

Industrialization, Finance, and Urbanization in Africa

OLUWATOSIN ADENIYI AND OLUDELE FOLARIN

ABSTRACT | This article investigates two key questions: what is the impact of industrialization on urbanization in Africa? And to what extent does financial development affect this industrialization–urbanization nexus? To elicit answers to these questions, data from 33 African countries over a period of 28 years were analyzed using a dynamic panel estimator. The findings showed that industrialization had positive and significant effects on urbanization. Further, the study shows that financial development had a positive effect on urbanization, although it lowers the positive effect of industrialization on urbanization. Hence, industrial policies, particularly those with marked job creation possibilities, should be accompanied by well-designed urban planning policies in order to sidestep the adverse socioeconomic consequences connected with the development of slums in urban areas.

KEYWORDS | urbanization, industrialization, financial development, Africa

JEL CLASSIFICATION | G2, L16, O18, N17

Urbanization in the literature has been argued to be an outcome of a number of factors including industrialization. Industrialization is deemed particularly critical since it is argued to propel economic transformation (Ajakaiye and Page 2012; Mijiyawa 2017). Since the early 2000s, there has been increased interest by policymakers and academics in understanding the extent to which a number of policies implemented post-1970s yielded the desired outcome in Africa, that is, economic transformation (Monga 2012). Recent studies (including Ajakaiye and Page 2012; Jayne, Chamberlin, and Benfica 2018) on Africa have basically argued that economic transformation occurred but also emphasized that it is

Oluwatosin Adeniyi, *corresponding author*, Department of Economics, Faculty of Economics and Management Sciences, University of Ibadan, Ibadan. Email: saino78@yahoo.com; Oludele Folarin, Centre for the Study of the Economies of Africa (CSEA), Abuja. Email: oludelefolarin@gmail.com.

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different from what was recorded in Asian countries. One of the key features of economic transformation evident in African countries is the growing number of cities, which in turn is associated with an increase in the level of urbanization (Duranton 2015; Ebeke and Etoundi 2017).

In the literature on economic transformation, urbanization (the share of urban population to total population) is argued to be driven primarily by industrialization (share of manufacturing value added in total output). In Africa, the experience can be aptly described as deindustrialization. For instance, in South Africa, industry share of output stood at 21.6% in 1970, declined to 17.5% in 2000, and further to 11.8% in 2018. In Nigeria, the share of manufacturing value added in total output followed similar pattern to that of South Africa, as it declined from 21.4% in 1981 to 8.4% in 2018. For Ethiopia, the statistics stood at 4.3% in 1981 and increased marginally to 5.8% in 2018.

While the level of industrialization has not changed markedly over the last four decades in most African countries, the level of urbanization has dramatically increased over the same period. For instance, in Ethiopia, the level of urbanization rose from less than 11% in 1981 to 20.8% in 2018. Similarly, in South Africa, it rose from 48.6% in 1981 to 66.4% in 2018. Also, in Nigeria, it was less than 25% in 1981 and by 2018, it had increased to 50.3%. Economic transformation in Asian countries was seen to be driven, in large part, by the financial sector, which provided the needed finance used for infrastructural investment (Bonin and Wachtel 2003). This, in turn, fostered industrialization in most Asian countries in the mid-1980s. The positive role of finance in Asian countries, given the level of financial repression in developing countries, led to the implementation of financial reforms in most African countries in the 1980s, which subsequently contributed to the marginal development of the financial sector in Africa (Fowowe 2013; Folarin 2019).

Given the abovementioned narrative, this study seeks to understand whether the variation in the level of urbanization observed in African countries is explained by their level of industrialization. This inquiry is important given the conclusion in Gollin, Jedwab, and Vollrath (2016), which shows that urbanization could occur in developing countries regardless of the level of industrialization. The authors argued that urbanization that takes place in the absence of industrialization might be caused by an increase in natural resource export, which increases the country's average income, thereby leading to an upsurge in urbanization. This effect was regarded as the city consumption effect.

While the urbanization literature evolved around studies on the causes and effects of rapid urbanization (Yang 1990; Gollin, Jedwab, and Vollrath 2016; Henderson, Adam, and Uwe 2017; Wang et al. 2020), it is observed that there is yet to be a study that specifically examined the impact of industrialization on urbanization on the one hand and the intervening role of the level of

sophistication of domestic financial markets on the nexus between industrialization and urbanization on the other hand. This study, therefore, attempted to fill these gaps. In this study, and to explore the latter objective, we argued that since financial institutions are mostly clustered in the cities and provide funding for industrial development, financial development might indirectly contribute to the rising level of urbanization in Africa. This study, therefore, also seeks to understand whether the level of financial sector development matters in understanding the effect of industrialization on urbanization in Africa. To achieve this objective, data from 33 African countries over the period of 1991 and 2018 was analyzed using dynamic panel estimator. The persistence in urbanization data informed the use of dynamic panel estimator over static panel estimator.

As a foretaste, the study findings showed that industrialization had a positive and significant effect on urbanization regardless of the measure of industrialization and when the interaction of industrialization and financial development is introduced in the model. Furthermore, the study findings show that regardless of the measure of financial sector development, whether it is measured from a financial services perspective or a financial depth perspective, financial development has two effects: first, it leads to an increase in urbanization; second, it had a reducing effect on the positive impact of industrialization on urbanization. This counterintuition is clear from the following simple thought experiment: the cluster nature of financial sector in the urban centers should enhance the migration from rural areas to the urban areas in search of jobs either in the financial sector or other sectors that the financial sector has aided to grow through its lending functions. However, the findings suggest that expansion of financial services to previously unbanked areas may lower the rate of urbanization arising from industrialization in African countries. This leaves the precise nature of the moderating influence of financial development unclear.

This study contributes to the policy dialogue on economic transformation in Africa by shedding light on the nexus between industrialization and urbanization in Africa. Overall, the study findings showed a positive relationship between industrialization and urbanization. In addition, the study established that financial sector development helps in curtailing the rate of urbanization associated with industrialization.

The remainder of this article is structured as follows. Section two presents a review of the literature on the linkage between industrialization and urbanization. Section three explains the research design adopted in this article; it comprises of the empirical framework and the methodology employed in the article. Section four provides parameter estimates showing the direction of the relationship between industrialization and urbanization as well as with financial development intervening. Section five contains the conclusion and the recommendations.

REVIEW OF RELEVANT LITERATURE

There are two competing schools of thought with regard to urbanization, namely modernization theory and urban bias theory (Lipton 1977; Njoh 2003). Both theories are premised on models of structural transformation as presented in Lewis (1954), where the author argued that structural transformation brings about movement of labor from the agricultural sector into a modern sector. It is generally assumed that agricultural activities are performed in the rural areas, whereas modern activities are performed in the urban areas (Black and Henderson 1999). The divergence between modernization theory and urban bias theory is rooted in the explanation for the causes of labor movement from the rural areas to the urban areas, which results in increases in urban population relative to the total population.

