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Analysis of value added tax effect on firms' cash flow in various sectors of the emerging economies

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Inadequate cash flow constitutes the major reason for most corporate failures. However, absence of empirical evidence on value added tax (VAT) effect on corporate cash flow in different industries means that cash flow implications are often ignored by VAT policy makers. This study examines the relationship between VAT and firms' cash flow in various sectors of the economy within the context of an emerging economy. The study employs factor analysis to determine if there is a statistically significant difference in cash flow effect of VAT on firms among the different industry groupings in Ghana. The study used data on firms registered with the Large Tax Payer Unit (LTU) of the Ghana Revenue Authority (GRA) to conduct the analysis. It was established that VAT effect on firms' cash flow differs significantly between industry groupings, depending on the particular factor influencing the amount of VAT remittance to revenue agencies. The findings also show that governments' decisions on the efficiency and neutrality of the VAT scheme must not only be influenced by its ability to transfer the tax burden from corporate bodies to final consumers, but also its effect on firms' cash flow in various industries. The findings have important policy implications for policy makers in evaluating the efficiency and neutrality of different tax schemes.

Key words: Cash flow, corporate income tax, industries, tax policy reforms, value added tax.

INTRODUCTION

Tax policy reform is an area that has been widely revisited by academicians in recent times as there is an increasing need to curtail overdependence on foreign sources of funding government expenditure. This area of reform has been tackled differently by different researchers over the years. Whereas Joshi and Ayee (2009) focused their attention on tracing the history of various tax reforms instituted in less developed countries, Muriithi and Moyi (2003) emphasized the need for governments to

effectively evaluate and choose between competing domestic funding sources for government budgets. In a similar vein, Tyran and Sausgruber (2002) called on policy makers to replace corporate income tax (CIT) with value added tax (VAT) as firms are unable to transfer the cash flow burden associated with CIT to the final consumer. These calls are based on the notion that firms require cash to carry on business. Indeed, Manisha (2012) asserted that cash is the lifeblood of every

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successful business organization. Even though emphasis on most tax policy reforms in less developed countries is shifting toward VAT implementation due to its purported ability to transfer the associated tax burden to the final consumer, little effort is exerted to discover the cash flow effect across various industries. Epstein and Jermakowicz (2010) described cash flows as "inflows and outflows of cash and cash equivalents". A number of factors influence the cash flows of firms. Scherr (1989) argued that organizational cash balance is significantly influenced by its cash conversion cycle consisting of its inventories holding period, accounts receivables collection period, and accounts payables payment period. Prior studies relied on projected data to assess the impact of VAT on corporate cash flow (Murphy, 1991). In some instances, actual data was employed to ascertain the general cash flow effect of VAT on corporate bodies (Salia, 2016).

Generally, a good tax system should improve government revenue without hampering private sector participation in infrastructure development (Ali-Nakyea, 2014). Private sector participation in infrastructure development is only possible if firms have cash to finance their activities. The purpose of this study is to ascertain the effect of VAT remittance on corporate cash flow of various industry groupings in Ghana. The conclusion from the study is expected to provide governments and policy makers with a fair idea about cash flow implications of VAT remittance on firms in different industries. Knowledge of the cash flow implications of VAT remittance on firms in different industries should enhance government decisions on the application of VAT rate to various industries without having adverse effects on corporate cash flow in various industries. It is also expected to aid corporate managers to determine which sectors to invest their scarce productive resources without being heavily hit by cash flow challenges resulting from VAT imposition.

LITERATURE REVIEW

There have been series of daily media attacks on governments' policies in less developed countries for failing to maximize the welfare benefits for citizens and residents in developing countries. According to Muriithi and Moyi (2003) and Kefela (2009), most governments in less developed countries have been under constant attack by the media for failing to provide basic infrastructure, education, and social needs of the people. As a result, most governments in developing countries, motivated by the interest of seeking re-elections to continue to govern, attempt to enhance the living standards of the people by providing basic infrastructure, addressing climate change, and reducing general poverty levels.

Until recent times, most developing countries depended heavily on funding from foreign donors and other external sources to fund their development activities (International Monetary Fund, 2011; Nsor-Ambala, 2015). Such heavy reliance on foreign donor funding is against the back ground that, inflows of funds from foreign sources to developing countries are unreliable, for different reasons. For example, it has been asserted that the sudden decline of inflows to less developed countries from bilateral and multinational institutions in the early 2000s is the result of the global crises in the developed world (Gupta and Tareq, 2008). According to Nsor-Ambala (2015), most governments resorted to imposition of domestic taxes coupled with various reforms in order to improve their revenue base and reduce overdependence on external funding. This implies that a suitable tax scheme capable of maximizing domestic revenue with less distortionary effects on the economy must be adopted.

