The Effect of Environmental Performance on Firm’s Performance – Evidence from Ghana

Kingsley Appiah\textsuperscript{ab}, Jianguo Du\textsuperscript{a}, Kofi Baah Boamah\textsuperscript{a}
\textsuperscript{a}School of Management, Jiangsu University, Zhenjiang 212013, PR China
\textsuperscript{b}Accountancy Department, Kumasi Technical University, Kumasi, Ghana
Corresponding Author: kingsleyappiah2004@yahoo.com (Kingsley Appiah*)

ABSTRACT

This paper looks at the effect of environmental performance on firm’s performance of mining companies in Ghana. The study looked at total cash cost and capital expenditure as measures of firm’s performance of selected mining company. The study used recent econometric approach: Fully Modified Ordinary Least Square (FMOLS) to find the long run relationship between the environmental performances and firm’s performance. The approach of the study is case study of a selected mining company listed at Ghana Stock Exchange for the period 2007-2015 using annual integrated and sustainability reports data. The study findings are that water consumption has a negative and significant impact on the financial performance of mining companies in Ghana. Hence, our study concludes that companies make environmental performance disclosures as means of meeting industrial regulations and policies and also to make the community see that they are doing something to mitigate the negative effect of their activities in the community.

Keywords: Environmental Performance; Firm’s Performance; Carbon Emission, Energy Consumption, Water Consumption

INTRODUCTION

According to the former Vice President of Republic of Ghana Mr. Kwesi Bekoe Amissah-Arthur on his key note address at the launch of the Environmental Protection Agency's 40th anniversary in Accra explained that Ghana is confronted with serious and complex environmental challenges, despite the various interventions by the Environmental Protection Agency (EPA) over the last 40 years. Some of the challenges include waste management, illegal mining, logging, deforestation, noise, water and air pollution. To deal with the challenges, government of Ghana has set up AKOBEN program launched in November 2010. The main aim for AKOBEN program is to disclose environmental performance ratings of mining and manufacturing companies using five-colours rating scheme (Ransford, 2011). The performance ranges from excellent to poor using colours as GOLD, BLUE, GREEN, ORANGE and RED respectively. The purpose of the rating is to measure the environmental performance of companies’ day to day activities once the companies have passed Environmental Impact Assessment (EIA) standard. AngloGold Ashanti mining company operating site called Iduapriem was rated BLUE whiles Obuasi site was rated RED meaning good and poor environmental performance by EIA (2012) report. Recently, environmental performance of mining companies is on the spot light globally due to its impact on stakeholders such as communities, shareholders and the firm at large (Earnhart and Lizal, 2010). The environmental performance of companies has become a major societal concern all over the world. However, studies have shown in both developed and developing countries that there is no laid down standard criteria to measure the environmental performance of a company (Campion and Godfred, 2013; Tan et al., 2017). There is an inconclusive debate on relationship between environmental performance and firm performance particularly in developing world which has led to the need to find how such relationship exist in Ghana’s mining sector.
Several studies have been conducted on environmental performance relationship with firm’s performance. Some have shown positive relationship and others negative relationship between the two in general perspective in both developed and developing economies. Typical example is the study by Gibson et al. (2013) on environmental management practices and firm performance in South African mining firm. The main objective of the study was to find out whether environmental management practice of mining firms have any relationship with firm’s financial performance in terms of return on equity as base measure. Using multiple regression statistics, the study used South African mining firms listed on Johannesburg Stock Exchange data for the analysis. The study rejected the null hypothesis thereby accepting the alternative hypothesis that carbon emission reduction, energy efficiency and water usage efficiency does not affect the firm’s financial performance and in this case the return on equity. The study showed no significant relationship between the variables. It was found that even though no relationship was established, however increase in financial performance tends to encourage firms to embark on environmental management practices. Based on this premise this study seek to find out how these environmental performance variables affect total cash cost and capital expenditure for the case of Ghana’s mining companies. The study is different to the one examined by Gibson et al. (2013) since the variables used to measures firms’ performance are different. In addition, the study look at the data of AngloGold Ashanti mining company activities in Ghana. Moreover, Ghana’s social, ethical and environment reporting standards are different from South Africa. The study seek to bring to light environmental performance variables relationship with company total cash cost and capital expenditure to guide corporate managers, investors and policy makers. Again, the importance of this work could be seen from the contributions it makes to the existing body of knowledge by separately looking at how carbon emission level, energy usage and water usage relates with total cash cost and capital expenditure of a company listed at Ghana Stock Exchange (GSE). This to the best of our knowledge is the first of its kind in Ghana. With this introductory background of the study, the next section will look at the literature relating to environmental performance and its measures. In addition to this, measures of firm’s performance (i.e. total cash cost and capital expenditure) would be discussed under dependent variables. The third section describes the methodology and data collection procedures of the case study mining company would be discussed. This would then followed by results and discussions of the study findings and the final section would look at conclusions of the study.

