Coercion, Persuasion, and Tax Compliance: The Case of Large Corporate Taxpayers

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P R É C I S

Pour favoriser l’observation fiscale, il y a deux approches opposées : l’approche coercitive et l’approche incitative. Personne ne s’est réellement attardé à tenter de comparer ces deux approches dans la littérature afin d’en mesurer le succès respectif. Cet article utilise des données originales de sondage pour évaluer l’efficacité de trois instruments coercitifs et de trois instruments incitatifs employés par le Large Taxpayer Unit du Bangladesh National Board of Revenue afin de favoriser l’observation par les grands contribuables constitués en société. À l’aide de la régression logistique, nous constatons que lorsque des instruments coercitifs ou incitatifs sont utilisés séparément, ils sont moins susceptibles d’améliorer l’observation fiscale des grands contribuables constitués en société que lorsque les deux types d’instruments sont utilisés conjointement, bien que la coercion semble le plus efficace des deux. Les conclusions peuvent être pertinentes dans d’autres pays qui sont largement tributaires des revenus fiscaux perçus auprès de grandes sociétés, notamment le Canada. Parmi les limites de l’étude, notons la mesure de certaines variables au moyen de données autodéclarées et l’hypothèse qu’aucun lien de causalité important n’existe entre les instruments coercitifs et incitatifs.

A B S T R A C T

To induce tax compliance, two opposite approaches are used: the coercive and the persuasive. Little attention has been paid in the literature to the comparative success of these two approaches. This article uses original survey data to assess the effectiveness of three coercive and three persuasive instruments used by the Large Taxpayer Unit of the Bangladesh National Board of Revenue to promote compliance by large corporate taxpayers. Using logistic regressions, we find that when instruments of either coercion or persuasion are used separately, they are less likely to improve the tax compliance of large corporate taxpayers than when both types of instruments are used in combination, although coercion seems the more powerful of the two. The findings may be relevant in other countries that rely heavily on tax revenue collected from large corporations, including Canada. Limitations of the study include the measurement of some variables

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using self-reported data and the assumption that no important causal constructs exist between the instruments of coercion and persuasion.

**KEYWORDS:** COMPLIANCE ■ CORPORATE INCOME TAXES ■ BANGLADESH ■ TAX ADMINISTRATION ■ SERVICE ■ TAX AUDITS

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**INTRODUCTION**

Spurring tax compliance is a challenge for virtually all tax administrations.¹ Tax agencies have used diverse techniques to increase compliance, depending on the type of taxpayer and the amount of revenues at stake. The techniques chosen are motivated by two apparently opposing strategies that have dominated the tax compliance debate: the coercive and the persuasive approaches.² The coercive tax compliance approach, also called the deterrence or stick-based approach, attempts to promote tax compliance through a mix of penalties and tax audits, whereas the persuasive approach, also called the collaborative, cooperative, or carrot-based approach, seeks

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to increase tax compliance by raising taxpayer morale through better taxpayer services, tax simplification, administrative procedures, mutual understanding, and education of taxpayers, among others.

The philosophy of the coercive approach is that as rational economic actors, individuals and corporate taxpayers take their compliance decisions by weighing the comparative benefits of non-compliance and the cost of punishment. Tax non-compliance, however, is not simply a cost-benefit choice; rather, there are non-rational cognitive forces—loosely described as tax morale, comprising taxpayer attitudes and beliefs—that influence compliance behaviour. It is therefore suggested that tax compliance can be better handled by instruments of persuasion. The persuasive approach argues that influencing these non-rational forces is less expensive than administering punitive actions and is more effective in deterring non-compliance.

The question that begs an answer is which of these approaches yields higher tax compliance among large corporate taxpayers. This is because large corporate taxpayers are unique in the substantial tax revenues they provide and the high risk they impose on the tax system. Large corporate taxpayers also command much financial and political power and professional expertise to outsmart the tax administration.

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7 Penelope Tuck, “Remaking the Large Corporate Taxpayer into a Visible Customer Partner: The Changing Role of Tax Governance,” 2004 (www2.warwick.ac.uk/fac/soc/wbs/projects/).
The objective of this article is to understand the contribution of coercive and persuasive tax compliance instruments in creating income tax compliance among large corporate taxpayers, taking Bangladesh as an example. We attempt to answer a fundamental question in tax compliance policy, as posed by Tuck: “[W]hat should be the nature of interaction between the tax administrations and large corporate taxpayers: ‘cops versus robbers’ or ‘service providers versus clients’?”