The current debate on the design and use of suitable tax schemes capable of transferring adequate income from the private to public sectors is traceable to Adam Smith's 1937 seminal work on the wealth of nations. Smith pioneered the need for policy makers to develop tax schemes capable of allocating productive resources in every economy in the most efficient manner. In a related seminal work, Bitker (1979) criticized Keynesian theories, politicians, and scholars for failing to provide solutions to poor economic performance of national governments. Bitker (1979) urged policy makers to focus on economic efficiency when selecting tax schemes through the application of the principles of equity, certainty and fiscal economy. The economic policy implication deduced from the seminal works of Smith (1937) and Bitker (1979) is that there is a direct relationship between a neutral tax scheme and its efficiency. Explaining the common belief about an efficient and neutral tax scheme in redistributing income, Atkinson (1977) stressed that such beliefs will only materialize if the social welfare function of a tax scheme is equal to the social utility of income. This implies that neutral tax schemes must be capable of providing benefits to a community equal to the amount of taxes collected from taxable persons within the community.

Corporate tax is regarded as a major scheme capable of helping a government to generate the required revenue for its budgetary activities (Koppenjan and Enserink, 2009). A number of impediments, including: tax revolts (Oman, 2000), failure to transfer tax burden faced by firms (Cronin et al., 2013; Jensen, 2013; Watrin and Ullmann, 2008), persistent tax avoidance practices (Yetman, 2001), and low income levels of individuals (Jensen, 2013) explain the reasons for CIT failure to achieve the desired results. In view of the numerous implementation challenges associated with the corporate tax schemes worldwide, many academicians and practitioners have argued for the adoption of a revenue-generating scheme capable of encouraging private sector participation in public businesses devoid of distortionary

effects to the economy.

Similarly, Koppenjan and Enserink (2009) purported that joint contributions from both public and private sectors is a vital ingredient for the attainment of the developmental agenda of governments in many countries. Given that the majority of the working groups of persons in developing countries are in the low-income bracket, CIT schemes are insufficient in propelling development. A number of varied tax mechanisms are expected to be used by policy makers to achieve the desired revenue targets. Jensen (2013) for instance, lamented that incentives including location packages often instituted by governments to attract private capital since 1160 have not been a complete success. Pressured by the desire to fulfill campaign and political party manifesto promises governments have sought alternative tax schemes to bring all taxable persons into the tax web. VAT has been viewed as one such alternative tax scheme. This explains why Moomau et al. (2011) recommended that governments should consider replacing CIT with a VAT scheme in order to avoid cash flow problems inflicted on businesses by CIT schemes. Such suggestions have led to varied arguments being advanced both in support and against VAT introduction in many countries.

Aizenman and Jinjarak (2008) referred to VAT as a form of multistage tax collected on the percentage of value added to goods sold or services rendered at each stage of production, import, and distribution. Various arguments have been advanced for adopting VAT by both researchers and practitioners. Firstly, VAT is considered attractive for its significant revenue generation capabilities. For example, the first proponent of VAT, a German, in 1919 explained that it was introduced to expand the government revenue base needed for economic development; this was further developed and introduced by the French government in 1954 (Bannock, 2001; Jean, 2003). In recent times, Gale and Harris (2010) urged governments to introduce VAT to provide a constructive solution to fiscal challenges facing the United States. They noted that VAT contributed 7% of the Gross Domestic Product in revenue, representing about 19% of total revenue at all levels of government among non-U.S. Organizations for Economic Cooperation and Development members in 2006. Similarly, Toder and Rosenberg (2010) projected that the United States could raise $355 billion in 2012 if a 5% VAT was applied to a broad base, including all consumption except for spending on Medicaid and Medicare, education, charitable organizations, and state and local governments.

It is often asserted that it is cheaper to administer VAT than to administer income taxes. In the United Kingdom, for example, administrative costs of the VAT were found to be less than half of those for income tax, measured as a share of revenue (Gale and Harris, 2010). Similar studies conducted using the New Zealand revenue department showed that just 3% of VAT returns, compared to 25% of income tax returns, were required

(Government Accountability Office, 2008). Related to low administrative cost is a high VAT compliance rate, Gale (2005) addressed this claim by noting that VAT is less likely to be evaded compared to retail sales tax because revenue collection is spread across stages of production, with producers receiving a credit against taxes paid, thereby serving as an incentive for compliance.

For similar reasons, cited by both researchers and practitioners, the idea of VAT witnessed a rapid spread across sub-Saharan Africa beginning in the late 1960s. Ghana, for instance, adopted VAT to broaden its revenue base (Ali-Nakyea, 2014). It is believed that VAT has been a consistent tax feature of many tax systems in both developed and developing worlds for its remunerative nature (Gebauer et al., 2007). Given the positive attributes associated with VAT, it is little wonder that it has received massive adoption across developing countries, including Ghana. In spite of the numerous virtues associated with VAT, it has also received various criticisms in most countries where it has been implemented.

