

Economics of Marketing Promotion in Segmenting the Informal Sector Taxpayers Using Tax Incentives as a Dose-Response Experiment

Adebayo G. ADEBAYO

Department of Accountancy

Faculty of Business Studies Rufus Giwa (Former Ondo State) Polytechnic

Qwo, Ondo State,

Nigeria.

(Corresponding Author) E-mail: adebayoga2016@gmail.com

E. O. OJO

Department of Business Administration

Faculty of Business Studies Rufus Giwa (Former Ondo State) Polytechnic

Qwo, Ondo State,

Nigeria.

Abstract

This study is focused on the application of dose-response experiment in marketing promotion strategy to segment the informal sector taxpayers into sizes or categories. This is carried out to assist tax officials especially at the state levels on increasing internally generated revenue (IGR) through the informal sector and be able to evaluate the outcome of tax incentives and compliance in their respective states. Data used in this study is a demonstrative characteristic of what can be expected from any state in the Federation. The data collected categorized the informal sector and segmented into sizes. Size 1 is Domestic Workers/Individuals/Artisans/Market Men and Women (DIAM); size 2 is Micro-Business Enterprises (MBE); size 3 is Small Scale Enterprises (SSE) and size 4 is Medium Scale Enterprises (MSE). Probit model was used to determine whether promotions have approximately the same effects on tax payment in the segmented taxpayers and therefore evaluate the POTENCY (the strength of the responsiveness of the taxpayers to pay taxes a result of dose response tax incentives) of tax incentives for compliance in the informal sector categories of taxpayers. A weak potency is an indication of tax evasion and avoidance. Findings revealed that only DIAM and the Medium Enterprises demonstrated the same level of potency and responded favourably in cooperating with the particular government in its drive to increase IGR in the state. The implication is that many taxpayers under Micro-and Small Businesses were likely to be involved in tax evasion and/or avoidance. The government, State Board of Internal Revenue (SBIR) and tax policy makers should intensify focus on Micro- and Small-Businesses to understand why the poor performance despite tax incentives.. Tax compliance strategies must be carefully designed, enforced and maintained.

Keywords: *Informal Sector, Dose-Response Experiment, Probit Model, Tax Compliance, Taxpayers' Potency.*

Introduction

The informal sector of the economy is severally referred to as the informal economy, grey economy, underground economy characterized by activities that are neither taxed nor monitored. Tax evasion and lack of monitoring is not absolute, as most local governments engage jungle justice in collecting “levies” from the various participants whose assessable profits could not be ascertained. Lacks of statistics on the activities of the informal sector that are not registered – a black market system, are devoid of the inclusion in the GDP. The various activities that make up the informal sector are diverse especially on issues relating to capital invested, technology used and income generation.(Meier and Rauch, 2005) This sector is prone to evading taxes aforesaid and can easily disregard government rules, regulation and licensing requirements. Still the sector still manipulates to enjoy certain government benefits. These characteristics of reaping where they do not so are tantamount to distributional inequality and equity bastardized. Women are the major players of the informal sector and this consequence is as a result of coping strategy against poverty. (Chen, 2001;UNRISD, 2010). Economists and policy makers have attempted to estimate size and cumulative products of the sector but they are consequently uncertain.

Recently, the perpetual fiscal imbalance of most states in the country as a result of oil price crash in the world market has forced them to be disquiet about the “black box” informal sector. Gradually the sector may be experiencing the unexpected through a tax reform to bring the sector into a modeled formality and the tax net. Osoro (1991) is of the view that the informal sector and taxes have to go through a reform for revenue adequacy.

It is widely believed that the present economic woes would had been mitigated if there has been good governance with innovative governors at the states level. The monetary gains are their utmost objectives in their do or die scrambling for power. They rely 100% on statutory allocations from the Federation Accounts. The statutory allocation trend from some selected months in 2013, 2014 and January 2015 to June 2016 is in Table 1 below:

Table1.Federation Accounts Allocation Committee: Allocations to States and Local Governments

Month/Year	Jun 2013	Nov 2013	Feb 2014	Apr 2014	Oct 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015
Amt N’ B	718.10	675.3	641.1	649.57	593.3	580.4	500.1	522.05	435.06	338.34	409.3	518.54	511.8	422.6

Month/Year	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May	Jun
Amt N’ B	389.94	475.83	369.88	387.77	370.0	345.09	299.7	288.5	305.13	559.03

Source: Monthly Statutory grants from the Federation Account Allocation Committee (FAAC)

Tax reforms in the informal sector are still an untapped opportunity by most state governments. Aggressive revenue drive is the most applauded option to improve their revenue base and widen their tax net to include whoever earns a living, be it artisans, market men and women and even domestic workers, in addition to micro, small and medium enterprises all in the informal sector.