Modernization theory, as the name connotes, argued that urbanization is a natural outcome of economic development as established by Lewis (1954). In other words, as an economy transits from an agrarian economy to a modern economy, urbanization takes place. Expansion of activities in the modern sector is the source of labor migration from rural areas to the urban areas. Urban bias theory, however, contended with the modernization theory by arguing that development in the urban areas is the outcome of government policies, which favor the urban areas over the rural areas in the provision of infrastructural facilities (Lipton 1977). According to urban bias theory, urbanization is rooted in bias in government policies, which accelerated the rate of development in the urban areas and not a natural outcome of economic development. This theory could explain, in part, why urban development in most African countries is concentrated in state capitals or locations where ports are sited (Smart 2018).

The measure of industrialization is rooted in two approaches—output and employment approach (Itaman and Awopegba 2021). Under the output approach, industrialization is measured as the share of industrial output in total output while under the employment approach, it is measured as the share of industrial sector employment in total employment. Urbanization entails migration of people from rural areas to urban areas. This indicates that if increased industrial output is not associated with increased employment, the effect of industrialization on urbanization might depend on how it is measured, and employment-based approach is likely to have more pronounced effect on industrialization.

Njoh (2003) investigated whether urbanization is associated with development in sub-Saharan African countries. Development was measured by the Human Development Index (HDI). United Nations used HDI to trace and

compare the living standard of people in a country at a given period. HDI estimates are based on a country's per capita income, life expectancy, and literacy rate. In the study, African countries were grouped into two categories, more urbanized and less urbanized, and the value of HDI was then compared across the two groups. The findings showed that urbanized African countries on average have higher HDI when compared to countries that are less urbanized. This finding suggests that increasing urbanization is associated with greater economic development.

A more recent study by Ebeke and Etoundi (2017) investigated the effect of natural resources on urbanization and the quality of life in cities in African countries. Their findings showed that natural resources contribute to the rapid pace of urbanization in Africa. This is consistent with Gollin, Jedwab, and Vollrath (2016) that focused on developing countries. Gollin, Jedwab, and Vollrath (2016) argued that with or without industrialization, urbanization will take place in the presence of natural resource exports. In their opinion, the traditional channel of industrialization, if it holds, would only intensify the rate of urbanization for countries with natural resources exports. Also, Ebeke and Etoundi (2017) established that the quality of life (which was measured by proportion of the urban population living in slum households) deteriorated with an increase in urbanization. Their findings suggest that there is a need to rethink the assumed linkage between growth in cities and industrialization (Hoselitz 1953; Scott 1986), especially when the population of people residing in a city can no longer be supported by the existing facilities.

One of the deliberate policy tools used by most African governments to boost industrialization and economic growth in the mid-1980s is the liberalization of the financial sector (Fowowe 2013). The policy to some extent contributed to the development of the African financial sector, although financial markets in Africa still lag behind other developing countries (Allen et al. 2014). Harrison, Lin, and Xu (2014), in a cross-sectional analysis that comprised of firm-level data from several world regions, showed that low access to finance, in addition to other factors, such as lack of infrastructure and political competition, explained the low level of manufacturing sector productivity in African countries relative to other regions. This is consistent with the findings in Fowowe (2017), which exclusively focused on African countries and found evidence that showed that firm performance increased with access to finance. Since financial institutions are mostly clustered in the cities and have incentives to provide funding for industrial development compared to agricultural activities in the rural areas, this study, therefore, examines whether the level of financial sector development matters in understanding the effect of industrialization on urbanization in Africa.

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EMPIRICAL FRAMEWORK, DATA, AND METHODOLOGY

Empirical Framework

In order to understand the effect of industrialization on urbanization in African countries as well as the intervening role of financial development on the main relationship of interest, this study incorporates ideas in Adeniyi, Ajide, and Salisu (2015), King and Levine (1993), and Rajan and Zingales (1998), although these studies focused on the only related issue of financial sector development and economic growth. While this study is on urbanization, we premised this study on the assumption that financial development may suggest an unequal distribution of firms between rural and urban areas. The high cost of rendering financial services in rural areas relative to the urban areas arises because the purchasing power of rural dwellers is lower. As a result, financial institutions are more likely to expand their operations in the urban areas and may be less willing to do the same in the rural areas. For instance, in sub-Saharan Africa, 23.2% of adults had an account with financial institutions in 2011 and this figure rose by 9.6% in 2017 to 32.8%. In rural areas, it was 19.4% in 2011 and 29.9% in 2017 (World Bank 2020).

Q2

Also, in South Africa, in 2011, the proportion of adult population in urban areas with an account stood at 53.6%, whereas it was 46.3% in rural areas. In 2017, the share of adults with account in financial institutions stood at 67.4%, whereas the estimate for rural areas was 66.9%. While aggregate and rural area estimate recorded an improvement, it is shown that the level of financial inclusion is slightly lower in rural areas, although the gap appears to have reduced over time. In Ghana, in 2011, 29.7% of the urban adult population had an account with the financial institutions, whereas the estimates are a bit lower in rural areas, as it stood at 25.5%. By 2017, the share of the adult population with an account with the financial institutions had increased to 42.3%, whereas rural population rose to 37.4%, maintaining a gap of 5%. Again, in Benin Republic, it is reported that 10.5% of the adult population have an account in financial institutions, whereas 8.5% had it in rural areas. In 2017, the proportion of the adult population with an account with the financial institutions rose to 31.9% in urban areas, whereas the estimate for rural area rose to 29.3%. Similarly, the estimate for the rural areas remains lower than the national average by approximately 2%. Overall, the improvement in financial sector development is, therefore, expected to have higher impact in the urban areas than in the rural areas based on the coverage of the financial institutions. This contradicts the theory of urban bias, which argues that growth in urban population is caused by deliberate government policies that favor urban areas. It then suggests that the presence of more financial institutions in the urban areas would attract more

people from the rural areas in search for financial services. Also, the presence of more financial institutions in the urban areas implies that firms in the urban areas are more likely to have access to affordable financial products, thereby supporting their expansion, and creating more jobs in the urban areas. The net effect of the excessive presence of financial institutions in the urban areas than in the rural areas is expected to lead to an increase in the level of industrialization and thereby urbanization. However, if the impact of financial sector development in the rural areas reduce the incentive for rural dwellers to migrate to urban areas when their financial demands are met, the implication of this is that financial development has the potential of slowing down the rate of rural-urban migration. Hence, the moderating impact of financial development on the industrialization-urbanization interactions is ambiguous.

From the foregoing, we first argue that urbanization is influenced by both the level of industrialization and financial sector development. Thus, the urbanization equation is expressed as follows:

$$URB_{it} = \beta_0 + \beta_1 IND_{it} + \beta_2 FD_{it} + \beta_3 IND_{it} * FD_{it} + u_i + v_t + \varepsilon_{it} \quad (1)$$

Where URB is the level of urbanization in country *i* and year *t*. Urbanization is computed as the ratio of urban population to total population, IND is the measure of industrialization, FD is the measure of financial sector development, $IND_{it} * FD_{it}$ is the interaction term of industrialization and financial development, u_i denotes country effect and v_t denotes year-fixed effect. Two measures of industrialization are considered in this study: the ratio of manufacturing sector output to total output (MANUGDP) and the ratio of manufacturing sector employment to total employment (EMPLIND). The ratio of manufacturing sector output to total output is the most commonly used measure of industrialization in the literature. In this study, however, we complimented that measure with an alternative measure of industrialization, which is the ratio of manufacturing sector employment to total employment. The two measures have a correlation coefficient of 0.43 and it is statistically significant at the 5% level. The low level of correlation between employment ratio and output ratio indicates the low level of manufacturing capacity utilization in most African countries and the rigidity firms faced in aligning staff strength with output level whenever the firm is experiencing some constraints in doing business.