Theoretically, the distributional burden of VAT is dependent on the measurement of household resources. For example, Gale and Harris (2010) posited that VAT tends to be regressive once the classification of households is based on, and tax burden is measured as a share of current income. They further explained that if households spend a larger proportion of their respective incomes compared to larger higher-income households, then VAT tends to impose a higher burden on the lower-income households. Another criticism levelled against VAT is that it has the tendency to reduce net business income, which can result in overall reduction in other revenue. Toder and Rosenberg (2010) estimated that an imposition of VAT will offset about 27% of gross VAT revenue from other sources.

Like all macroeconomic tools, implementation of VAT will require careful analysis of its likely effects. This study was based on the theoretical framework of public finance theory. Public finance theory requires that governments carefully evaluate tax schemes in resource mobilization efforts by ensuring that selected schemes are capable of generating the highest amount of revenue with minimal distortionary effects (Musgrave, 1959). The findings from prior investigations have, however, provided a research gap to fill. Using projected data consisting of sales, account receivables, account payables and inventories, Murphy (1991) established that VAT adoption in the United States will impact significantly on the corporate cash flow in the year of effectivity.

In a confirmatory study using actual data from the LTU of GRA, Salia (2016) concluded that Ghanaian firms are not immune to the effect of VAT on their cash flows. All these prior researches were confined to establishing the relationship between VAT and general business cash flow, thereby leaving a research gap on the extent to which VAT remittances affect the cash flow position of businesses in different sectors of the Ghanaian economy.

The current study therefore explored whether or not VAT has a significant cash flow effect on businesses across different industry groupings in Ghana. The results should have similar implications for emerging economies. The key research question therefore was:

1. Is there any difference in the effect of VAT on cash flow of the different industries in the Ghanaian economy?
Based on a two-factor analysis, the following research hypotheses was developed to answer the research question:
2. H01: Cash flow effect of VAT on businesses is not significantly different among the different industries in the Ghanaian economy.
3. Ha1: Cash flow effect of VAT on businesses is significantly different among the different industries in the Ghanaian economy.

METHODOLOGY

This study was conducted based on firms' data obtained from the LTU of GRA. The firms represent the five key sectors of the Ghanaian economy: financial institutions, agriculture, mining and petroleum, service, and manufacturing. All firms that were registered with the LTU between January 1, 2009, and December 31, 2011, were included in this study. The LTU is a tax administrative office established in May 2004. The office has been tasked to collect all types of taxes and duties from all firms classified as large taxpayers in Ghana. These firms contribute to the greatest percentage of all tax revenue to the government. According to Witt and Lautenbacher (2003), the combined yearly average percentage contribution of LTU-registered firms to the Ghana government's annual corporate tax revenue is about 90%. As 90% of corporate tax is accrued from registered firms in the LTU and given the argument that VAT introduction was intended to broaden the government revenue base, there is a strong justification for the reliance on the LTU data for this study.

A quota sampling technique was used in apportioning obser-vational units from different sectors. This approach was considered suitable as the sectors under study were not equal regarding number of firms or size of firms. Given that firms registered with the LTU were predetermined by the GRA, it was most suitable to use a convenience sampling method to call observational units into the sample.

As the economic and political environment of Ghana is similar to that of other emerging economies in Africa and given that Ghana has enjoyed fairly stable economic and political stability over the last two to three decades, this study considered available data for firms in the five industry groupings over three years consistent with similar approaches used for similar studies in other emerging economies. Each firm had to have been in existence from January 1, 2009, through December 31, 2011. Also, complete data had to exist for each firm for 2009, 2010 and 2011. The criteria adopted were consistent with Talebnia et al. (2012) statistical study, which classified the sample as already listed on the Tehran Stock Exchange under either pharmaceutical companies or the chemical industry spanning from 2002 to 2010.
Talebnia et al. (2012) indicated that a firm could only be included in the sample if it had been accepted by the Tehran Stock Exchange as of 2002, its fiscal year end coincided with the last month of the solar year in Iran, the firm's data were available for the period of the study, and the firm had not changed its fiscal year during the study period. As all firms included in the current study had their fiscal years starting January 1 and ending December 31, it was feasible to use the criteria outlined by Talebnia et al. (2012) for this study.

In this study, the dependent variable was represented by VAT amount paid with the accounts payable, accounts receivable, industry, and sales representing predictor variables. Smith et al. (1973) in their seminal work, confirmed percentage increase in sales value, accounts payable, and accounts receivable as major predictor variables affecting business cash flow positions. Data for each firm were classified based on preexisting sector classification. The firms were then regrouped into either VAT-paying firms or non-VAT-paying firms. Table 1 presents an extract of the data used for this analysis. Statistical tools in statistical package for social sciences (SPSS), Minitab and Microsoft Excel were primarily used in analyzing the results. Graphical tools consisting of tables and figures also were used to carry out this study.

