

## **Banking Sector Integration and Economic Growth: Re-examination of the Impact of Financial Integration on Growth**

Abubakar Abdullahi<sup>1,2</sup>, Sani Hussaini Gimi<sup>3</sup>, & Sunday Elijah<sup>\*2,4</sup>

<sup>1</sup> Department of Economics,  
Kaduna State University, Kaduna State, Nigeria

<sup>2</sup> Department of Economics,  
Universiti Putra Malaysia, Malaysia

<sup>3</sup> Department of Business Administration,  
Federal University Gusau, Zamfara State, Nigeria

<sup>4</sup> Department of Economics,  
Federal University Gusau, Zamfara State, Nigeria

\*Correspondence Email: [elijahsundayecons@gmail.com](mailto:elijahsundayecons@gmail.com)

### **Abstract**

*Despite the supposed importance of international financial integration, scholars are divided as to the impact of financial integration on economic growth, with no clear consensus. This study investigates the impact of banking sector integration on economic growth in a panel of 108 developed and developing countries. Using annual data from 2000-2015 and employing the panel quantile regression method, the results show that the banking sector integration on economic growth varies across income level. Banking sector integration is reported to have affected growth positively at very low income level but it has negative impact for middle income level. Banking integration has no impact on growth at upper low income and high income levels.*

**Keywords:** Banking Sector Integration, Economic Growth, Quantile Regression

**JEL Classification:** C23; E44; F33; F43; G21; O57

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### **1. Introduction**

Global report on cross border hotel investment by JLL (2015) reveals that the Australian region relies most on off-shore banks for total investment (accounting for 57 per cents of total investment in global hotels in the economy). Latin American is said to be the most regional financially integrated region, with 40 per cents of its total investment funds sourced within the region and 26 per cents from off-shore banks. Africa relies completely on off-shore funding for such investment. North America is the least integrated region, funding 75 percentage of such investment domestically, only 1 per cent is raised within the region, 12 per cents from off-shore, and 12 per cents from other part of the world. For Europe, 16, 36

and 10 per cents are from intra-regional, off-shore banks, and global sources respectively. 50 per cent of investments in the Middle East are funded domestically. The balance is augmented from funds within the region (26 per cents) and off-shore equity firms and investment banks (24 per cents). Asia rely greatly from domestic sources (76 per cents) and from other countries within the region (22 per cents). Only 2 per cents are raised from off-shore banks sources.

The last few decades recorded significant improvement in the degree of financial integration. Thus, the importance of banking sector integration cannot be overlooked, as it provides important means through which the economy is finance especially in the case for developing countries (Illut and Chirlesan, 2012). It is argued that financial integration promotes growth through financial sector efficiency, capital redistribution, adoption of global best practices among other good benefits (Chakraborty, Hai, Holter and Stepanchuk, (2016); Vo and Daly, 2007; Schmukler, 2004). In the case for banking integration, it may affect growth through two channels; the first by capital expertise and new technologies available for growth and the second channel is through risk sharing and diversification.

In spite of supposed positive impact of financial integration on growth, contention still exist as to the impact of financial integration and economic growth as some scholars have argued that financial integration leads to financial and economic volatility (Gourinchas and Jeanne, 2013; Biekpe and Motelle, 2013; Villareal and Bielma, 2017). Thus, scholars are divided by the impact of financial integration on growth. It has been argued that banking integration assist in spreading financial shock/crisis through contagiousness as evidence during global financial meltdown of 2008 (Global Financial Development report, 2017/2018).

One of the reasons for variance in findings among scholars is that the impact of financial integration may in fact be heterogeneous and varies among countries based on income level. Most past studies assumed homogeneous impact of financial integration on growth, even within heterogeneous samples. However, Ibrahim (2016) have shown that the impact of financial integration is heterogeneous and varies across income levels. Again, some of the past studies were focused on the degree of banking sector integration (Illut and Chirlesan, 2012). Thus, it is pertinent to investigate the heterogeneous impact of financial integration across the entire data spectrum and not to rely on the mean estimate as used in most past studies. This study will investigate the impact of banking sector integration on economic growth.

The rest of the work is organized as follows; Section 2 briefly discusses literature review. Section 3 presents methodology and data. Section 4 discusses results. Section 5 summarizes the findings.