Objectives of the Study.

This study is designed to assist tax officials, SBIR and tax policy makers especially at the state levels, in their adventure into taxing the informal sector to increase the IGR for the state. Specifically:

1. To assess the response rate by comparing the expected responses with the observed responses
2. To assess the degree of responsiveness of the categories of taxpayers to tax incentives
3. To evaluate the relative median potency of each category of taxpayers and rank them accordingly. This is a litmus paper to test evasion and/or avoidance.

Review of Literature

As a result of the continuous monthly dwindling in revenue allocation from the Federation Account to the states, due to the falling price of oil in the world market, state governments should take the initiatives of boosting internally generated revenue as well as eliminating wastes in government expenditure and reduce the cost of governance by rationalizing agencies with overlapping functions.

State governments should be innovative, think and plan and stop the practice of feeding bottle democracy. Most states and their governments are relying solely on the hand to mouth from Federal accounts.

Revenue assurance principles as applied to public governance, is a companion of IGR. Revenue Assurance (RA) may be defined as the process within an organization of ensuring that all possible revenue is collected accurately and in a timely manner, identifying where revenue gets lost, and minimizing such losses by eliminating revenue leakage and lowering overhead costs whilst managing fraud to an acceptable level (Hamid, 2012). RA is therefore, about improving revenues and cash flows and eliminating leakages, excesses, abuses and fraud as well as minimizing operating cost. Revenue assurance would only thrive in the presence of transparent governance, accountability and zero tolerance for corruption.

Tax Incentives and Increasing IGR in the Informal Sector

Various tax incentives doses can be applied to entice taxpayer to pay tax as at when due. In other words it is indirectly a bait for tax compliance. Tax incentives range from rate reduction (in the case of personal income tax, company income tax or value added tax), tax holiday, access to special government policies, and a rebate off tax liability in form of a percentage. It is not obligatory for the taxpayer to key in into the incentives. This study centres its discussions on *a rebate off (representing a dose-response)* on the tax expected to be paid. The major target is to increase IGR in the informal sector. Any individual or businesses in the sector with any assessable income would pay tax (Vanguard, 2016; Bello, 2016)

Tax Incentives and Potency

In tax parlance, potency is the ability of enticing tax payers to pay their taxes with less rebate offer. It is the strength of the responsiveness of the taxpayers to pay taxes a result of tax incentives.

Taxpayers Potency and Relative Potency

This is the value offer (rebate off) necessary to achieve a desired probability of tax payment. For example, a 9.670% rebate offer would entice Mr A to make a tax payment, while 11.818% rebate offer would raise the probability of tax payment would entice Mr B, then Mr A's has a tax potency more than Mr B. The relative median potency of these two taxpayers is the ratio of the rebate values needed to obtain a 50% probability of tax payment, or $9.670/11.818 = 0.818$. At a 100% performance of Mr A in tax payment, Mr B's performance under the same condition is 81.8%.

Increasing Compliance

It is highly imperative that the government make the use of tested and trusted Tax Officials. Tested and trusted tax officials are very obligatory to avoid tax payers from developing apathy and self-justification for tax avoidance and evasion. Tax officials must also have zero tolerance for corruption. Corruption is the root of all economic evils. It is an obstacle to economic growth and development of the country, eradication of poverty, improved life expectancy and improved livelihood of all Nigerians to mention a few.

In the aspect of tax collection and boosting IGR, corruption, which includes collusion between tax officials (tax administration) and tax payers to evade taxes: issuing exemption certificate to unqualified taxpayers, creating multiple false taxpayer identification, writing off of a tax debt without justification, closure of a tax audit without any adjustment being made or penalties being imposed for evaded liability, manipulation of audit selection, deletion or removal of a tax payer's records from the tax administration's registration filing and accounting records among others. According to Asher (2001), corrupt tax practices are likely to impact the informal sector more severely than the large firms in the formal sector

The Probit Analysis

This has been a marketing strategy used by retail companies establish the relationship between the size of a promotion (measured as a percentage off the retail price) and the probability that a customer will buy. Moreover, they want to establish this relationship for their store, catalog, and internet sales. In the context of a dose-response experiment, the promotion size can be considered a dose to which the customers respond by buying. The three sites at which a customer can shop correspond to different agents to which the customer is introduced. In this study, four sizes are used.