The study examined the effect of VAT status and industry type on the sales and accounts receivables of the firms. The researchers also considered the choice of industry with goods sold and accounts receivables, regardless of the nature of VAT status. The researchers used two-factor factorial methodology to carry out the experiment. The two factors involved in this experimental study were industry and VAT status. The first factor had five levels: agriculture, services, manufacturing, financial institution, and mining and petroleum. The second factor had two levels: firms that pay VAT and firms that do not pay VAT.

The main justification for choosing this statistical approach was based on the fact that this experimental study involved two factors, and that there was likely to be an interaction effect on the sales amounts and/or accounts receivable of the experimental units. This implies that the effect of one factor may be dependent on the level of factor of the other. The model was consequently fit as follows:

$$y_{ijk} = \mu + \lambda_i + \beta_j + (\lambda\beta)_{ij} + \epsilon_{ijk},$$

where
1. $i = 1, 2, 3, 4, 5$
2. $j = 1, 2$
3. $k = 1, 2, 3 \ldots 629$
4. y_{ijk} is the response variable: sales amount or accounts receivables
5. μ is the overall mean effect of the two factors on the response variable, that is, the average of the mean responses for the two-factor populations
6. λ_i is the effect of the ith level of type of industry
7. β_j is the effect of the jth level of VAT status
8. $(\lambda\beta)_{ij}$ is the joint influence of industry type at the ith level and VAT status at the jth level (the interaction)
9. ϵ_{ijk} is the error term and is independent and identically normally distributed with a mean of zero and a constant variance, $N(0, \sigma^2)$.

The following hypotheses were tested:

1. Ho1: $\lambda_i = 0$, $i = 1, 2, 3, 4, 5$, meaning different industry types have no effect on sales amount/accounts receivables.
Ha1: $\lambda_i \neq 0$, for at least one i, meaning different industry types have some effect on sales amount/accounts receivables.
2. Ho1: $\beta_1 = \beta_2 = 0$, meaning differences in VAT status have no effect on sales amount/accounts receivables.
Ha1: At least one $\beta_1 \neq 0$, meaning differences in VAT status have some effect on sales amount/accounts receivables.
3. Ho1: $(\lambda\beta)_{ij} = 0$, meaning there is no interaction effect between the two factors (figure 1).
4. Ha1: At least one $(\lambda\beta)_{ij} \neq 0$, meaning there is some interaction effect between the two factors.

RESULTS AND DISCUSSION

Basis for conclusions

Only 629 firms were listed with the Large Tax Payer Unit

Table 1. Extracts of the data used in the analysis (From LTU of GRA, 2009–2011).

Obs	Industry	VAT	Sales*	VAT amt.*	Accts. rec.*	Accts. pay.*
1	Agriculture	No	765.525.539	-	--47.955.440	42.322.606
2	Agriculture	No	-	-	90.248	827.718
3	Agriculture	Yes	16.185.587	1.675.359	1.156	1.317
4	Agriculture	No	9.128.738	-	136.931	45.644
5	Agriculture	No	98.982.458	-	7.927	1.108.882
6	Mining and petroleum	Yes	762.845.300	15.035.472	74,596	142,053
7	Mining and petroleum	Yes	93.439.800	357.641	17.468.000	6.993.000
8	Mining and petroleum	Yes	188.693.498	1.097.567	22.775	75.086
9	Mining and petroleum	Yes	0	2.959.714	16.004.320	14.621.165
10	Mining and petroleum	Yes	4.472.000	150.595	7.690	2.533
11	Mining and petroleum	Yes	18.925.050	920.783	1.743.165	928.767
156	Financial institution	No	42.037.964	-	19.822.407	123.139.207
157	Financial institution	No	374.234	-	200.720	31.4725
158	Financial institution	No	7.633.000	-	18.516	857
159	Financial institution	No	4.540.492	-	836.503	1.396.464
160	Financial institution	No	6.965.078	-	5.560.005	3.092.156
161	Financial institution	No	2.576.413	-	1.462.889	181.296
162	Financial institution	No	831.928	-	59.722	6.593.080
163	Financial institution	No	61.822.729	-	657.231.411	902.213.882
164	Financial institution	No	101.593	-	321.143	619.455

*Amounts are presented in Ghana Cedis.

Figure 1. General arrangement of a two-factor analysis design.

(LTU) from January 1, 2009, to December 31, 2011. A total of 594 of the firms satisfied the predetermined selection criteria and were therefore used for data to carry out the analysis. The breakdown of firms that were included is as follows: 14 agriculture, 52 mining and petroleum, 145 manufacturing, 175 financial institutions, and 208 services. Each of these firms belong to an industrial grouping that either pays VAT or pays no VAT. Of the 594 firms, 181 were non-VAT-paying institutions and 413 were VAT-paying institutions. By applying a two-factor analysis quantitative technique, the researchers examined the effect of VAT status and industry type on log of sales amount and log of accounts receivables, respectively, using SPSS. In each case, the null hypothesis is rejected when the p value is less than the significance level of 0.05. However, Murphy (1991) in a related study found that the independent variable,

accounts payables, is not statistically significant. Hence, this was subsequently dropped from the model even though its inclusion will still make the model adequate for prediction.

