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SMEs and Economic Growth in Nigeria: An Autoregressive Distributed Lag Approach

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Abstract

This empirical study adopts an autoregressive distributed lag approach in order to examine how small and medium enterprises (SMEs) have contributed to economic growth in Nigeria between 1981 and 2013. We find that investment in SMEs has had a significant and positive impact on economic growth in the country. Given that Nigeria is economically underdeveloped, it is essential that the majority of its (largely rural) population be integrated into the process of economic development through entrepreneurship in small businesses. This means encouraging further investment in SMEs and prioritizing their access to credit facilities, infrastructure development, and capacity building to promote long-run socioeconomic development through this medium.

Keywords: SME, economic growth, unit root, autoregressive, entrepreneurs.

JEL classification: L26, O12.

1. Introduction

In many countries, the past few decades have witnessed renewed interest in the development of small and medium enterprises (SMEs). Various studies have acknowledged the importance of SMEs in economic growth (see Hu, 2010; Afolabi, 2013), referring to them as "the engine of growth" and as "catalysts for [the] socioeconomic transformation of any country" (Leegwater & Shaw, 2008).SMEs represent a means to attain key macroeconomic objectives such as employment generation, increased growth, and poverty reduction at low investment cost while developing a country's entrepreneurial capabilities and indigenous technology (Adebiyi, 2004).They also improve regional and sectoral economic balance by enabling industrial dispersal across sectors and locations, and

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generally promote effective resource utilization, which is critical to engineering economic development and growth (Odedokun,1988;Kongolo, 2010).

Over the past few years, there has been an impressive increase in the number and volume of Nigerian government programs that seek to encourage the unemployed, young persons, welfare recipients, and disadvantaged groups to set up their own small businesses. The government has also established several micro-lending institutions to support SMEs through access to credit and loans. These include the Nigerian Bank for Commerce and Industry, the National Economic Reconstruction Fund, the People's Bank of Nigeria, other community banks, and the Nigerian Export and Import Bank. SMEs are expected to contribute about 34 percent (the ratio of the gross value of manufacturing to GDP) to the national product and to generate 60–70 percent of total employment with sustainable yearly growth (Egbabor, 2004).

While the impact of SMEs on economic growth has received increased empirical attention in the literature (see Leegwater & Shaw, 2008; Bamidele, 2012; Afolabi, 2013),very few studies have focused on SMEs in Nigeria, especially on their contribution to macroeconomic growth in the country. Additionally, most such studies have not taken into account the properties of the time-series data used, which renders them less reliable. Our objective, therefore, is to empirically investigate the impact of SMEs on economic growth in Nigeria using the autoregressive distributed lag (ARDL) approach.

2. Conceptual and Theoretical Review

There is no generally accepted definition of a "small" business because the classification of firms as large or small is a subjective and qualitative judgment (Kongolo, 2010). The definition of an SME has changed overtime with shifts in price level, advances in technology, and other considerations. SMEs can be defined by the number of employees and turn over, by the type of industry, paid-up capital, and number of paid employees (Ekpenyong & Nyong, 1992), or by the degree of development and economic structures present (Yang, Lim, & Kanamori, 2006).

In the UK, for example, small businesses are defined as those with an annual turnover of GBP 2 million or less and with fewer than 200 paid employees. In the US, SMEs include enterprises with fewer than 500 regular employees in the case of manufacturing or with fewer than 100

regular employees and an average annual operating revenue of less than US$6 million in the case of wholesale and retail. SMEs in the services and construction sectors are classified as having an average annual income of less than US$6 million and less than US$28.5 million, respectively (Yang et al., 2006). In Japan, SMEs are defined as those firms in manufacturing with JPY 100 million in paid-up capital and up to 300 employees, those in wholesale with JPY 30 million in paid-up capital and up to 100 employees, and those in retail and services with JPY 10 million in paid-up capital and up to 50 employees (Ozigbo & Ezeaku, 2009).