Our approach is to research and analyze the contribution of selected coercive and persuasive compliance tools for collecting taxes from large corporate taxpayers registered with the Large Taxpayer Unit (LTU) of the Bangladesh National Board of Revenue (NBR). The effectiveness of the LTU itself is not the focus of this article.

To secure corporate tax compliance, particularly in countries heavily dependent on tax revenues from large businesses, tax administrations across the world have created LTUs. The first of these was introduced in Argentina in the late 1970s, and the creation of such units in other developing countries was strengthened in the early 1990s under the patronage of the International Monetary Fund (IMF). By 2002, 50 countries, and by 2006, 67 countries, had established LTUs, either as independent units or as special departments within semi-autonomous tax administrations. LTUs are self-contained tax administration offices, providing one-stop services to settle the tax liabilities of the largest taxpayers. As tax administration units, LTUs tend to employ a compliance approach that relies more on persuasive than coercive instruments.

There are three reasons for selecting Bangladesh’s LTU as a case study to investigate the comparative effects of coercive and persuasive approaches to tax compliance:

- First, Bangladesh is a prominent case of dependence on large corporate tax revenues; its tax/gross domestic product ratio (10.4 percent in 2012) is among the lowest in South Asia, and (as reported in 2011) large corporate taxpayers provide one-third of total tax revenues and over 90 percent of corporate taxes.

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8 Ibid., at 1.
taxes. A major objective behind the formation of the LTU in Bangladesh was to speed up the real growth of tax revenues by offsetting the impact of high inflation rates (the Olivera-Tanzi effect). According to the 2015 Trading Economics report, the average inflation rate in Bangladesh from 1994 to 2015 was 6.63 percent, with a record high rate of 12.71 percent in 1998. Although there was a massive improvement in income tax collection from large corporate taxpayers in the Bangladesh LTU’s initial years, revenue growth in both nominal and real terms has gradually decreased. The real growth rate of the LTU’s tax collection, after adjustment for inflation, fell to 10.1 percent in the financial year 2008-9 from 45.5 percent in financial year 2005-6. A falling trend during the period 2001-2011 in the interest rate spread of Bangladeshi commercial banks may (if it reduced those banks’ profits) have contributed to the LTU’s falling growth in revenue collected. Taxes paid by large taxpayers in the banking sector make up a substantial part of the LTU’s revenue.

Second, the Bangladesh LTU, like other LTUs around the world, has striven to simplify tax procedures and enhance taxpayer services to popularize the self-assessment system and raise tax revenues from large corporate taxpayers. At the same time, Bangladesh also uses coercive instruments to enforce compliance. To tackle tax fraud, as the IMF states, Bangladesh introduced “effective audit and collection enforcement . . . strong but fair penalty systems to signal that tax fraud will be prosecuted.” The Income Tax Ordinance of Bangladesh starts with financial penalties and ends in a maximum of five years of imprisonment for tax cheating. To combat tax evasion, the NBR set up a Central Intelligence Cell, mainly focused on large taxpayers’ compliance.

Third, and most importantly for our research, we had access to real tax office data, placing this study among the first of its kind in tax compliance research in developing countries.

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The topic of this article should be of considerable interest in Canada, where the International and Large Business Division (ILBD) has been set up within the Canada Revenue Agency to administer the taxes of 900 large businesses and 6,000 controlled entities. Together, in 2009, these taxpayers accounted for 53 percent of federal corporate income taxes and a large percentage of the goods and services tax.\textsuperscript{19} In Canada, large corporate taxpayers pose a high risk to the tax system. Risk rating assessment shows that 37 percent of large corporate taxpayers in Canada are high risk, 38 percent are medium risk, and only 25 percent are low risk.\textsuperscript{20} Therefore, in terms of concentration of income tax revenues and the risk posed to the tax system by large corporate taxpayers, Bangladesh and Canada are similar. As in Bangladesh, in persuading the large corporate taxpayers of Canada to be on the low-risk side, the ILBD offers “the ‘carrot’ of . . . real-time audit assistance,” but owing to “[c]ultural attitudes and distrust on both sides of the relationship,” the high risk rating of large corporate taxpayers remains unabated.\textsuperscript{21}

The rest of the article is organized as follows. We first provide an overview of the literature on coercive and persuasive approaches to tax compliance. We then outline the methodology of our research, including the variables, models, and data used in the study. We present our analysis and results, and provide a comparison of statistical outputs. We end the article with a discussion of our conclusions.

THE COERCIVE VERSUS PERSUASIVE DEBATE IN TAX COMPLIANCE THEORY

Underlying coercive and persuasive approaches to tax compliance are risk-based and non-risk-based theories. The risk-based theories emerged from neoclassical economic thinking, focusing on individual economic incentives. They include expected utility theory,\textsuperscript{22} prospect theory,\textsuperscript{23} and expectancy theory.\textsuperscript{24} The risk-based


\textsuperscript{21} Ibid.