LITERATURE REVIEW

Empirical literature on environmental effects on firm’s financial performance has been mixed, with some studies reporting positive relationship (Montabon et al, 2007; Bansal & Gao, 2006; King & Lenox, 2001; Konar & Cohen, 2001; Dowell et al, 2000; King & Lenox, 2000), neutral relationship (Paton & Elsayed, 2005) and negative relationship (Ziegla et al, 2009; Joshi et al, 2005; Khanna et al, 1998; Konar & Cohen, 1997). Eljjido-Ten (2004); Deegan and Rankin, (1996); Kent, et al., (1997) reveal that due to inadequate statutory enforcement of environmental reports, most developing country’s firms decide on their own as to what to disclose in other to favour their corporate image. Similarly, Wiseman, (1982); Harte and Owen, (1991); Fekrat, et al., (1996) also argue that some corporate entities do not disclose the true reflection of their entities environmental performance. This is because there is no generally accepted standard for environmental reporting, hence individual company’s report their environmental status based on how management wanted to portray to the public which makes comparisons difficult if not impossible.

Empirical study conducted by Arafat, Warokka and Dewi (2012) revealed that companies in Indonesia fully support the formulation of environmental policies however, the companies fall short of the policies implementation to achieve the needed results. The study was aimed at extending the literature done in Western countries that suggest that there is a link between the environmental disclosure, environmental performance and financial performance. The study used data of 33 Indonesian manufacturing firms which are listed in Indonesian Stock Exchange (IDX). In analyzing the data, t-test and multivariate regression model was used. Findings were that environmental performance has significant influence on financial performance of manufacturing firms in Indonesia. That is, firms with good environmental performance rate tends to perform better financially due to its ability to manage the environmental variable leading to a reduction in cost. Using content analysis approach Tze san Ong et al. (2016) analysed annual report of 100 companies to determine the quality and quantity of the environmental disclosures of the companies between the period of 2009 and 2013. With regards to the relationship between...
environmental disclosures and financial performance of public listed companies in Malaysia, their paper shows positive relationship between environmental disclosures and earning per share but emphasized that the relationship depends on the quality of the disclosure. Similarly, Russo and Pogutz, (2009) also found a significant short-term relationship between environmental performance and operating performance such as return on asset using sample from the Global Fortune 500 index spanning for period 2002 to 2005. Data was analysed using statistical analysis based on two-stage least square regression models.

Other school of thoughts produce intuitive contradictory view on the relationship between environmental performance and firm performance to be statistically insignificant, which are different from those early empirical studies, which suggested a positive relation (Rockness, Schlachter, and Rockness, 1986; Freedman and Jaggi, 1992). A study by Gonenc and Scholtens (2017) on environmental and financial performance of fossil fuel firms: A closer inspection of their interaction. The study was done using firms sample from oil, gas and coal industry to find out the environmental indicators relation with the financial performance for the period 2002-2013. The findings were that environmental outperformance has no impact on chemical firm’s financial performance. On the other hand, Delmas and Nairn-Birch (2010) also examined the impact of greenhouse gas emissions (GHG) on firm financial performance. Interestingly, their findings indicated that increasing carbon emissions resulted in a positive impact on firm financial performance when employing accounting based measures of financial performance, while the same linkage was negative when using market based measures of firm financial performance.

