Firm specific determinants of corporate effective tax rate of listed firms in Nigeria

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This study examines the Corporate Effective Tax Rates (ETRs) of non-financial firms listed in Nigerian Stock Exchange. The study also measures the neutrality of taxation within the Nigerian economic sectors and establishes the relationships between ETRs and firm specific characteristics of size, leverage, profitability, capital intensity, inventory intensity, labour intensity and auditor type. Data were extracted from the financial statements of sampled firms in respect of the variables and subjected to analyses in ordinary least square (OLS), random effect and fixed effect models. The results show that ETRs were lower than the Statutory Tax Rate during the period of the study and that there are differences in ETR from one sector of the economy to the other. The study further reveals that larger and more profitable firms are faced with high tax burden while firms with high leverage, capital intensity, and tax expert (auditor type) are faced with lower ETR. There is no significant relationship between ETR and labour intensity.

Key words: Effective tax rates, statutory tax rates, non-financial companies, tax incentive, tax expert.

INTRODUCTION

The statutory tax rate (STR) has been severely criticized for its inability to reflect the actual tax burden borne by firms. Because of this, Nicodeme (2001) opines that economists have come up with the concept of effective tax rate (ETR) as a measure of actual tax burden inherent in investment decisions. Two types of ETR are generally encountered in literature; the King and Fullerton (1984) marginal effective tax rate (METR) which measures the implicit tax rate inherent in an investment projects, and the average effective tax rate (AETR) which is considered to be better suited for showing the overall tax burden of a firm (Callihan, 1998). Spooner (1986) posits that METR can be used to determine the tax incentive to invest in new assets and AETR to measure the distribution of tax burden of previous investments. The concept, ETR, has also been involved in backing pension policies (Francis and Recter, 1987), determining management compensation (Ronen and Aharoni, 1989), reaching investment decisions and determining investment behaviour (Shevlin, 1987; Devereux and Griffiths, 1998), examining tax planning effectiveness (Shevlin, 1999), back up agitation for tax equity (Citizen for Tax Justice, 1986) and to support changes in public policies (Gupta and Newberry, 1997) amongst others.

ETR has been calculated for many countries (Buijink et al., 1999, Kraft, 2014; Mourikis, 2015, Ribeiro, 2016), many sectors (Kiefer, 1980; Derashid and Zhang, 2003;
Rohaya et al., 2008) and single investment projects (Devereux and Griffiths, 1998). Moreover, researches in ETR have found it to be different from the STR during the periods of the studies (Rohaya et al., 2008, Nicodeme, 2001), from one sector to another (Derashid and Zhang, 2003) and from one economy to another economy (Buijink et al., 1999).

Researches on the causes of this variability in the ETR have also enjoyed quite a significant amount of studies. Most of these researches, however, have been conducted in the USA and the developed western countries, to a less extent in the Asian Countries (Kim and Limpaphayom, 1998), very little in Africa and there seems to be no study published on determinants of effective tax rate in Nigeria, even though the issue of tax is an important issue in Nigeria just as it is in other parts of the world.

Knowing the actual corporate tax burden companies bear in Nigeria and the factors that affect them is important because of the current efforts of government to attract foreign investments into the country and the dwindling revenue from oil, which makes tax the new focus for revenue generation. This study, therefore, has several objectives. One, it investigates the tax burden, as measured by effective tax rates, being experienced by non-financial firms in Nigeria. Two, it examines whether there is equity in the corporate tax system in Nigeria. This is measured by the neutrality/dispersion in ETR across various sectors of the economy. It also determines the firm specific characteristics that cause variability in the ETRs. The importance of this study lies in the provision of new insight on ETR in the Nigerian corporate tax system and serves as a guide to policy makers and firms on tax matters and tax planning.

LITERATURE REVIEW

Kiefer (1980) traces the ETR in the primary sub-sectors of public utility sector of the US economy from 1954 to 1978. He adopts two variants of ETR: the actual and the inflated. The findings suggest that both measures of ETR witnessed steadily decline from 1954 to 1978 for all the sub-sectors of electric utility, telephone, and gas with occasional increase in between. The study neither discloses STR during the study period for the purpose of comparison nor produces the industrial average ETR of the sector for the period of the study.

Hullen and Robertson (1984) investigate the ETR in the manufacturing industry with special emphasis on the high-technology sector. Their findings show that the high-technology sector had the highest ETR in the industry (even higher than the industrial average) during the period of the study. The study of Diaz, Rodrigues and Ariaio (2011) analyses the determinants of ETR for the banking sector of the Spanish economy using panel data. It finds that the ETRs for the two sub-sectors (banks and saving banks) examined were 10% lower than the STR, and the determinant of ETR to include type of entity, breakdown of assets and liabilities and that the capital structure plays prominent role in determining the ETR.