## **2. Literature Review**

The debate on the impact of financial integration on growth is without consensus among scholars. Some scholars argue that financial integration ensures that needed capital is readily available, promotes efficiency and leads to specialization in the banking sector, thereby promoting economic growth (Gehring, 2013; Maudos and Fernandez De Guevara, 2015; Nicolo and Juvenal, 2014; Chakraborty et al; 2016; Hooy and Lim, 2013).

Other scholars argue that capital inflows and outflows occasioned by financial integration, especially in economies not well developed to accommodate such capital flows may leads to exchange rate and macroeconomic shocks and therefore promote economic and financial instability (Motelle and Biekpe, 2015; Van-Ewilck and Arnold, 2015; Calliatore, Ghironi, and Lee, 2016). Also, it spreads and amplifies the impact of financial shock across countries as in the case of global economic and financial crisis of 2008 (Fecht, Gruner, and Hartmann, 2012; Neaime, 2016; Paramati, Roca, and Gupta, 2016; Pyun and An, 2016; Milcheva and Zhu, 2015, Lehkonen, 2015).

Other scholars have focused on the determinants of financial integration. Factors such as trade openness, economic growth, economic/financial/political crises, institutions, and membership to regional economic bloc have been reported to be important determinants of financial integration (Alotaibi and Mishra, 2016; Perego and Vermeulem, 2016; Guesmi, Teulon, and Muzaffar, 2014; Bekaert et al; 2013).

**3. Methodology**

This study utilized the quantile regression method to estimate the impact of banking sector integration on economic growth. The standard panel OLS/mean estimators model the relationship between the explanatory variables on the conditional mean of the dependent variable. These estimators fail to take into account the problem of heterogeneity and simply assume that impact to be static across the entire data spectrum. This may however be incorrect especially with heterogeneous sample where the impact varies across data spectrum (Ibrahim et al; 2016). Unlike the mean estimators, the quantile regression as proposed by koenker and Bassett (1978) models the relationship between the explanatory variables on the conditional mean of the dependent variable. Quantile regression model seeks to minimize the absolute sum of error,  $(\min \sum |y_i - \beta x_{is}|)$  but penalizes for over and under-predictions.

Koenker and Bassett (1978) have assigned asymmetric penalties for the *quantiles* in order to optimize the *Least Absolute Deviation* as below;

$$\min \sum_{i=y_i \geq \alpha_q + \beta_q x_s} q |y_i - (\alpha + \beta_i X_s)| + \sum_{i=y_i < \alpha_q + \beta_q x_s} (1 - q) |y_i - (\alpha + \beta X_s)|; \dots\dots 1$$

$$\text{where, } \begin{cases} q \epsilon_{qi} \text{ if } \epsilon_{qi} \geq 0 & \text{under prediction} \\ (1 - q) \epsilon_{qi} \text{ if } \epsilon_{qi} < 0 & \text{over prediction} \end{cases}$$

This equation serves as a check function in the *quantile regression* model which allows for the estimation of the *conditional linear quantile regression* function defined below;

$$q(y_i | x_s) = \alpha_{qi} + \beta_{qi} x_{is} + \epsilon_{qi}; \dots\dots\dots 2$$

where  $q(y_i | x_s)$  denotes conditional quantile representation,  $\alpha_q$  is the intercept at the  $q^{th}$  quantile,  $\beta_{qi}$  is the slope coefficient at the  $q^{th}$  quantile,  $\epsilon_{qi}$  is the error term at the  $q^{th}$ ,  $y_i$  and  $x_s$  are the dependent and vector of explanatory variables respectively. As in the case of *standard OLS*, the  $\beta_{qi}$  measures the marginal effect of the  $X_s$  at the corresponding  $q^{th}$  so that

$$\frac{\partial q(y_i|x_i)}{\partial x_i} = \beta_{qi} \dots\dots\dots 3$$

Some of the strength of the quantile regression method over other mean estimators are; it is most suited for heterogeneous sample and non-normal data as in our case. Also, it is not affected by extreme values/outliers as the parameter estimates apply to specific quantile of the dependent variable. Again, it provides better characterization of the entire data spectrum.

To measure the impact of banking sector integration on economic growth, we present a linear quantile panel model as thus below;

$$y_{qit} = \alpha_{qit} + \beta bi_{qit} + \theta \text{ control variables}_{qit} + \varepsilon_{qit}; \dots\dots\dots 4$$

Where  $\beta$ , and  $\theta$  are coefficients or parameter estimates of financial integration and other control variables our model.  $\alpha$  is the intercept of the model and  $\varepsilon$  is the error term. The subscript  $q$  denotes specific quantile while the subscript  $it$  imply panel. The control variables include investment, inflation, trade, government expenditure, population, and institutional factors. Therefore, inserting these variables into the model we have;

$$y_{qit} = \beta_{0qit} + \beta_1 bi_{qit} + \beta_2 k_{qit} + \beta_3 inf_{qit} + \beta_4 tr_{qit} + \beta_5 gov_{qit} + \beta_6 pop_{qit} + \varepsilon_{qit} \dots\dots\dots 5$$

Except for inflation and population growth rate, all other variables are transformed to log form.

