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IMPACT OF ELECTRICITY PRICES ON GROWTH AND DEVELOPMENT OF SMEs IN GHANA: A CASE OF SELECTED PHARMACEUTICAL INDUSTRIES IN ASHANTI REGION

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Abstract

This research explores the effect of electricity prices on the growth and development of Small and Medium Enterprises (SMEs) in the Ashanti Region of Ghana by the use of the Vector Error Correction Model (VECM) and the Johansen co-integration method. The findings suggest that there is a negative, long-term relationship between the prices of electricity and SMEs growth and development. Empirical findings indicate that the long-run relationship between electricity prices and SMEs growth is special and negative. Higher energy rates were found to have a negative effect on SMEs ' growth and development. The findings suggest that a 1% increase in ELEC (average electricity price hikes) has a 0.68 percent lag in decreasing PRO. Furthermore, according to the VECM findings, a 1% increase in PPI lags PRO by 1.2 percent.

Keywords: Electricity prices, SMEs, Profit, Growth, Ghana

INTRODUCTION

Energy production has made significant technological strides over the last century and has been a cornerstone in the development of modern society. Holding such a crucial position in the energy sector is continuously being discussed in society and is facing considerable public scrutiny. Since electricity is an important good for the industry as well as for households, its output must be sustained at all times. The electricity-generating industry has been under tight government control because of its value to society to ensure a stable and fair market.

Revenue management and competitive electricity pricing are concepts that offer enormous solicitation opportunities in the energy sector. These methods of demand-side management can help to facilitate the sale of electricity at distinctive prices over various demand levels. Even though SMEs remain the fastest growing sector in developing countries' economies, their operations have been overwhelmed by insufficient and unstable power supplies and higher electricity prices rendering most SMEs unproductive and inefficient. However, connection a stable supply of electricity at a reasonable price is considered to be very important for the day-to-day operations of most small and medium-sized companies.

The provision of electric power is a very powerful contributor to the stable and faster economic development of every country. Accessibility to a constant supply of electricity has a profuse effect on the economy and the welfare of any society. Notwithstanding the above, power supply is a very crucial input in the activities of SMEs over the world. Aside from being a necessity or an essential asset in powering industrial machines, it also plays a very significant role in human capital. In order to ensure efficiency and effectiveness, all SMEs need a constant

flow of electricity since it serves as an essential input in the process of production. Electricity has also contributed greatly to the production and distribution of products and services.

Availability or the constant flow of electricity also helps significantly in preserving finished goods for future demands or consumption. Thus, it leads to the enhancement of consumers' satisfaction thereby assisting in the making of goods readily available to consumers anytime their demand for it arises. It goes a long way to preserve the firm's credibility and preserves its reputation and honesty, as a result of customers' confidence being maintained on getting their demands met (Nyanzu & Adarkwah, 2016). According to (Cissokho & Seck, 2013), businesses pump a lot of capital to improve their productivity level, which makes electricity a key direct and indirect input in their production process and survival. Since the usage of electricity is very crucial in the efficiency of every SMEs, the cost of electricity will have an impact on their survival. As electricity serves as a major input in the daily activities of SMEs, their rate of electricity usage will increase as well.

Although some countries rely substantially on renewable energy sources such as hydropower, wind power, or solar power, others consume enormous amounts of fossil fuels. The cost of energy is determined by several factors, including access to resources, market conditions, and resource privatization. According to (Lee & Anas, 1992) Solomon Islands' Pacific island nation is the country with the highest energy price in the world, at an outrageous price of US 99 cents per kilowatt-hour. The tropical islands such as Vanuatu, the US Virgin Islands, the Cook Islands, and Tonga are countries with the lowest electricity prices. Germany, Denmark, and Belgium pay a high amount of money to enjoy electricity. Different consumers pay different amounts of money for electricity based on how or what they use it for. The skyrocketing prices of electricity are too high to bear for residential and industrial users since it costs more to supply power to them. Industrial users of electricity consume more and can access electricity at higher voltages, so it is more efficient and less costly to supply energy to these customers. To industrial customers, the power price is typically close to the energy market level. Many researchers have studied how power outages affect the output of SMEs in the same research area but nothing has been said about how price rises in energy affect the output of these SMEs. To fill this gap, the researcher seeks to examine the effects of the increase in electricity prices on the growth of SMEs.