It is an appropriate method of estimating the effect of one or more independent variables on a binomial dependent variable, particularly in the setting of a dose-response experiment. This is applied to informal sector taxpayers in this study.

For example, tax authority may want to establish the relationship an incentive in form of a rebate on tax liability (measured as a percentage off the total tax paid) and the probability that a taxpayer will pay. Moreover, the tax officials would want to establish this relationship for some categories of tax payers represented in this analysis as Codes (Sizes) 1 or 2 or 3 or 4. . In the context of a dose-response experiment, the rebate on tax liability can be considered a dose to which the taxpayers respond by paying their taxes. The four sizes at which a taxpayer can belong correspond to different categories to which the tax officials had grouped them.

Using probit analysis, tax officials can determine whether tax education, orientation and incentives have approximately the same effects on the different categories of taxpayer. .

Natural Response Rate

The natural response rate is the probability of getting a response with no dose. In the tax payment example, the natural response rate is the proportion of taxpayers who would pay without a tax rebate. A natural response rate of 0 means the response is due only to the stimulus, that is, voluntary compliance. Tax officials can specify the value of the voluntary tax compliance or natural response rate (if known), or allow it to be estimated from the data. The natural response rate is a measure of credibility status of the government from taxpayers.

Research Questions

The following research questions were formulated for the purpose of achieving the study objectives

1. What is the rate of voluntary tax compliance in the informal sector study area?
2. What is the response rate of tax payers to tax incentives?
3. How was the pattern of comparing expected responses of taxpayers for tax payment displayed when compared with the observed (or actual) responses?

Research Hypotheses

The following hypotheses were formulated using 5% level of significance.

Ho₁: There will be no significant impact of tax incentives on the different categories of tax payers in the informal sector

Ho₂: The relative median potency estimate of one category/size of taxpayers is not significantly different from other categories/sizes of the taxpayers.

3. METHODOLOGY

3.1 Data Collection

The data collected was from the number of taxpayers from the informal sector after proper orientation and incentives in form of rebate offer, in a hypothetical state in Nigeria. Taxpayers were invited to tax orientation programme. Domestic workers/Individuals/Artisans/Market men and women (DIAM) were 14170; those categorized as Micro Business Enterprises (MBE) were 8210; likewise Small Scale Enterprises (SSE) were 5930 and Medium Scale Enterprises (MSE) were 2970. A total of 31280 responded throughout the state. After the orientation, taxpayers were offered incentives for payment of tax liability quarterly and within six weeks of the due date as in Table 3 below.

Table 3. Week of Payment and Rebates

Week of Payment	1	2	3	4	5	6
Rebate on Tax Liability [%]	15	12.5	10	7.5	5.0	2.5

If a tax payer pays the tax liability within a week, there is a rebate of 15% but only 2.5% if payment takes six weeks. No incentives after six weeks. Rather, the taxpayer may face the wrath of the law.

The responses are as the Table 4 bellow.

Table 4. Tax Orientation Attendants and the Respondents taking up the Rebate Offer.

Various Categories of taxpayers	Codes (Size)	Rebate offer on Tax Liability[%](reb off)	Taxpayers (Subjects) who opted for various rebates (subj)	Subjects who Eventually Resp(resp)
Dom/Ind/Artisans/Mkt (DIAM)	1	2.5	2200	120
	1	5.0	2320	420
	1	7.5	2140	540
	1	10	1970	1130
	1	12.5	2680	2020
	1	15	2860	2440
Micro Business Ent (MBE)	2	2.5	1320	110
	2	5.0	1360	70
	2	7.5	1430	360
	2	10	1600	730
	2	12.5	1180	570
	2	15	1320	960
Small Scale Ent (SSE)	3	2.5	880	50
	3	5.0	1130	120
	3	7.5	1060	120
	3	10	770	230
	3	12.5	1200	520
	3	15	890	540
Medium Scale Ent (MSE)	4	2.5	460	30
	4	5.0	490	90
	4	7.5	450	110
	4	10	410	240
	4	12.5	560	420
	4	15	600	510

Source: A Pilot (Demonstrative) Study

1=Domestic workers/Artisans/Market Men and Women

2= Micro Businesses

3 =Small Scale Enterprises

4 =Medium Scale Enterprises.