Chowdhury (1988) examines the effective indirect tax rates for final products in Bangladesh for 1984/85 fiscal year, using country-wide input and output data. These he compares with STRs and finds that the ETRs on products are lower than the STR, at varying degrees between commodity groups. Within the framework of micro-backward looking approach, Sebastian (2011) determines the rate at which listed companies in Romania effectively pay tax. Albeit the result shows a declining ETRs (which were lower than the STR) during the study period, the STR was lower than the ETR in the last year of the study which the author attributes to the financial crisis that hit the country during that year. Although these studies find dispersion in ETR within products and sectors, they fail to investigate the factors responsible for these discrepancies.

Several studies have examined ETR and its determinants but there is no consensus on the main variables that explain ETR. Research on the determinants of ETR with company data begins with Stickney and Magee (1982). Hitherto, several studies had looked at ETR variability across industries with aggregate data (Callihan, 1998), Gupta and Newberry (1997) study the determinants of the variability in corporate effective tax rates pre and post the 1986 US tax reform.

The study uses 823 firms during the pre-reform period (1982 to 1985) and 915 firms during the post reform period (1987 to 1990) for the analyses. The U.S. Tax Reform of 1986 simplifies tax code, removes some deductions and reduces the income tax rate from 46% to 34% and personal income tax from 50% to 28%. This reform was considered the most significant reform in the tax structure of America in the preceding 50 years. The study shows that the effective tax rate is not associated with firm size when the relationship is examined over time for companies with long histories against the contention of Jensen and Meckling (1976) who suggest positive relationship in relation to the Political Cost Theory (The Political Cost Theory suggests that large firms are prone to high tax burden because of their visibility, that makes them prone to higher public scrutiny and government regulations (Zimmerman, 1983)). However, results further show that the effective tax rate is negatively correlated with capital structure, elements of assets and positively correlated with firm performance (ROA), these correlations continued after the 1986 tax reform.

Harris and Feeny (1999) and Richardson and Lanis (2007) study determinants of variability in ETR in Australia, while Harris and Feeny (1999) find interest payment and R&D to be negatively related with ETR and listed and foreign owned companies are positively related to ETR, Richardson and Lanis (2007) find positive relation between R&D, capital intensity and negative
relation between ETR and firm size and leverage. It was also established in the study of Derashid and Zhang (2003) that corporate ETRs vary significantly from sector to sector and that determinants are non-linear amongst different industrial sectors. Rohaya et al. (2010) examination of ETR in Malaysia reveals that large firms are exposed to higher ETR (confirming the Political Cost Theory) while highly leveraged and capital intensive firms enjoy low level of ETR. The sectoral analysis by the study indicates that firms in trading and services, properties and construction sectors face high level of ETR. The study also finds highly profitable firms to be associated with high taxes.

Janssen and Buijink (2000) examine the determinants of variability of corporate effective tax rates using panel data of 879 firms for five years (1994 to 1998) in Netherlands. The study finds that Dutch corporate tax system offers substantial amount of tax incentives, yet, the average effective tax rate is not related to company characteristics. Kim and Limpaphayom (1998) seek to answer this question of whether the political cost theory subsists in the developing nations of Hong Kong, Korea, Malaysia, Taiwan and Thailand. They apply the hypothesis of positive relationship between firm size and ETR. The study samples 372 companies from Hong Kong, 601 in Korea, 361 in Malaysia, 251 in Taiwan and 264 in Thailand. The results of the study did not support for this hypothesis. Rather, the political clout theory was supported as firm size and ETR to be negatively related. (The Political Power/Clout Theory proposes that large firms are faced with lower tax burden due to the resources at their disposal to engage in aggressive tax planning, influence the political process and command favour, and waivers from government (Siegfried, 1972).

Liu and Cao (2007) examine the determinants of corporate effective tax rates of listed companies in China Stock market for a seven year period (1998 to 2004). They found that firm size and capital intensity have no significant effect on ETR but highly leveraged and labour intensive firms have negative significant relationship. The lower ETR of labour intensive firms confirms the government move to promote employment. The study also finds that the larger the share of largest shareholder, the larger is the ETR. Rohaya et al. (2008) study corporate effective tax rates of Malaysian public listed companies. 294 large Malaysian companies were sampled from 2000 to 2004. They found that real estate, trading and services and construction companies had higher ETRs and lower ETRs were associated with highly leveraged companies and those with high capital intensity and extensive foreign operations. Stickney and McGee (1982) in their study use data from the US Compusat for three year period spanning 1978 to 1980. The study measures ETR as total income taxes payable divided by adjusted book income before taxes. The study established that heavily capital intensive, highly leveraged and natural resources industries face low ETR. Firm size and foreign operations were less important indicators of low ETR.