Similarly, financial sector development was measured as the ratio of credit to the private sector to gross domestic product (GDP; DCPS). An increase in the ratio implies an improvement in the level of financial development, whereas a decrease denotes a deterioration in the level of financial development. For robustness, an alternative measure of financial sector development was used, the ratio of broad money to GDP (BROAD MONEY). Broad money is the

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summation of narrow money, which is highly liquid, with less liquid form of money, savings, and time deposits. This measure of financial sector development captures the depth of the financial sector. Similar to the interpretation of the ratio of credit to the private sector to GDP in relation to the financial sector development, an increase in the ratio of broad money to GDP indicates an improvement in the level of financial sector development, whereas a decrease denotes a deterioration.

We extended equation 1 to include the lagged value of the dependent variable given that it exhibits an upward trend. This enables us to test whether persistency holds. Persistence is deemed to have occurred when the lagged urbanization level has positive and significant effect on contemporaneous urbanization level. We expect persistence to hold because the ratio of urban population to total population is on the increase for nearly all African countries over the period considered in this study. In addition to the lagged value of urbanization, we also included a set of control variables. Equation 1 is reexpressed as follows:

$$URB_{it} = \alpha_0 + \alpha_1 URB_{it-1} + \alpha_2 IND_{it} + \alpha_3 FD_{it} + \alpha_4 IND_{it} * FD_{it} + \mathcal{G}' sX_{it} + u_i + v_t + \varepsilon_{it} \quad (2)$$

Where URB, IND, and FD are as designated earlier, while X is the vector of the control variables, u_i denotes country effect, and v_t denotes year-fixed effect. The control variables used in the study are the level of economic development (log GDPPC), population growth rate (POPG), the development in information and communications technology (ICT; MOB100), trade openness (TRADE), and inflation rate (INFDEF). The level of economic development (log GDPPC) is measured as the natural logarithm of the real value of GDP per capita at constant 2,010 US\$. The use of constant 2,010 US\$ rather than local currency was informed by the need to ensure cross-sectional consistency in the measure of the income per capita as well as to eliminate the effect of exchange rate regime variations.

Population growth (POPG) measures the rate of changes in the population of a country. The development in ICT is measured as the number of the population per 100 with a mobile phone. It is assumed that an increase in this measure is an indication that more people are adopting the use of technology. Trade Openness (TRADE) is the ratio of the sum of import and export to GDP. Inflation rate (INFDEF) is the rate of change in GDP deflator. It captures the level of macroeconomic stability. A high inflation rate denotes macroeconomic instability, whereas a low inflation rate suggests macroeconomic stability.

In equation 2, α_2 and α_4 are the two important parameters for this study. The α_2 shows the direct impact of industrialization on urbanization. A positive coefficient indicates that industrialization drives urbanization, whereas a negative indicates that industrialization reduces urbanization. The α_4 shows the conditional impact of financial development on the effect of industrialization on urbanization. As a result, the net effect of industrialization on urbanization is obtained as follows: $\alpha_2 + \alpha_4 * \overline{\ln(FD)}$, where FD is the mean of financial development for the periods covered in the study and \ln is natural logarithm.

Data and Methodology

This study employed a panel data approach, which comprises of time dimension and cross-section dimension in examining the impact of industrialization on urbanization as well as the potential moderating effect of financial development on the primary nexus of interest. The study employed a sample of 33 African countries¹ over the period of 1991 to 2018. Two basic conditions were used in selecting the countries: first, the country must have data on urbanization over the period of 1991 to 2018.² Second, the country must have considerable number of observations for the key variables: financial development, and industrialization. To avoid altering the data-generating process, all missing periods were not filled. This explains why the total number of observations across the 11 variables presented in Table 1 are not the same. However, given our inclusion criteria, the variable with the lowest data points is the ratio of credit to private sector as a ratio of GDP (DCPS) with 313 observations, out of a maximum obtainable data point of 330, given a ratio of 94.8%.

DCP is the ratio of credit to private sector to total GDP; Broad money is the ratio broad money to total GDP; GDPPC is Gross Domestic Product Per capita; EMPLIND is the ratio of employment in the industrial sector to total employment; INFDEF is inflation rate computed based on GDP deflator; MANUGDP is the ratio of manufacturing sector output to total GDP; MOB100 is mobile phone subscription per 100 persons; POPG is population growth rate; TRADE is trade openness and it is computed as the ratio of the summation of import and export to GDP; URB is urbanization and it is ratio of urban population to total population; and NATURAL is natural rent and it is the ratio of natural rent to total GDP.

The descriptive statistics of the variables used in the study are presented in Table 1. It is seen that the ratio of urban population to total population stood at an average value of 39.1% with a standard deviation of 17.4%. The average value of the ratio of domestic credit to the private sector to GDP for the period covered and the countries sampled is 23.1% with a standard deviation of 27.7%. This suggests that the level of financial development exhibits some degree of

TABLE 1 | Descriptive Statistics

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
BROAD MONEY	328	35.564	25.353	6.16	119.317
DCPS	313	23.146	27.699	1.194	152.484
EMPLIND	320	15.349	9.78	1.505	42.985
GDPPC	330	2,411.212	2,810.39	210.804	14,417.1
INFDEF	330	9.932	12.947	-10.422	98.795
MANUGDP	325	11.328	5.815	0.713	34.768
MOB100	326	39.793	46.464	0	184.298
POPG	330	2.272	1.023	-5.052	7.371
TRADE	324	71.096	35.019	15.403	211.354
URB	330	39.054	17.35	6.364	89.37
NATURAL	297	10.049	9.716	0.002	55.473

fluctuation since its standard deviation exceeds the mean. The mean value of the ratio of broad money to GDP stood at 35.6% with a standard deviation of 25.4%. The mean of manufacturing output to total output is 11.3%, whereas the average ratio of manufacturing employment to total employment is 15.3%. This is an indication that employment ratio on the manufacturing sector is on average higher than output contribution.

Murphy, Shleifer, and Vishny (1989) established that urbanization through homogenous tastes and higher income creates demand effects that bring about industrialization, thus resulting in endogeneity problem of reverse causality. Consequently, the data analysis was performed on equation 2 and was estimated using a system Generalized Method of Moments (GMM) estimator. In addition to the problem of endogeneity, GMM estimator is the appropriate estimator based on three reasons. First, the use of fixed effect estimators has been established to yield inefficient estimates in the presence of lagged dependent variable. Second, the time dimension is smaller than the number of cross sections. Third, the issues bordering on inaccuracy in the determination of firms that strictly fall under the manufacturing group makes the measurement of industrialization highly susceptible to measurement errors. Given the dynamic nature of the model, system GMM yields more accurate estimates in the presence of measurement errors.

