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ORIGINAL ARTICLE

A Survey on Tax Evasion using Randomized Response Technique

Adepetun, A.O. and Adeosun, S. O.

Department of Statistics, Federal University of Technology, PMB 704, Akure, Ondo State, Nigeria

*Corresponding Author: aoadepetun@futa.edu.ng

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Abstract

Taxation is a tool used by government to raise revenue. It is also used as an instrument of economic and social policy. This paper adopted Randomized Response Technique to estimate proportions of non-compliance of taxpayers in Akure metropolis as well as analysing socio-demographic variables which may affect those proportions. Survey questionnaires were administered on taxpayers in Akure with a view to collecting data from them. The data collected were analysed using z-test. The findings of this study revealed that among the respondents completing the Randomized Response survey instrument, 47.7% admitted tax evasion by trading goods and not reporting it in tax form, 48.7% admitted evasion by excluding some outside income, 49.8% admitted tax evasion by being paid in cash and not reporting it, 43.7% admitted evasion by hiding investment to avoid payment of tax while 43% admitted evasion by cheating on tax whenever the chances arises respectively.

Keywords: Randomized response technique, tax evasion, socio-demographic variables, taxpayers, z-test

Introduction

The randomized response technique was proposed originally by Warner (1965). The innovative approach was designed to protect the privacy of survey respondents when they were asked sensitive questions. In the Warner design, the respondents are given two logically opposite questions and are instructed to answer one or the other depending on the outcome of a randomizing device. For example, suppose the sensitive characteristic is tax evasion. The respondent may be asked to toss a dice, and the outcome determines which question they answer.

Question 1: I have evaded tax.

Question 2: I have never evaded tax.

The methods currently used to gather information on the level of tax evasion in Akure metropolis are insufficient. Tax collectors have generally relied upon tax form collected from FIRS (Federal Inland Revenue Services), or direct questioning via interview to derive estimates of tax evasion activity (Kalvass and Geibel, 2006). Unfortunately, each of these methods has been shown to greatly underestimate the actual amount of illegal activity (Buchman and Tracy, 1982; Fox and Tracy, 1986).

A precise definition of taxation by Olatunde (2007) and Ogundele (1999) is that taxation is one of the sources of income for government, such income as used to finance or run public utilities and perform other social responsibilities. According to Mason and Calvin (1978) taxation is the most important source of revenue for modern governments, typically accounting for ninety per cent or more of their income. Soyode and Kojola (2006) define tax evasion as an intentional and conscious practice of not revealing full taxable income. It is a violation of tax laws in which the tax rate due by a taxable person is unpaid after the minimum required period (Abdurafiu *et al.*, 2010).

The design originally outlined by Warner (1965) has been extended to incorporate multiple sensitive traits (Horvitz *et al.*, 1967). A precise definition of taxation by Olatunde (2007) and Ogundele (1999) is that taxation is one of the sources of income for government; such income is used to finance public utilities and perform other social responsibilities. According to Mason and Calvin (1978) taxation is the most important source of revenue for modern governments, typically accounting for ninety per cent or more of their income.

Taxes are classified into direct and indirect. Yunusa (2003) and Aguolu (2004) defined direct taxes as taxes levied on the income of individual, group of individuals, and business firms and are paid directly by the person or persons on which it is legally imposed by the tax authority has been extended to incorporate multiple sensitive traits (Horvitz *et al.*, 1967).

In this study, we conducted a survey to investigate the rate at which people keep indulging in tax evasion for their own personal gain.

Methodology

This study involves the administration of survey questionnaires on tax evasion on some respondents in Akure metropolis using randomized response technique for effective data analysis. The survey was composed of three sections: randomized response technique questions about tax evasion; questions related to the respondent's awareness of regulations and experience in paying tax. Using data from all three sections, an estimate of the proportion of violators were analysed against regulation awareness and demographic questions to clearly distinguish different characteristics of the tax payer surveyed.

Results and Discussion

Three hundred people were approached to participate in this survey. The final responses rate was 93% (279 of 300 approached). Approximately 0.141% of the total taxpayers' population of 197,320 were surveyed.

The second section of the survey completed by respondents used the randomized response technique to estimate levels of non-compliance with regulations of the Federal Inland Revenue Service. Table below shows the questions that were included in the randomized response technique section. In all of the randomized response questions, the targeted sensitive reply was a response of "yes".