Table 4 shows that from records, the Domestic/Individuals/Artisans/market men and women (DIAM) who opted that they can pay in the first week, (with 15% rebate), about 2440 out of 2869 actually responded. Only 120 responded out of 2200 of DIAM in the sixth week to enjoy 2.5% rebate. Also, under medium scale enterprises (MSE), out of 600 who opted to pay within a week (with 15% rebate), 510 actually responded. Other categories can be observed from the table.

3.2 Model Specification

3.2.1 The Probit Analysis Model

The linear regression techniques cannot be restricted to the probability of an event which must lie between 0 and 1. Probit analysis model is best applied to such situations especially when probability of a response to stimulus is of interest. The probit model is a type of generalized linear model. It can link the range of real numbers to the 0-1 range by some extension to linear regression model.

There is an unobserved continuous variable, Z , which can be thought of as the "propensity towards" the event of interest. In the case of the taxpayers, Z represents taxpayer's propensity to

pay at due date, with corresponding to greater probabilities of paying. Mathematically, the relationship between Z and the probability of taxpayers' response is:

$$P_i = c + (1 - c)F(z_i)$$

where

P_i = the probability the i^{th} case experiences the event of interest

Z_i = the value of the unobserved continuous variable for the i^{th} case

F = a link function.

c = the natural response rate..

The model also assumes that Z is linearly related to the predictors.

$$Z_i = b_0 + b_1 x_{i1} + b_2 x_{i2} + \dots + b_p x_{ip}$$

where

x_{ij} is simply the j^{th} predictor for the i^{th} case when there is no grouping variable. When there is a grouping variable, indicator variables are constructed to represent the levels of the grouping variable and added to the list of predictors.

b_j is the j^{th} coefficient

p is the number of predictors

If Z were observable, you would simply fit a linear regression to Z and be done. However, since Z is unobserved, you must relate the predictors to the probability of interest by substituting for Z .

$$P_i = c + (1 - c) F(b_0 + b_1 x_{i1} + b_2 x_{i2} + \dots + b_p x_{ip})$$

The model coefficients are estimated through an iterative maximum likelihood method.

3.2.2 Link Functions for the Probit Analysis Procedure

Link functions transform Z to a 0-1 scale, thus providing the "link" coefficients and the probability of interest. The link functions available are the probit and logit. The logit link will produce a logistic regression model:

$$F(Z) = 1 / [1 + e^{-Z}]$$

The probit link assumes that Z is approximately normally distributed:

$$F(Z) = \Phi^{-1}(Z) \text{ (Gujarati et al, 2013)}$$

Where F^{-1} is the inverse standard normal distribution. The logit and probit links often give similar results, though the probit link discriminates better near the median; potency (.5 probability response) and the logit link performs better elsewhere.

This study relies on SPSS 21 to generate the effects of tax education, orientation and incentives. SPSS was chosen largely because it uses probit analysis as a model for setting of dose response experiment and is capable of ordering the analysis into subsets such as the parameter estimate, cell counts, confident limits and the relative median potency estimates. Since history, the IBM

SPSS econometric software has been known for its high degree of consistency, reliability and dependability.

4. Results and Discussion.

The results of the statistical outputs from Table A-1 to Table A-7 have been fully discussed in a table by table approach under each relevant table.

Further discussions of the results are to provide answers to research questions and the testing of the respective hypotheses. The results and discussion would toe the line of the research questions and the research hypotheses.

Research Question 1- What is the rate of voluntary tax compliance in the informal sector study area?

Table A-2 shows the rate of voluntary tax compliance in the study area. The estimated rate was 0.069 (or 6.9%) with standard error of 0.003. This is a highly reliable estimate because $0.003/0.069$ is 0.043 (or 4.3%) signifying voluntary compliance of 0.069(31280). This is 2158 out of 31280 taxpayers. The importance of voluntary compliance is that it measures the credibility status of the government from the taxpayers.

