants of Financial Integration

Before delving into the various determinants of financial integration, it is important to identify some of the variables which serve as proxy for international financial integration (IFI). While there is no generally accepted singular quantitative measure of financial integration, most researchers agree that it is closely related with capital mobility and financial openness (ADB, 2013). Hence, in addition to the indicators highlighted in the preceding section, Vo (2005) constructed other suitable proxies for measuring IFI. These include aggregate stock of assets and liabilities relative to GDP, the ratio of stock of liabilities to GDP, the ratio of aggregate stock of foreign direct investment and portfolio investment to GDP, the aggregate flows of equity relative to GDP, equity inflows as a share of GDP, the aggregate stock of equity relative to GDP and the stock of equity inflows relative to GDP (Ananchotikul et al. (2015); Edison et al., 2002; ECB, 2005 and 2015; Kose et al., 2006; Karakaya, et al., 2016; Schularick and Steger, 2007; Friedrich et al., 2010). It is argued that the quantity-based measure of international financial integration is expected not only to take cognizance of the ability of foreign investors to invest domestically but also the ability of residents in the host country investing abroad (Vo, 2005).

Moreover, a number of factors or indices have been acknowledged by most observers (Garali and Othmani, 2015; Vo, 2005; Chen and Quang, 2012) to have influence on international financial integration.

2.2.1. Level of development

Most observers contend that countries that are rich, and well educated tend to be more financially integrated (Edison et al., 2002; Prasad et al., 2003) compared to other countries that are poor and less educated. For the correlation to be confirmed as applied in previous studies (Vo, 2005; and Garali and Othmani, 2015) that adopted the level of development in their studies as driver of IFI, GDP per capita growth rate and tertiary education enrollment rate (TENR) were included in the baseline model as proxy for level of development and education attainment.

2.2.2. Trade openness

One of the drivers of financial integration is trade openness (Lane and Milesi-Ferretti, 2003), and is measured by the ratio of foreign trade (exports+imports) to GDP. Yi (2003) assessed the

importance of trade growth and argue that the remarkable growth in the trade share of output is one of the major developments in the world economy. Despite lack of clarityin the way through which trade influences financial flows, sign of the correlation generally appear to be positive (Arribas et al., 2009), and points to the fact that trade in good would most likely be directly related to financial integration. However, Arfaoui and Baoub (2010) used data from the major emerging economies from 1988 to 2008 and observed that trade openness leads to financial integration. Vo (2009) asserts that increase in trade openness remains a critical factor that influences globalization.

2.2.3. Economic growth

Palmer (2012) refers to economic growth as increase in the aggregate output in an economy, and stresses that the productive capacity of the economy should be proficient in producing additional quantities of goods and services. A number of studies have assessed the link between IFI and economic growth (Chen and Quang, 2012; Dogbey and Dogbey, 2016; Osada and Saito, 2010; Kose et al., 2006) and there seem to be a general consensus that a positive link exist between financial integration and economic growth (Mahajan and Verma, 2015; Schularick and Steger, 2007), or at least have certain degree of influence on financial integration (Ananchotikul et al., 2015). Fakhr and Tayebi (2009) examined the growth and IFI relation in the East Asia-Pacific region from 1990 to 2005 and found that GDP has positive effect on financial integration in the region. Some empirical studies on Nigeria found a positive link between growth and financial integration (Dogbey and Dogbey, 2016; Olaniyi, 2013)

2.2.4. Exchange rate and real interest rate

These macroeconomic variables have been argued to influence the degree of financial integration (Fakhr and Tayebi, 2009). Exchange rates fluctuation impedes the development of international trade and capital movements (Garali and Othmani, 2015). Uncertainties surrounding exchange rate can be an obstacle to IFI since risk associated with exchange rate affects pricing on the capital market. Fakhr and Tayebi (2009) infer that interest rate and exchange rate may well affect both domestic and foreign interest rates long-run association and, if integrated, could be a determinant of international financial integration. However, some empirical literatures contend that the effect of exchange rate and interest rate on financial integration remains ambiguous (Fakhr and Tayebi (2009), but were found to exert positive influence on the Nigerian case (Ogbuagu and Ewubare, 2015).