LITERATURE REVIEW

Electricity is an essential component in almost all SMEs manufacturing activities. Therefore, as far as these SMEs ' economic activities are concerned, the price of electricity has the ability to directly or indirectly influence their operations. Electricity has then become the

vehicle of growth for the existence of SMEs in this new world where nearly everything requires technology. The price of electricity is very crucial for every firm that uses electricity. This is due to the source of the electric power supply. In the view of (Lee & Anas, 1992)(Steel & Webster, 1991), the source of electricity in developing countries is not efficient, as a result, it is detrimental to the survival of SMEs. Insufficient source of power supply is one of the factors that is leading to the poor performance of businesses in Ghana.

Technically, two forms of power disruptions may impact businesses: poor quality and power outages (Lineweber & McNulty, 2001). The first one refers to voltage fluctuations, which could cause serious damage to equipment and machinery, as well as a significantly high cost of consistent repairs and replacement. The second disruption leads to complete loss of power, which can last for an hour or more (Cissokho & Seck, 2013). Ghana government is the sole supplier of electricity in the country and as a result of its monopoly, it has performed poorly as there are no other competitors in the energy business. This led to the outrageous price of electricity and poor delivery services, which affects consumers negatively in the long run according to (Forkuoh & Li, 2015). (Beck & Cull, 2014) also reported that the cost of supplying electricity is higher in most developing countries than in developed ones, whereas alternative energy supplies in developing countries are lower and more costly.

Empirical research into the effect of power outages on the growth and survival of businesses in the nations of Africa found that about 820 manufacturing companies were closed between 2000 and 2008, with the number rising to 834 in the following year, both because of the lack of electricity supply and the high price of energy choices offered (Akuru et al., 2014).

Most small and medium-sized businesses invest in stand-by generators to provide power which are costly relative to grid electricity. Generators do require some technical know-how ,a sufficient supply of fuel and spare parts. However, firms using their own generators are stated to have increased in recent years in Sub-Saharan Africa. It is observed that there is a strong and positive correlation between electricity prices and the operation cost of SMEs. This has been linked to the fact that almost all SMEs are experiencing financial distress and might not afford the high price of energy supply, as a result, may use production cutting ways that are leading shortfalls in sales and profit but high production price from the charge elements.

According to (Durlauf et al., 2001), analysis of realistic data on electrical energy and pilot prediction on dynamic pricing shows that income elasticity of electricity and market demand is small but several behavioural factors and lifestyle can significantly increase demand and supply. Electricity availability and costs have long been established as the major factor in deciding

SMEs production. The economies of the advanced countries were dependent on SMEs growth, and the future of Ghana's economy depends also on well thriving small enterprises. Industries in this part of the land can only thrive with access to reliable and affordable electricity. While this is much desired by all, the current body structure does not fully support the realization of this objective (Hub, 2017). The swift growth of the economy is as a result of the low rates of electricity and this also leads to the high demand for it. In every economy, the manufacturing sector is the highest consumer of electricity as argued by (Lim & Yoo, 2013). An increment in electricity prices, in conjunction with other factors has direct relationship with total production costs and this may lead to competition among producers in these countries. This might have a proportional effect on the investment decisions that are taken by both international and domestic firms (Barteková & Ziesemer, 2019). The potential effect of electricity prices has been ignored so far despite its impact on the economy. When it comes to the relationship between prices of energy and the economy, the latest report by the European Commission (2014d) analyses the effects of energy costs on export competitiveness in the EU manufacturing industries. Nevertheless, (Akkemik, 2011) also viewed the impact of surplus energy supply on trade between 14 OECD countries and 10 sectors had an inverse proxy for energy costs while (Meltzer, 1981) also explored the effects of bilateral trade across 42 countries and 62 energy price differentials industries. Taken together, these studies found that energy price differentials are substantial in determining the competitive decisions taken by a country. (Akkemik, 2011) also put it that, as a vital input for various economic activities, consistent changes in electricity prices without a doubt have an impact on production activities and also the investment decisions taken by firms and on the overall level of the price which leads to inflation.

