

# The Impact of Urbanization and Industrialization on Bank Development: Evidence from the Gambia

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## ABSTRACT

The aim of the paper is to investigate the extent to which urbanization and industrialization affect bank development in The Gambia. To achieve the objective of this research, the Autoregressive Distributed Lag (ARDL) is employed and to check the robustness of the results, the Fully Modified Ordinary Least Square (FMOLS), Dynamic Ordinary Least Square (DOLS), Canonical Cointegrating Regression (CCR) and VECM Granger Causality are employed on time series data from 1990-2017. The results revealed that urban concentration has a positive impact on banking sector development of The Gambia both in the short and long run. Conversely, industrialization has a significant negative association with bank development in the short run, but insignificant in the long run. Furthermore, the results from the Granger Causality technique revealed a unidirectional relationship moving from both urbanization and industrialization to bank development. Urbanization should be encouraged, as urban development leads to bank development and consequently the banking sector accounts for 90% of the financial industry in The Gambia, which can promote economic growth. Furthermore, the manufacturing industries should increase their level of partnership with the banks in order to ease their financial distress and increase productivity.

**Keywords:** Bank development, Urbanization, Industrialization, Autoregressive distributed lag, Fully modified ordinary least square, The Gambia.

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### Highlights of this paper

- The aim of this paper is to investigate the impact of urbanization and industrialization on bank development of The Gambia.
- The study employed the Autoregressive Distributed Lag (ARDL) and Fully Modified Ordinary Least Square, Dynamic Ordinary Least Square and Canonical Cointegrating Regression to check for the robustness of the results on a time series data from 1990-2017.
- The study suggested that urbanization has a positive impact on bank development, while industrialization has a negative significant impact on bank development in the short run but insignificant in the long run.

## 1. INTRODUCTION

The banking industry has consistently been an attractive area of research, which is due to the fact that banks facilitate the circular flow of money within an economy. As argued by Benfratello *et al.* (2008) and Kendall (2012) the banks ease financial constraints by providing loanable funds, which encourages entrepreneurship, innovation and economic growth. Demirguc-Kunt and Levine (2001) and Levine (1997;2005) stated that proper financial markets and functioning banks lead to a high economic growth rate in a country, and they further explained that efficient and effective financial sectors help in reducing the cost of debt financing and other factors that could retard growth. Fulford (2015) showed that the effect of banking is not only restricted to industrial entrepreneurship, but also affects urbanization; hence, during national banking age of 1863-1913, nearness to a bank create under cultivation of land, efficient production and an increase in population which in turn improved the urban density proxy for economic development. Duranton (2014) argued that the rate of economic growth is influenced by urbanization through the agglomeration effect whereby workers in the urban centres benefit from resource sharing and enhanced matching. Due to this, the clustering of firms and resources has been linked to urbanization (Rosenthal and Strange, 2004). Therefore, urbanization and industrialization should be thoroughly understood due to their paramount characteristics of modernization. However, most studies have neglected the impact of these indicators on bank development (Isiksal *et al.*, 2019). This prompted the authors to write this paper in order to investigate the effects of urbanization and industrialization on bank performance in The Gambia. This paper will make significant contributions to the existing literature; firstly, although urbanization and industrialization have been widely studied, based on the authors' investigation, no study has linked the impact of industrialization and urbanization with bank development. The paper includes urbanization and industrialization under one contextual framework to test their impact on bank development. This paper is structured in the following pattern: Section 2 "represents the literature review on urbanization, industrialization and development", Section 3 is the "methodology- ARDL, FMOLS, DOLS, CCR and VAR-EG Causality Test". Section 4 shows the "data presentation and discussion", while Section 5 is a "summary of analysis and conclusion".

## 2. LITERATURE REVIEW

### 2.1. Urbanization and Industrialization Framework

Due to the limited literature on the relationship between urbanization, industrialization and bank development, studies on financial development and economic growth are used to comprehend this relationship. Bodenhorn and Cuberes (2010) in their study on the North-Eastern United States between 1790 and 1870 using a panel and cross-sectional technique, found that financial development has a strong and positive relationship with urbanization. Kundu (2013) in the case of India, suggested that the urbanization process has different aspects of development, one of which includes financial development. Johansson and Wang (2015) in the case of China and India using a panel data-set, found financial development to be a major cause of urbanization with a feedback relationship. According to