The objective of the study of Kraft (2014) is two-fold, one into examine the determinants of effective tax burden of German firms and; two is to find out the changes in tax burden and its determinants following the 2008 Germany’s corporate tax reform. The results confirm the political cost theory of firm size relationship with tax burden and high leverage and capital intensity firms were found to enjoy lower amount of tax burden. The corporate tax reform was found to lower the tax burden from hitherto and also found to impact on the size and sign of the determinants. For example the relationship of leverage with ETR turned positive after the reform indicating that highly levered firm no longer enjoy low tax burden after the reform.

Ribeiro (2015) examines the factors responsible for variability in ETR using data obtained from 704 listed firms on the London Stock Exchange. Apart from the usually examined, the study also examines the effect of corporate governance dynamics on ETR. The result of the study confirms the Political Cost Theory regarding both size (Rodriguess and Arias, 2014), and profitability suggesting that big and highly profitable pay are faced with high tax burden in the UK. The study also finds leverage and capital intensity to be negatively related to ETR. Mourikis (2016) study using Greek firms found similar results.

RESEARCH METHODS

Sample selection

123 non-financial firms were listed on the Nigerian Stock Exchange during the period of the study 2010 to 2014, 59 of which were chosen from ten (10) different sectors for the purpose of this study. The sectors include agricultural, industrial goods, conglomerate, consumer goods, construction and real estate, services, healthcare, oil and gas, information and communication technology and natural resources sectors. Financial service sector companies were removed from the sample because they are faced with peculiar government regulation that may distort the result of the study (Gupta and Newberry, 1997). To obtain a panel data from the sample selected within the year scope 2010 to 2014, companies must have no missing financial information for all the five (5) years under review. The short period covered reduces the chances of data mortality which may reduce the number of firms in the sample. The sample was chosen after framing out:

1. Firms with negative income or tax refunds, since their ETRs may be meaningless (Kim & Limpaphayom, 1998)
2. Firms with missing data or non-active firms.
3. Foreign firms, because their home country different tax law could influence their business decisions.

The sample size is reconciled as presented in Table 1.

Model specification and measurement of variables

The empirical analyses in this study used the following general multivariate model. The ETR model is estimated for ETR1 and ETR2.
Table 1. Sample reconciliation.

| Variable                                    | Number of firms (2010-2014) |
|---------------------------------------------|------------------------------|
| Non-financial listed firms                  | 123                          |
| Firms with negative income/Tax refunds      | 37                           |
| Firms with missing data                     | 27                           |
| Sample size                                 | 59                           |

Table 2. Descriptive statistics.

| Variable | Minimum | Maximum | Mean    | Std. Deviation |
|----------|---------|---------|---------|----------------|
| ETR1     | 0.07    | 0.26    | 0.2077  | 0.01781        |
| ETR2     | 0.18    | 0.32    | 0.2896  | 0.01351        |
| FSIZE    | 8.14    | 11.99   | 10.1111 | 0.73316        |
| LEV      | 0.12    | 0.95    | 0.5278  | 0.18491        |
| ROA      | 0.01    | 0.74    | 0.1083  | 0.09114        |
| CAPINT   | 0.05    | 0.99    | 0.5115  | 0.22499        |
| INVINT   | 0.01    | 0.58    | 0.0666  | 0.07763        |
| LINT     | 0.01    | 1.00    | 0.5593  | 0.49731        |
| AUDdummy | 0.00    | 1.00    | 0.5593  | 0.49731        |

Where ETR1 is measured as current income tax expenses divided by profit before tax; ETR2 as current year tax plus deferred tax provision; FSIZE as natural logarithm of total assets; LEV as long term debt divided by total assets; ROA as operating profit divided by total assets; CAPINT as non-current assets divided by total assets; INVINT as inventory divided by total assets; LINT as multiplicative inverse root of number of employees; AUDdummy as 1 for the big 4 audit firms and 0 for others.

ETR_{it} = \beta_0 + \beta_1 FSIZE_{it} + \beta_2 LEV_{it} + \beta_3 ROA_{it} + \beta_4 CAPINT_{it} + \beta_5 INVINT_{it} + \beta_6 LINT_{it} + \beta_7 AUDdummy_{it} + \epsilon_{it}

Where ETR refers to ETR1 and ETR2, ETR1 is measured as current income tax expense divided by profit before tax, and ETR2 is measured as total tax expenses (current income tax expenses plus deferred tax expense) divided by profit before tax; FSIZE is a firm size measured as log of total assets; LEV is a firm leverage measured as long term debt divided by total assets; ROA is return on assets and represents profitability. It is here measured as operating profit divided by total assets; CAPINT is capital intensity, it is measured as non-current assets divided by total assets; INVINT is inventory intensity, it is measured as total inventory divided by total assets; LINT is labour intensity, it is measured as multiplicative inverse root of number of employees; AUDdummy is auditor type and represents tax expertise, as a dummy variable it is scored 1 for any firm being audited by any of the big 4 audit firms and 0 otherwise; \beta_0...\beta_7 are co-efficients; \epsilon is the error term; i is the ith firm, t is the firm-years spanning from 2010 to 2014.