One of the most debatable topics in this literature is the interrelation between electricity prices and output. In recent years the price of electricity in Ghana has increased. This has drawn the public's attention especially to those who undertake the economic activity with electricity. Meanwhile, in other developing countries like South Africa, the energy sector was relieved from tax and dividend payments, which lead to extremely low prices (Gonese et al., 2019). Most literature supports the idea that increased production from SMEs and other industries contributes to increased consumption of electricity. Studies in Canada and South Africa (Fei, 2014) (Polemis & Dagoumas, 2013), Greece and South Africa, Japan, and the United Kingdom (H. et al., 2013) are among them. Electricity prices have a very uneven influence on economic productivity and growth, according to these studies. The problem of high electricity prices was less concerning in these circumstances, but it was also more difficult to determine because the studies included more decades (1960–2007) with low electricity prices and fewer periods (2008–2011) with high electricity prices, notably in South Africa. This

indicates that, as stated by (Gonese et al., 2019), electricity use and price shocks have a significant influence on production growth.

Literally, electricity usage is normally more responsive to disparities in GDP (Ghali & El-Sakka, 2004) than it is to variations in electricity tariffs. Other studies have focused on the link between electricity use and aggregate GDP rather than electricity prices and their adverse effects on small business growth. The current research covers times when electricity prices were rising simultaneously time. The use of panel data once again reveals how electricity prices affect output at SMEs in Ghana, particularly pharmaceutical firms.

RESEARCH METHODOLOGY

This research employs the paradigm employed in (Ziqing1 et al., 2009) to assess the influence of energy costs on SMEs' growth in Ghana. . In their study on Economic growth, energy consumption, and carbon emissions in China, (Ziqing1 et al., 2009) analyze the relationships between economic growth, energy consumption and carbon dioxide emissions using an autoregressive distributed lag (ARDL) procedure and Engle-Granger causality test in China over the period 1965-2011. The variables used in this study are GDP, energy and carbon emissions. While (Ziqing1 et al., 2009) was conducted on a country level, our study focuses on SMEs in Ghana. (Ziqing1 et al., 2009) model is as follow:

$$GDP_t = F(G, E, C) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, G is China's real GDP (G, constant 2000 US$) from the World Bank's World Development Indicators 2011, E is energy consumption data (E, ton) from the analysis and information of world energy full reporting 2012, and C is carbon dioxide emissions data (C, ton) from the analysis and information of world energy full reporting 2012.

The author is therefore inspired by this model to build his own, which is specifically focused on SMEs in a given region of Ghana.

PRO = Profits: Profit is the financial gain realized when the money generated by a commercial operation exceeds the expenditures, costs, and taxes incurred in keeping the firm running. Any profits earned are returned to the company's owners, who can choose to keep the money or reinvest it. Entire revenue minus total expenses equal profit. Therefore, electricity prices will in either way have a positive impact or a negative impact on the profit margin of SMEs.

ELP = Electricity Prices: Electricity prices are expected to fall, while the link between electricity prices and SMEs growth is expected to flip in the other direction. Because rising energy prices are likely to raise output costs in the economy as a whole, the sign is predicted to be negative. This consequently raises the overall price level stemming from cost-push inflation

or can deter electricity-intensive industry operations. These two factors carry the anticipated effect of decreasing the gross domestic product and thereby rising economic growth.

PPI = Producer Price Index Represents the Producer Price Index (PPI), which is a weighted price index calculated at the level of the producer. This indicator measures the level of inflation seen by producers. The PPI (formerly known as the Wholesale Price Index) tracks changes in wholesale markets, manufacturing, and commodity markets (Freeman, 2013). It is also an early warning sign of inflation because an increase in the price of raw materials provided to companies to make their final product has a significant impact on their wholesale pricing to retailers. The economy's tangible products are produced by all of the industries that make up the economy. Imports are frequently left out of this category.

The data used for the analysis has been gathered from different sources. Most of the data contained monthly measurements of SMEs, in other cases the data was calculated as a monthly average. Data from the years 2016 January to 2019 April was gathered and imported to an excel worksheet where it was formatted to fit the analysis. The data was then exported to E-views for further analysis. The authors choice of this study period is motivated by data availability and the need to use consistently measured variables. The adopted analytical approach adopted is the Johansen Cointegration which has enable the study to assess the effect of electricity prices on the growth and development of SMEs in the Ashanti Region of Ghana.