Annual data from 1995-2013 for 105 developed and developing countries is used. Refer to appendix 1 for list of countries. The choice of sample and time dimension is subject to data availability. Real GDP per capita (ly) is used as proxy for economic growth as used by Sarafi (2016) Domestic investment (lk) is measured by gross fixed capital formation and has been utilized in studies by Ahmed (2016) the number of foreign banks (lnfb) is use to proxy banking sector integration. This measure has been used in studies by Consumer price index is used as measure of inflation (inf) similar to Ahmed and Mmolainyane (2014) government final consumption expenditures (lg) is used to represent public expenditure as used by Mmolainyane and Ahmed (2015) Trade ration (ltr) proxies trade openness and is the ratio of the sum of export and import to GDP. This variables has been used in previous studies by Ahmed (2016) finally, population growth rate (pop) is to measure the impact of population growth on economic growth and has been used in past empirical models by Chen and Quang (2014) Data on real GDP per capita, gross fixed capital formation, inflation, government expenditure, trade ratio, and population growth is collect from World Bank World Development Indicator database while data on the number of foreign banks are collected from World Bank Global Financial Development database.

#### 4. Results

The result from Tables 4.1 and 4.2 below present the descriptive statistics and the correlation tables. Table 1 provides the general descriptive statistics and according to the quantiles (25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, an 90<sup>th</sup>). Table 4.3 presents the correlation matrix. From the correlation table, there is low and negative correlation between measure of banking sector integration and economic growth. Population growth is found to be negatively correlated

with growth. All other measures are found to have positive correlation with economic growth, although, weak in most cases.

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Ly	1974	8.60	1.53	5.13	11.62
Lk	1971	23.24	2.94	-4.07	28.81
Lnfb	1940	3.35	0.95	0	4.60
Inf	1974	1.18	1.20	-8.52	1.45
Lg	1974	23.15	2.05	18.39	28.55
Ltr	1974	4.29	0.54	2.69	6.09
Pop	1974	1.23	1.20	-3.82	7.91

Table 4.2: Quantile Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>Ycat = 1</i>					
Ly	494	6.58	0.52	5.13	7.45
Lk	494	21.72	1.61	18.76	27.21
Lnfb	488	3.39	0.89	1.09	4.60
Inf	494	25.08	223.02	-8.52	4145.10
Lg	494	21.25	1.35	18.50	26.01
Ltr	494	4.07	0.48	2.69	5.10
Pop	494	2.26	1.04	-2.04	7.91
<i>Ycat = 2</i>					
Ly	493	8.05	0.29	7.45	8.57
Lk	493	22.70	1.37	20.21	26.40
Lnfb	490	3.50	0.73	1.09	4.510
Inf	493	15.61	63.32	-1.27	1058.37
Lg	493	22.36	1.24	18.39	25.10
Ltr	493	4.36	0.40	3.14	5.13
Pop	493	1.25	1.22	-2.17	5.36
<i>Ycat = 3</i>					
Ly	494	9.16	0.36	8.58	9.97
Lk	494	23.99	1.43	21.10	26.97
Lnfb	486	3.59	0.62	1.60	4.47
Inf	494	9.44	15.39	-4.00	197.47
Lg	494	23.73	1.42	20.66	26.82
Ltr	494	4.32	0.52	2.74	5.39
Pop	494	0.60	0.99	-3.82	2.63
<i>Ycat = 4</i>					
Ly	493	10.62	0.35	9.98	11.62
Lk	490	24.56	4.82	-4.07	28.81
Lnfb	476	2.91	1.28	0	4.56
Inf	493	4.72	2.37	-4.47	1.45
Lg	493	25.28	1.52	21.50	28.55
Ltr	493	4.40	0.66	2.81	6.09
Pop	493	0.82	0.763	-1.85	5.32