RESULTS AND DISCUSSION

Descriptive statistics

Table 2 provides the descriptive statistics of the ETR measures and the explanatory variables. Table 2 presents the mean, minimum, maximum and standard deviation values of each of the variables. The mean for ETR1 is 0.2077 and ETR2 is 0.2896. Both mean values are below the statutory tax rate (currently at 30%). Expectedly, the mean for ETR2 is higher than ETR1 because of the inclusion of deferred tax in numerator of ETR2 and given that their denominators are the same.
Table 3. Annual average of ETR1 and ETR2.

| Year | ETR1 | ETR2 |
|------|------|------|
| 2010 | 0.20 | 0.29 |
| 2011 | 0.19 | 0.28 |
| 2012 | 0.21 | 0.29 |
| 2013 | 0.22 | 0.29 |
| 2014 | 0.20 | 0.28 |

The standard deviation values (ETR1, 0.01781; ETR2, 0.01351) suggest a slight variation in the ETRs amongst firms. With respect to the explanatory variables, FSIZE has a mean of 0.1011 and a standard deviation of 0.73316; LEV has a mean of 0.5278 and a standard deviation of 0.18491 and ROA has a mean of 0.1083 and a standard deviation of 0.09114. Further, CAPINT has a mean of 0.5115 and a standard deviation of 0.22499; INFININT has a mean of 0.1467 and a standard deviation of 0.13135; LINT has a mean of 0.0666 and a standard deviation of 0.07763; and AUDdummy has a mean of 0.5593 and a standard deviation of 0.49731.

Table 3 contains the average of ETR1 and ETR2 during the period of the study. It is evident that both versions of ETR are below the Statutory Tax Rate(STR) of 30% throughout the period of study. This suggests the availability of tax incentive in the corporate tax system of the country as Nicodeme (2001) opines that the presence of tax incentives makes the ETR different from STR. As observed earlier, the ETR2 is consistently higher than ETR1 throughout the period of the study because of the inclusion of deferred tax in the numerator of ETR2 and given that their denominators are the same.

### Sector ETR analysis

Figure 1 shows the mean for ETR1 and ETR2 of various sectors. This study finds that corporate ETRs are different across sectors and are equal to or below the statutory tax rate of 30%. The differences in ETR across the sector portend the differences in tax incentives extended to the different sectors and indicate the non-neutrality of the corporate tax system in Nigeria.

For ETR1, natural resources sector reports the lowest mean at 25%, and the highest ETR1 mean is reported by agricultural sector at 30%. Meanwhile, ETR2 reports the lowest mean at 13% for companies from natural resources sector, and the highest ETR2 mean is reported by agricultural service at 22%. These imply that companies within those sectors that report lower mean ETRs may be more aggressive in their tax planning activities during the period under review, hence, it is proved that various tax incentives offered gave those companies the chance of engaging in more aggressive tax planning, while those sectors with higher mean ETRs were less involved in aggressive tax planning during the year under review. The aforementioned statistical results suggest that there is variability of corporate ETRs within and across sectors during the year under review.

Table 4 shows correlation coefficients among the study variables. The correlation result suggests that variables of the study are not related. Expectedly, dependent variables, ETR1 and ETR2, have the highest positive correlations at 0.798 given the similarity in their definitions. However, the explanatory variables are not significantly correlated and the highest positive correlation reported between FSIZE and CAPINT. Thus, there
Hausman test carried out shows that ETR 2 is also positive but contrary to the theory that larger firms are associated with lower tax rates, this finding suggests that ETR1 and ETR2 have not only a significant and the results not spurious but reliable. Change in ETR1 is explained by the examined determinants at 62% (with an Adjusted R-Squared of 62%), while change in ETR2 is explained by the same margin. The Hausman test carried out shows that probability Chi2 of 62% and 70% for ETR1 and ETR2 respectively at 5% level of significance. Hausman test is said to have favoured random effect when the null hypotheses is rejected and the alternative accepted, and null hypotheses is rejected when the prob. Chi2 is greater than 5% level of significance (Feeny et al., 2002).

With regards to the individual explanatory variables, FSIZE has a significant positive relationship with ETR1, this, supports the political cost theory that larger firms are faced with higher tax burden because they have greater visibility and therefore exposed to greater political pressure (Jensen and Meckling, 1976). This finding supports Kraft (2014) and Ribeiro (2015). The relationship of FSIZE with ETR 2 is also positive but insignificant and provides no support for either of the contending theories relating size with ETR (the political cost and the political power) but supports earlier findings in Fenny et al. (2002) and Liu and Cao (2007).