RESULTS

Stationarity and unit root test results

Analysis of the following graphs allows us to deduce that the explained variable Profits (PRO) is stationary without differentiation, just like the explanatory variable Electricity Prices (ELP). Regarding the second explanatory variable Producer Price Index (PPI), the analysis of the graph alone cannot allow us to conclude on its stationarity. For further analysis, we proceed to the unit root test on the three study variables.

Augmented Dickey Fuller (ADF) Results

Analysis of the results of the Augmented Dickey-fuller unit root test demonstrates that the variables PRO and ELP are stationary at level without differentiation. Only the PPI variable is not stationary at level. But since the study adopted co-integration to analyze the impact of electricity prices on SMEs growth, all the variables must be stationary at the same level before being able to conduct the analysis of co-integration analysis and the vector error correction model. Thus, we conduct a first differentiation in order to find out if all the variables are

stationary at the same level. As the following table shows, at the first difference, all the variables of the study are stationary at 5% level of significance. The probability of the variables (P=0.0000) are smaller than 5% (0.05).

Table 1: Augmented Dickey Fuller Results

	Level			First Difference		
Variables	Constant	Trend and Constant	None	Constant	Trend and Constant	None
LPRO	-5.136473 (0.0001)	-5.167289 (0.0008)	-0.041016 (0.6620)	-6.316873 (0.0000)	-6.515764 (0.0000)	-6.429106 (0.0000)
LELP	-6.031703 (0.0000)	-5.997297 (0.0001)	0.037933 (0.6884)	-6.794945 (0.0000)	-6.688473 (0.0000)	-6.898022 (0.0000)
LPPI	-3.067618 (0.0375)	-2.988872 (0.1481)	-1.038702 (0.2643)	-6.404122 (0.0000)	-6.400727 (0.0000)	-6.473208 (0.0000)

In order to confirm the results of the Dickey-Fuller Augmented test, it is important to conduct a second stationarity test, that of Phillips-Perron. The following sub-session will therefore address this test.

Phillips Peron test results

The results of the Phillips-Perron test are fairly consistent with those of Augmented Dickey-Fuller. At level, only Profit and Electricity Prices are stationary. But after the first differentiation all the variables of the study are stationary.

Table 2: Phillips Peron Test Results

	Level			First Difference		
Variables	Constant	Trend and Constant	None	Constant	Trend and Constant	None
LPRO	-5.087825 (0.0002)	-5.117740 (0.0009)	-0.061331 (0.6561)	-18.70095 (0.0001)	-19.58186 (0.0000)	-18.63842 (0.0000)
LELP	-6.693906 (0.0000)	-7.153743 (0.0000)	-0.079812 (0.6498)	-23.08377 (0.0001)	-23.68422 (0.0000)	-22.57555 (0.0000)
LPPI	-2.915564 (0.0526)	-2.801966 (0.2052)	-1.129264 (0.2309)	-8.363687 (0.0000)	-11.85172 (0.0000)	-7.940408 (0.0000)

Johansen Approach to Cointegration (Lag Order Specification)

Table 3: Output of the optimal lag selection test

VAR Lag Order Selection Criteria
Endogenous variables: LPRO LELP LPPI
Exogenous variables: C
Date: 04/30/20 Time: 02:34
Sample: 2016M01 2019M04
Included observations: 37

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-45.72498	NA	0.002795	2.633782	2.764397*	2.679830
1	-31.13696	26.02186*	0.002072*	2.331728*	2.854187	2.515919*
2	-28.97438	3.506887	0.003032	2.701318	3.615623	3.023653
3	-22.36729	9.642779	0.003547	2.830664	4.136814	3.291143

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The table above shows the output of the optimal lag selection test. The lag length with the asterisk is the one selected by the respective criteria. When selecting the optimal lag, the smaller the criteria the better the model. The results show that most of the criteria chose 1 as optimal lag except Schwarz information criterion. So, for the rest of our analysis, the study will use 1 as optimal lag.