Theories are suggestive of the coercive approach to tax compliance, emphasizing audit and penalties as deterrents to tax non-compliance. Allingham and Sandmo were the first to model the economic approach of tax compliance, based on Becker’s seminal work on the economics of crime and punishment.

The risk-based theories of tax compliance have been challenged by non-risk-based approaches. Proponents of the latter argue that dealing with tax non-compliance by economic rationality alone assumes that the taxpayer is a gambler or a thief, and that in the long run only consensual exchange of resources will prevail. Non-risk-based analyses stem from psychological and sociological theories and are more concerned with the persuasive aspects of tax compliance. They include intention theory, norms of compliance, and the inertia model. According to the non-risk-based theories, taxpayers are not always selfish; they can also be responsible and honest. Non-risk-based theories stress the personal and social factors underlying tax compliance behaviour.

25 Allingham and Sandmo, supra note 3.
26 Becker, supra note 3.
One prominent development in non-risk-based theory is intention theory, primarily developed by Fishbein and Ajzen\textsuperscript{34} and applied by Lewis,\textsuperscript{35} McGill,\textsuperscript{36} and Jackson and Milliron\textsuperscript{37} in studying tax compliance behaviour. These researchers found that individual attitudes toward tax evasion were affected by age, level of education, income level, and several other demographic features of the taxpayers. Another development, in the same line of thought, stresses the norms of tax compliance, arguing that if a society considers evasion to be wrong and immoral, taxpayers will be less non-compliant.\textsuperscript{38} A society with a strong tradition of non-compliance tends to encourage tax evasion to continue. For social and cultural reasons, individuals compare their own tax payment behaviour with that of others. If a taxpayer sees that others are not paying their taxes properly, or the government is not making proper use of tax revenues, he or she will tend to evade taxes. An extension of this proposition is the inertia model, which asserts that once an individual is habituated to certain behaviours or states of mind, it is difficult for him or her to suddenly withdraw from such practices. Similarly, a taxpayer who has a longstanding history of tax compliance does not suddenly become a violator.\textsuperscript{39} The reason for this is not the fear of detection but the habit of compliance. In sum, theories underlying the persuasive approach suggest that establishing mutual trust and understanding with taxpayers will influence tax compliance decisions. They imply that the imposition of penalties aimed at increasing tax compliance may sometimes backfire because penalties provoke evasive behaviour.

Although the persuasive paradigm has provoked much debate in tax compliance literature, empirical research has focused exclusively on coercive instruments.\textsuperscript{40} Hasseldine et al. state that “[a]lthough persuasive communications have been examined in some accounting-related studies . . . to date none of those studies has used persuasive communications to encourage compliant reporting behavior and to deter

\textsuperscript{34} Fishbein and Ajzen, supra note 29.


\textsuperscript{39} Ibid.

noncompliant reporting.” And Timmons argues that “most theories hinge on the coercive model of tax compliance, but tax compliance cannot be explained by coercion alone in most cases.”

The sparse literature comparing the effects of coercive and persuasive instruments on taxpayers has been concerned mainly with individual and sole proprietor taxpayers. The few analyses of tax compliance among large corporations have been confined to measuring the influence of selected coercive tools, such as penalties, audits, and tax rates, rather than comparing those tools with persuasive instruments. This literature includes Kamdar, the United States General Accounting Office, Slemrod and Venkatesh, Okike, and Aparicio et al. Only Taliercio has looked at the taxpayer service issues of large corporate taxpayers. A few other studies have evaluated LTUs’ performance as tax administration units and focused on their compliance techniques and approaches.

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42 Timmons, supra note 27, at 27.
50 For example, George Hamilton, “Integral Unit for Large Taxpayer Management in the Tax Administration” [1994] no. 15 Revista de Administración Tributaria CLAT/IEF 134-56; Baer et al.,
Our review of the literature shows that there is an absence of studies of the compliance behaviour of large corporate taxpayers in relation to coercive and persuasive instruments. This study provides an approach to carrying out such studies and applies it to Bangladesh, producing a result that suggests the superiority of combining the use of coercive and persuasive instruments.