It is important to describe the identification and exclusion restrictions, which Asongu and Acha-Anyi (2019) noted has critical in validating the soundness of GMM estimation. Identification entails the selection of the dependent, endogenous variables, and exogenous variables (Asongu and Acha-Anyi 2019). In this study, the dependent variable is urbanization, and all explanatory variables are considered suspected endogenous given that all variables have the likelihood of being endogenously related to urbanization. However, years are considered

exclusively exogenous variables. The identification strategy employed was established in Roodman (2009) and adopted in Asongu and Acha-Anyi (2019) and Tchamyou and Asongu (2017).

As earlier reported, we included the lagged of the dependent variable to address simultaneity. Further, we evaluated the validity of the exclusion restriction using Difference in Hansen Test (DHT) for instrument exogeneity. The exogenous instrument is only valid when we reject the null hypothesis suggesting that the instruments explain the rate of urbanization in African countries only through the identified suspected endogenous variables considered in equation 2. Furthermore, for accurate estimation, the number of instruments is expected to be lower than the number of countries. Consequently, we averaged the data over 3 years to arrive at 10 data points from 1991 to 2018. As reported in Tables 2 to 6, the estimation procedure is satisfied as the null hypothesis was not rejected in the estimated models. The DHT null hypothesis is similar to the standard Instrumental Variable (IV) procedure, where we test the Sargan over-identifying restrictions (OIRs). The Sargan OIRs test investigates the strictly exogenous variables affect urbanization rate exclusively through the suspected endogenous variable channels (Tchamyou and Asongu 2017).

EMPIRICAL FINDINGS

The result of the estimated parameters of equation 2 is presented in Table 2 with the level of financial sector development measured as the ratio of domestic credit to the private sector as a ratio of GDP (DCPS), that is, the level of financial services rendered by the financial institutions. Industrialization is measured as the ratio of manufacturing output to total GDP. The results in Table 2 column (1) indicates that urbanization exhibits persistence. This is because the lagged value of urbanization had a significant effect on the contemporaneous value of urbanization. Given that the coefficient is positive and slightly higher than one, this result suggests that a change in the lagged value of the level of urbanization leads to more than a proportionate change in the contemporaneous value of the level of urbanization. In other words, the urban population grows at a geometric rate. The coefficient of per capita income is negative and significant at the 5% level. The sign obtained appears to contradict *a priori* expectation of a positive relationship. The inverse relationship experienced could be interpreted to mean that improvement in average income level in African countries makes an average person remain in the rural area, however, when the economy deteriorates, the incentives for rural dwellers to migrate to the urban areas in the search for higher remuneration increases. Although, the job might be unavailable, or the few available jobs become oversubscribed. Nevertheless,

TABLE 2 | Industrialization (Output Approach), Financial Service Development, and Urbanization

	(1)	(2)	(3)	(4)	(5)
URB(-1)	1.106*** (0.009)	1.06*** (0.02)	1.08*** (0.013)	1.068*** (0.02)	1.066*** (0.015)
Log(GDPPC)	-1.402*** (0.123)	-0.988** (0.414)	-0.543** (0.235)	-1.208** (0.486)	-0.515 (0.318)
Log(MANUGDP)	-0.033** (0.014)	0.162*** (0.058)	0.135*** (0.047)	0.11* (0.058)	0.163** (0.06)
POPG	-0.085*** (0.018)	0.043 (0.065)	0.306*** (0.06)	-0.022 (0.079)	0.41*** (0.086)
Log(DCPS)	0.195*** (0.05)	0.195*** (0.05)	0.234*** (0.045)	0.168*** (0.047)	0.188*** (0.048)
Log(MANUGDP)* Log(DCPS)		-0.08*** (0.021)	-0.088*** (0.019)	-0.061** (0.023)	-0.076*** (0.021)
MOB100			-0.009*** (0.001)		
Log(TRADE)				-0.342 (0.36)	
INFDEF					0.026*** (0.005)
Constant	8.184*** (0.802)	2.01 (2.707)	-2.161 (1.953)	5.645 (4.064)	-2.8 (1.847)
Net effects	na	-0.089	-0.142	-0.082	-0.076

	(1)	(2)	(3)	(4)	(5)
AR (1)	0.002	0.013	0.033	0.008	0.610
AR (2)	0.644	0.455	0.458	0.498	0.815
Sargan OIR	0.000	0.000	0.000	0.000	0.000
Hansen OIR	0.275	0.221	0.115	0.269	0.192
DHT for instruments					
(a) Instruments in levels H excluding group	0.209	0.299	0.146	0.307	0.253
Dif (mill, H = exogenous)	0.553	0.226	0.211	0.295	0.227
(b) IV (years, ed(diff)) H excluding group	0.243	0.039	0.043	0.072	0.021
Dif (mill, H = exogenous)	0.419	0.782	0.436	0.742	0.830
Fisher	133,948.93***	44,440.03***	33,582.09***	44,150.55***	59,607.92***
No. of instruments	29	22	22	24	22
No. of countries	33	33	33	33	33
No. of observations	292	279	275	275	279

Notes: Standard errors are in parentheses; ***, **, and * significant at 1%, 5%, and 10%, respectively; URB is urbanization and it is ratio of urban population to total population; GDPPC is Gross Domestic Product Per Capita; MANUGDP is the ratio of manufacturing sector output to total GDP; POPG is population growth rate; DCP is the ratio of credit to private sector to total GDP; MOB100 is mobile phone subscription per 100 persons; TRADE is trade openness and it is computed as the ratio of the summation of import and export to GDP; INFDEF is inflation rate computed based on GDP deflator; Log is natural logarithm; DHT is Difference in Hansen Test for exogeneity of instruments; Dif is Difference; and OIR is overidentifying restrictions test. The reported value for Sargan OIR, Hansen OIR, AR (1), AR (2), and DHT for instruments are prob. value. Under the net effect, na means that the marginal effect and/or unconditional effect are insignificant.

and somewhat consistent with the findings in this study, is the idea that higher overall income per capita implies that rural dwellers are also better off and may, therefore, have little or no incentives to move to urban centers suggesting that improving incomes and lower urbanization pressures are in tandem.

The coefficient of population growth is positive and significant when financial development and other determinants of urbanization are controlled for (see columns [3] and [5]). These results suggest that as the population grows for instance at a positive rate of 10%, the urban population as a ratio of the total population increases by about 0.3%. In other words, for every increase in population growth, the share of the population in the urban area increases. Our main variable of interest in Table 2 column (1) is manufacturing output as a share of total output (MANUGDP) and the result shows that an increase in manufacturing output as a share of total GDP leads to a decrease in urbanization. Ideally, we expect a positive relationship in line with the idea that industrialization spurs urbanization. Given that over the periods covered in the study, manufacturing output as a share of GDP was on the decline for most African countries, it suggests that urbanization in African countries increases.