Johansen Cointegration Analysis results

At the 5% significance level, the Johansen cointegration trace test in Table x reveals that there is only one (1) cointegration equation between the research variables. Because the trace (test) statistic of 56.869 is greater than the critical value of roughly 42.915 at the 5% significance level, the null hypothesis of no cointegration vectors among the variables is rejected. The Maximum-Eigenvalue test in Table yields results that are very similar to those of trace. At the 5% significance level, it reveals that there is only one (1) cointegration equation between the study's variables. This means that the variables have considerable long-run dynamics.

Table 4: Cointegration Rank Test (Trace) Results.

Null	Alternative	Trace Test		
		Test Statistic	5% Critical Value	Prob.
r = 0	r = 1	55.86906	42.91525	0.0016
r ≤ 1	r = 2	25.37125	25.87211	0.0576
r ≤ 2	r = 3	9.070468	12.51798	0.1761

Table 5: Cointegration Rank Test (Maximum Eigen Value) Results

Null	Alternative	Maximum Eigenvalue Test		
		Test Statistic	5% Critical Value	Prob.
r = 0	r = 1	30.49781	25.82321	0.0112
r ≤ 1	r = 2	16.30078	19.38704	0.1328
r ≤ 2	r = 3	9.070468	12.51798	0.1761

The cointegration hypothesis being verified, we can therefore conclude that it is an Error Correction Model (ECM).

The Vector Error Correction Model Empirical Results

All variables (if non-stationary) must be cointegrated in the first I (1) or second I (2) differentiation before executing the vector error correction model. The variables in this investigation are cointegrated in the first differentiation I. (1). The short- and long-run dynamics of the series can then be investigated using the vector error correction model. The classic vector error correction model for cointegrated series is as follows:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \sum_{i=0}^{n} \delta_i \Delta X_{t-i} + \varphi Z_{t-1} + \mu_t \dots\dots\dots (2)$$

Where, Z is indeed the error correction term (ECT) and the ordinary least squares residuals from the long-run cointegration regression are:

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \dots\dots\dots (3)$$

$$Z_{t-1} = ECT_{t-1} = Y_{t-1} - \beta_0 - \beta_1 X_{t-1} \dots\dots\dots\dots (4)$$

The estimated vector error correction model (VECM) results with PRO as targeted variable is as follows:

$$DPRO = -0.029ECT_{t-1} - 0.267DLPRO_{t-1} - 0.022DLPRO_{t-2} - 0.682DLELP_{t-1} - 0.350285DLELP_{t-2} - 1.197DLPPI_{t-1} + 1.249DLPPI_{t-2} - 0.01 \ldots\ldots\ldots\ldots\ldots (5)$$

The VECM examines the short and long-run dynamic linkages in the impact of electricity prices on SMEs growth, with all exogenous factors lagged once. The results of the VECM mentioned above are shown in the table below:

Table 6: VECM Results (Monthly Data Jan 2016- April 2019), long-run dynamics

Variable	Coefficient	Standard error	t-Statistic	Prob.
Constant	-33.95686			
DLPRO(-1)	1.000000			
DLELP(-1)	- 0.682389	0.269862	2.528657	0.0171
DLPPI(-1)	- 1.197345	0.823316	-2.454296	0.0106

In the model tested, the long-run dynamics are described below by the following equation:

$$PRO = -33.95686 - 0.682389ELP - 1.197345PPI \ldots\ldots\ldots (6)$$

The above equation shows that Electricity prices (ELP) has a negative long-run relationship with SMEs' profits. Producer pricing index (PPI) shows a negative long-run association with SMEs growth, according to the same equation. In terms of explaining PRO, all variables with absolute t-values larger than 2 are statistically significant. This suggests that in the long run, ELP (electricity prices) and PPI (producer price index) are important in explaining PRO. The findings suggest that a percentage increase in ELEC (average electricity price hikes) has a 0.68 percent lag in decreasing PRO. Furthermore, the VECM findings imply that a percentage increase in PPI is associated with a 1.2 percent fall in PRO.

The model's short-run consequences are shown in the table 7.

Table 7: VECM Results (Monthly Data Jan 2016- April 2019), Short-run dynamics

Variable	Coefficient	Standard error	t-Statistic	Prob.
DLPRO (-2)	-0.022	0.192	-2.114	0.009
DLELP (-2)	-0.350	0.199	2.760	0.008
DLPPI (-2)	1.249	0.799	-1.562	0.129

The above table shows the short-term dynamics of the VECM. The results suggest that in the short-term, ELP has a negative impact on SMEs' profits, and is statistically significant. On the other hand, the coefficient of producer price index (PPI) is positive and also not statistically significant.