**METHODOLOGY**

Our analysis is based on an empirical examination of survey data gathered from large corporate taxpayers in Bangladesh, coupled with data from the tax authority. The steps in carrying out the analysis were as follows. First, the critical variables (tax compliance, coercive instruments, and persuasive instruments) were defined operationally. Second, the tax compliance performance of large corporate taxpayers in Bangladesh was measured (see appendix table A1) using LTU tax office data, with a specific focus on overall compliance with tax filing, reporting, and payment obligations (see appendix table A2). Third, a questionnaire survey of a sample of firms was carried out (and is reproduced in the appendix). Fourth, to test the association of coercive and persuasive instruments with revealed compliance behaviour, a logit regression model was constructed and applied to the survey data. Finally, the analyses were compared with regard to the comparative influence of the coercive and persuasive instruments.

**Defining the Variables**

Simply defined, tax compliance means honouring tax liabilities according to tax laws and accounting practices.\(^{51}\) In other words, it means filing returns with taxes paid, fully and on time.\(^{52}\) Taxpayers forgo part of their income in taxes without any direct benefits. As a consequence, making intentional (fraudulent) or unintentional (as a

\(^{51}\) James and Alley, supra note 2; and Braithwaite and Wirth, supra note 50.

\(^{52}\) Roth et al., supra note 32.
result of errors or ignorance) mistakes of different kinds is inevitable in tax compliance. Some corporate non-compliance may be unintentional and may simply require clarification and proper understanding of the tax law, rather than enforcement in the form of penalties and audits. But all tax offences, intentional or unintentional, are treated equally by many tax administrations. Slemrod and Yitzhaki\textsuperscript{53} comment that whether done intentionally or not, if an action by a taxpayer causes a loss of revenue, it is treated as non-reporting of income.

Brown and Mazur\textsuperscript{54} decompose tax compliance into three mutually exclusive segments: filing, reporting, and payment. Filing compliance refers to the proportion of returns submitted by registered taxpayers; reporting compliance measures the accuracy of income reporting, and payment compliance measures the percentage of taxes paid on reported income. All these components are summed to measure overall tax compliance. For this study, tax compliance is measured as a binary variable, owing to the nature of the data and for ease of measurement.

A large corporate taxpayer filing its tax return by the statutory deadline is filing-compliant and is assigned a value of 1; a taxpayer failing to meet the deadline is filing non-compliant and assigned a value of 0. Reporting compliance is measured from LTU audit adjustment records. For measurement purposes, no audit adjustment means that the taxpayer has been found to be “clean” in its income declaration, although practically it may mean that the audit measures have failed as a result of deficient auditing skills or corrupt audit practice. No audit adjustment means that the taxpayer is reporting-compliant (value = 1), whereas an audit adjustment means reporting non-compliant (value = 0). Payment compliance is measured from LTU payment registers. No shortfall between the payable and the paid taxes makes a taxpayer payment-compliant (value = 1). Any shortfall between these two makes a taxpayer payment non-compliant (value = 0). On the basis of the above measurements, a taxpayer is considered overall compliant if in each of the components it has scored 1 (filing = 1, reporting = 1, and payment = 1), resulting in a total score of 3. A taxpayer will be overall non-compliant if its total score is less than 3. Total scores of 3 are converted into 1 and scores below 3 are converted into 0 in order to run the analysis. In measuring tax compliance at all levels, the effect of tax appeals relating to initial non-compliance has been taken into account. The tradition of measuring tax compliance as a binary variable is not new in tax compliance studies. Torgler\textsuperscript{55} uses a logistic regression model where tax evasion, the dependent variable,
is measured as a binary variable. Boame\textsuperscript{56} in analyzing the compliance behaviours of Canadian individual taxpayers measured reporting and payment compliance as binary variables. In explaining the role of empathy and sympathy in tax compliance, Christian and Alm calculated reporting compliance as a “binary variable showing if the subjects reported the entire income to the tax administration, equal to 1 for full compliance and 0 otherwise.”\textsuperscript{57}

Coercion as a concept is defined as an external command expressed implicitly or explicitly to enforce obedience.\textsuperscript{58} In taxation, coercive power is exercised by tax administrations “through threats of sanctions or violence,”\textsuperscript{59} although it can be used illegally by tax officials for their private gain. Coercion in this article means the forces and sanctions that the LTU applies to large corporate taxpayers to encourage them to pay their taxes. The three instruments of coercion selected are financial penalties, tax audit, and imprisonment, and the three persuasive instruments chosen are taxpayer service, tax simplification, and mutual understanding. Financial penalty is the coercive action most widely applied to control non-compliance in any tax administration. Tax audit is included in the study because when penal actions fail, the tax administration moves to unearth business details by desk-based or comprehensive audit actions.

The selected instruments are used as independent variables in the regression models. Eight control variables are also chosen, because they may influence tax compliance. These are corporate demographic factors (size, ownership pattern, location, corporate sector, and age since incorporation), marginal tax rate, employee salaries, and type of tax adviser appointed. (See appendix tables A3 and A4 for further details about the control variables and their measurement.)