Research Question 2 - What is the response rate of tax payers to tax incentives?

Table A-5b is computed from Table A-5a which shows the response rate size by size without recourse to value of rebate offer Size 1 rate = 47.2%; size 2 rate = 34.13%; size 3 rate = 26.56% and size 4 = 47.10. The response rate is generally since no categories of the taxpayers could manage up to 50% average. The response rate of all taxpayers is 28.75, $(47.2 + 34.13 + 26.56 + 47.10 = 114.99/4)$

Research Question 3- How was the pattern of comparing expected responses of taxpayers for tax payment displayed when compared with the observed (or actual) responses?

The residuals in column (g) of Table A-5a are the outcome of the difference between the expected responses and the observed responses. The pattern of the residuals is best revealed when it is expressed relative to the expected responses. The outcome is in Table A-5c. The expected responses in column (f) and the residuals in column (g) of Table A-5a are transferred to Table A-5c. We take the modulus (positive value) of the residuals since we are interested in the relative percentages. These percentages are a type of coefficient of variation is. Large coefficient indicates cells that are not well fit by the model. Any variation more than 0.25 may not be well fit by the model. It may be concluded that the pattern shows cells 2, 8, 14, 20 and 21 not well fit. These are just about 5 cells out of 24 cells. Overall pattern (addition of all the percentages divided by 24 cells) shows that the model fit well at an average variation of 0.2083.

Research Hypothesis 1- H_{01} : There will be no significant impact of tax incentives on the different categories of tax payers in the informal sector.

Table A-6 is the confidence limit table. The analysis shows the rebate offer that would be able to achieve a 50% desired probability of tax payment. The analysis shows 9.67% rebate offer to attract 50% from DIAM. In the case of Micro-Business, it is 11.818% rebate offer. It is 13.997% and 9.683% rebate offer for Small and Medium Enterprises respectively. Hypothesis 1 is rejected and the alternative hypothesis is accepted.

Research Hypothesis 2 - Ho2 : The relative median potency estimates of one category/size of taxpayers is not significantly different from other categories/sizes of the taxpayers.

The issue of potency is very important when a dose, incentives or an empowerment is entrenched in a tax reform especially of the informal sector. Table A-7 Shows the relative median potency of the categories/sizes of the taxpayers. Since the confident limit does not include 1, there is a significant difference in the relative potency of the sizes except sizes 1 and 4. The null hypothesis is rejected.

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APPENDIX*

Table A-1 Data Information

		N of Cases
Valid		24
	Out of Range ^a	0
Rejected	Missing	0
	LOG Transform Cannot be Done	0
	Number of Responses > Number of Subjects	0
Control Group		0
	1. (Domestic workers/Individuals/Artisans/Market men and women)	6
Size ^b	2. Micro-Businesses	6
	3. Small Scale	6
	4. Medium Scale	6
		6

- a. Cases rejected because of out of range group values.
This model validity is 100% with reliable as rejection cases is null.
- b. The various sizes represent the categories (or control group) tax payers.

Table A-2 Natural Response Rate Estimate^a

	Estimate	Std. Error
PROBIT	.069	.003

a. Control group is not provided.

About 6.9% of all taxpayers would pay taxes without rebate offer. This signifies voluntary compliance of 2158 out of 31280 taxpayers.

Table A-3 Chi-Square Tests

		Chi-Square	df ^b	Sig
PROBIT	Pearson Goodness-of-Fit Test	289.894	18	.000 ^a
	Parallelism Test	9.403	3	.024

Chi-Square Tests

		Chi-Square	df ^b	Sig.
PROBIT	Pearson Goodness-of-Fit Test	289.894	18	.000 ^a
	Parallelism Test	9.403	3	.024

- a. Since the significance level is less than .050, a heterogeneity factor is used in the calculation of confidence limits. The performances of the categories (sizes) of taxpayers are significantly different
- b. Statistics based on individual cases differ from statistics based on aggregated cases.

Table A-4 Parameter Estimates

	Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
PROBIT ^a	Rebuff	2.238	.041	54.030	.000	2.156	2.319
	1	-5.077	.102	-49.586	.000	-5.180	-4.975
	2	-5.526	.105	-52.748	.000	-5.631	-5.421
	3	-5.904	.111	-53.427	.000	-6.015	-5.794
	4	-5.080	.106	-47.800	.000	-5.186	-4.974
	Intercept ^b						

a. PROBIT model: $\text{PROBIT}(p) = \text{Intercept} + \text{BX}$ (Covariates X are transformed using the base 2.718 logarithm.)

b. Corresponds to the grouping variable size.