Shahbaz *et al.* (2018) population concentration played a major role in promoting financial development in India, based on their study of the period from 1952-1977. Furthermore, they also established a unidirectional causal relationship that runs from population density to financial development. The study of Rosenthal and Strange (2004) revealed that an increase in productivity by 3.8% can be achieved by doubling the size of cities. Bertinelli and Eric (2004) used a semi-parametric evaluation procedure on a panel of 39 countries (cross-country) ranging from 1960-1990 and established a “U-shaped” relationship between economic growth and urban concentration. McCoskey and Kao (1999) using panel cointegration techniques in 52 states, also found that urbanization has a long-term impact on growth. However, Alam *et al.* (2007) found that swift urbanization growth has negative implications on economic growth by straining social amenities.

In contrast to the models proposed by Oh and Lee (2004) a considerable amount of the economic development literature has paid attention to agglomeration special effects in developing markets. According to Moreno-Monroy (2012) urbanization is a major indicator of the home country viewpoint of emerging markets. The fundamental idea of agglomeration, which was pioneered by Adam Smith, is that personnel in the urban areas are more likely to be more industrious than those residing in rural areas due to spillover and agglomeration effects (Duranton, 2015). This is more likely to be the case because cities offer a wider range of privileges for a large assortment of agglomeration effects, which enable corporations to benefit from being close to each other and facilitate the access to key scarce resources including capital, managerial talent and skilled labour (Sassen, 1991;1994). According to Caves (1996) urbanization causes skills and capital to be clustered in distinct vicinities, which will in turn provide external economies of scale to urban firms, thereby facilitating lower costs of production and an increase in profitability, competitiveness and internationalization. Moreover, Glaeser *et al.* (2001) elucidated that a high level of urbanization leads to an increase in the number of potential consumers, thereby creating agglomeration effects and increasing the profitability of those firms operating within larger cities. Therefore, we argue that urbanization provides a conducive environment for banks to develop in terms of human resources, larger market share, and accessibility to debt financing thus, urbanization is positively associated with bank development.

On the other hand, the following studies were conducted on financial development and industrialization: The study of Rajan and Luigi (1998) revealed that corporations that obtain most of their funding from external or debt finance tend to grow more rapidly in countries with healthy financial markets; and that the cost of debt can be reduced through the existence of a developed and organized financial system. They added that most developing countries are deficient in terms of properly developed capital markets. Yang and Yi (2008) demonstrated a unidirectional association moving from financial development to economic growth in Korea from 1971-2020 by employing the superexogeneity technique. Similarly, Masih *et al.* (2009) used a structural long-run technique to test the causation between economic growth and financial development in Saudi Arabia from 1985-2004. They established a unidirectional causation flowing from financial development to economic growth. Furthermore, Zhang *et al.* (2012) tested the association between growth in economic activities and financial development, using GMM on 286 urban settlements in China from 2001 to 2006. They highlighted a positive association between financial development and economic growth/industrialization. On the contrary, a time series was used by Singh (2008) in India for the period 1951-1996. The analysis supported bidirectional causation between economic growth/industrialization and financial development. Moreover, Isiksal and Chimezie (2016) in the case of Nigeria investigated association between industrialization and GDP employing the “Granger Causality within the framework of VECM” from 1997-2012. Their results revealed that industrialization have a significant positive and bidirectional causal relationship with GDP. Therefore we expect industrialization to have a positive impact on bank development. Eric and Zhoa (2017) also investigated the causal relationship between financial development and

industrialization (aggregate production) using an ARDL model for the case of Cameroon from 1970 to 2014. They found that industrialization had short and long-run effects on financial development.

Table-1. Represent the Summary of literature review.

Authors	Interval	Country	Methodology	Outcome
Bodenhorn and Cuberes (2010)	1790-1870	North-eastern United States	Panel and cross-sectional analysis	FD increase URB.
Shahbaz <i>et al.</i> (2018)	1952-1977	India	EG-Causality	URB→FD
Bertinelli and Eric (2004)	1960-1990	39 countries (cross-country)	Semi-parametric evaluation procedure	“U-shaped relation between FD and GDP Growth
McCoskey and Kao (1999)	1991	52 nations	Panel cointegration	Economic Growth increase URB.
Yang and Yi (2008)	1971-2002	Korea	Superexogeneity analysis	FD→Economic growth
Masih <i>et al.</i> (2009)	1985-2004	Saudi Arabia	Structural long-run technique	FD→Economic Growth
Zhang <i>et al.</i> (2012)	2001 to 2006	286 urban settlements in China	GMM	FD increase Economic Growth
Singh (2008)	1951-1996	India	EG-Causality	FD↔GDP
Isiksal and Chimezie (2016)	1997-2012	Nigeria	EG-Causality	Industry↔GDP
Eric and Zhoa (2017)	1970 to 2014	Cameroon	ARDL	Short and long-run association between FD and IND.