In 1988, the Central Bank of Nigeria defined small enterprises as those with an annual turnover not exceeding NGN 500,000.[1] In the 1990 budget, the federal government defined small enterprises for the purpose of commercial bank loans as firms with an annual turnover not exceeding NGN 500,000. The National Economic Reconstruction Fund has put the ceiling for small firms at NGN 10 million. In July 2001, the National Council of Industries (at its 13th meeting in Makurdi, Benue) categorized small businesses as those employing (i) total capital of over NGN 1.5 million but not more than NGN 50 million (including working capital but excluding the cost of land), and/or(ii) 11–100 workers. Medium enterprises were defined as those employing (i) total capital of over NGN 50 million but not more than NGN 200 million (including working capital but excluding the cost of land), and/or (ii) 101–300 workers.

3. Empirical Review

The literature includes numerous empirical studies on the impact of SMEs on economic growth in the context of developed countries, most of which use regression techniques. Similar studies on Nigeria are, however, more limited. For instance, Iyigun and Owen (1998) find a negative relationship between economic development and self-employment in the labor force. Carree, van Stel, Thurik, and Wennekers (2002) establish a nonlinear relationship between economic development and entrepreneurship. Beck, Demirgüç-Kunt, and Maksimovic(2002) estimate a standard growth regression model for a cross-section of countries, which includes the relative size of the SME sector in terms of employment. They find that the sector has a positive, but not robust, impact on economic growth.

[1]Monetary Policy Circular No. 22.

Using a similar approach, Audretsch and Keilbach (2005) and Mueller (2007) find that different measures of entrepreneurship have a positive impact on economic growth in the context of developed countries. Van Stel,Carree,andThurik(2004)investigate the contribution of total entrepreneurial activity to GDP growth for a sample of 36 countries and test whether this contribution depends on the level of economic development (measured as GDP per capita). Their results show that entrepreneurial activity by nascent entrepreneurs and owner-managers of young businesses does affect economic growth, but that this effect depends on the level of per capita income.

In another cross-country study, Hu (2010) uses a dataset comprising 37 developed and developing countries to examine the role of the SME sector in economic growth during the 1960s to the 1990s.The study finds that small businesses contribute to economic prosperity. Specifically, in pursuing economic growth, SMEs in high-income economies tend to exploit entrepreneurship while those in less developed economies drive job creation.

Leegwater and Shaw (2008) investigate the role of micro, small, and medium enterprises in the growth of per capita income in the US, using data on firms in the formal manufacturing sector with fewer than 10, 20, 100, and250 employees. Their regression model indicates a positive relationship between economic growth and the prevalence of medium-scale firms or smaller (250 employees or fewer). However, they find only a limited link between growth and the prevalence of small or micro firms (with fewer than 10, 20, or 100 employees). In another study on the US, Bruce, Deskins, Hill, and Rork (2009) reveal that a higher concentration of small businesses in neighboring states increases a particular state's own economic growth rate.

Most studies on the impact of SMEs on economic growth in Nigeria are descriptive (see Agbonifoh, Ehiametalor, Inegbenebor, & Iyayi, 1999; Bamidele, 2012; Muritala, Awolaja, & Bako, 2012). Although some have used inferential methods such a ssimple ordinary least squares (OLS), they do not take into account the time-series properties of the variables used. For instance, Kadiri (2012) examines the contribution of SMEs to employment generation in Nigeria, using binomial logistic regression tools. He finds that SMEs have not had a positive economic impact because they are often unable to obtain adequate business financing. Onakoya, Fasanya, and Abdulrahman (2013) examine the impact of financing small enterprises on economic growth, applying OLS to quarterly time-series data for1992–

2009. They note that loans to small entrepreneurs have a positive impact on the sector's economic performance.

Somoye (2013) evaluates the impact of finance on entrepreneurship growth in Nigeria using an endogenous growth framework. The study's results show that financing, interest rates, real GDP, unemployment, and industrial productivity are significant determinants of entrepreneurship in this case. Afolabi (2013) employs OLS to assess the effect of financing for SMEs on economic growth in Nigeria between 1980 and 2010. The study reveals that the SME sector's output—with wholesale and retail trade output as a component of GDP used as a proxy—and commercial banks' credit to SMEs both have a positive and significant impact on economic development.