In other perspective, Elsayed and Paton (2005) found that the environmental performance relation with the financial performance to be neutral. Elsayed and Patron however added that their findings are consistent with theoretical view that a firm has to continue investment up to a point where its average cost equals the average revenue received. Study of Muhammad et al. (2015) revealed two relations between the environmental performance and firm’s performance in two separate period of observations. The first was before financial crisis in Australia in the period 2001-2007. During this period, the study found the relation to be strongly positive. However no relation was found between the variables after financial crisis of public listed companies in Australia. On this basis, our study used econometric model to find answers of the relationships between dependent variables and independent variables. Thus regression equation with the main explanatory variables (i.e. without other variables) stated as:

Firm’s Performance = Environmental Performance

\[ Y_t / CP_t = \alpha + B_1 \text{Environmental Performance} + U_t \]

\[ CP_t = \alpha + B_1 \text{Energy Consumption} + B_2 \text{Water Consumption} + B_3 \text{Capital Expenditure} + U_t \]  
Where:

\( Y_t \) and \( CP_t \) are the dependent variables; that is, total cash cost and capital expenditure respectively, \( \alpha \) is the intercept, \( \beta_1, \beta_2 \) and \( \beta_3 \) are the slopes. The independent variable is represented by environmental performance and is proxy by Energy Consumption (EC), Water Consumption (WC) and Carbon Emission (CE). The \( U_t \) represents the random term which is assumed to have a normal distribution with mean and variance \( \sigma^2 \). \( t \) a time period (year), \( \alpha \) and \( \beta_1, \beta_2, \beta_3 \) (coefficients) measure the change in Y and CP with respect to EC, WC and CE, holding other factors constant in the estimation model.

To test the relationship between environmental performance measures and firm’s performance and to ensure inclusivity, the study introduced other explanatory variables such as the average number of employees, production volumes and industry dummy. Hence, equation (1) and (2) is re-written as:

\[ Y_t = \alpha + B_1 \text{Energy Consumption} + B_2 \text{Water Consumption} + B_3 \text{Capital Expenditure} + B_4 \text{Average Number of Employees} + B_5 \text{Production Volume} + U_t \]  
\[ CP_t = \alpha + B_1 \text{Energy Consumption} + B_2 \text{Water Consumption} + B_3 \text{Capital Expenditure} + B_4 \text{Average Number of Employees} + B_5 \text{Production Volume} + U_t \]

Where:

\( Y_t \) = Total cash cost, \( CP_t \) = Capital Expenditure, \( EC_t \) = Energy usage, \( WC_t = \) Water usage, \( CE_t = \) Carbon emission level; \( SZ_t \) = average no. of employees; \( PV_t = \) Production volume. The \( U_t \) represents the random term which is assumed to have a normal distribution with mean and variance \( \sigma^2 \), \( \alpha \) = intercept and \( t \), a time period (year).

AngloGold Ashanti’s mining company energy is predominantly fossil fuel generated. The energy usage of the company is very high and that the company is trying hard to minimize its energy usage due to an increase in both cost and greenhouse gas emissions level. The association between firm carbon emissions level and its financial performance can only be explained by stakeholder theory (Jones, 1995). The stakeholder theory states that firm’s success is dependent on the success of management’s ability to manage relationships of firms’ with its stakeholders (Freeman, 1984, Brammer & Millington, 2008, Munilla and Millles, 2005; Phillips, 2003). With this view, the conventional idea that the success...
of the firm is dependent solely upon maximising shareholders’ value is not sufficient. The theory is therefore useful in explaining why firms undertake environmental and social engagements seriously in the attempt to fulfilling its part of the contract (Cho & Patten, 2007).

Several literature review provides quite consistent evidence of a negative relationship between firms’ emissions and firms’ financial performance. Additionally, several studies also revealed and support the view that pollution reduction have positive association with firm performance. Other studies depicts how firms are trying through various environmental measures to mitigate the negative effects of pollution on firm financial performance within the restricted environmental regulations.