Results of the factorial experiment with log of sales as the response variable

The following hypotheses were tested in order to determine the interactive effect of VAT status and industry type on log of sales:
1. Ho1: $\lambda_i = 0$, i = 1, 2, 3, 4, 5, meaning different industry types have no effect on sales amount.
2. Ha1: $\lambda_i \neq 0$, for at least one i, meaning different industry types have some effect on sales amount.
3. Ho1: $\beta_1 = \beta_2 = 0$, meaning differences in VAT status

Table 2. Between-subjects factors with their corresponding levels used in the analysis.

Variable	Value label	*n*
Vatc	VAT	413
	No VAT	181
Indus	Agriculture	14
	Manufacturing	145
	Service	208
	Financial institutions	175
	Mining and petroleum	52

Table 3. ANOVA: Interaction between industry types and sales amounts.

Tests of between-subjects effects					
Source	Type III SS	df	MS	F	Sig.
Corrected model	136.92	6	22.82	6.14	0.00
Intercept	42540.25	1	42540.25	11438.03	0.00
Vatc	13.11	1	13.11	3.52	0.06
Indus	98.19	4	24.54	6.60	0.00
Vatc*Indus	20.47	1	20.47	5.51	0.02
Error	2183.17	587	3.71	-	-
Total	170354.27	594	-	-	-
Corrected total	2320.08	593	-	-	-

Note. Dependent variable: logicsales.

have no effect on sales amount.
4. Ha1: At least one $\beta j \neq =$, meaning differences in VAT status have some effect on sales amount.
5. Ho1: $(\lambda\beta)ij = 0$, meaning there is no interaction effect between the two factors.
6. Ha1: At least one $(\lambda\beta)ij \neq 0$, meaning there is some interaction effect between the two factors.

Table 2 presents the two factors and their respective levels and displays the total number of experimental units in the experiment. Table 3 depicts the analysis of variance (ANOVA) for this experiment. For the first hypothesis, Table 3 indicates that the F value for the industry factor was 6.60 with a p value of 0.00. Since the p value was less than 0.05, the significance level, the researchers rejected the hypothesis and concluded that different industry levels have an effect on sales amount at the 5% significance level. For the second hypothesis, Table 3 depicts that the F value for VAT factor was 3.52 with a p value of 0.06. As the p value was greater than 0.05, the researchers failed to reject the hypothesis and concluded that differences in VAT status have no effect on sales amount. Finally, for the interaction between VAT status and industry type, the F statistic was 5.51 and its corresponding p value was 0.02. This provided the

researchers enough evidence to reject the third hypothesis and conclude that there is interaction effect between the two factors.

Multiple comparisons test for industry types with respect to log of sales

Because an ANOVA shows a significant difference in the means of factor levels, it was appropriate for the researchers to conduct multiple comparisons among the levels. This particular experiment was conducted using Tukey's honest significant difference (HSD) method for the comparison. Table 4 provides the mean differences between the pairs of all the industry levels. As can be seen in Table 4, the test indicated that there was a significant difference in the means of the pairs of some industry types with respect to their sales at the 0.05 level of significance. In other words, manufacturing against mining and petroleum (p = 0.03), services against financial institutions (p = 0.01), and financial institutions against mining and petroleum (p = 0.00) were significantly different in terms of their sales. This analysis is presented in Figure 2. Mining and petroleum had the biggest average sales, whereas financial institutions

Table 4. Multiple comparisons between mean differences of industry type.

Variable	Indus (I)	Indus (J)	Mean diff. (I – J)	SE	Sig.
Tukey HSD	Agriculture	Manufacturing	−0.17	0.54	1.00
		Service	−0.34	0.53	0.97
		Financial institutions	0.29	0.54	0.98
		Mining and petroleum	−1.07	0.58	0.35
	Manufacturing	Agriculture	0.17	0.54	1.00
		Service	−0.17	0.21	0.93
		Financial institutions	0.46	0.22	0.21
		Mining and petroleum	−0.90*	0.31	0.03
	Service	Agriculture	0.33	0.53	0.97
		Manufacturing	0.17	0.21	0.93
		Financial institutions	0.63*	0.20	0.01
		Mining and petroleum	−0.74	0.30	0.10
	Financial institutions	Agriculture	−0.29	0.54	0.98
		Manufacturing	−0.46	0.22	0.21
		Service	−0.63*	0.20	0.01
		Mining and petroleum	−1.37*	0.31	0.00
	Mining and petroleum	Agriculture	1.07	0.58	0.35
		Manufacturing	0.90*	0.31	0.03
		Service	0.74	0.30	0.10
		Financial institutions	1.37*	0.31	0.00

produced the smallest average sales. The figure also shows that firms that charge VAT have small average annual sales compared to entities that do not charge VAT. As established earlier, differences in VAT status were not statistically significant with respect to log of sales.