Profitability (ROA) has a significant positive relationship

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### Table 4. Correlation matrix of the variables.

| Variable | ETR1 | ETR2 | FSIZE | LEV | ROA | CAPINT | INVINT | LINT | AUDdummy |
|----------|------|------|-------|-----|-----|--------|--------|------|----------|
| ETR1     | 1    | -    | -     | -   | -   | -      | -      | -    | -        |
| ETR2     | 0.798** | 1    | -     | -   | -   | -      | -      | -    | -        |
| FSIZE    | -0.06 | -0.257** | 1     | -   | -   | -      | -      | -    | -        |
| LEV      | 0.01  | 0.07  | 0.11  | 1   | -   | -      | -      | -    | -        |
| ROA      | 0.387** | 0.169** | 0.05  | 0.01| 1   | -      | -      | -    | -        |
| CAPINT   | -0.472** | -0.375** | 0.319** | -0.288** | -0.133* | 1      | -      | -    | -        |
| INVINT   | 0.456** | 0.332** | -0.304** | 0.203* | 0.01 | -0.488** | 1      | -    | -        |
| LINT     | 0.241** | 0.314** | -0.05  | -0.154** | -0.08 | 0.128* | -0.11  | 1    | -        |
| AUDdummy | -0.03 | -0.465** | 0.226** | 0.232** | 0.207** | -0.249** | -0.03  | 0.177** | 1       |

*Significant at 10%; ** significant at 5%; *** significant at 1%.

### Table 5. Random effect model regression result.

| Variable | Predicted sign | ETR1 | ETR2 |
|----------|----------------|------|------|
| FSIZE    | +/-            | 0.54269 (3.5625)** | 0.082772 (0.7554) |
| LEV      | -              | -1.18817 (-2.4526)* | 0.861801 (2.3313)* |
| ROA      | +              | 7.51597 (8.4832)** | 3.801097 (5.5528)** |
| CAPINT   | -              | -2.78328 (-6.5134)** | -2.466074 (-7.4020)** |
| INVINT   | +              | 5.43227 (6.7013)** | 1.2054 (2.0171)* |
| LINT     | -              | 7.57626 (4.5495)** | 5.462510 (5.0484)** |
| AUDdummy | +/-            | -0.5434 (-1.9861)* | -1.625825 (-9.0404)** |

R-Square: 62% 62%
Adjusted R-squared: 61% 61%
Hausman Prob >Chi2: 62% 62%
F-Statistics (p-value): 29.7761(0.022) 29.3637(0.032)
Firm (Firm-Years): 59 (123) 59 (123)

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Regression results

Table 5 presents the random effect regression model results for ETR1 and ETR2. The overall model results indicate that ETR1 and ETR2 have p-value of 0.022 and 0.032, which implies that they both are statistically significant at 5%. The results further show that F-Statistics for both ETRs is greater than their critical value, which implies that the overall model was statistically significant and the results not spurious but reliable. Change in ETR1 is explained by the examined determinants at 62% (with an Adjusted R-Squared of 62%), while change in ETR2 is explained by the same margin. The Hausman test carried out shows that probability Chi2 of 62% and 70% for ETR1 and ETR2 appear to no challenge of multicollinearity in the study.
with both measures of ETRs employed in this study indicating that larger companies pay higher effective tax, thus supporting the contention of Jensen and Meckling (1976) that more profitable firm are prone to higher taxes. These findings are at par with the findings of Rohaya et al. (2010). The result also contradicts the results of previous researchers like Derashid and Zhang (2003), Harris and Feeny (1999), Janssen (2005), Kim and Limpaphayom (1998) and Richardson and Lanis (2007) who found negative relationship, maintaining that larger firms faces less tax burden (Table 6).

LEV and CAPINT are two variables Rohaya et al. (2008) observe are consistently negative in their relationship with ETR in literature which the result of this study confirms. This result also conforms to expectation. The negative relationship that exists between LEV and the corporate ETR measures could have been influenced by the tax deductibility of interest associated with debt financing that reduces the amount of taxable income. This result lends credence to the earlier ones in Rodriguez and Arias (2014) and Mourikis (2016). The negative coefficient that exists between CAPINT and corporate ETRs implies that firms with large capital investment face lower tax burden because of the deductibility of capital allowance which also reduces the amount of taxable income. The result supports the findings of Boudewijn and Buijink (2000), Stickney and McGee (1982), Gupta and Newberry (1997), Derashid and Zhang (2003), Janssen (2005) and Richardson and Lanis (2007) while the findings of Janssen and Buijink (2000) and Feeny et al. (2002) contradict the findings of this study.