2.2.5. Inflation and financial market development

Inflation represents the changes in price level in an economy hence, price and macroeconomic stability have been argued to effect on the degree financial development (Garali and Othmani, 2015). Inflation rate is proxied by the annual percentage change in the consumer price index (CPI). On the Nigerian case, Adegbite and Adetiloye (2013) adopted financial development and the nominal exchange rate as key indicators of financial integration.The development of stock market is measured by market capitalization of listed companies relative to GDP. An increase in the size of the market enhances financial relationship, liquidity, the ease of raising fund and diversification of risk (Arfaoui and Baoub, 2010).

3. DATA AND METHODOLOGY

Data for this study is sourced from World Bank Database over the period 1960–2015. Our dependent variable and measure of Nigerian economy is the GDP growth. The independent variables comprise selected determinants of international financial integration; these include financial market development (measured as the ration of market capitalization of listed companies in Nigeria to GDP), trade openness (measured as the ratio of foreign trade (i.e., imports plus exports) to GDP),real interest rate, exchange rate and inflation rate. The Phillip-Perron (PP) unit root testtest for unit root was employed to ascertain the stationarity of the selected variables. The Engel and Granger test for cointegration was employed to determine if our proxy variables are cointegrated. The vector error correction model (VECM) was applied to assess the dynamic effects of the independent variables on the dependent variable. The VECM-Granger causality test was used in order to determine the nature of causal links existing among the variables selected.

The baseline linear model for this study is presented as follows:

$$ECGr_t=\beta_0+\beta_1FMC_t+\beta_2TOP_t+\beta_3RIR_t+\beta_4EXR_t+\beta_5INF_t+\varepsilon_t \quad (1)$$

Where ECGr = Economic growth, as proxied byGDP growth, FMC = Financial market capitalisation, RIR = Real interest rate, EXR = Exchange rate, INF = inflation rate, β_0 =, constant, $\beta_1 - \beta_5$ coefficients, and = error term.

There are three stages to our estimation. First we test our variables for stationarity using the Phillip-Perron unit root test. Time-series data is stationary if its mean and variance are constant over time (Gujarati, 2003). The Phillip-Perron is based on the following model:

$$\Delta y_t = \mu + \alpha_{t-1}t + \sum_{i=1}^{n}\gamma_i\Delta\gamma_{t-1} + \varepsilon_t \quad (2)$$

Where t = linear time trend, μ = constant, Δ = differencing operator, and εt is the error term. If the variables are stationary or integrated at order zero, 1(0), we can employ the Ordinary least square (OLS). However, if our variables are integrated of order one, 1(1), we will have the justification to proceed with the ECM estimate.

This second stage enables us find out if long run relationship exist among the variables. If at this point our variables are co-integrated, we then move on to the third stage where we the run the error correction model (ECM) by modifying our baseline equation thus:

$$\Delta ECGr_t = \beta_0 + \sum_{i=0}^{n}\beta_1\Delta ECGr_{t-1} + \sum_{i=0}^{n}\beta_2\Delta FMC_{t-1} + \sum_{i=0}^{n}\beta_3\Delta TOP + \sum_{i=0}^{n}\beta_4\Delta RIR_{t-1} + \sum_{i=0}^{n}\beta_5\Delta EXR_{t-1} + \beta_6 ECT_{t-1} + \varepsilon_t \quad (3)$$

Where ECT_{t-t} = lagged value of the error correction term.