Conflicting empirical evidence marshalled in support of the view that carbon emissions reduction is a cost burden and detrimental to firms competiveness (Walley & Whitehead, 1994) or that reduction in carbon emissions increases efficiency, saves resources and gives cost advantage (Konar & Kohen,2000; Dowell et al.,2000) seem paradoxical. In the view of Stuart & Gautan (1996) firms that attempts to reduce emissions increases efficiency thereby saving the companies money. Stuart & Gautan (1996) study was aimed at finding the relationship between firm’s carbon emission level and firm performance. In all, 500 firms were used as sample size of data from the investors’ responsibility research center corporate environmental profile and compustat. The study findings were that companies with high level of emission tends to gain more. In other breath, a portion of Iwata and Okada (2011) findings support Stuart & Gautan findings that greenhouse gas reduction leads to an increase in financial performance of some industries such as clean industries. However same cannot be said about dirty industries of which no significant effect of carbon emission reduction was found on financial performance. This led to the conclusion that the financial performance tend to increase with the effect of an increase in the greenhouse gas. Is against this background that the study seek to find out whether the carbon emission level of mining companies affects companies total cash cost and capital expenditure and the researcher hypothesized that:

- $H_1$: Carbon emission reduction affects mining companies total cash cost
- $H_2$: Carbon emission reduction does not affect mining companies total cash cost
- $H_3$: Carbon emission reduction affects mining companies capital expenditure
- $H_4$: Carbon emission reduction does not affect mining companies capital expenditure

Gbadebo, Odularu and Okonkwo (2009) investigated the relationship between energy consumption and the Nigerian economy from the period of 1970 to 2005. The study seek to find out whether energy consumption has positive relationship with economic growth in Nigeria. While reviewing the relevant literatures on the relationship between energy consumption and economic growth, endogenous growth theory was adopted as theoretical framework. Applying co-integration technique, the study revealed positive relationship between current period energy consumption and economic growth. The study further stress that energy efficiency of firms does not only cause a reduction in utility cost but however involves increasing revenue which has positive effect on increasing the firms productivity. The implication of the study is that increased energy consumption is a strong determinant of economic growth having an implicit effect in lagged periods and both an implicit and explicit effect on the present period in Nigeria. With this, the researchers hypothesized that:

- $H_5$: Energy usage affects mining companies total cash cost
- $H_6$: Energy usage does not affect mining companies total cash cost
- $H_7$: Energy usage affects mining companies capital expenditure
- $H_8$: Energy usage does not affect mining companies capital expenditure

AngloGold Ashanti annual report (2013) states emphatically that water management remains a critical environmental issue in their operation in Ghana. Water management has two main themes namely water consumption (i.e. quantity of water used during operations) and water quality (which includes issues such as acid rock drainage and discharges from tailings dams). The efficient use of water is very important for the firm and its stakeholders which is sole responsibility of management of the firm to articulate. Since bad water management provides firms with unnecessary cost, both directly when firm’s purchase water and indirectly when firms have to treat water discharged from its activities, Is against this background that, the study look at whether water usage impact on mining
company’s total cash cost and capital expenditure. Therefore the researcher hypothesized that:

- $H_9$: Water usage efficiency affects mining companies total cash cost
- $H_{10}$: Water usage efficiency does not affect mining companies total cash cost
- $H_{11}$: Water usage efficiency affects mining companies capital expenditure
- $H_{12}$: Water usage efficiency does not affect mining companies capital expenditure

### DEPENDENT VARIABLES

Total cash costs consist of all the direct and indirect operating cash costs related directly to the physical activities of mining, processing, third-party refining expense, on-site general and administrative costs, royalties and mining production taxes, net of by-product revenues earned to mention a few. Total cash costs provide management and investors an indication of net cash flow, after consideration of the realized price received for production sold. Management also uses this measurement for the comparative monitoring of performance of mining operations time-to-time from a cash flow perspective. On the other hand, Capital expenditure is incurred in the acquisition of permanent asset which is meant to be used permanently in the business operations for the purpose of earning revenue. Capital expenditure also involves expenditure incurred on assets for the purpose of increasing profit margin or tries to reduce the total cost of production. On the premise of Life Cycle Cost Assessment, it is believed that as companies acquires energy efficient equipment and appliances their capital expenditure will increase. However, the companies will save energy and money in the long run. Therefore, the need to look at the relationship between the capital expenditure and other variables in the contest of Ghana mining companies.