**Data and Sample Size**

Data on tax compliance of large corporate taxpayers and their contact details were collected from the LTU database. The questionnaire survey was carried out to investigate to what extent coercive and persuasive instruments contribute to the tax compliance levels achieved by large corporate taxpayers. In conducting the survey,


the same sample of firms as extracted from the tax office data was used. Stratified random sampling was adopted, where every item of the strata would have an equal chance of being selected. Heuristically, a sample size needs to be 5 to 10 times higher than the number of independent variables.60 This requirement was satisfied by the effective sample size of 154.

The survey questionnaire was sent to the respondent large corporate taxpayers by registered mail twice, with an interval of four months between the first and the second mailing.61 The sample consists of 162 firms from a total of 275 large corporate taxpayers, selected using a standard random sampling formula.62 In addition, three research assistants were appointed to contact the respondents to collect the completed questionnaires and answer any of their queries. The assistants were specifically instructed not to disturb the respondents and to allow them sufficient time to fill in the questionnaire. Perhaps as a result of the monitoring by the research assistants, 154 complete responses were received, making a response rate of 95.65 percent. We covered all of the major industry sectors through stratification, with 87 from the finance sector, 44 from the manufacturing sector, and 31 from the service sector. Three-quarters of the sample firms were public limited companies, the rest being private companies. Sectorally, over half (52 percent) were from finance, over a quarter (28 percent) from manufacturing, and the remaining 20 percent from services and trading. Corporations with multinational locations numbered only a few (16 percent), with the vast majority being local corporations (84 percent). There was wide variation in the asset size of sample large corporate taxpayers: 60 percent had assets of less than US$25 million, and 25 percent had assets between US$80 million and US$500 million.


61 The reliability statistics for the survey questionnaire were measured with intraclass correlation (ICC). The single-measure ICCs for all concepts range from 0.52 to 0.83, and the average-measure ICCs range from 0.68 to 0.91, all significant at the $p < 0.001$ level. This indicates high consistency and reliability between the tests conducted on the two occasions. Likewise, the point-biserial correlations are within acceptable limits. For all other single-item questions, the values range from 0.16 to 0.42, and therefore the predictive validity is well maintained.

62 Following Israel (Glenn D. Israel, “Determining Sample Size,” University of Florida, Institute of Food and Agricultural Sciences Extension, 2009 (http://edis.ifas.ufl.edu/pd006)), the formula used to determine sample size was

$$
n = N/[1 + N(e)^2].$$

Where $n =$ sample size, $N =$ population, and $e =$ alpha level,

$$n = 275 / [(1 + 275(0.05)^2)] = 162.$$

The alpha level applied was 0.05, with a standard margin of error of 5 percent. This calculation of sample size is also corroborated by the sample size estimation formula from Sharon L. Lohr, *Sampling: Design and Analysis*, 2d ed. (Boston: Brooks/Cole, 2010).
Models Applied to the Data

We have used logistic regression to analyze the data because we want to predict whether an event will occur or not. The dependent variable is dichotomous. In logistic regression models, rather than taking the event itself as the dependent variable, the log of the odds that the event will happen is taken.\(^{63}\) Thus, in logit models, estimated coefficients can be interpreted either as logit or as odds value.\(^{64}\) For ease of interpretation, the odds value logit model is used, as presented below:

\[
\ln (\text{odds}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon.
\]

Where

\[
\text{odds} = \frac{\text{prob}_{\text{event}}}{(1 - \text{prob}_{\text{event}})} = \frac{p}{(1 - p)},
\]

the model becomes

\[
\ln \left[ \frac{\text{prob}_{\text{event}}}{(1 - \text{prob}_{\text{event}})} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \varepsilon. \quad (1)
\]

The left-hand side of the equation (odds) is expressed in exponentiated logistic (that is, the antilog of the original logistic coefficients). \(\beta_0, \beta_1, \beta_2, \text{ and } \beta_n\) are the coefficients for the respective variables \(X_1, X_2, \text{ and } X_n\). The coefficients measure the change in the ratio of the probabilities. Using this basic model, the following logit model is estimated:

\[
\ln \left[ \frac{\text{prob}_{\text{OvlCom}}}{(1 - \text{prob}_{\text{OvlCom}})} \right] = \beta_0 + \beta_1 \text{TaxPen} + \beta_2 \text{TaxAud} + \beta_3 \text{Imprison} \\
+ \beta_4 \text{TaxServ} + \beta_5 \text{TaxSimp} + \beta_6 \text{MutUnd} + \beta_7 \text{CorSiz} \\
+ \beta_8 \text{CorOwn} + \beta_9 \text{Corloc} + \beta_{10} \text{CorpSect} \\
+ \beta_{11} \text{MarTaxRate} + \beta_{12} \text{EmpSal} + \beta_{13} \text{CorAge} \\
+ \beta_{14} \text{TaxAdv} + \varepsilon, \quad (2)
\]