In Table 2 column (2), when financial sector development and the interactive term of industrialization and financial development were introduced, the initial results on the impact of lagged level of urbanization, and income per capita, were unaffected, but the coefficient of industrialization turns positive. It is seen that financial sector development has a positive and significant effect on urbanization and the effect is significant at the 5% level. However, the coefficient of the interactive term is negative and significant indicating that with a given level of financial development, an increase in industrialization leads to a decrease in urbanization. The net effect of industrialization on urbanization is negative suggesting that financial development helps in dampening the effect of industrialization on urbanization.

In Table 2 column (3), the role of technology is controlled for and the result shows that the impact of financial sector development doubles. Like an increase in income, technology has a negative and significant effect on urbanization. These results indicate that the availability of technological facilities in both rural and urban areas, especially in rural areas, plausibly reduces the marginal benefit of moving to urban areas given the comparatively peaceful life associated with rural areas. The interactive term of industrialization and financial development is negative, and the net effect is negative indicating that controlling for technological advancement suggests that financial development makes industrialization have dampened effect on urbanization.

In Table 2 column (4), trade openness is controlled for and the results presented show that the effect of industrialization on urbanization is statistically

different from zero. Also, the interactive term is negative and significant and the net effect of industrialization on urbanization is negative, which is consistent with earlier reported findings. Trade openness is also seen to have had a reducing effect on urbanization, although the effect is not significant at 5% level. Inflation, a measure of macroeconomic condition, is also controlled for. The results obtained, as shown in Table 2 column (5), indicate that macroeconomic instability, that is, an increase in inflation rate leads to an increase in urbanization.

Turning to Table 3 where industrialization is measured as the ratio of employment in the manufacturing sector to total employment, the results reported in Table 3 is qualitatively similar to what was reported in Table 2 for all variables except for the effect of industrialization and population growth on urbanization in terms of sign. For instance, lagged urbanization rate had a positive and significant effect on contemporaneous urbanization rate, income per capita had a negative and significant effect on urbanization rate, and technological adoption and trade openness both had negative effects on urbanization. The net effect of industrialization on urbanization is negative and technology had the highest value in absolute. The results suggest that technology helps in amplifying the role of financial development in ameliorating the rural–urban migration associated with industrialization.

The coefficient of the ratio of employment in the manufacturing sector to total employment is positive and significant at the 5% significance level. Also, the interaction term of industrialization and financial development is negative and significant. The results are quite similar to what we observed in Table 2 when manufacturing output was used to measure industrialization. However, without the inclusion of the interactive term, we observed divergence effect of industrialization on urbanization. The differences may be explained in terms of the role of technology in credit making and deposits taking. Technological adoption enhances the efficiency of banks in granting loans more in urban areas when compared to rural areas, whereas technological adoption helps people in the rural areas to deposit more, thereby increasing financial depth, which, in turn, might reduce the incentive for rural dwellers to migrate to urban centers.

The positive coefficient of the effect of industrialization when measured from employment perspective suggests that industrialization contributes to urbanization. The results can be explained along the idea that when industries conglomerate in a given location and such industries experience expansion, employment is created. This leads to a situation whereby people migrate to the new location, as more people are employed due to industrial expansion, the location experiences population expansion.

TABLE 3 | Industrialization (Employment Approach), Financial Service Development, and Urbanization

	(1)	(2)	(3)	(4)	(5)
URB(-1)	1.112*** (0.013)	1.078*** (0.006)	1.09*** (0.008)	1.076*** (0.006)	1.072*** (0.006)
Log(GDPPC)	-1.714*** (0.289)	-0.941*** (0.254)	-0.711** (0.277)	-0.873*** (0.215)	-0.653*** (0.232)
Log(EMPLIND)	0.633** (0.264)	0.882*** (0.189)	0.286* (0.168)	0.955*** (0.226)	0.902*** (0.115)
POPG	-0.111*** (0.026)	-0.071** (0.033)	-0.05** (0.022)	-0.142*** (0.032)	0.027 (0.019)
Log(DCPS)		0.102*** (0.015)	0.119*** (0.016)	0.101*** (0.015)	0.118*** (0.01)
Log(EMPLIND)x Log(DCPS)		-0.434*** (0.056)	-0.369*** (0.059)	-0.442*** (0.06)	-0.446*** (0.045)
MOB100			-0.006*** (0.001)		
Log(TRADE)				-0.022 (0.171)	
INFDEF					0.017*** (0.002)
Constant	7.832*** (1.45)	3.25** (1.313)	1.843 (1.257)	2.911*** (0.969)	0.575 (1.355)
Net effects	na	-0.482	-0.873	-0.434	-0.499

	(1)	(2)	(3)	(4)	(5)
AR (1)	0.001	0.011	0.017	0.011	0.175
AR (2)	0.791	0.566	0.413	0.365	0.992
Sargen OIR	0.000	0.000	0.000	0.000	0.000
Hansen OIR	0.088	0.146	0.230	0.220	0.234
DHT for instruments					
Instruments in levels H excluding group	0.024	0.095	0.279	0.076	0.063
Dif (mill, H = exogenous)	0.908	0.500	0.265	0.849	0.942
IV (years, ed(diff)) H excluding group	0.145	0.027	0.110	0.073	0.177
Dif (mill, H = exogenous)	0.157	0.897	0.667	0.810	0.461
Fisher	78,758.37***	105,039.03***	289,746.25***	91,968.30***	346,058.97***
No. of instruments	24	27	30	30	30
No. of countries	32	32	32	32	32
No. of observations	288	273	269	269	273

Notes: Standard errors are in parentheses; ***, **, and * significant at 1%, 5%, and 10%, respectively; URB is urbanization and it is ratio of urban population to total population; GDPPC is Gross Domestic Product Per Capita; EMPLIND is the ratio of employment in the industrial sector to total employment; POPG is population growth rate; DCP is the ratio of credit to private sector to total GDP; MOB100 is mobile phone subscription per 100 persons; TRADE is trade openness and it is computed as the ratio of the summation of import and export to GDP; INFDEF is inflation rate computed based on GDP deflator; Log is natural logarithm; DHT is Difference in Hansen Test for exogeneity of instruments; Dif is Difference; and OIR is overidentifying restrictions test. The reported value for Sargan OIR, Hansen OIR, AR (1), AR (2), and DHT for instruments are prob. value. Under the net effect, na means that the marginal effect and/or unconditional effect are insignificant.

Robustness Checks

As explained in the empirical framework and methodology section, financial development can be measured from more than one perspective. The approach used in the main analysis is rooted in financial services function of the financial institutions. Another perspective is through the depth of the financial sector. Here, the measurement of the financial sector development captures the quantum of transactions through the financial sector, and it is computed as the ratio of broad money to total GDP. An increase in the ratio of broad money to total GDP indicates an increase in financial depth, and a decrease in the ratio indicates that the financial sector is shallower. The coefficients in Tables 2 and 3 are reestimated using the new measure of financial development and the results obtained are reported in Tables 4 and 5, respectively.