### METHODOLOGY

Our study initially applied the equation (5) as shown below ...

$$
\begin{align*}
(Y_t / CP_t) &= \omega_0 + \beta X_t + \sum_{k=1}^{K} y_k \Delta X_{t-k} + V_t \\
V_t \text{ ......................... (5)}
\end{align*}
$$

Where $(Y_t / CP_t)$ denotes the dependent variable: Total cash cost, and Capital Expenditure. The $X_t$ denotes the independent variables in this study. The long run covariance is presented as:

$$
\Omega_t = \lim_{T \to \infty} F \left[ \left( \frac{1}{T} \right) \left( \sum_{t=1}^{T} 1 \right)^t \left( \sum_{t=1}^{T} 1^t \right)^t \right]
$$

Then the FMOLS estimator is extended to the equation (6) below:

$$
\hat{\beta} = \frac{1}{n} \sum_{t=1}^{n} \left[ \sum_{t=1}^{T} (X_t - \bar{X}_t)^2 \right]^{-1} \left( \sum_{t=1}^{T} (X_t - \bar{X}_t) (Y_t^* / CP_t^*) - \Gamma_T \right) \text{ ......................... (6)}
$$

Where $Y_t^* = Y_t - \bar{Y} - (\bar{\Omega}_1,0 / \bar{\Omega}_1,1) \Delta X_t$ ;

$$
CP_t^* = CP_t - \bar{CP} - (\bar{\Omega}_1,0 / \bar{\Omega}_1,1) \Delta X_t ;
$$

and

$$
\hat{\gamma} = \bar{F}_1,0 + \bar{\Omega}_1,0 - (\bar{\Omega}_1,0 / \bar{\Omega}_1,1) (\bar{F}_1,1 + \bar{\Omega}_1,1)
$$

The FMOLS estimation modifies the Ordinary Least Square (OLS). It overcomes the inherent problem of the serial correlation in the cointegration residuals as well as the endogeneity bias predominant in most analysis involving the causal influence from the endogenous to the exogenous variables.

### DATA COLLECTION

Data for the analysis were put together from the annual integrated and sustainability reports of AngloGold Ashanti mining company focusing on only Ghana. The total data figures for each variable for the analysis consist of the total activities from Iduapriem and Obuasi mining sites of AngloGold Ashanti Mining Company in Ghana. Data used was represented by two dependent variables namely total cash cost and capital expenditure while independent variables are represented by carbon emission level (CE), energy consumption (EC), water consumption (WC), Production Volume (PV) and Size (SZ). Data for water include consumption by surface operations facilities but exclude domestic water consumption. Calculation of CO$_2$ equivalent is based on energy usage and is performed through emission factor which is determined by AKOBEN in consultation with Electricity Company of Ghana (ECG), GridCo and Environmental Protection Agency (EPA). Carbon emissions reduction is measured in metric tonnes of CO$_2$ equivalent (mt CO$_{2e}$); water consumption is measured in kilo litres per tonne (Kl/t), energy consumption is measured in Giga Joules per tonne (Gj/t), Production Volume (attributable gold production, measured in 000 oz) and Size (Average no. of employees both permanent and contract employees). On the other hand, the dependent variables total cash and capital expenditure were measured as ($/oz produced) and ($m) respectively.
RESULTS AND DISCUSSIONS

Table 1: Results from the Fully Modified Ordinary Least Squares (FMOLS)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>20.89 [6.79***]</td>
<td>4.53 [0.36]</td>
<td>-7.22 [1.81]</td>
<td>6.24 [0.86]</td>
</tr>
<tr>
<td>Model 2</td>
<td>0.46 [2.23**]</td>
<td>1.38 [2.15]</td>
<td>2.70 [1.09]**</td>
<td>2.13 [1.87]</td>
</tr>
<tr>
<td>Model 3</td>
<td>-1.10 [1.97***]</td>
<td>-0.98 [2.75]</td>
<td>-0.96 [3.82***]</td>
<td>-1.28 [2.31]</td>
</tr>
<tr>
<td>Model 4</td>
<td>-0.51 [2.34]</td>
<td>0.00 [0.97]</td>
<td>0.65 [0.16]</td>
<td>-0.50 [0.69]</td>
</tr>
</tbody>
</table>