where

\[ \text{OvlCom} = \text{overall compliance: coded as 1 if overall tax-compliant; 0 otherwise} \]
\[ \text{TaxPen} = \text{tax penalty, measured by a Likert-type scale: coded as 1 if the respondent agrees with the usefulness of tax penalties; 2 if undecided; 3 if disagrees} \]
\[ \text{TaxAud} = \text{tax audit, measured by the common logarithm of additional tax demands} \]

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Methodological Limitations

Several caveats must be kept in mind regarding the research method and its context. First, we recognize that there are certain limitations in the use of tax audit data to measure reporting compliance in a country like Bangladesh, which ranks as one of the highest in the world on global indexes of corruption\(^5\)—corruption being itself

one of the reasons for tax audit failure. Nepotism and perverse client-patron relationships dominate the business environment in Bangladesh and cause most of the country’s regulatory and governance problems. There is every possibility that tax officials will reward the taxpayers who pay the highest bribes. Second, the data used in the study were cross-sectional and were collected on the large corporate taxpayers of Bangladesh only. The focus on only one country limits the external validity or generalizability of the study results. Third, respondent attitudes measured on a single-item Likert-type scale are subjective and may bias variable measurement. However, measurement of attitudes by single-item questions is not new in research. For example, Khalek conducted successful research on happiness using this method. In taxation research, Lago-Peñas and Lago-Peñas measured tax morale by asking the single question, “Should citizens not cheat on their taxes?”

ANALYSIS AND RESULTS

This section outlines the analysis performed to identify the instruments that might have contributed to the level of tax compliance achieved by the large corporate taxpayers. The predictors included 16 dummy variables, which represented five categorical variables measured on a five-point Likert-type scale. However, some variables and their categories, as found in the preliminary cross-tabulation, were unsuitable for analysis because there were very few or no cases. Categories of such variables were carefully combined by recoding the five-point Likert-scale items into a three-point scale. Muenchen and Hilbe suggest that to summarize survey results and to make the presentation simpler, five-point Likert-scale items can be recoded into a three-point scale. In the logit models, each of these predictors takes on three categories and is assigned a value ranging from 1 to 3. Observations scaled 1 for the

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69 Multicollinearity was checked by using a variance inflation factor with a cutoff value of 5 (Graeme D. Hutcheson and Nick Sofroniou, The Multivariate Social Scientist: Introductory Statistics Using Generalized Linear Models (Thousand Oaks, CA: Sage, 1999); and Scott Menard, Applied Logistic Regression Analysis (Thousand Oaks, CA: Sage, 1995)). The values of the variance inflation factor ranged from 1.041 to 1.257, and therefore all of the 16 predictors were included in the analysis. In running the model, the enter method was followed.

70 The rule of thumb is that the minimum expected cell frequency should be at least 5 for any meaningful analysis (Julie Pallant, SPSS Survival Manual: A Step by Step Guide to Data Analysis Using SPSS (Buckingham, UK: Open University Press, 2001)).

71 Robert A. Muenchen and Joseph M. Hilbe, R for Stata Users (London: Springer, 2010), at 204.
predictors—for example, taxpayer service quality and mutual understanding—would mean “very good.” A value of 2 would mean “good” and 3 “poor.” For predictors like tax simplification, tax penalty, and imprisonment, a value of 1 would mean “agree,” a value of 2 would mean “undecided,” and a value of 3 would mean “disagree” in response to the statement that the particular compliance instrument is useful or effective. The other predictor, tax audit, is a continuous variable.72 The eight control variables were put in the model to nullify the effect of extraneous variables.

The results showed that the model was statistically significant \( \chi^2 (16, N = 154) = 84.61, p = 0.000 \) compared to the null models. Also the fitness of the model improved from the baseline model \(-2 \log \text{likelihood } = 180.71 \) to the intended model \(-2 \log \text{likelihood } = 96.09 \). The model explained between 45.8 percent (Cox and Snell \( R^2 \)) and 62.8 percent (Nagelkerke \( R^2 \)) of the variance in tax compliance, and it correctly classified 78.0 percent of large corporate taxpayers who were tax-compliant and 88.6 percent of taxpayers who were tax non-compliant, with an overall success rate of 84.8 percent in making the classification. Appendix table A5 shows the \( \beta \) coefficients, Wald \( \chi^2 \), significance levels, and exp. (\( \beta \)) by predictors, and the results can be interpreted as follows.