Table 4.3: Correlation Matrix

Variable	ly	Lk	lnfb	inf	lg	ltr	Pop
Ly	1.00						
Lk	0.36	1.00					
Lnfb	-0.17	-0.23	1.00				
Inf	0.16	-0.72	-0.02	1.00			
Lg	0.74	0.61	-0.36	0.08	1.00		
Ltr	0.23	-0.16	0.29	0.05	-0.19	1.00	
Pop	-0.49	-0.19	0.13	-0.03	-0.38	-0.13	1.00

Table 4.4 below presents the OLS and Quantile regression results. The result from OLS estimation show that gross fixed capital formation, inflation, and population growth are found to affect growth negatively. Banking sector integration is insignificant to economic, while public expenditures and trade are found to affect economic growth positively. The results from the Quantile estimations revealed that gross fixed capital formation, inflation, and population negatively affect growth except at 90<sup>th</sup> quantile. Again, the coefficients of the quantile estimates between 25<sup>th</sup>-75<sup>th</sup> quantiles are not significantly different from the OLS estimates (for gross fixed capital formation and inflation). With respect to population growth, the quantile estimates (25<sup>th</sup> to 75<sup>th</sup>) are statistically different from the OLS estimate. This implies that the negative impact of population growth on economic growth is larger among low and middle income countries.

The results of the quantile estimations show that public expenditures and trade have positive impact on economic growth. With respect to public expenditures, it is found that except for high income countries, the coefficient is not statistically different with the OLS estimate. For high income countries, the impact of public expenditure on growth is less relative to the low and middle income countries. The quantile results for trade revealed that has greater positive impact for upper middle and high income countries relative to the middle and low income countries. The quantiles estimates for the 75<sup>th</sup> and 90<sup>th</sup> quantiles are statistically different to the OLS estimate.

Estimates from the quantile regressions show that banking sector integration is has no impact on economic growth for low and high income countries. On the contrary, the results show that banking sector integration has negative impact on growth for middle income countries. The quantile plot (Figure 2) provides rather a more detailed impact of banking integration on growth, from the quantile plot, it is evident that banking integration has significantly positive impact on economic growth at a very low income level (below 20<sup>th</sup> quantile). At this income level, the quantile estimate and confidence interval are positive and statistically different from zero.

The results reveal important information with policy implication. The result from table 3 show that the impact of financial integration is not homogenous across the entire sample. Rather, it varies based on income level. Countries differs owing to certain inherent characteristics. To assume that the impact of integration is same for all sample is in fact wrong and misleading. The BP/CW test shows that the sample variance is heterogeneous. Banking sector integration is beneficial for low income countries, especially very low

income countries. Middle income countries are negatively impact while integration has no impact on growth among high income/very high income.

Table 4.4: Least Square and Quantile Regression Results

Ly	OLS Regression	Quantile Regression (25 <sup>th</sup> )	Quantile Regression (50 <sup>th</sup> )	Quantile Regression (75 <sup>th</sup> )	Quantile Regression (90 <sup>th</sup> )
Lk	-0.253*** (0.03)	-0.35*** (0.06)	-0.23*** (0.03)	-0.24*** (0.02)	0.07 (.092)
Lnfb	0.01 (0.02)	0.04 (0.02)	-0.075***+ (0.02)	-0.078***+ (0.01)	-0.020 (0.04)
Inf	-4.33*** (7.29)	-6.35*** (1.19)	-4.71*** (7.16)	-4.11*** (5.28)	1.17 (2.10)
Lg	0.80*** (0.03)	0.90*** (0.05)	0.77*** (0.03)	0.78*** (0.02)	0.62***+ (0.09)
Ltr	1.024***+ (0.03)	0.91*** (0.047)	0.99*** (0.03)	1.13***+ (0.02)	1.17***+ (0.06)
Pop	-.175*** (0.01)	-0.19***+ (0.02)	-0.217***+ (0.01)	-0.219***+ (0.01)	-0.12*** (0.02)
Cons	-8.351*** (0.32)	-8.393***+ (0.434)	-7.595***+ (0.318)	-7.736***+ (0.24)	-11.31***+ (0.58)
Adj-R <sup>2</sup> /Pseudo- R <sup>2</sup>	0.740	0.499	0.531	0.532	0.433
BP/CW test			73.30 [0.0000]		
N			105		