Table 6. Fixed effect model regression result.

| Variable      | Predicted sign | ETR1          | ETR2          |
|---------------|----------------|---------------|---------------|
| FSIZE         | +/-            | 0.55267 (2.2408)* | 0.17154 (0.8134) |
| LEV           | -              | -1.18475 (-1.9699) | -1.04788 (2.0376)* |
| ROA           | +              | 7.6352 (7.1348)*** | 3.93591 (4.3012)*** |
| CAPINT        | -              | -2.3054 (-4.3432)*** | -1.94048 (-4.2752)*** |
| INVINT        | +              | 5.29707 (4.4479)*** | 0.51095 (0.5017) |
| LINT          | -              | 14.56737 (1.1872) | 4.58841 (0.4373) |
| AUDdummy      | +/-            | -1.82005 (3.0113)*** | -1.11815 (0.3414)*** |

R-Square: 51% 47%
Adjusted R-squared: 45% 43%
Hausman Prob >Chi2: 62% 70%
F-Statistics (p-value): 17.5777 (0.003) 7.77664 (0.025)
Firm (Firm-Years): 59 (123) 59 (123)

*Significant at 10%, ** significant at 5%, *** significant at 1%

$ETR_t = \beta_0 + \beta_1 FSize_{it} + \beta_2 LEV_{it} + \beta_3 ROA_{it} + \beta_4 CAPINT_{it} + \beta_5 INVINT_{it} + \beta_6 LINT_{it} + \beta_7 AUDdummy_{it} + \epsilon_{it}$

encourages tax aggressiveness in the economy. The study supports the findings of Janssen (2005) who found a similar relationship between ETR and auditor type. As predicted, INVINT has a significant positive relationship with both ETR measures, due to its substitution effect as suggested by Ribeiro (2015). This positive coefficient suggests that firms with high inventory are faced high tax burden.

The result supports the findings of Gupta and Newberry (1997), Richardson and Lanis (2007) and Fernandez-Rodriguez and Martinez-Arias (2011) who found a positive and significant association between inventory intensity and corporate ETR. However, it contradicts findings of Derashid and Zhang (2003) who did not find any significant relationship. LINT has a significant positive relationship with both corporate ETR measures. Buijink et al. (1999) point out that employment costs are tax deductible and will negatively influence the tax burden of firms. In addition, firms in Nigeria enjoy certain tax incentive in respect of their number of employees. However, finding in this study contradicts the statement and situation by indicating a positive relationship between number of employees and corporate ETR. This implies that the higher the number of employees the higher is the tax burden of a firm. This situation suggests that listed firms in Nigeria may not be taking the advantage offered by the tax incentive relating to the number of employees.

Robustness checks

The lack of consensus of the empirical results on determinants of ETR could have been influenced by various factors including, the definition of ETR and the model used. Therefore, this study uses Fixed Effect and OLS regression models to check the consistency of the
Table 7. Pool regression model result.

| Variable | Predicted sign | ETR1         | ETR2         |
|----------|----------------|--------------|--------------|
| FSIZE    | +/-            | 0.60652 (5.7664)*** | 0.10865 (1.4270) |
| LEV      | -              | -1.31254 (-3.3181) | 0.682427 (2.3833)* |
| ROA      | +              | 7.34783 (9.7094)*** | 3.731376 (6.8117)*** |
| CAPINT   | -              | -3.53851 (-9.1766)*** | -2.821662 (-10.1094) |
| INVINT   | +              | 5.00554 (8.2536)*** | 1.176048 (2.6790)    |
| LINT     | -              | 7.53037 (8.4806)*** | 5.496364 (8.5514)*** |
| AUDdummy | +/-            | -0.63775 (-4.1701) | -1.655731 (-14.9571)*** |

R-Square | 69% | 73% |
Adjusted R-squared | 68% | 71% |
F-Statistics (p-value) | 60.1206 (0.000) | 70.0763 (0.000) |
Firm (Firm-Years) | 59 (123) | 59 (123) |

With t-statistics in parentheses.
*Significant at 10%, **significant at 5%, ***significant at 1%.

\[ \text{ETR}_t = \beta_0 + \beta_1 FSize_t + \beta_2 LEV_t + \beta_3 ROA_t + \beta_4 \text{CAPINT}_t + \beta_5 \text{INVINT}_t + \beta_6 \text{LINT}_t + \beta_7 \text{AUDdummy}_t + \epsilon_t. \]

Table 8. Pool regression model result.