Table 1 provides the results of fully modified ordinary least squares (FMOLS) classified into model 1 to 4. Model 1 and 2 provides the regression of dependent variable Y against the main explanatory variables (i.e. Model 1) and when other explanatory variables are introduced (i.e. Model 2). Same can be said for Model 3 and Model 4 about dependent variable CP. Based on Table 1, regressing the two dependent variables against all the explanatory variables in their natural logarithm provides the marginal effect or coefficients of the explanatory variable that shows the effect of the changes in carbon emission (CE), water consumption (WC), energy consumption (EC), average number of employees (SZ) and production volume (PV) on both total cash cost and capital expenditure. This means that the total cash cost and capital expenditure of the company decrease or increase with the change of CE, WC, EC, SZ and PV.

This then provides equation (3) and (4) as:

\[ Y_t = 4.53 + 1.38 EC_t + 0.01 CE_t + -0.90 WC_t + -0.22 PV_t + U_t \]  

\[ CP_t = 6.24 + 2.13 EC_t + -1.29 WC_t + -0.50 CE_t + 0.00 SZ_t + 0.51 PV_t + U_t \]

Model 2 and 4 in table 1 shows that only EC has positive relationship with both Y and CP. Meanwhile, negative relationship was found between Y and WC, SZ and PV. On the other hand, WC and CE have negative relationship with CP. Since the t-value of WC in both Model 2 and 4 are greater than 2 then one can say that \( \beta_2 \) is statistically significant and for that matter, the study reject the alternative hypothesis and accept the null hypothesis (\( H_0 \), \( H_{11} \)). On the other hand EC t-value is greater 2 in Model 2 but less than 2 in Model 4. This means that EC is significant in terms of the total cash cost but insignificant of capital expenditure of the company. On this score, the study rejected the alternative hypothesis (\( H_3 \)) and accepted null hypothesis (\( H_3 \)) in model 2 and accepted alternative (\( H_5 \)) and rejected null hypothesis (\( H_7 \)) in Model 4.

The rest of the explanatory variables (i.e. CE, SZ, PV) t-values in both Model 2 and Model 4 are less than 2 and therefore their coefficient \( \beta_3, \beta_4 \) and \( \beta_5 \) are statistically insignificant.

Table 2: Descriptive Analysis (Total Cash-Dependent Variable)

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1614.333</td>
<td>502.6895</td>
<td>832</td>
</tr>
<tr>
<td>EC</td>
<td>2610297</td>
<td>578942.7</td>
<td>1450000</td>
</tr>
<tr>
<td>WC</td>
<td>5814772</td>
<td>2436503</td>
<td>3879000</td>
</tr>
<tr>
<td>CE</td>
<td>259416.4</td>
<td>65866.85</td>
<td>161922</td>
</tr>
<tr>
<td>SZ</td>
<td>6395.889</td>
<td>1688.909</td>
<td>2421</td>
</tr>
<tr>
<td>PV</td>
<td>472777.8</td>
<td>97860.59</td>
<td>246000</td>
</tr>
</tbody>
</table>

Table 3: Descriptive Analysis (Capital Expenditure-Dependent Variable)

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP</td>
<td>1.54e+08</td>
<td>7.31e+07</td>
<td>3.80e+07</td>
</tr>
<tr>
<td>EC</td>
<td>2610297</td>
<td>578942.7</td>
<td>1450000</td>
</tr>
<tr>
<td>WC</td>
<td>5814772</td>
<td>2436503</td>
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<td>PV</td>
<td>472777.8</td>
<td>97860.59</td>
<td>246000</td>
</tr>
</tbody>
</table>

Table 2 and 3 shows the descriptive statistics which provides the average (i.e. mean), standard deviation, min. and max. of the variables. The tables revealed that the highest mean was recorded by water consumption followed by energy consumption with the least mean recorded by the size of the company in both table 2 and 3. Water consumption recorded the highest changes as shown by the standard deviation in the descriptive analysis of table 2 and 3. Water consumption and energy consumption therefore appear to be key variables for mining companies’ firm performance in Ghana.