The results in Table 4 show that the effects of lagged urbanization, income per capita, and population growth on urbanization are less affected by the use of an alternative measure of financial development. The signs and the direction of relationships reported in Table 2 are the same with what was found when financial development was measured as financial depth, the ratio of broad money to total GDP. The effect of industrialization is, however, significant in three out of the four cases when we introduced the financial development, and the interaction of industrialization and financial development are controlled for. In situations whereby the coefficient of industrialization is significant, it nonetheless had the positive sign, although the net effect is negative, which is consistent with what was reported in Table 2.

In Table 5, financial development is measured as financial depth, the ratio of broad money to GDP. Similar to the results reported in Table 3 when financial development is measured as the ratio of domestic credit to private sector to GDP, the results reported in Table 5 indicated that the use of an alternative measure of financial development does not significantly change the conclusion arrived at earlier. In other words, an increase in employment in the manufacturing sector still had a positive and significant effect on the level of urbanization. The net effect of industrialization on urbanization is consistent with what was reported in Table 3, where it is negative in two out of the four cases. The net effect is negative when we controlled for technology indicating that expansion in technology reduces the tendency for rural dwellers to migrant permanently to urban areas. Further, the net effect is positive when we controlled for trade and inflation, which is slightly different from what we observed in the main regression. Suggesting that the reducing effect is lower in an inflationary environment, and trade intensity countries/periods.

TABLE 4 | Industrialization (Output Approach), Financial Depth, and Urbanization

	(1)	(2)	(3)	(4)	(5)
URB(-1)	1.106*** (0.009)	1.075*** (0.018)	1.055*** (0.015)	1.077*** (0.014)	1.049*** (0.015)
Log(GDPPC)	-1.402*** (0.123)	-0.175 (0.33)	-0.124 (0.233)	-0.245 (0.31)	0.348* (0.181)
Log(MANUGDP)	-0.033** (0.014)	0.198* (0.111)	0.445*** (0.155)	0.152 (0.113)	0.372*** (0.124)
POPG	-0.085*** (0.018)	0.152* (0.081)	0.311*** (0.081)	0.184*** (0.04)	0.436*** (0.123)
Log(BM)	0.089 (0.087)	0.089 (0.087)	0.406*** (0.113)	0.049 (0.088)	0.261** (0.098)
Log(MANUGDP)* Log(BM)		-0.067* (0.037)	-0.163*** (0.048)	-0.05 (0.038)	-0.132*** (0.042)
MOB100			-0.009*** (0.001)		
Log(TRADE)				0.126 (0.151)	
INFDEF					0.02*** (0.004)
Constant	8.184*** (0.802)	-3.146 (3.259)	-11.518** (4.461)	-2.248 (3.205)	-11.355*** (2.966)
Net effects	na	-0.041	-0.137	na	-0.099

(Continued)

TABLE 4 | (Continued)

	(1)	(2)	(3)	(4)	(5)
AR (1)	0.002	0.003	0.002	0.004	0.338
AR (2)	0.644	0.844	0.340	0.782	0.861
Sargen OIR	0.000	0.000	0.000	0.000	0.000
Hansen OIR	0.275	0.025	0.042	0.078	0.093
DHT for instruments					
Instruments in levels H excluding group	0.209	0.085	0.541	0.178	0.174
Dif (mill, H = exogenous)	0.553	0.055	0.008	0.101	0.132
IV (years, ed(diff)) H excluding group	0.243	0.028	0.059	0.103	0.090
Dif (mill, H = exogenous)	0.419	0.146	0.143	0.125	0.283
Fisher	133,948.93***	50,240.36***	63,952.25***	32,159.52***	61,849.09***
No. of instruments	29	20	22	22	22
No. of countries	33	33	33	33	33
No. of observations	292	291	287	287	291

Notes: Standard errors are in parentheses; ***, **, and * significant at 1%, 5%, and 10%, respectively; URB is urbanization and it is ratio of urban population to total population; GDP/PC is Gross Domestic Product Per Capita; EMBLIND is the ratio of employment in the industrial sector to total employment; POPG is population growth rate; DCP is the ratio of credit to private sector to total GDP; MOBI00 is mobile phone subscription per 100 persons; TRADE is trade openness and it is computed as the ratio of the summation of import and export to GDP; INFDEF is inflation rate computed based on GDP deflator; Log is natural logarithm; DHT is Difference in Hansen Test for exogeneity of instruments; Dif is Difference; and OIR is overidentifying restrictions test. The reported value for Sargan OIR, Hansen OIR, AR (1), AR (2), and DHT for instruments are prob. value. Under the net effect, na means that the marginal effect and/or unconditional effect are insignificant.

TABLE 5 | Industrialization (Employment Approach), Financial Depth, and Urbanization

	(1)	(2)	(3)	(4)	(5)
URB(-1)	1.112*** (0.013)	1.082*** (0.009)	1.09*** (0.006)	1.086*** (0.014)	1.077*** (0.007)
Log(GDPPC)	-1.714*** (0.289)	-0.605** (0.235)	-0.731** (0.284)	-1.45*** (0.25)	-0.609*** (0.146)
Log(EMPLIND)	0.633** (0.264)	1.326*** (0.482)	2.074*** (0.567)	2.681*** (0.789)	1.894*** (0.531)
POPG	-0.111*** (0.026)	-0.15*** (0.027)	-0.063*** (0.021)	-0.16*** (0.029)	-0.062*** (0.019)
Log(BM)		0.037 (0.041)	0.176*** (0.028)	0.126** (0.06)	0.08* (0.042)
Log(EMPLIND)x Log(BM)		-0.415*** (0.146)	-0.753*** (0.125)	-0.619** (0.234)	-0.508*** (0.158)
MOB100			-0.004*** (0.001)		
Log(TRADE)				-0.222 (0.131)	
INFDEF					0.004*** (0.001)
Constant	7.832*** (1.45)	1.777 (1.434)	-1.292 (1.601)	4.131** (1.758)	-0.297 (1.248)
Net effects	na	-0.156	-0.615	0.470	0.080

(Continued)

TABLE 5 | (Continued)

	(1)	(2)	(3)	(4)	(5)
AR (1)	0.001	0.006	0.007	0.005	0.018
AR (2)	0.791	0.337	0.341	0.365	0.706
Sargen OIR	0.000	0.000	0.000	0.000	0.000
Hansen OIR	0.088	0.080	0.158	0.157	0.196
DHT for instruments					
Instruments in levels H excluding group	0.024	0.053	0.108	0.130	0.046
Dif (mill, H = exogenous)	0.908	0.427	0.480	0.394	0.956
IV (years, ed(diff)) H excluding group	0.145	0.035	0.185	0.170	0.294
Dif (mill, H = exogenous)	0.157	0.520	0.262	0.286	0.197
Fisher	78,758.37***	130,440.57***	242,205.81***	211,739.99***	569,905.03***
No. of instruments	24	27	30	30	30
No. of countries	32	32	32	32	32
No. of observation	288	286	282	281	286

Notes: Standard errors are in parentheses; ***, **, and * significant at 1%, 5%, and 10%, respectively; URB is urbanization and it is ratio of urban population to total population; GDPPC is Gross Domestic Product Per Capita; EMLIND is the ratio of employment in the industrial sector to total employment; POPG is population growth rate; DCP is the ratio of credit to private sector to total GDP; MOBI00 is mobile phone subscription per 100 persons; TRADE is trade openness and it is computed as the ratio of the summation of import and export to GDP; INFDEF is inflation rate computed based on GDP deflator; Log is natural logarithm; DHT is Difference in Hansen Test for exogeneity of instruments; Dif is Difference; and OIR is overidentifying restrictions test. The reported value for Sargan OIR, Hansen OIR, AR (1), AR (2), and DHT for instruments are prob. value. Under the net effect, na means that the marginal effect and/or unconditional effect are insignificant.