| Variable | Predicted sign | ETR1         | ETR2         |
|----------|----------------|--------------|--------------|
| FSIZE    | +/-            | 0.60652 (5.7664)*** | 0.10865 (1.4270) |
| LEV      | -              | -1.31254 (-3.3181) | 0.682427 (2.3833)* |
| ROA      | +              | 7.34783 (9.7094)*** | 3.731376 (6.8117)*** |
| CAPINT   | -              | -3.53851 (-9.1766)*** | -2.821662 (-10.1094) |
| INVINT   | +              | 5.00554 (8.2536)*** | 1.176048 (2.6790)    |
| LINT     | -              | 7.53037 (8.4806)*** | 5.496364 (8.5514)*** |
| AUDdummy | +/-            | -0.63775 (-4.1701) | -1.655731 (-14.9571)*** |

R-Square | 69% | 73% |
Adjusted R-squared | 68% | 71% |
F-Statistics (p-value) | 60.1206 (0.000) | 70.0763 (0.000) |
Firm (Firm-Years) | 59 (123) | 59 (123) |

With t-statistics in parentheses.
*Significant at 10%, **significant at 5%, ***significant at 1%.

\[ \text{ETR}_t = \beta_0 + \beta_1 FSize_t + \beta_2 LEV_t + \beta_3 ROA_t + \beta_4 \text{CAPINT}_t + \beta_5 \text{INVINT}_t + \beta_6 \text{LINT}_t + \beta_7 \text{AUDdummy}_t + \epsilon_t. \]

three models. The results are presented in Table 6 and 7 respectively.

Table 6 is a presentation of the results of the fixed effect regression model. From this table it is evident that the explanatory powers of the random model are significant at 1% for both measurement of ETR. The adjusted R-square of the fixed model is lower than that of the random effect but the same with that of OLS (as presented in Table 8) except with respect to ETR2 where the OLS is higher. The F-statistics of the two models are higher than critical value. Thus, the statistical output results of the random effect model fairly provide a consistent result with that of the fixed effect and OLS models.

The coefficients and the direction of the relationship between the variables of the random effect are similar with that of the fixed effect and OLS models. The explanatory variables, leverage, profitability, capital intensity and auditor are statistically significant for both measures of ETR across the three models though at different levels. The additional ETR measure and the tripartite regression model were used in order to improve the robustness of the empirical results by comparing their output results. The coefficient estimate and direction of the association of the variables of the three models are similar and consistent.

CONCLUSION

This study examines the corporate ETRs of non-financial listed firms on Nigeria Stock Exchange (NSE) and the neutrality of the corporate tax system in Nigeria. Seven accounting variables were used to test the relationship
that exists between company characteristics and variations in their ETRs in a bid to find out the causes of variability in ETR in Nigeria. These accounting variables are firm size, leverage, profitability, capital intensity, inventory intensity, labour intensity and auditor type. The analyses are based on panel sample of 59 (123 firm-years) of non-financial companies listed in Nigeria spanning 2010 to 2014.

The study uses fixed effect model, random effect model and pooled OLS model to estimate the coefficient for each of the explanatory variables and the results are compared as robustness check. The analysis of the study was based on the random effect model as it outperforms the fixed effect in Hausman Test conducted. The result of the study indicates that corporate ETRs overall were below the Statutory Tax Rate during the period of the study and differ considerably between companies from the same sector and between sectors during the period under review. The mean of the overall ETRs and for all sectors were below the statutory tax rate of 30% for the period of the study.

The empirical results provide a significant positive relationship between firm size and ETR with additional evidence from fixed effect and pooled OLS models. The positive relationship implies that larger firms face higher income tax burdens. The result from random effect and pooled OLS models provide additional evidence for leverage, capital intensity and the auditor type. The study suggests that highly leveraged, highly capital intensive and firms that hire the big 4 auditor firms face lower tax burden. Furthermore, the study finds evidence that highly profitable and highly inventory intensive companies face higher tax burden. The positive relationship that exists between labour intensive and corporate ETR implies that companies may be ignorant of the tax incentives attached to the highly labour intensive companies or are not taking advantage of it.

It is evident from this study that tax incentives provided by the tax authorities in Nigeria is substantially significant even though they vary from sector to sector. This dispersion of ETR found amongst the sectors challenges the equity of the corporate tax system in Nigeria.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Boudewijn C, Buijink P (2000). Determinant of the Variability of Effective Tax Rates: Evidence from Netherland. MARC Working Paper.

Buijink W, Janssen B, Schols Y (1999). Corporate effective tax rates in the European Union. Citesexr.ist.psu.edu/viewdoc/download?doc=10.1.1.40.7361&rep=rep&type=pdf. (acc)

Callihan DS (1998). Corporate effective tax rates: A synthesis of the literature. J. Account. Lit. 13(1):1-45.

Chowdhury OH (1998). Effective tax rates for Bangladesh: 1984/85.