Interaction effect between industry type and VAT status

Table 5 and Figure 3 indicate the level of interaction between industry type and VAT status, the two main factors. It can be seen that agriculture, services, manufacturing, and mining and petroleum firms even though charge VAT have high average sales.

Results of the factorial experiment with log of accounts receivable as the response variable

For this section, a two-factor analysis was used to determine the interactive effect of VAT status and industry type on log of accounts receivable. The following hypotheses were tested in order to establish the interactive effect of VAT status and industry type on log

of accounts receivable:

1. Ho1: $\lambda_i = 0$, i = 1, 2, 3, 4, 5, meaning different industry types have no effect on accounts receivables.
2. Ha1: $\lambda_i \neq 0$, for at least one i meaning different industry types have some effect on accounts receivables.
3. Ho1: $\beta_1 = \beta_2 = 0$, meaning differences in VAT status have no effect on accounts receivables.
4. Ha1: At least one $\beta_j \neq 0$, meaning differences in VAT status have some effect on accounts receivables.
5. Ho1: $(\lambda\beta)_{ij} = 0$, meaning there is no interaction effect between the two factors.
6. Ha1: At least one $(\lambda\beta)_{ij} \neq 0$, meaning there is some interaction effect between the two factors.

Table 6 shows the two factors and their respective levels, and displays the total number of experimental units in the experiment. Table 6 provides the ANOVA for the experiment. For the first hypothesis under this section, the F value for the industry factor was 8.81 and p value was 0.00. Given that the p value was less than the 0.05 significance level, the researchers rejected the hypothesis and concluded that different industry levels have an effect on accounts receivable at the 5% significance level. For the second hypothesis under this section, Table 6 shows that the F value for VAT factor was 16.46 with a
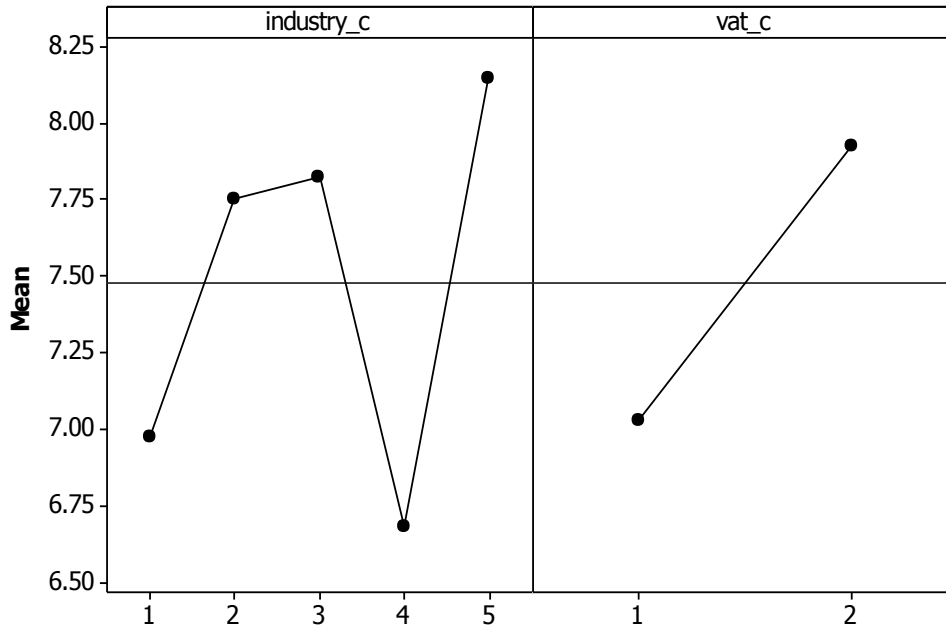
Figure 2. Main effects plot for logicsales.

Table 5. Interaction effect between industry type and VAT status.

Indus	Vatc	*M*	*SE*	95% confidence interval	
				Lower bound	Upper bound
Agriculture	VAT	7.36	.48	6.41	8.31
	No VAT	7.20	.25	6.70	7.70
Manufacturing	VAT	7.31	.07	7.17	7.44
	No VAT	.[a]	.	.	.
Service	VAT	7.38	.06	7.26	7.49
	No VAT	.[a]	.	.	.
Financial institutions	VAT	5.74	.38	5.01	6.48
	No VAT	7.15	.06	7.02	7.27
Mining and petroleum	VAT	7.70	.12	7.47	7.93
	No VAT	.[a]	.	.	.

Note. Dependent variable: lgcisales ([a]This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable).

corresponding p value of 0.00. As the p value for VAT status was less than 0.05, the researchers rejected the hypothesis and concluded that differences in VAT status have a significant effect on accounts receivable. Finally, for the interaction between VAT status and industry type, the F value was 1.77 and p value was 0.18. As the p value was greater than 0.05, it gave the researchers enough evidence to fail to reject the third hypothesis and conclude that there is no interaction effect between VAT status and various industry groupings.