In Table 6, we reestimated equation 2 to account for the role of natural resource rent. The purpose of this investigation is to reassess the conclusion in Ebeke and Etoundi (2017) and Gollin, Jedwab, and Vollrath (2016) that urbanization increases with natural resources. As shown in Table 6, we observed that industrialization had a positive and significant effect on urbanization, although the effect is lower when the financial sector development is measured as financial services. The interaction term of industrialization and financial development is negative regardless of how it is measured. Furthermore, net effect of industrialization on urbanization is consistent with the earlier reported results.

Furthermore, we found that an increase in natural resources exports contributed in part to an increase in urbanization in African countries, as shown in Table 6. Our finding is consistent with Ebeke and Etoundi (2017) and Gollin, Jedwab, and Vollrath (2016). Natural resources exports had weak effect on urbanization when industrialization was measured from the output perspective, whereas the effect is stronger when industrialization is measured from the employment perspective. Urbanization entails migration from rural areas to urban areas, and employment plays a crucial role in migration. Hence, we argue that the measure of industrialization based on employment gives a more convincing picture of the effect of industrialization on urbanization.

CONCLUSION AND POLICY RECOMMENDATIONS

Economic transformation is believed to be accompanied with urbanization as it causes movement from rural areas to urban areas in the quest to engage in sectors with higher level of productivity, sectors which in turn pay higher rewards for labor time. A positive net effect of industrialization on urbanization suggests that highly industrialized African countries have higher level of urbanization. On the contrary, a negative net effect suggests that an increase in urbanization is associated with deindustrialization, which might partly explain why impressive economic growth may sometimes be associated with little job creation.

The literature on urbanization mainly centered on the causes and effects of an increase in urbanization (Njoh 2003). This study focused on under-researched areas of the dynamics of structural economic transformation namely the impact of industrialization on urbanization with a specific focus on Africa. Additionally, it investigated the intervening role of financial sector development in the industrialization–urbanization relationship. In this study, we argued that since financial institutions are mostly clustered in the cities and provide funding for industrial development, financial development should thereby contribute to rising urbanization in Africa.

TABLE 6 | Industrialization, Financial Development, Natural Resource, and Urbanization

	(1)	(2)	(3)	(4)
URB(-1)	1.076*** (0.01)	1.064*** (0.015)	1.089*** (0.015)	1.093*** (0.009)
Log(GDPPC)	-0.889*** (0.281)	-0.337 (0.298)	-0.6** (0.226)	-0.522 (0.332)
Log(MANUGDP)	0.107*** (0.025)	0.179*** (0.064)		
Log(EMPLIND)			0.14 (0.622)	0.494** (0.194)
POPG	-0.008 (0.023)	-0.074*** (0.016)	-0.08*** (0.025)	-0.007 (0.024)
Log(DCPS)	0.206*** (0.024)			0.152*** (0.022)
Log(BM)		0.209*** (0.053)	0.029 (0.054)	
Log(MANUGDP)x Log(DCPS)	-0.078*** (0.011)			
Log(MANUGDP)* Log(BM)		-0.078*** (0.023)		-0.448*** (0.077)
Log(EMPLIND)x Log(DCPS)			-0.04 (0.188)	
Log(EMPLIND)x Log(BM)			0.12*** (0.038)	0.065 (0.051)
Log(natural)	-0.017 (0.057)	0.131** (0.051)		

	(1)	(2)	(3)	(4)
Constant	2.212 (1.856)	-3.32 (2.796)	1.742 (2.288)	-0.145 (1.863)
Net effects	-0.138	-0.100	na	-0.914
AR (1)	0.070	0.020	0.015	0.044
AR (2)	0.331	0.390	0.418	0.475
Sargen OIR	0.001	0.000	0.000	0.000
Hansen OIR	0.277	0.455	0.414	0.520
DHT for instruments				
Instruments in levels H excluding group	0.981	0.848	0.563	0.952
Dif (mill, H = exogenous)	0.010	0.097	0.242	0.068
IV (years, ed(diff)) H excluding group	0.256	0.416	0.500	0.413
Dif (mill, H = exogenous)	0.391	0.470	0.300	0.590
Fisher	100,878.74***	101,794.69***	54,191.35***	236,809***
No. of instruments	29	29	29	29
No. of countries	33	33	32	32
No. of observations	251	263	256	244

Notes: Standard errors are in parentheses; ***, **, and * significant at 1%, 5%, and 10%, respectively; URB is urbanization and it is ratio of urban population to total population; GDPPC is Gross Domestic Product Per Capita; MANUGDP is the ratio of manufacturing sector output to total GDP; EMPLIND is the ratio of employment in the industrial sector to total employment; POPG is population growth rate; DCP is the ratio of credit to private sector to total GDP; BM is the ratio broad money to total GDP; Natural rent and it is the ratio of natural rent to total GDP; DHT is Difference in Hansen Test for exogeneity of instruments; Dif is Difference; and OIR is overidentifying restrictions test. The reported value for Sargen OIR, Hansen OIR, AR (1), AR (2), and DHT for instruments are prob. value. Under the net effect, na means that the marginal effect and/or unconditional effect are insignificant.

However, if the development of the financial sector helps rural dwellers to achieve their financial needs where they are, such improvement in the level of financial sector development may encourage rural dwellers to remain in their location, thus reducing the pace of urbanization. Hence, the precise moderating effect of financial sector development on the primary nexus of interest remains unclear.

This study, therefore, sought to understand whether the level of financial sector development matters in understanding the effect of industrialization on urbanization in Africa. To achieve this objective, data from 33 African countries over the period of 1991 to 2018 was analyzed using system GMM estimator. Two measures of industrialization were used in this study: the ratio of manufacturing output to total GDP and the ratio of manufacturing employment to total employment. The main measure of financial development used in the study is the ratio of domestic credit to private sector to GDP, which measures the level of financial services rendered by the financial sector. As a robustness check, we used another measure of financial sector development, financial depth, which is computed as the ratio of broad money to GDP.