Overall, the literature on the impact of SMEs on economic growth remains inconclusive. More studies that use inferential techniques and take note of time-series properties are needed. We attempt to fill this gap by using the ARDL approach and paying adequate attention to the nature of the variables used. In so doing, the study aims to contribute to the empirical literature in this field.

4. Model Specification

This study employs the neoclassical growth model in examining the role of SMEs in economic growth. The standard version of this model seeks to explain the growth rate of aggregate output based on factors such as labor, capital, and technological progress (or the Solow residual). The model is written as follows:

$$Y_t = A_t \, f\,[K_t, L_t] \tag{1}$$

where, in period t, Y_t represents output, K_t is capital input, and L_t is labor input. A_t denotes the technology level in the economy or its stock of knowledge and total factor productivity.

Given the significance of technological factors in determining economic growth and the argument that innovations by entrepreneurs contribute significantly to technology (see Schumpeter, 1934), we introduce investment in SMEs into equation (1) to capture the effect of technological change on economic growth. The exchange rate and inflation rate are also added to the equation as control variables. This yields

$$Y_t = \beta_0 + \beta_1 K_t + \beta_2 L_t + \beta_3 SME_t + \beta_4 EXR_t + \beta_5 INF_t + \mu_t \tag{2}$$

Where Y is the log of GDP, SME is the log of investment in SMEs, EXR is the exchange rate, INF is the inflation rate, K is the log of capital, L denotes the labor force, and $\alpha_i$and μ are parameters and the error term, respectively.

5. Data Sources and Methodology

We have used secondary data spanning the period 1981–2013. SME performance is captured by investment in SMEs. Gross fixed capital formation and the total labor force capture capital and labor, respectively. The inflation rate and exchange rate are represented by the percentage change in the consumer price index and the effective US dollar to Nigerian naira exchange rate. GDP at 1990 constant prices denotes income. Apart from the data on the labor force, which was sourced from the World Bank's development indicators for 2013, all other variables were obtained from the central bank's statistical bulletin for 2014 and various annual reports.

In order to empirically assess the long- and short-run impact of SME performance on economic growth in Nigeria, we estimate equation (2) using the bounds testing or ARDL cointegration procedure developed by Pesaran, Shin, and Smith (2001). The ARDL procedure can be used when the regressors are integrated of order 0or 1,unlike the Johansen approach, which strictly requires that all variables are integrated of order 1, that is, stationary at first difference (Oteng-Abayie & Frimpong, 2006). The ARDL procedure is also more efficient in the case of small or finite samples as is the case here (see Kakar, Kakar, Khan, & Waliullah, 2011). The approach is not, however, considered efficient in the presence of variables that are stationary at second difference.

ARDL cointegration entails several stages. First, the stationary properties of the time-series variables in equation (2) are examined by implementing the unit root test. All variables are tested in levels and in the first difference using the augmented Dickey–Fuller (ADF) test and Phillip–Perron unit root test. Next, we test for the existence of a long-run relationship between economic growth, SME performance, and all other regressors within a univariate framework. Following Pesaran et al. (2001), we adopt the bounds test, modeling the long-run equation (3) as a general vector autoregressive model of order p as follows:

$$\Delta Y_t = C_0 + \beta_1 Y_{t-1} + \beta_2 K_{t-1} + \beta_3 L_{t-1} + \beta_4 SME_{t-1} + \beta_5 EXR_{t-1} + \beta_6 INF_{t-1} + \sum_{i=1}^{p} \phi_1 \Delta Y_{t-1} + \sum_{i=1}^{p} \phi_2 \Delta K_{t-1} + \sum_{i=1}^{p} \phi_3 \Delta L_{t-1} + \sum_{i=1}^{p} \phi_4 \Delta SME_{t-1} + \sum_{i=1}^{p} \phi_5 \Delta EXR_{t-1} + \sum_{i=1}^{p} \phi_6 \Delta INF_{t-1} + \mu_t \quad (3)$$

where β and ϕ are the long-run and short-run multipliers, respectively, C_0 is the drift, and μ_t is a white noise error.

Equation (3) is estimated using OLS to test for the existence of cointegration or a long-run relationship among the variables. This is done by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables:

H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ (there is no long-run relationship)

H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$

The calculated F-statistic from equation (3) is compared with the critical value tabulated by Pesaran et al. (2001). If it exceeds the upper critical value, the null hypothesis of no long-run relationship can be rejected regardless of whether the underplaying order of integration of the variables is 0 or 1.

Once cointegration is established, the conditional ARDL (p_1, q_1, q_2, q_3, q_4, q_5) long-run model for equation (2) can be estimated as follows:

$$Y_t = C_0 + \sum_{i=1}^{p} \beta_1 Y_{t-1} + \sum_{i=0}^{q1} \beta_2 K_{t-1} + \sum_{i=0}^{q2} \beta_3 L_{t-1} + \sum_{i=0}^{q3} \beta_4 SME_{t-1} + \sum_{i=0}^{q4} \beta_5 EXR_{t-1} + \sum_{i=0}^{q5} \beta_6 INF_{t-1} + \mu_t \quad (4)$$

All the variables are as previously defined. Next, we select the orders of the ARDL (p_1, q_1, q_2, q_3, q_4, q_5) model for the six variables, based on the Akaike information criterion (AIC). The final step involves obtaining the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta Y_t = \lambda_0 + \sum_{i=1}^{p} \phi_1 \Delta Y_{t-1} + \sum_{i=1}^{p} \phi_2 \Delta K_{t-1} + \sum_{i=1}^{p} \phi_3 \Delta L_{t-1} + \sum_{i=1}^{p} \phi_4 \Delta SME_{t-1} + \sum_{i=1}^{p} \phi_5 \Delta EXR_{t-1} + \sum_{i=1}^{p} \phi_6 \Delta INF_{t-1} + \delta_7 ECM_{-1} + \mu_t \quad (5)$$

Where ϕ denotes the short-run dynamic coefficients and δ indicates the speed of the adjustment that restores equilibrium to the dynamic model.

6. Empirical Results

Table 1 gives the results of the ADF and Phillip–Perron tests. All the variables apart from capital and labor are stationary only in first difference; capital and labor are stationary both in levels and first difference. These results justify the use of the ARDL method.

Table 1: Unit root tests

Variable	ADF test		Phillip–Perron test	
	Level	First difference	Level	First difference
Y	-1.620579	-4.374513**	-1.723958	-4.277885**
K	-3.775140*	-3.777678*	-3.596300*	-3.571732*
L	-3.673604*	-13.166270**	-4.650099**	-12.417120**
SME	-2.158035	-6.344676**	-1.968816	-12.170530**
CRE	-2.068625	-8.835226**	-2.068625	-8.823902**
EXR	-2.090197	-5.306837**	-2.090197	-5.306770**
INF	-2.805947	-5.357068**	-2.800139	-10.354610**

Note: **and * denote significance at 1% and 5%, respectively.
Source: Authors' calculations.

6.1. Bounds Testing for Cointegration

The bounds testing approach allows us to determine whether there is a long-run relationship among the variables. We use a general-to-specific modeling approach guided by the AIC to select a maximum lag order of 1 for the conditional ARDL vector error correction model.