Multicollinearity

Each independent variable is perfectly correlated with itself with a result of 1.00. Using r to represent correlations between variables. The correlations between the dependent variables Y and CP; and the main independent variables are listed below:

<table>
<thead>
<tr>
<th>Y</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>rECY</td>
<td>-0.48</td>
</tr>
<tr>
<td>rWCY</td>
<td>-0.84</td>
</tr>
<tr>
<td>rCEY</td>
<td>0.31</td>
</tr>
<tr>
<td>rZSY</td>
<td>-0.48</td>
</tr>
<tr>
<td>rPVY</td>
<td>-0.62</td>
</tr>
</tbody>
</table>

rECY - 0.48, rWCCP - 0.52, rWCCP - 0.09, rCECP - 0.42, rSZCP - 0.60, rPVCP - 0.42
Furthermore, the correlations between the five independent variables EC, WC, CE, SZ and PV for the two dependent variables are:

<table>
<thead>
<tr>
<th>r</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>WCEC</td>
<td>0.70</td>
</tr>
<tr>
<td>CEEC</td>
<td>0.04</td>
</tr>
<tr>
<td>SZEC</td>
<td>0.89</td>
</tr>
<tr>
<td>PVEC</td>
<td>0.81</td>
</tr>
<tr>
<td>CEWC</td>
<td>-0.50</td>
</tr>
<tr>
<td>SZWC</td>
<td>0.52</td>
</tr>
<tr>
<td>PVWC</td>
<td>0.58</td>
</tr>
<tr>
<td>SZCE</td>
<td>0.33</td>
</tr>
<tr>
<td>PVCE</td>
<td>0.34</td>
</tr>
<tr>
<td>PVSZ</td>
<td>0.95</td>
</tr>
</tbody>
</table>

The results of the above table shows positive correlation among the variables except the correlation between carbon emissions and water consumption which is strong but negative. This means that carbon emission and water usage has an inverse relationship. Therefore the level of carbon emission has no effect on water usage of the company and vice-versa. The results of the test shows a strong positive correlation between the average number of employees (SZ) and production volume (PV). However, there is a slightly weak correlation between carbon emissions and other two variables namely average number of employees and production volume. On the other hand, there is positive but weak correlation between carbon emission and energy consumption.

CONCLUSION
This paper seeks to investigate the long-run relationship among environmental performance and firm’s performance of developing country like Ghana whilst utilising the recent econometric approach: Fully modified OLS (FMOLS). The results of the FMOLS as shown in Table 1 revealed that Water consumption (WC) has a negative and significant impact on the financial performance of Ghana mining companies (in Model 1&3). A 1% increases in WC leads to a decline in total cash and capital expenditure of Anglogold Mining Company by 110% and 99% respectively (Model 1& 3). It can therefore be inferred that water consumption is a key factor to the financial performance of mining companies. Our findings vehemently supports recent works such as Calderón et al. (2012) who similarly found water consumption to negatively influence the performance of a company.

In the long run, it is expected that the energy consumption of Anglogold will contributes positively to its financial performance. From the FMOLS results (Table 1), the elasticity of financial performance (total cash) with respect to energy consumption is 0.46. Moreover, a 1% increase in energy consumption of Anglogold brings about a change of 276% in her capital expenditure (Model 3). Our study attributes the growth in financial performance to the increase in production of Anglogold which results in the upsurge in demand for energy to meets its production needs. Our study supports studies such as Gbadebo et al. (2009) who found that increases in energy consumption leads to better financial performances. Hence, our study concludes that companies make environmental performance disclosures as means of meeting industrial regulations and policies and also to make the community see that they are doing something to mitigate the negative effect of their activities in the community.