Figure 1: Quantile plot of the dependent variable

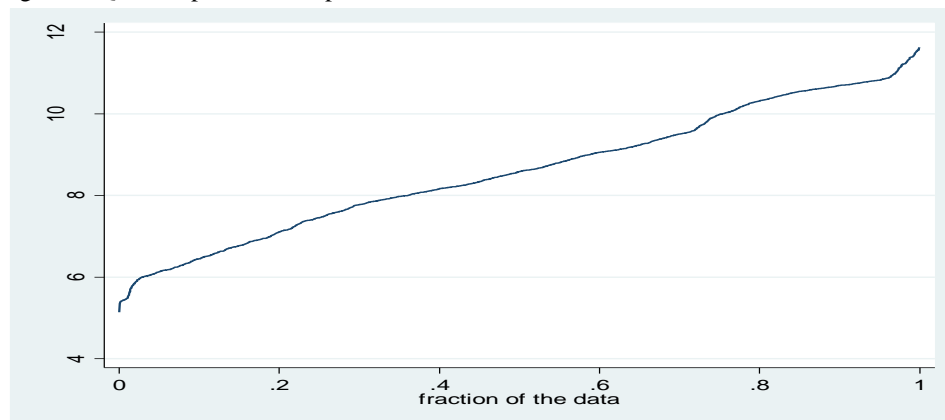
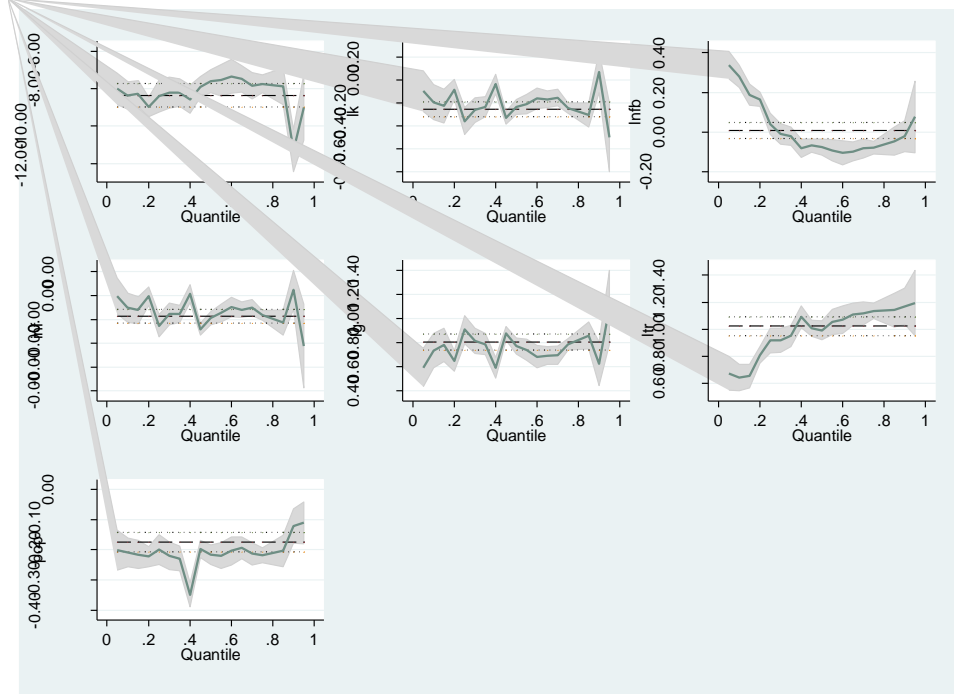


Figure 2: Quantile plot of the parameter estimates



### 5. Summary

The debate on the impact of financial sector integration is contentious. Although the world has witnessed significant increase in the degree of financial integration and capital flow between and among countries/regions, yet its impact on growth is mixed; thus calling for caution among policy makers. This paper argues that the impact of banking sector integration varies across income level. Using annual data from 2000-2015 in a panel of 105 countries and by means of the panel quantile regression, the results show that banking sector integration positively impact on growth among very low income countries but is insignificant among the upper low income and high income countries. On the contrary, the results reveal that banking sector integration affects growth negatively among middle income and upper middle income countries. The study recommends however for further development of the study so that: number of countries should be added and the annual data should go beyond 2015.



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## Appendix 1: list of countries

*Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Benin, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chile, Colombia, Congo Rep., Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt Arab Rep., El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Korea Rep., Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Macedonia FYR, Madagascar, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Morocco, Mozambique, Namibia, Nepal, Netherlands, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Russian Federation, Rwanda, Senegal, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sudan, Swaziland, Sweden, Switzerland, Tanzania, Thailand, Togo, Tunisia, Turkey, Uganda, Ukraine, United Kingdom, United States, Uruguay, Venezuela RB., Vietnam.*