Table 2 indicates that the calculated F-statistic lies below the upper level of the bounds critical value of 6.32 and the lower level of 2.73 for k=5.This implies that the null hypothesis of no cointegration can be rejected, indicating there is a cointegrating relationship among the variables.

Table 2: Results of bounds test applied to equation (3)

Dependent variable	AIC lag	F-statistic	Prob.	Outcome
Y	1	6.059231	0.000463	Cointegration

Source: Authors' calculations.

Having confirmed the existence of a long-run relationship between financial integration, economic growth and the other selected variables, we then apply the ARDL method to estimate the long-run parameters of equation (2). Table 3 gives the estimated long-run coefficients. The lag length of the long-run model was selected on the basis of the AIC. The R-squared and adjusted R-squared terms are about 0.99, signifying that about 99 percent of the variations in economic growth are explained by all the independent variables included in the model. The F-statistic value of the long-run model is also significant and implies that all the independent variables are jointly significant. The Durbin–Watson (DW) test statistic shows an absence of autocorrelation in the model.

Table 3: Estimated long-run coefficients using the ARDL approach

Dependent variable =Y

Independent variable	Coefficient	T-ratio (prob.)
Y(-1)	1.102991	11.552400
		(0.000000)
K(-1)	-0.058004	-2.650350
		(0.014000)
L (-1)	0.018339	0.195016
		(0.847000)
SME (-1)	0.032566	2.102826
		(0.046200)
EXR (-1)	0.026356	2.260903
		(0.033100)
INF (-1)	0.008308	1.002562
		(0.326100)
Constant	-0.967004	-0.917933
		(0.367800)
R^2	0.995155	
Adjusted R^2	0.993944	
F-statistic	821.560200	
(p-value)	(0.000000)	
DW	1.823729	

Source: Authors' calculations.

The long-run results indicate that past income, capital investment, investment in SMEs, and the exchange rate all have a significant, positive effect on economic growth in Nigeria. Labor and the inflation rate have an insignificant effect on economic growth in the long run. An increase of 1 percent in investment in SMEs will, on average, lead to an increase of about 0.03 percent in economic growth. This implies that the Nigerian economy has been enhanced by the SME sector, possibly through innovations leading to employment generation, job creation, and poverty alleviation. This finding is consistent with those of van Stelet al. (2004), Hu (2010), and Afolabi (2013).

The short-run coefficients for the relationship between investment in SMEs and economic growth are given in Table 4. As with the long-run model, the lag length of the short-run model is selected on the basis of the AIC. The signs of the short-run estimates are similar to those of the long-run model, except for capital and labor, which both have negative signs. The estimates are insignificant at the 5 percent critical level and capital has an insignificant relationship with economic growth. The results show

that there is a significant, positive relationship between investment in SMEs and economic growth in the short run. This result is consistent with that of Afolabi (2013) who uses OLS to find that SMEs have a significant effect on economic growth in Nigeria.

Table 4: Short-run results for selected ARDL model

Dependent variable =Y

Independent variable	Coefficient	T-ratio (prob.)
Constant	0.004495	0.389393
		(0.700700)
Y	1.078379	4.037485
		(0.000600)
K	-0.048450	-1.534298
		(0.139200)
L	-0.061541	-0.907607
		(0.373900)
SME	0.032267	2.446014
		(0.022900)
EXR	0.009404	0.443279
		(0.661900)
INF	0.019720	2.578650
		(0.017100)
ECM(-1)	-0.792312	-2.429784
		(0.023700)
R^2	0.536351	
Adjusted R^2	0.388826	
F-statistic	3.635663	
(p-value)	(0.009357)	
DW	1.968156	

Source: Authors' calculations.

Past income and the inflation rate have a significant, positive impact on economic growth in Nigeria. The error correction parameter is statistically significant at the 5 percent critical level, indicating the existence of a stable short-run relationship. The coefficient of determination (R-squared) is about 0.53, which implies that about 53 percent of the variations in economic growth are explained by variations in all the independent variables. The F-statistic value is also significant and implies that all the independent variables are jointly significant. Finally, the DW statistic shows an absence of autocorrelation in the model.