Overall, the model of the study performed well. In cointegration analysis, the coefficient of the error correction term (ECT) has to be negative and statistically significant for it to retain economic interpretation. In this study, the ECT (-0.029; Prob.= 0.0158) does satisfy both conditions. In other words, about 3% departure from the long-term equation is corrected each period.

Diagnostic Tests

Breusch-Godfrey serial correction test

The result of the Breusch-Godfrey serial correlation suggests that there is no evidence of serial correlation since the P-values (0.2956 & 0.2025) are greater than 5% level of significance.

Table 8: Breusch-Godfrey serial correlation test

F-statistic	1.275403	Prob. F(2,27)	0.2956
Obs*R-squared	3.193816	Prob. Chi-Square(2)	0.2025

Arch test of heteroscedasticity

Table 9: Heteroskedasticity Test: ARCH

F-statistic	0.846086	Prob. F(1,34)	0.3641
Obs*R-squared	0.874104	Prob. Chi-Square(1)	0.3498

Cusum Test

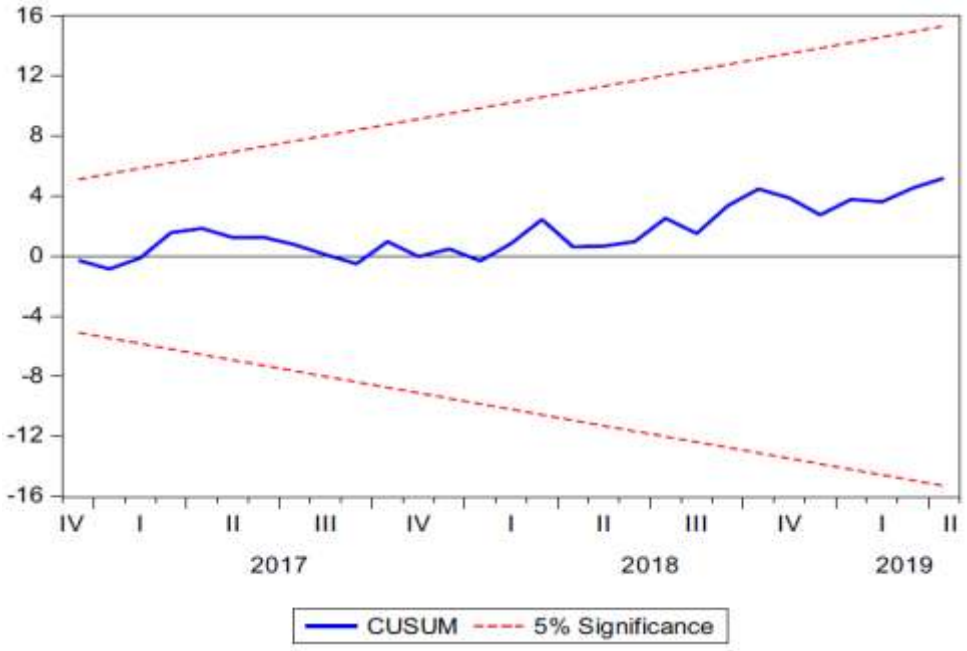

Figure 2: Cusum Test result

As long as the blue curve line is within the red boundaries, the model is set to be dynamically stable.

The findings show that SMEs' growth (PRO) has a negative long-run connection with electricity prices (ELP) and the producer price index (PPI). The null hypothesis is rejected in favor of the alternative hypothesis based on the evidence reported in this chapter. As a result, it can be inferred that changes in electricity prices and the producer price index have a detrimental impact on the growth of SMEs in Ghana.