Bangladesh Dev. Stud. 16(2):57-80.

Citizen for Tax Justice (1986). 130 reasons why we need tax reform. Washington D.C. Citizen for Tax Justice.

Derakhsh Z, Zhang H (2003). Effective tax rates and the industrial policy hypothesis: evidence from Malaysia. J. Int. Account. Audit. Taxa. 12(1):45-62.

Devereux MP, Griffiths R (1998). Taxes and the location of production: Evidence from a panel of US multinationals. J. Public Econ. 68(3):335-367.

Díaz ARF, Rodrigues EF, Ariao AM (2011). Determinants of tax burden of Spanish banking sector: are there differences between banking and non banking. www.tandfonline.com/doi/abs/11.1098/02102412.2011.10779710.

Feeny S, Gillman M, Harris MN (2002). Econometric accounting of the Australian corporate tax rates: a firm panel example. Account. Res. J. 19(1):64-73.

Fernandez-Rodriguez E, Martinez-Arias A (2011). Determinants of effective tax rates: Evidence from USA and EU. Inter-tax 38(9):381-

Francis JB, Reiter SA (1987). Determinants of corporate pension funding strategy. J. Account. Econ. 9:35-59.

Gupta S, Newberry K (1997). Determinants of the variability in corporate effective tax rates: evidence from longitudinal data. J. Account. Publ. Polic. 16(1):1-34.

Harris MN, Feeny S (1999). The Determinants of corporate effective tax rates: evidence from Australia. Working Paper no. 21/99.Melbourne Institute of Applied Economic and Social Research, University of Melbourne, Melbourne Victoria, Australia.

Janssen B (2005). Corporate effective tax rates in the Netherlands. De Economist 153(1):44-66.

Janssen B, Vandenbussche H, Crabbe K (2005). Corporate tax savings when hiring a big 4 auditor: empirical evidence of Belgium. Catholic University of Leuven, Belgium.

Jensen, MC, Meckling WH (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. J. Financ. Econ. 3(4):305-360.

Kiefer DW (1980). The diminishing federal income tax burden of public utilities. National Tax J. 33(4):393-414.

Kim KA, Limpaphayom P (1998). Taxes and firm size in Pacific Basin emerging economies. J. Int. Account. Audit. Taxa. 7(1):47-68.

Kraft A (2014). What really affects German firm’s effective tax rate? Int. J. Financ. Res. 5(3):1-20.

Liu X, Cao S (2007). Determinants of corporate effective tax rates: evidence from Listed companies in China, Chinese Economy, 40(6):49-67.

Mounkis I (2015). Determinants of the variability of effective corporate tax rates: Evidence from Greece. Unpublished Master Thesis. http://nemertes.lis.upatras.gr/jspui/bitstream/10889/9901/1/Dissertation.pdf

Nicodeme G (2001). Computing effective tax rates: comparisons and result. Economic Paper Number 153. http://europa.eu.int/economy_finance

Ribeiro AM (2015). The determinants of effective tax rates: firm characteristics and corporate governance. Masters Thesis in Finance and Taxation. University of Porto. Portugal. https://ideas.repec.org/p/por/fepwp/567.html.

Richardson G Lani R (2007). Determinants of variability in corporate effective tax rates and tax reform: evidence from Australia. J. Account. Publ. Polic. 26(6):689-704.

Rodrigues EF, Ariao, AM (2014). Determinants of effective tax rates in the BRIC countries. Emerging Markets Finance and Trade 50:14-228.

Rohaya NM, Fadzillah N, Mastuki N (2011). Corporate tax planning: A study on corporate effective tax rates of Malaysian listed companies. Int. J. Trade. Econ. Financ. 1(2):189-193.

Rohaya NM, Mastuki N, Bardai B (2008). Corporate effective tax rates: A case study on Malaysian public listed companies. Malaysian Account. Rev. 7(1):1-20.

Ronen J, Aharoni A (1989). The choice among accounting alternatives and management compensation: effect of corporate tax. Account. Rev. 64:69-86.

Sebastian L (2011). Effective corporate income tax in Romania. a micro backwards looking approach. Annals of University of Oradea Economic
Shevlin T (1987). Taxes and off-balance sheet financing: research and development limited partnership. Account. Rev. pp. 480-509.
Siegfried JJ (1972). The relationship between economic structure and the effect of political influence. http://ideas.repec.org/p/por/fepwps/567.html
Spooner G (1986). Effective tax rates from financial statements. Natl. Tax J. 9(3):293-307.

Stickney CP, McGee VE (1982). Effective corporate tax rate: the effect of size, capital intensity, leverage, and other factors. J. Account. Public Policy 1(2):125-152.
Zimmerman JL (1983). Taxes and firm size. J. Account. Econ. 5:119-149.