7. Conclusion

This empirical study adopts an autoregressive distributed lag approach in order to examine how small and medium enterprises (SMEs) have contributed to economic growth in Nigeria between 1981 and 2013. We find that investment in SMEs has had a significant and positive impact on economic growth in the country. Given that Nigeria is economically underdeveloped, it is essential that the majority of its (largely rural) population be integrated into the process of economic development through entrepreneurship in small businesses. This means encouraging further investment in SMEs and prioritizing their access to credit facilities, infrastructure development, and capacity building to promote long-run socioeconomic development through this medium.

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Appendix

Data used in study

Year	Y	INF	EXR	SME	K	L
1981	251,052.3	20.90000	0.610000	162.1400	18,220.59	24.09000
1982	246,726.6	7.700000	0.670000	173.7800	17,145.82	24.64000
1983	230,380.8	23.20000	0.720000	176.0000	13,335.33	25.22000
1984	227,254.7	39.60000	0.760000	189.0100	9,149.760	25.70000
1985	253,013.3	5.500000	0.890000	177.2500	8,799.480	26.17000
1986	257,784.5	5.400000	2.020000	167.4100	11,351.46	26.68000
1987	255,997.0	10.20000	4.020000	159.2400	15,228.58	27.38000
1988	275,409.6	38.30000	4.540000	187.1360	17,562.21	27.98000
1989	295,090.8	40.90000	7.390000	254.4800	26,825.51	28.66000
1990	328,606.1	7.500000	8.040000	117.8000	40,121.31	30.04000
1991	328,644.5	13.00000	9.910000	118.4000	45,190.23	30.13000
1992	337,288.6	44.50000	17.30000	118.4000	70,809.16	30.99000
1993	342,540.5	57.20000	22.05000	326.6000	96,915.51	31.89000
1994	345,228.5	57.00000	21.89000	491.4000	105,575.5	32.87000
1995	352,646.2	72.80000	81.02000	354.3000	141,920.2	33.82000
1996	367,218.1	29.30000	81.25000	254.0000	204,047.6	34.80000
1997	377,830.8	8.500000	81.65000	384.0000	242,899.8	35.88000
1998	388,468.1	10.00000	83.81000	218.4000	242,256.3	36.98000
1999	393,107.2	6.600000	92.99000	436.8000	231,661.7	38.10000
2000	412,332.0	6.900000	101.7000	450.2000	331,056.7	39.25000
2001	431,783.2	18.90000	111.9000	304.3000	372,135.7	40.42000
2002	451,785.7	12.90000	121.0000	925.5000	499,681.5	41.60000
2003	495,007.2	14.00000	129.3000	2,261.000	865,876.5	54.36000
2004	527,576.0	15.00000	133.5000	2,612.700	863,072.6	43.73000
2005	561,931.4	17.90000	132.1470	3,594.100	804,400.8	57.21000
2006	595,821.6	8.200000	128.8500	2,712.200	1,546,526.0	49.62000
2007	634,251.1	5.400000	125.8330	3,868.200	1,936,958.0	50.13000
2008	672,202.6	6.980000	118.5609	2,592.400	2,053,006.0	48.62000
2009	718,977.3	13.93000	124.8700	7,317.700	3,050,576.0	48.36000
2010	776,332.2	11.80000	150.2980	8,674.200	4,012,919.0	48.33000
2011	834,000.8	12.40000	157.4994	8,689.300	3,908,280.0	51.19000
2012	888,893.0	12.20000	160.7800	8,894.500	3,357,398.0	52.64000

Note: Y= log of GDP,SME=log ofinvestment in SMEs,EXR= exchange rate, INF= inflation rate,K= log of capital, L= labor.
Source: Authors' calculations.