CONCLUSIONS, RECOMMENDATIONS, AND LIMITATIONS

The key goal of this research was to investigate the effect of electricity prices on the growth and development of SMEs in the Ashanti Region of Ghana. The objectives were to conduct an econometric analysis of how the listed variables affect the growth and development of SMEs in Ghana's Ashanti Region and to offer policy recommendations based on the findings. The second part of this research reviewed the theoretical and related literature. Electricity's function in economic growth is derived from ecological economics, and the most important factor of production is believed to be the stock of fossil fuels and solar power. The findings were indecisive in that some found that electricity prices had a favorable impact on economic growth

while others found that they have a negative impact. The approach used to determine the influence of energy prices on SMEs growth and development in Ghana's Ashanti Region was studied in the methodology part. The analytical framework for this study is also laid forth in this part, as well as a full review of the econometric methodologies employed. The study's empirical findings were provided in the last part of the study. The findings in this research show that electricity prices have a detrimental long-run association with SMEs growth and development. The following are some of the key takeaways from the findings:

With all exogenous variables lagged once, the VECM estimates that there are short and long-run dynamic linkages in the impact of electricity prices on SMEs growth. Producer pricing index (PPI) shows a negative long-run association with SMEs growth, according to the same equation.

From the abovementioned analysis, findings, and outcomes in the study, we recommend the following as having an impact on the growth and development of SMEs: The prices of electricity, the producer price index of a country at a given period, the profit margin of SMEs.

While the findings of this study show a negative relationship between SMEs' growth and development and power prices in Ghana's Ashanti Region, it is important to remember that increasing the price charged to customers has economic benefits as well. Raising energy rates to a cost-reflective level has a number of advantages, one of which is that it lays the groundwork for the country's electrical generation to be sustainable and reliable. This will allow for the efficient allocation of a scarce resource like energy in the long run. Furthermore, the cost-reflectivity of power pricing will allow for the development of alternative energy sources and the diversification of energy sources.

The author also suggests that the government implement legislative solutions to mitigate the effects of rising electricity prices. Subsidies, progressive price increases, improved energy efficiency and demand-side management, increasing competition in the electricity supply industry, and providing targeted help to disadvantaged sectors are some of the policy choices available (SMEs). Subsidizing electricity helps to keep jobs in vulnerable sectors while also achieving broader societal goals like providing electricity to low-income SMEs and newborn SMEs. This will also help to boost economic development by reducing the inflationary effects of rising goods and service prices.

Finally, transitional help for vulnerable industries might be provided to SMEs that have typically relied on low energy prices as a competitive advantage. Such SMEs are vulnerable to increases in electricity prices, and if they are unable to sustain higher user rates, they may be forced to close. The collapse of these SMEs has far-reaching consequences, including an increase in unemployment.

In this study, using certain selected pharmaceutical enterprises in Ghana's Ashanti region, we investigate the impact of electricity prices on the growth and development of SMEs. The basis of this study was to identify some of the factors that can affect electricity prices and how they can affect the growth and development of SMEs in the long and short run. This was essential due to the limited research solutions towards answering the impact of electricity prices on the growth and development of SMEs, particularly in Kumasi. These questions are stated as: What is the impact of electricity prices on the performance of SMEs in Ghana? What is the effectiveness of the electricity generating and distributing companies in Ghana? What are the other factors affecting the performance of SMEs in Ghana aside from electricity? Do electricity prices affect the prices of final goods and services? The outcome of the analysis demonstrated that the variables recommended had a significant relationship to SMEs growth and development.

After testing the reliability and validity of our study, variables with absolute t-values larger than 2 are statistically significant in explaining PRO, according to the findings. This suggests that in the long-run, ELP (electricity prices) and PPI (producer price index) are important in explaining PRO. The findings suggest that a percentage increase in ELEC (average electricity price hikes) has a 0.68 percent lag in decreasing PRO. Furthermore, the VECM findings imply that a 1.2 percent fall in PRO is caused by a percentage increase in PPI lagged once. The study, therefore, highly recommends that special attention needs to be attached with regards to ELEC, PRO, AND PPI to address the study objectives.

The study could not cover all possible SMEs in the Ashanti region of ghana mostly due to time, and material resource constraints, so a limited number of data were given out to the author. The study covered some firms which are primarily small and medium scale enterprises within the Kumasi Metropolis. It was also difficult to collect information from certain pharmaceutical companies because they were afraid that the data they were giving out would end up in the hands of tax officials, as most of them do not comply with their tax obligations despite the researchers' assurances. For our future research, it is highly recommended to explore the potential relationship between PPI and SMEs growth. We also intend to research firm sizes and how electricity prices affect their expansion rate.

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