Probit Analysis estimates a common slope, common natural response rate, and separate intercepts for each factor level i.e. increasing the value of the rebate offer for *DIAM* tax payers has the same effect as increasing the value of the rebate offer for *Micro Business taxpayers on the transformed scale*.

The ordering of the sizes therefore is -5.077; -5.080; -5.526 and -5.904 as 1; 4; 2; and 3 respectively. Note that -5.077 is higher than -5.080 or -5.526 or -5.904.

Tale A-5a. Cell Counts and Residuals

	Number (a)	Size (b)	Rebuff** (c)	Number of Subjects (d)	Observed Responses (e)	Expected Responses (f)	Residual (g)	Probability (h)
	1	1	.916	2200	120	154.095	-34.095	.070
	2	1	1.609	2320	420	310.995	109.005	.134
	3	1	2.015	2140	540	714.875	-174.875	.334
	4	1	2.303	1970	1130	1107.699	22.301	.562
	5	1	2.526	2680	2020	1974.114	45.886	.737
	6	1	2.708	2860	2440	2425.981	14.019	.848
	7	2	.916	1320	110	91.252	18.748	.069
	8	2	1.609	1360	70	128.056	-58.056	.094
	9	2	2.015	1430	360	304.201	55.799	.213
	10	2	2.303	1600	730	638.072	91.928	.399
	11	2	2.526	1180	570	685.553	-115.553	.581
PROBIT	12	2	2.708	1320	960	955.183	4.817	.724
	13	3	.916	880	50	60.673	-10.673	.069
	14	3	1.609	1130	120	89.039	30.961	.079
	15	3	2.015	1060	120	153.340	-33.340	.145
	16	3	2.303	770	230	215.057	14.943	.279
	17	3	2.526	1200	520	529.803	-9.803	.442
	18	3	2.708	890	540	526.720	13.280	.592
	19	4	.916	460	30	32.215	-2.215	.070
	20	4	1.609	490	90	65.507	24.493	.134
	21	4	2.015	450	110	149.912	-39.912	.333
	22	4	2.303	410	240	230.096	9.904	.561
	23	4	2.526	560	420	411.990	8.010	.736
	24	4	2.708	600	510	508.548	1.452	.848

** The rebate off is expressed in Logarithm base = 2.718

The goodness of fit statistics are based on the cell counts and residuals table. Cells in the table represent the cross-classification of the *Sizes of taxpayers* and *rebate offer*. Note that the values of *rebate offer* shown are the natural logarithms of the actual values.

- Thus, the first row of the table pertains to *DIAM* taxpayers who were offered a 2.5% rebate
- The observed responses column reports the number of cases observed in the records that are in the cross-classification
- The expected responses column reports the number of cases one would expect to see in the cell if the model is correct
- The residuals are measures of the difference between the observed and predicted values. Large residuals can indicate cells that are not well fit by the model. For example, cells 2, 8, 14, 20 and 21.

Table A-5b Response Rate Irrespective of Rebate offer Classification*

Categories/Sizes (a)	Number of Subjects (All taxpayers showing interest)(b)	Expected Responses (c)	Response Rate % (d)=b/c	Rank (e)
1	14170 (DIAM)	6689	47.20	1 st
2	8210 (MBE)	2802	34.13	3 rd
3	5930 (SSE)	1575	26.56	4 th
4	2970 (MSE)	1398	47.10	2 nd

*Computed by the author from Table A-5a. The total expected responses for DIAM, is the addition of column (f) in Table A-5a, i.e. 154.095+310.995+2425.981 (up to size 1)= 6689. The same is for MBE, SSE, and MSE.

Table A-5c Residuals Expressed Relative to Expected Responses in Percentage.