The study findings showed that industrialization had a positive and significant effect on urbanization. The interaction of industrialization and financial development is negative, suggesting that financial development dampens the positive effect of industrialization on urbanization. Thus, the results are evaluated based on the net effect of industrialization on urbanization. When we measure industrialization as the share of manufacturing output in total output or as the share of the employment in the manufacturing sector as a share of total employment, the net effect is negative suggesting that industrialization had reducing effect on urbanization. In the presence of weak financial sector development, industrialization contributes to urbanization in African countries. Furthermore, the study findings show that the lagged value of urbanization had a positive and significant effect on current level of urbanization. Also, the coefficient is greater than 1 suggesting that in 2023, on average, urbanization rate in most African countries would be higher than what was recorded in 2022. In other words, the study findings indicates that the proportion of the population residing in urban areas increases over time. However, because the coefficients of the lagged urbanization are greater than 1, the estimated models are unstable.³

Since rapid industrialization, especially the job-generating type, was found to precipitate fast-paced urbanization in the sample of African countries analyzed, governments may put in place complimentary policies such as various forms of agricultural policies. Such policies, notwithstanding active industrial policies, are likely to make rural settings increasingly attractive for those residing there and, therefore, stem the tide of unbridled rural–urban population drifts. Hence, industrial policies should be accomplished with urban planning

policies to avoid the development of slums in urban areas. Also, it thus seems to stand to reason on the basis of the findings that in considering complimentary intervention channels that may be helpful in population management in rapidly industrializing economies in Africa, financial sector reforms aimed at achieving higher financial depth may be effectual.

NOTES

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1. The sampled countries are Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Chad, Congo Rep., Cote d'Ivoire, Egypt, Eswatini, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Malawi, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania, Togo, and Tunisia.

2. Given the estimation approaches adopted in the study, we averaged the data over a period of 3 years to average at 10 data points over the period covered in the study. The approach was necessitated to reduce the number of instruments and prevent problem associated with instruments proliferation as spotted by one of the reviewers.

3. The urbanization rate in most African countries follows an upward trend, which in part explains why the coefficient we obtained is greater than 1. The study finding is consistent with the evidence in Ebeke and Etoundi (2017) that focused on urbanization in Africa.

REFERENCES

- Adeniyi, O., B. Ajide, and A. Salisu. 2015. "Foreign Capital Flows, Financial Development and Growth in Sub-Saharan Africa." *Journal of Economic Development* 40, no. 3: 85–103.
- Ajakaiye, O., and J. Page. 2012. "Industrialisation and Economic Transformation in Africa: Introduction and Overview." *Journal of African Economies* 21, no. suppl_2: ii3–18.
- Asongu, S. A., and P. N. Acha-Anyi. 2019. "The Murder Epidemic: A Global Comparative Study." *International Criminal Justice Review* 29, no. 2: 105–20.
- Black, D., and V. Henderson. 1999. "A Theory of Urban Growth." *Journal of Political Economy* 107, no. 2: 252–84.
- Bonin, J., and P. Wachtel. 2003. "Financial Sector Development in Transition Economies: Lessons from the First Decade." *Financial Markets, Institutions and Instruments* 12: 1–66.
- Duranton, G. 2015. "Growing through Cities in Developing Countries." *The World Bank Research Observer* 30, no. 1: 39–73.
- Ebeke, C. H., and S. M. N Etoundi. 2017. "The Effects of Natural Resources on Urbanization, Concentration, and Living Standards in Africa." *World Development* 96: 408–17.
- Folarin, O. E. 2019. "Financial Reforms and Industrialisation: Evidence from Nigeria." *Journal of Social and Economic Development* 21, no. 1: 166–89.

- Fowowe, B. 2013. "Financial Liberalization in Sub-Saharan Africa: What Do We Know?" *Journal of Economic Surveys* 27, no. 1: 1–37.
- . 2017. "Access to Finance and Firm Performance: Evidence from African Countries." *Review of Development Finance* 7, no. 1: 6–17.
- Gollin, D., R. Jedwab, and D. Vollrath. 2016. "Urbanization with and without Industrialization." *Journal of Economic Growth* 21, no. 1: 35–70.
- Harrison, A. E., J. Y. Lin, and L. C. Xu. 2014. "Explaining Africa's (Dis) Advantage." *World Development* 63: 59–77.
- Henderson, J. V., S. Adam, and D. Uwe. 2017. "Has Climate Change Driven Urbanization in Africa?" *Journal of Development Economics* 124: 60–82.
- Hoselitz, B. F. 1953. "The Role of Cities in the Economic Growth of Underdeveloped Countries." *Journal of Political Economy* 61, no. 3: 195–208.
- Itaman, R. E., and O. E. Awopegba. 2021. "Finance, Oil Rent and Premature Deindustrialisation in Nigeria." *Structural Change and Economic Dynamics* 59: 149–61.
- Jayne, T., J. Chamberlin, and R. Benfica. 2018. "Africa's Unfolding Economic Transformation." *Journal of Development Studies* 54, no. 5: 777–87.
- King, R. G., and R. Levine. 1993. "Finance and Growth: Schumpeter might be Right." *The Quarterly Journal of Economics* 108, no. 3: 717–37.
- Lewis, A. 1954. "Economic Development with Unlimited Supplies of Labour." *The Manchester School* 22, no. 2: 139–91.
- Lipton, M. 1977. *Why Poor People Stay Poor: The Urban Bias in World Development*. Cambridge: Harvard University Press.
- Mijiyawa, A. G. 2017. "Drivers of Structural Transformation: The Case of the Manufacturing Sector in Africa." *World Development* 99: 141–59.
- Monga, C. 2012. "Shifting Gears: Igniting Structural Transformation in Africa." *Journal of African Economies* 21, no. suppl_2: ii19–54.
- Murphy, K. M., A. Shleifer, and R. Vishny. 1989. "Income Distribution, Market Size, and Industrialization." *The Quarterly Journal of Economics* 104, no. 3: 537–64.
- Njoh, A. J. 2003. "Urbanization and Development in Sub-Saharan Africa." *Cities* 20, no. 3: 167–74.
- Rajan, R., and L. Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88, no. 3: 559–86.
- Roodman, D. 2009. "A Note on the Theme of Too Many Instruments." *Oxford Bulletin of Economics and Statistics* 71, no. 1: 135–58.
- Scott, A. J. 1986. "Industrialization and Urbanization: A Geographical Agenda." *Annals of the Association of American Geographers* 76, no. 1: 25–37.
- Smart, L. 2018. "Exploring the Rapid Urbanisation of the Oil Rich Developing Countries in Africa and its Drivers: The case of Nigeria." MA diss., Durham University.
- Tchamyou, V. S., and S. A. Asongu. 2017. "Information Sharing and Financial Sector Development in Africa." *Journal of African Business* 18, no. 7: 24–49.
- Wang, Z., Y. Rasool, B. Zhang, Z. Ahmed, and B. Wang. 2020. "Dynamic Linkage among Industrialisation, Urbanisation, and CO₂ Emissions in APEC Realms: Evidence Based on DSUR Estimation." *Structural Change and Economic Dynamics* 52: 382–89.
- Yang, X. 1990. "Development, Structural Changes and Urbanization." *Journal of Development Economics* 34, no. 1–2: 199–222.

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