### 3. METHODOLOGY

#### 3.1. Data

In this paper, time series annual data is used for the period 1990-2017. Bank development is used as the dependent variable, while the explanatory variables are urbanization and industrialization, which were obtained from the World Bank database. The selection of these variables (urbanization and industrialization) is based on the study by Jones (1991). However, bank development is included in the model due to its significant contributions in the financial system of The Gambia. This can be written as:

$$\ln BD = f(\ln U \text{ and } \ln I) \tag{1}$$

The model in Equation 1 can be expressed in the following manner:

$$\ln BD_t = \beta_0 + \beta_1 \ln U + \beta_2 \ln I + \epsilon_{it} \tag{2}$$

Where,

$\ln BD$  = log of bank development.

$\ln U$  = log of urbanization.

$\ln I$  = log of industrialization.

$\epsilon_{it}$  = error term.

Table-2. Explanation of the variables.

Variables	Formula	Unit	Source
Bank Development (InBD)	Private credit by deposit money banks to GDP		World Bank (2017)
	The percentage of the urban population in the total population	Percentage	
Urbanization (InU)		Percentage	World Bank (2017)
Industrialization (InI)	Manufacturing Value Added per capita	Value \$	World Bank (2017)

### 3.2. Model Specification

The presence of cointegration among the variables was primarily analyzed with the ARDL technique initiated by Pesaran *et al.* (2001). The key benefit is that the explanatory variables can be of integration order that is level and first difference. The decision that cointegration exists can be made when the F-statistics of the bound test is more than the corresponding critical values. Likewise, if the value of F-statistics is between the upper and lower bounds, then the cointegration finding is inconclusive. Below is the ARDL equation for InBD, InU and InI:

$$\Delta \text{InBD}_t = y_0 + \sum_{i=1}^n y_1 \Delta \text{InBD}_{t-j} + \sum_{i=1}^n y_2 \Delta \text{InU}_{t-j} + \sum_{i=1}^n y_3 \Delta \text{InI}_{t-j} + \sigma_1 \text{InBD}_{t-1} + \sigma_2 \text{InU}_{t-1} + \sigma_3 \text{InI}_{t-1} + \varepsilon_{1t} \quad (3)$$

Where,

$\Delta$  = the difference form of the variables.

$N$  = is the optimal lag number.

$\varepsilon_{1t}$  = error condition.

### 3.3. Bayer Hanck and Bound Cointegration

The cointegration technique established by Bayer and Hanck (2013) jointly analyzed the p values of the single test of cointegration in the Fisher's equation:

$$EG-J = -2 [\ln(P_{EG}) + \ln(P_J)] \quad (4)$$

$$EG-J-B-BDM = -2 [\ln(P_{EG}) + \ln(P_J) + \ln(P_B) + \ln(P_{BDM})] \quad (5)$$

Where,

EG =

p-values of Engle and Granger (1987); Johansen (1988); Boswijk (1994) and, Banerjee *et al.* (1998) represent Equations 4 and 5. The null proposition is rejected when the statistics of Fisher is greater than the critical values. The bound cointegration has the following propositions:  $H_0 = \sigma_1 = \sigma_2 = 0$  and  $H_1 \neq \sigma_1 \neq \sigma_2 \neq 0$ . Following the determination of the presence of cointegration, the error correction model is analyzed using the equation below:

$$\Delta \text{InBD}_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \text{InBD}_{t-j} + \sum_{i=1}^n \beta_2 \Delta \text{InU}_{t-j} + \sum_{i=1}^n \beta_3 \Delta \text{InI}_{t-j} + \text{ECT}_{t-1} + u_t \quad (6)$$

Where,

$\Delta$  = change in the variables.

$\text{ECT}_{t-1}$  = one period lagged error correction condition.