Multiple comparisons test for industry type with respect to log of accounts receivable

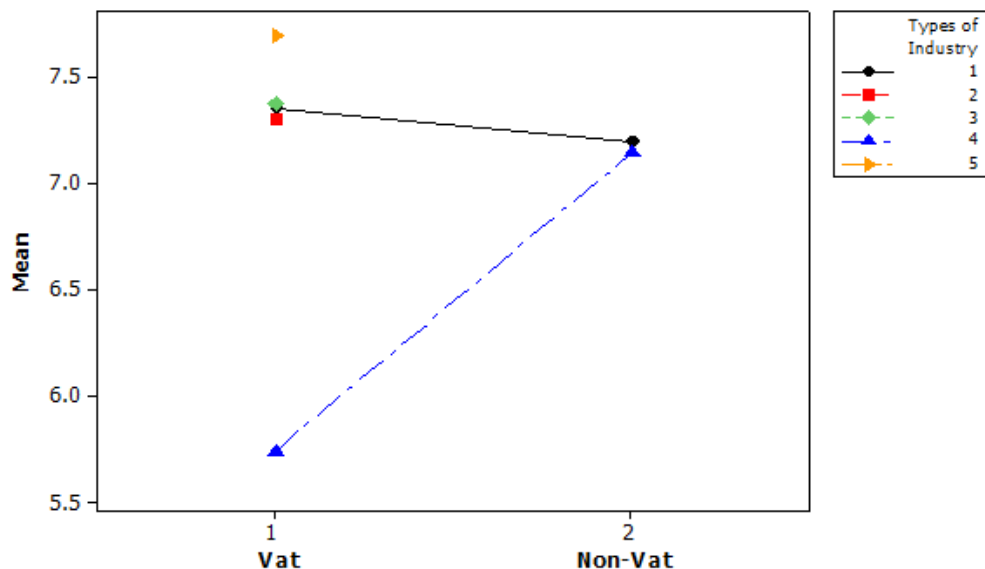The researchers deemed it appropriate to carry out

Figure 3. Interaction plot for log of CI sales.

Table 6. *ANOVA:* Interaction between industry types and accounts receivable.

Tests of between-subjects effects					
Source	Type III *SS*	*df*	*MS*	*F*	Sig.
Corrected model	233.45	6	38.91	5.96	0.00
Intercept	28480.71	1	28480.71	4359.97	0.00
Indus	230.30	4	57.58	8.81	0.00
Vatc	107.54	1	107.54	16.46	0.00
Vatc*Indus	11.59	1	11.59	1.77	0.18
Error	3932.45	602	6.53	-	-
Total	119576.27	609	-	-	-
Corrected total	4165.90	608	-	-	-

Note. Dependent variable: loc_acctr.

multiple comparisons among the levels as the ANOVA showed no significant difference in the means of factor levels. The researchers used Tukey's HSD method to do the comparison in this experiment. Table 7 depicts the mean differences between the pairs of all the industry levels.

The test results in Table 7 revealed that at the 5% significance level, there was no significant difference in the means of the pairs of some industry types with respect to their accounts receivable. Those affected were agriculture against manufacturing ($p = 0.12$), agriculture against mining and petroleum ($p = 0.08$), manufacturing against financial institutions ($p = 0.89$), manufacturing against mining and petroleum ($p = 0.96$), services against financial institutions ($p = 0.28$), services against mining and petroleum ($p = 0.69$), and financial institutions against mining and petroleum ($p = 1.00$). In other words,

there was no significant difference in terms of accounts receivable (Figure 4).

CONCLUSION AND RECOMMENDATIONS

This study investigated the effect of VAT on firms' cash flow across different industry groupings. The study draws its sample from the LTU of GRA database. The researchers employed Factor Analysis to determine the effect of VAT on firms' cash flow among different industry groupings in Ghana. It was established that VAT effect on the cash flow position of firms within each industry depends on the dominant variables that influenced the amount of tax remittances to the revenue agencies.

The findings show that the effect of VAT on firms' cash flow significantly diffe r between industry groupings in

Table 7. Multiple comparisons between mean differences of industry types with respect to log of accounts receivable.