Table 1. Randomized response technique survey questions

RRT 1	Trading or exchanging goods or services with friends or neighbor and not reporting it in your tax form
RRT 2	Reporting your main income fully but excluding small outside income.
RRT 3	Being paid in cash for a job and then not reporting it in your tax form.
RRT 4	Not reporting some earnings from investment or interest that the government would not be able to find out
RRT 5	Cheating on Tax if you have the chance.

Data Analysis

The calculation of the proportion of non-compliance of taxpayers in Akure metropolis was obtained using the estimator $\hat{\pi} = \frac{\left(\frac{x}{n} + p - 1\right)}{(2p-1)}$ according to Warner (1965) where $\hat{\pi}$ is the estimated proportion of 'yes' responses; *x* is the number of "yes" responses to the sensitive questions; p is the predetermined probability of answering the sensitive questions; and *n* is the total number of valid responses respectively.

Hypotheses Development

Guided by the results of previous studies, we hypothesized the following relationships between the demographic attributes of taxpayers and their propensity to evade tax.

H_1: Men will display higher proportion of tax evasion than women.
H_2: The proportion of tax evasion will be higher for married taxpayer than for single taxpayer.
H_3: Taxpayers with higher level of education will exhibit a higher proportion of evasion than taxpayers with lower level of education.
H_4: Self-employed taxpayers will exhibit higher proportion of tax evasion than employees.

Statistical Procedures

Z-tests were used in hypotheses testing. All comparisons involving randomized response data used the estimated proportion of evasion and the sampling variance to calculate the z-score, using the estimator

$$Z = \frac{X1 - X2 - \ldots - Xn}{(Var(X1) + Var(X2) + \ldots + Var(Xn))^{1/2}} \quad (1)$$

where *X* is the estimated proportion of the respondents admitting tax evasion; Var (*X*) is the variance of the estimated proportion and α is the level of significance (α = 0.05); $Z_\alpha = 1.96$

Table 2. Proportion analysis of Tax Evasion against Gender

Type of Evasion	Gender	No of "yes" Responses	Proportion of Evasion	Z score
RRT 1	Male	66	45.1%	0.647
	Female	67	39.5%	
RRT 2	Male	70	55%	0.518
	Female	66	37.2%	
RRT 3	Male	63	37.7%	-0.206
	Female	76	60.5%	
RRT 4	Male	57	23%	-0.163
	Female	65	34.8%	
RRT 5	Male	57	23%	-0.131
	Female	63	30.2%	

Table 3. Proportion analysis of Tax Evasion against Marital Status

Type of Evasion	Marital Status	No of "yes" Responses	Proportion of Evasion	Z score
RRT 1	Married	68	36.5%	-0.468
	Single	65	48.7%	
RRT 2	Married	72	45.5%	-0.010
	Single	64	46.2%	
RRT 3	Married	76	54.5%	0.098
	Single	63	43.6%	
RRT 4	Married	70	41%	0.154
	Single	52	15.6%	
RRT 5	Married	74	50%	0.189
	Single	46	0.38%	

Table 4. Proportion analysis of Tax Evasion against Employment

Type of Evasion	Employment	No of "yes" Responses	Proportion of Evasion	Z Score
RRT 1	Govt./Public organization	35	45.4%	
	Private business	61	44.7%	-0.120
	Self Employed	37	35.6%	
RRT 2	Govt./Public organization	35	45.4%	
	Private business	56	31.5%	-0.242
	Self Employed	45	68.5%	
RRT 3	Govt./Public organization	35	45.4%	
	Private business	70	68.5%	-0.115
	Self Employed	34	23.3%	
RRT 4	Govt./Public organization	34	40.7%	
	Private business	56	31.5%	-0.021
	Self Employed	32	15%	
RRT 5	Govt./Public organization	28	13%	
	Private business	57	34.1%	-0.147
	Self Employed	35	27.4%	