First, when the usefulness of tax penalties is dummy coded into “agree” and “undecided,” by setting “disagree” as the reference group, there is no significant difference in tax compliance between large corporate taxpayers scaling the usefulness of tax penalties as “agree” and those scaling it as “disagree” \( (\beta = 0.884, p = 0.271) \). There is also no significant difference in tax compliance between large corporate taxpayers scaling the usefulness of tax penalties as “undecided” and those scaling it as “disagree” \( (\beta = 0.707, p = 0.370) \). This result suggests that tax penalties do not affect the tax compliance of large corporate taxpayers. In other words, tax penalties seem to be ineffective for increasing tax compliance.

Second, when tax audit adjustment is tested as a predictor, there is a significant difference in the tax compliance of large corporate taxpayers who were audited and found to require audit adjustments, compared to others \( (\beta = -0.698, p = 0.000, \text{ odds ratio } = 0.498) \). Results show that a 1 percent increase in audit adjustment leads to a 0.69 percent decrease in the probability of tax compliance.73 This finding indicates that firms that are reporting as non-compliant (that is, have tax adjustments)

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72 Tax audit data collected from LTU records were found to be highly skewed (skew = 6.509, SE = 0.195, kurtosis = 50.138, SE = 0.389) owing to audit adjustments ranging from zero to several million dollars. To make the distribution normal, the distribution was transformed to log form, using base 10. Before the transformation was done, 1 was added to all audit adjustments because there were zeros. Post-log transformation values (skew = −0.082, SE = 0.195, kurtosis = −1.847, SE = 0.389) of the diagnosis statistics were found satisfactory.

73 In a logit model, where a predictor is log transformed, we interpret “the coefficient (without transformation) as a percentage change for a 1 percent increase in the covariate in its original metric” (Paul D. Allison, *Survival Analysis Using SAS: A Practical Guide*, 2d ed. (Cary, NC: SAS Institute, 2010), at 214). Since tax audit adjustment is log transformed, the coefficient 0.698 is interpreted as a percentage change for a 1 percent change in tax audit adjustment.
also tend to be payment non-compliant. Measuring tax non-compliance based on tax deficiencies, Hanlon et al. argue that “noncompliance is generally a progressive phenomenon,” meaning that non-compliance as a fraction of a scale increases with the size of the company. Similarly, among large corporate taxpayers in the US manufacturing sector, Mills finds a positive relationship between excess of book income over taxable income and proposed audit adjustment. Moreover, there is evidence that firms that are suspected of underreporting and are audited frequently tend to have lower compliance owing to the huge expenses involved in the audit process. In this connection, Kopczuk states that “very high probability of audit (such as for large corporations that are almost continuously audited) can backfire when audits are themselves costly.”

Third, when the effectiveness of imprisonment is dummy coded as “agree” and “undecided,” by setting “disagree” as the reference group, there is no significant difference found in tax compliance between corporations scaling the effectiveness of imprisonment as “agree” and those scaling it as “disagree” ($\beta = -1.207$, $p = 0.152$). There is also no significant difference in tax compliance between corporate taxpayers scaling the effectiveness of imprisonment as “undecided” and those scaling it as “disagree” ($\beta = -0.293$, $p = 0.774$). This means that imprisonment does not play a statistically significant role in increasing tax compliance among large corporations. There is evidence in the literature that criminal prosecution may not have any significant impact on recidivism in comparison with fines or other coercive actions. Levi argues that “imprisonment had no significant effect on recidivism compared with fines or probation.” He claims that if criminal prosecution is pursued as a sporadic action, the evaders rationalize evasions as non-serious and non-harmful behaviour. Therefore, criminal actions, once initiated, should be prosecuted in order to send the message that non-compliance is a serious offence and will not remain unpunished.

Fourth, when the quality of taxpayer service is dummy coded into “very good” and “good,” by setting “poor” as the reference group, there is a significant difference in tax compliance between large corporations scaling service quality as “very