Table 1: Descriptive statistics

Stat	ECGR	FMC	TOP	REXR	INFR
Mean	5.292388	14.11295	41.04944	110.4478	20.77081
Median	5.503147	8.347951	40.74746	90.57462	12.07481
Maximum	14.60438	63.81124	68.76650	272.5218	76.75887
Minimum	−0.552030	3.348493	11.07268	49.77731	0.223606
Observations	30	30	30	30	30

Table 2: Unit root test

Variables	ADF statistic	Critical value			Order of integration	Remark
		1%	5%	10%		
ECGr	−7.476391	−3.689194	−2.971853	−2.625121	I (1)	Stationary
FMC	−5.510453	−3.689194	−2.971853	−2.625121	I (1)	Stationary
TOP	−7.008758	−3.689194	−2.971853	−2.625121	I (1)	Stationary
EXR	−6.412460	−3.689194	−2.971853	−2.625121	I (1)	Stationary
INF	−4.228564	−3.788030	−3.012363	−2.646119	I (1)	Stationary

ADF: Augumented Dickey-Fuller

Table 3: Engel and granger cointegration test

Null hypothesis: ECT has a unit root	t-statistic	Prob.*
Augmented Dickey-Fuller test statistic	−4.432647	0.0015
Test critical values		
1% level	−3.679322	
5% level	−2.967767	
10% level	−2.622989	

Table 4: Error correction model estimation

Dependent variable: D (ECGr)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.124183	0.566064	0.219380	0.8283
D (FMC)	−0.003867	0.063625	−0.060771	0.9521
D (TOP)	−0.022672	0.060005	−0.377838	0.7090
D (REXR)	0.006206	0.010632	0.583709	0.5651
D (INFR)	−0.079710	0.034607	−2.303294	0.0306
ECT(-1)	−0.814278	0.195545	−4.164144	0.0004
R-squared	0.471160			
D-W stat	1.518449			
F-statistic	4.098282			

4. ANALYSIS AND DISCUSSION OF RESULTS

The statistical descriptions of the variables are shown in Table 1. The economy grew at an average rate of 5.29% p.a., between 1986 and 2015. Within the period, growth rate peaked at 14.60% and lowest at negative 0.55%. The ratios of Market capitalization and trade openness relative to GDP averaged averagedb14.44 % and 41.05% respectively, while the mean values of real effective exchange rate and the inflation rate is 110.45 and 20.77% respectively.

The series were tested for stationarity using the Augumented Dickey-Fuller unit root test. The results of this preliminary test are presented in Table 2, and indicate that the variables have no unit root, hence are stationary. None of the series was stationary at level, but were found to be stationary after first differencing. The result led us to perform the cointegration test using the Engel and Granger residual approach in Table 3. The error term of the baseline regression was found to be stationary at level, which provides evidence of a long-run relationship between the variables.

Table 4 presents that error correction model estimation as specified in equation (4). The results show that financial market capitalization and trade openness do not have significant effect on the economy; both indicators exerted negative influence on the growth of the economy. Expectedly, inflation has significant negative effect on the economy whereas real effective exchange rate has insignificant positive effect on the variable of interest. The error correction term (ECT) has the right sign and is significant indicating that the speed of adjustment to long-run equilibrium is high. The coefficient of the lagged error correction term is −0.814278 meaning that the system corrects disequilibrium in the previous period at the speed of 81.43% on annual basis to get at the steady state. The results further revealed that the overall regression is significant.

5. CONCLUSSION

This study examined the determinants of international financial integration (IFI) and how they impact on the Nigerian economy using data from the Central bank of Nigeria for the period 1986-2015. The key determinants were regressed against GDP growth. The results showed that financial market capitalisation and trade openness both have negative and insignificant influence on economic growth. The real effective exchange rate has positive but insignificant effect on economic growth while inflation exerted positive and significant impact on the economy. The dynamic estimate provided evidence of long-run causality running from IFI determinants to economic growth. The coefficient of the error correction term indicates that the system corrects disequilibrium in the previous period at the speed of 81.43% annually to get at the steady state.

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