Table 5. Proportion analysis of Tax Evasion against Education level

Type of Evasion	Education Level	No of "yes" Responses	Proportion of Evasion	Z Score
RRT 1	Primary	11	42.8%	-0.178
	Secondary	44	71.4%	
	Tertiary other than university	45	24.8%	
	University	33	36.1%	
RRT 2	Primary	11	42.8%	-0.185
	Secondary	39	50%	
	Tertiary other than university	52	46.9%	
	University	34	40.7%	
RRT 3	Primary	15	100%	-0.079
	Secondary	41	58.5%	
	Tertiary other than university	50	40.6%	
	University	33	36.1%	
RRT 4	Primary	7	-15.2%	-0.244
	Secondary	38	59.3%	
	Tertiary other than university	47	31.1%	
	University	30	22.2%	
RRT 5	Primary	8	-2.4%	-0.179
	Secondary	33	24.4%	
	Tertiary other than university	48	34.3%	
	University	31	26.9%	

Conclusion

Of the respondents completing the randomized response survey instrument, 47.7% admitted tax evasion by trading goods and not reporting it in tax form and 48.7% admitted evasion by excluding some outside income and 49.8% admitted tax evasion by being paid in cash and not reporting it and 43.7% admitted evasion by hiding investment to avoid payment of tax lastly, 43% admitted evasion by cheating on tax if the chances arises.

H_1 hypothesizes that men would display a higher proportion of evasion than women. The results in Table 1 indicate that higher proportion of evasion occurred among women than men pointing to a different direction from the hypothesized one.

H_2 hypothesizes that the proportion of tax evasion will be higher for married taxpayer than for single taxpayer. The results in Table 2 indicate that higher proportion of tax evasion occurred among married taxpayer than single taxpayer contrary to the hypothesized direction.

H_3 tests whether taxpayers with higher level of education exhibit higher proportion of evasion than taxpayers with lower level of education contrary to the hypothesized direction, a negative relationship between education and tax evasion was found. Taxpayers without tertiary education tended to have higher proportions of tax evasion (71.4% for RRT1,

50% for RRT2, 58.5% for RRT3 and 59.3% for RRT4) than taxpayer with tertiary education (36.1% for RRT1, 46.9% for RRT2, 40.6% for RRT3 and 31.1% for RRT4), but none of the differences are statistically significant, so H_3 is rejected.

In H_4, we hypothesized that self-employed taxpayers would exhibit higher proportion of tax evasion than employees. The results in Table 3 indicate higher proportion of evasion occurred among private organization taxpayers than any other taxpayers pointing to a different direction from the hypothesized one.

References

Abul-Ela, Abdel-Latif, A., Greenberg, B. G. and Horvitz, D. G. (1967): A multiproportion randomized response model. *Journal of the American Statistical Association*, 62, 990-1008.

Aguolu, O. (2004): Tax policy reform in Nigeria. *World institute for developmental Economic research (WIDER) research paper*, 2006/03 Finland, UNU_WIDER.

Buchman, T. A. and Tracy, J. A. (1982): Obtaining Responses to Sensitive Questions: Conventional Questionnaire versus Randomized Response Technique. *Journal of Accounting Research, 20(1), 263-271.*

Fox, J. A. and Tracy, P. E. (1986): Randomized Response*:* A method for sensitive surveys, 67(1), 116-129.

Kalvass, A. S. and Geibel, I. J. (2006): The unrelated question randomized response model. *Proceedings of the Social Statistics Section,* 3, 211-220.

Mason, R. and Calvin, L. (1978): A study of admitted income tax evasion. *Law and Society Review (Fall)*, 4, 73-89.

Ogundele, A. E. (1999): Impact of tax administration on government revenue in a developing economy-A case study of Nigeria. *International Journal of Business and Social Science,* 3(8), 99-113.

Olatunde, J. O. (2007): Tax Evasion, Tax Avoidance and Corruption. An Interface with Source of Finance for Development in Nigeria*,* 2, 114-122.

Soyode, L. and Kajola, S. O. (2006): The Relationship between Culture and Tax Evasion Across Countries: Additional Evidence and Extensions. *Journal of International Accounting, Auditing and Taxation,* 17, 67– 78.

Temitope, O. F., Olayinka, M. U. and Abdurafiu, O. N. (2010): The Ethics of tax evasion: Perceptual evidence from Nigeria. *European Journal of Social Science*, 8(3), 360-371.

Warner, S. L. (1965): Randomized response: a survey technique for eliminating evasive answer bias. *Journal of the American Statistical Association*, 60, 63-69.

Yunusa, A. A. (2003): Improving interview method and questionnaire design. San Francisco: Jossey-Bass Publishers.

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