Variable	Indus (I)	Indus (J)	Mean diff. (I – J)	*SE*	Sig.
		Manufacturing	−1.55	0.65	0.12
	Agriculture	Service	−2.33*	0.64	0.00
		Financial institutions	−1.81*	0.65	0.04
		Mining and petroleum	−1.82	0.71	0.08
		Agriculture	1.55	0.65	0.12
	Manufacturing	Service	−.78*	0.27	0.04
		Financial institutions	−.26	0.28	0.89
		Mining and petroleum	−.27	0.41	0.96
		Agriculture	2.33*	0.64	0.00
Tukey HSD	Service	Manufacturing	0.78*	0.27	0.04
		Financial institutions	0.52	0.26	0.28
		Mining and petroleum	0.51	0.39	0.69
		Agriculture	1.81*	0.65	0.04
	Financial institutions	Manufacturing	.26	0.28	0.89
		Service	−.52	0.26	0.28
		Mining and petroleum	−.01	0.40	1.00
		Agriculture	1.82	0.71	0.08
	Mining and petroleum	Manufacturing	.27	0.41	0.96
		Service	−.51	0.39	0.69
		Financial institutions	0.01	0.40	1.00
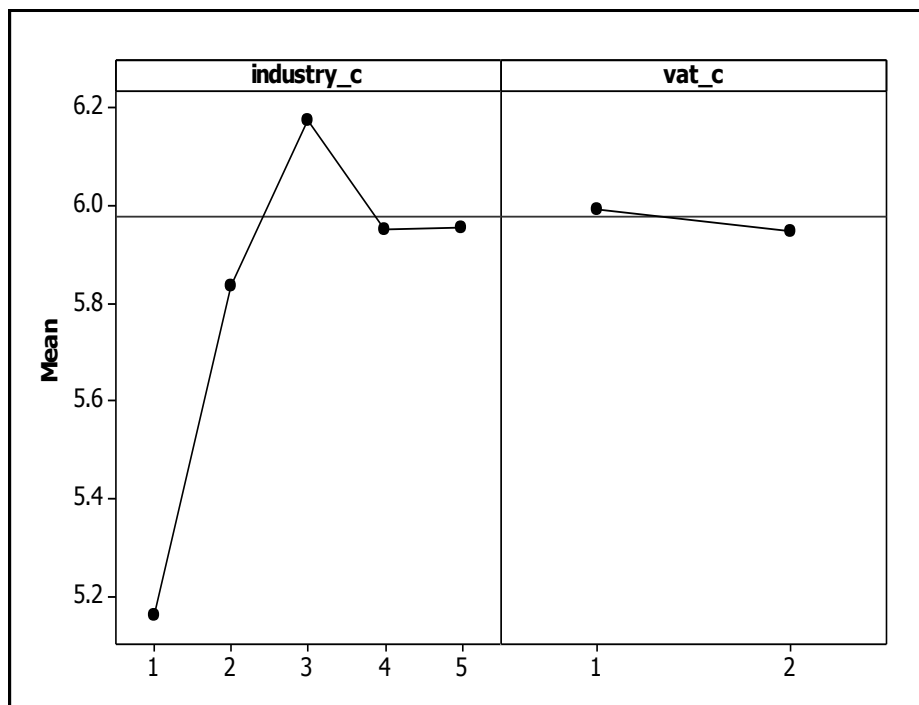
Figure 4. Main effects plot for log_acctr.

instances where corporate sales constitutes the dominant variable that dictates total VAT remittances to revenue agencies. This happens between manufacturing and mining and petroleum, services and financial institutions, and financial institutions and mining and petroleum. The results from the study further show that in instances where firms' sales dictates VAT remittances to revenue agencies, firms' VAT status do not influence their sales amount but rather the class of industry grouping the firms belongs will. The results also show that firms from agriculture, services, manufacturing, and mining and petroleum sectors though charge VAT, have high average sales compared to financial institutions with no VAT element.

Where accounts receivables constitute the main variable differentiating amount of VAT remittance to the revenue agency, there was no significant cash flow effect of VAT on firms across different industries. This was evident between agriculture and mining and petroleum, manufacturing and financial institutions, agriculture and manufacturing, manufacturing and mining and petroleum, services and financial institutions, services and mining and petroleum, and financial institutions and mining and petroleum. The study shows that even though various industry groups and VAT status affect their average annual accounts receivables, such pattern of behavior do not change the cash flow positions of those firms.

The findings from the study provide three tax policy implications for decision makers: Firstly, governments should recognize the need to introduce and/or apply different VAT rates to different sectors of the economy if the objective is to stimulate and enhance revenue generation without creating adverse effects on respective cash flows positions for firms. Secondly, the leadership of various industry associations should endeavor to influence any VAT legislation contemplated by govern-ment with the aim of ensuring that legal requirements reflect industry characteristics. This is important to ensure that VAT legislations are not detrimental to respective industry cash flows. Finally, but not least, the knowledge of how VAT impacts differently on cash flow positions of firms in various industries, should guide policy makers when finalizing decisions on the two major tax schemes: Corporate Income Tax and VAT so that decisions will maintain the efficiency and neutrality of the different tax schemes.

It is worthy of mention that since the reasons accounting for the different pattern of behavior across different industry groupings could not be deduced from this study, it is recommended that a qualitative study be conducted to explain the likely reasons for the existing behavior as VAT is imposed on various sectors of the economy.

Conflict of interests

The authors have not declared any conflict of interests.

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