### 3.4. Long-Run Estimation

The long-run correlation between the cointegrating variables can be analyzed by examining a single cointegration vector. The "Fully Modified OLS", as propounded by Phillips and Bruce (1990) can be utilized to analyze the long-run effect. This approach has the benefit of achieving asymptotic performance; hence, it checks the autocorrelation that occurs and eliminates the endogeneity problem amongst the variables. Moreover, the "Dynamic OLS" method as propounded by Stock and Mark (1993) and "Canonical Cointegrating Regression" will be used to analyze the robustness of the FMOLS. The DOLS method additionally has the characteristics of evading

the viable outcomes of the endogeneity of the regressors that might also arise. The cointegration equations may be carried out to the specific order of series presented that there is long-run cointegration between the estimated variables, at this stage the model can be written as follows:

$$\ln_t BD = \alpha_{it} + \beta_{1i} \ln U + \beta_{2i} \ln I + \beta_{3i} \ln + e_{it}; \tag{7}$$

Where,

$\alpha_{it}$  = the country specific effects.

$\ln BD$  = natural log of bank development.

$\ln U$  = natural log of urbanization.

$\ln I$  = natural log of industrialization.

$\varepsilon$  = error term.

#### 4. DATA PRESENTATION

##### 4.1. Unit Root Test

The ADF unit root test in Table 2 suggests  $\ln BD$ ,  $\ln U$  and  $\ln I$  have unit roots at level but are stationary at first difference. Therefore, the null hypothesis that a unit root exists at level is rejected and the corresponding hypothesis of stationarity is accepted hence the p values of the differenced variables are < 5% significance level.

Table-3. Augmented Dickey Fuller fisher unit root.

Variables	Level				First difference			
	Intercept		Intercept & trend		Intercept		Intercept & trend	
	ADF	P value	ADF	P value	ADF	P value	ADF	Pvalue
$\ln BD$	-3.807	0.8991	-3.151	0.1160	-3.945	0.0058***	-3.8537	0.0295***
$\ln U$	-1.983	0.2917	-1.925	0.6127	-3.510	0.0209***	-3.8462	0.0314***
$\ln I$	-1.953	0.3041	-2.767	0.2207	-3.602	0.0128***	-3.5276	0.0571**

Note: The SIC criterion is used for the optimal lag selection.

##### 4.2. Cointegration Test

The Bayer-Hanck results provided evidence for the presence of cointegration; hence the statistics of Fisher is greater than the critical values at 5% significance.

Table-4. Bayer-Hanck cointegration test.

Variables	Fisher's statistics		Cointegration
	EG-J	EG-J-B-BMD	
$\ln BD$ ( $\ln U$ , $\ln I$ )	55.9118412**	166.45393**	Yes
Significance level	Critical values		
5%	10.858	21.342	

Note: \*\*\* and \*\* represent 1% and 5% respectively.

The bound results of cointegration in Table 5 indicate a long-run cointegration among the variables. Hence, the null supposition of no cointegration between the variables is rejected if the  $F_{pss}$  value is above the "bound critical value" at 5% significance.

Table-5. Bound test of cointegration.

Dependent variable	F-statistics (F <sub>pss</sub> )	Bound critical value**		Cointegration
		I(0)	I(1)	
InBD=f(InU, InI)	22.44*	3.17	4.14	Yes

Note: \*indicates the null hypothesis of no cointegration at 5%. \*\* The bounds critical values are taken from Pesaran, Shin, and Smith (2001) with unrestricted intercept and no trend.

4.3. Short Run and Long Run Analysis

Table-6. Auto regressive distributed lag (ARDL).

Variables	Coefficient	t-statistics	P values
$\Delta InU$	53.00358	4.394550	0.0007***
$\Delta InU (-1)$	7.158925	0.471690	0.6450
$\Delta InU (-2)$	55.15468	4.000692	0.0015***
$\Delta InI$	-0.157917	-0.575594	0.5747
$\Delta InI (-1)$	-1.322009	-4.604635	0.0005***
$\Delta InI (-2)$	-1.144027	-4.036628	0.0014***
$\Delta InI (-3)$	-1.889694	-5.275040	0.0002***
$ECT_{t-1}$	-0.750478	-8.812607	0.0000***
R <sup>2</sup>	0.858672		
DW	2.088535		
Normality	3.2420		0.1977
LM Serial correlation	0.7671		0.6814
Heteroskedasticity	6.6210		0.7609
Ramsey	0.5007		0.4927

Note: \*\*\* \*\* \* indicates the level of significance at 1% 5% and 10%.  $ECT_{t-1}$  represents the estimated error correction coefficient in the model and Durbin Watson.