S/N	1	2	3	4	5	6	7	8	9	10	11
Expected Resp (f)	154.09	310.99	714.88	1107.69	1974.11	2425.98	91.25	128.06	304.2	91.93	685.55
Residuals(g)	34.095	109.01	174.87	22.3	45.89	14.019	18.75	58.056	55.799	91.93	115.55
Percent(g/f)	22.12	35.05*	24.46	02.00	02.32	03.29	20.54	45.34*	18.34	14.41	16.85

12	13	14	15	16	17	18	19	20	21	22	23	24
996.18	60.67	89.04	153.34	215.06	529.8	526.72	32.22	65.51	149.91	230.09	411.99	508.55
4.817	10.673	30.961	33.34	14.943	9.803	13.28	2.215	24.493	39.912	9.904	8.01	1.452
0.005	17.59	34.77*	21.74	06.95	01.85	02.52	06.87	37.39*	26.62	04.3	01.94	0.0028

The Percentage Column was Computed by the Author.

*Cells 2, 8, 14, 20 and 21 with the respective percentages of 35.05, 45.34, 34.77, 37.39, and 26.62, may not be well fit by the model. The percentages in these cells are more than 25%.

Table A-6Confidence Limits

Size	Probability	95% Confidence Limits for rebuff			95% Confidence Limits for ^b .	
		Estimate	Lower Bound	Upper Bound	Estimate	Lower Bound
PROBIT ³ 1	.400	8.635	7.959	9.234	2.156	2.074
	.450	9.142	8.484	9.738	2.213	2.138
	.500	9.670	9.026	10.270	2.269	2.200
	.550	10.229	9.593	10.842	2.325	2.261
	.600	10.830	10.193	11.470	2.382	2.322
2	.400	10.553	9.712	11.395	2.356	2.273
	.450	11.172	10.315	12.059	2.413	2.334
	.500	11.818	10.935	12.764	2.470	2.392
	.550	12.500	11.579	13.525	2.526	2.449
	.600	13.234	12.260	14.359	2.583	2.506
3	.400	12.497	11.292	13.785	2.526	2.424
	.450	13.231	11.979	14.607	2.583	2.483

	.500	13.996	12.686	15.476	2.639	2.540
	.550	14.804	13.423	16.410	2.695	2.597
	.600	15.673	14.205	17.431	2.752	2.654
4	.400	8.646	7.536	9.777	2.157	2.020
	.450	9.154	8.014	10.335	2.214	2.081
	.500	9.683	8.509	10.922	2.270	2.141
	.550	10.242	9.028	11.549	2.327	2.200
	.600	10.844	9.583	12.231	2.384	2.260

a. A heterogeneity factor is used.

b. Logarithm base = 2.718

The confidence limits table (shown here for probabilities from .400 to .600) displays the value offer necessary to achieve a desired probability of tax payment. For example, size 1 (DIAM) = 9.67% rebate offer, size 2 (MBE) = 11.818% rebate offer, size 3 (SSE) = 13.996% rebate offer, and size 4 (MSE) = 9.683 rebate offer.

Table A-7 Relative Median Potency Estimates.

	(I) size	(J) size	95% Confidence Limits			95% Confidence Limits with LOG Transform ^a		
			Estimate	Lower Bound	Upper Bound	Estimate	Lower Bound	Upper Bound
PROBIT	1	2	.818	.736	.899	-.201	-.306	-.107
		3	.691	.594	.783	-.370	-.521	-.245
		4	.999	.875	1.139	-.001	-.133	.131
	2	1	1.222	1.113	1.358	.201	.107	.306
		3	.844	.737	.954	-.169	-.305	-.047
		4	1.220	1.061	1.420	.199	.059	.351
	3	2	1.184	1.048	1.357	.169	.047	.305
		1	1.447	1.277	1.683	.370	.245	.521
		4	1.445	1.230	1.742	.368	.207	.555
	4	2	.819	.704	.942	-.199	-.351	-.059
		1	1.001	.878	1.143	.001	-.131	.133
		3	.692	.574	.813	-.368	-.555	-.207

*SPSS 21 Output

a. Logarithm base = 2.718. Computation does not include natural response rate.

Potency is the ability of enticing tax payers to pay their taxes with less rebate offer. The relative median potencies are displayed in Table A-7. The first row shows an estimate and confidence interval for the relative median potency of *Domestic/Individuals/Artisans/Market men & women (DIAM) vs Micro Business sizes (MBE)*. Since the confidence interval does not include 1, one can conclude there is a difference in their median potencies. Specifically, the DIAM size is more potent because it requires a smaller rebate offer to achieve median potency but very near in potency to MSE.