Table 6 presents the short-run ARDL estimation. The analysis revealed that urbanization has a significant positive association with bank development. Thus, an increase or decline in urbanization will cause an increase or decrease in bank development. However, industrialization is reported to have a negative association of -1.322009, -1.144027, and 1.889694 with bank development at lag 1, 2 and 3 respectively; thus, an increase or decline in industrialization will cause a decline or increase in bank development.

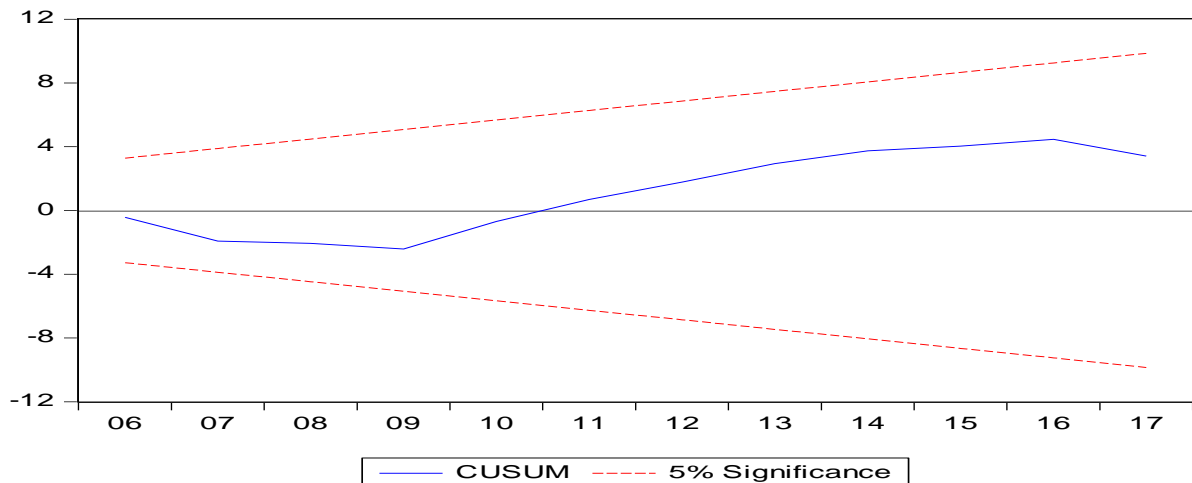


Figure-1. Cusum test.

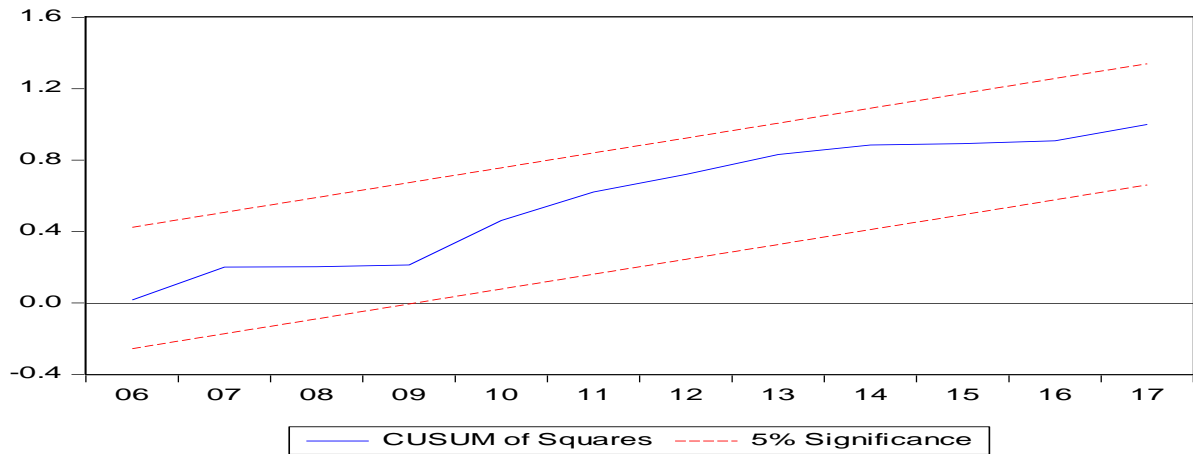


Figure-2. Cusum of squares test.

Table 6 reports the short-run model and diagnostic tests for the ARDL-ECM framework. The results show that there is no serial correlation and heteroskedasticity; according to the Ramsey RESET test, the model is well-specified, which implies the stability of the model. Furthermore, the CUSUM and CUSUMsq showed in Figure 1 and 2 respectively as suggested by Brown *et al.* (1975) were conducted to test the robustness of stability in the model. The two figures show that the plots of CUSUM and CUSUMsq are 5% significant hence the blue lines are within the red lines.

Table-7. Fully modified OLS (FMOLS), dynamic OLS (DOLS) and canonical cointegrating regression (CCR).

Variables	FMOLS	DOLS	CRR
InU	2.4049*** (0.0000)	3.8655*** (0.0151)	2.3836*** (0.0000)
InI	-0.0363 (0.9464)	0.9197 (0.7607)	-0.0709 (0.8882)
C	-3.0375	-6.1330	-2.9487
R <sup>2</sup>	0.86	0.94	0.86
Adj. R2	0.8634	0.9141	0.8501
S.E	0.0570	0.0431	0.0574
Long run	0.0052	0.0026	0.0052

Note: InU= Urbanization, and InI=Industrialization. The brackets symbolize the P values while, \*\*\*\*\*, \*\*\*, \* represent 1%, 5% and 10% significance level respectively.

The long run estimations in FMOLS, DOLS and CCR revealed that urbanization has a positive impact on bank development at 1% significance level and that a 1% increase in urbanization in The Gambia will cause an upward shift in bank development in the long-run by 2.4%, 3.86% and 2.38% respectively. Furthermore, the analysis from FMOLS and CCR showed that industrialization has an insignificant negative influence on bank development, while DOLS reported an insignificant but positive relationship.

#### 4.4. Causality Test

Table-8. VAR granger causality test.

H0: absence of causality	F-statistics	P-value
InU → InBD	5.5570	0.0621*
	0.7623	0.6831
InI → Nbd	16.6117	0.0002***
	0.9440	0.6237

Note: InU= Urbanization, and InI=Industrialization. \*\*\*\*\*, \*\*\*, \* represent 1%, 5% and 10% significance level respectively.



Table-9. VECM granger causality test.

Variables	Coefficient	T-statistics	P values
All→InBD	-0.155575	-3.146926	0.0009***
All→InU	0.000645	0.863433	0.3999
All→InI	0.049556	1.879183	0.0775*

Note: \*\*\*\*\* represent 1%, 5% and 10% significance level respectively.

The results from the VECM Granger Causality test in Table 8 reveal a unidirectional causal relationship flowing from urbanization and industrialization to bank development. Thus, the H<sub>0</sub> (null hypothesis) of the non-existence of a causal relationship between bank development and the explanatory variables is rejected. The VECM causality analysis in Table 9 suggests that jointly, both InU and InI have a causal association with bank development, while both InBD and InU have a joint causality on industrialization. Conversely, bank development and industrial agglomeration have no joint impact on urban concentration.

## 5. CONCLUSION

The aim of this paper is to investigate the effects of urbanization and industrialization on banking development for The Gambia. The ARDL, FMOLS, DOLS, CCR and EG Causality test are used on time series data from 1990-2017. The results from the short run ARDL revealed a positive association between urbanization and bank development; however, a negative association between industrialization and bank development is found. This implies that an increase in industrialization will cause a decline in bank development.

In addition, based on the long run results from the dynamic model, urbanization has affected bank development positively; this implies that an increase in urban concentration will result in an improved banking sector in The Gambia. Our findings concur with those of *Shahbaz et al. (2018)* whose study suggested that population density has played a key role in promoting financial development in India. Conversely, an insignificant negative association between industrialization and bank development was found in the long-run, although this relationship is significant in the short-run. Furthermore, the results from the Granger Causality technique revealed a unidirectional relation moving from urbanization and industrialization to bank development. Moreover, the joint causality analysis suggested that jointly, both InU and InI have a causal association with bank development; similarly, both InBD and InU have a joint causality on industrialization. Conversely, bank development and industrial concentration have no joint impact on urban concentration.

Based on the results presented in this section we recommend that urbanization should be encouraged; hence, urban development leads to bank development and consequently the banking sector accounts for 90% of the financial industry in The Gambia, which can promote economic growth. Equally, banks should increase their services and number of branches in rural areas to control rural-urban migration and to mitigate the struggle of workers in rural areas, whereby the majority have to travel many kilometres to access their salaries. The manufacturing industries should increase their level of partnership with banks in order to ease their financial distress.

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