77 Michael Levi, Civil and Criminal Penalties for Serious Tax Non-Compliance: A Review of Impact Evidence (Cardiff: Cardiff University, School of Social Science, 2009), at 14.
good” and those scaling it as “poor” ($\beta = -3.064$, $p = 0.002$, odds ratio = 0.047). There is also a significant difference in tax compliance between corporate taxpayers scaling taxpayer service quality as “good” and those scaling it as “poor” ($\beta = -2.434$, $p = 0.012$, odds ratio = 0.088). The inverted odds ratio ($1/0.047 = 21.27$) means that large corporate taxpayers that view taxpayer service quality as “very good” are 21.27 times less likely to be tax-compliant than those that view it as “poor.” The inverted odds ratio ($1/0.088 = 11.36$) means that large corporations that scale quality of taxpayer service as “good” are 11.36 times less likely to be tax-compliant than those that scale it as “poor.” This suggests that good or very good taxpayer service reduces compliance. This is an unexpected result. However, international tax compliance literature demonstrates that taxpayer service is treated like other public services—for example, the service that patients expect from hospitals. Taxpayer services are effective only when the service provider-customer relationship is well accepted by both the taxpayer and the tax administration.79 Jenkins and Forlemu80 say that taxpayer service may fail to get desired results if taxpayers believe that tax non-compliance will be treated as a mere misdemeanour rather than a felony.

Fifth, when the usefulness of tax simplification is dummy coded as “agree” and “undecided,” by setting “disagree” as the reference group, there is a significant difference in tax compliance between large corporate taxpayers scaling the usefulness of tax simplification as “agree” and those scaling it as “disagree” ($\beta = 1.826$, $p = 0.051$, odds ratio = 6.208). There is also a significant difference in tax compliance between large corporate taxpayers scaling the usefulness of tax simplification as “undecided” and those scaling it as “disagree” ($\beta = 0.109$, $p = 0.038$, odds ratio = 1.115). The inverted odds ratio ($1/6.208 = 0.16$) means that large corporate taxpayers that “agree” about the usefulness of tax simplification are 0.16 times more likely to be tax-compliant than those that “disagree.” The odds ratio ($1/1.115 = 0.90$) means that large corporate taxpayers that are “undecided” about the usefulness of tax simplification are 0.90 times more likely to be tax-compliant than those that “disagree.” This result is evidence that tax simplification is likely to improve the tax compliance of large corporate taxpayers.

Sixth, when the level of mutual understanding is dummy coded into “very good” and “good,” by setting “poor” as the reference group, there are no significant differences in tax compliance between large corporate taxpayers scaling the level of mutual understanding as “very good” and those scaling it as “poor” ($\beta = 0.534$, $p = 0.602$). There is also no significant difference in tax compliance between large corporate taxpayers scaling the level of mutual understanding as “good” and those scaling it as “very poor” ($\beta = 1.159$, $p = 0.141$). This indicates that mutual understanding as a means to generate tax compliance is less likely to be effective.

79 Tuck, supra note 7.
80 Jenkins and Forlemu, supra note 38.
In sum, the results suggest that taxpayer service, tax simplification, and tax audits are statistically significant predictors of tax compliance. Taxpayer service and tax audit are found to have a negative influence on the likelihood of increased tax compliance, while tax simplification has a positive effect.

**SUMMARY AND CONCLUSION: DO COERCIVE OR PERSUASIVE INSTRUMENTS DETERMINE COMPLIANCE BEHAVIOUR?**

The preceding section presents our findings in relation to tax compliance overall without a discussion of the influence of the instruments on each component of compliance—that is, filing, reporting, and payment. For an overview of the effect of each instrument on each compliance component and on tax compliance overall, tables 1 and 2 below summarize the statistically significant results.

The first panel of table 1 lists instruments significant to filing compliance and the second panel lists instruments significant to reporting compliance. Similarly, the first panel of table 2 shows the instruments significant to payment compliance and the second panel shows instruments significant to tax compliance overall. As table 1 indicates, filing compliance is influenced by two instruments, tax penalty and tax audit, both of which are coercive tax instruments. For reporting compliance, only tax audit comes out as a significant predictor, and this also is a coercive instrument. In the case of payment compliance, three coercive instruments—penalty, tax audit, and imprisonment—are found to have a statistically significant influence. It is to be noted that only payment behaviour can be influenced by imprisonment. For the achievement of overall tax compliance, table 2 indicates that three instruments are important—tax audit, taxpayer service, and tax simplification. One of these, tax audit, is a coercive instrument; and the other two, taxpayer service and tax simplification, are persuasive instruments. It is to be noted that mutual understanding as an instrument of persuasion has no impact on any of the tax compliance components.

Our findings are consistent with the international tax compliance literature in several aspects. Findings of other studies show that criminal prosecution as a compliance instrument is encouraged only in case of serious non-compliance. Imprisonment as a compliance action brings no output if applied on an irregular basis. Enforcement actions against large corporate taxpayers in the form of audit may fail when tax audit

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81 We carried out a chi-square automatic interaction detector (CHAID) analysis and multilevel logistic regression, which are not reported here. The purpose was to test for the robustness of the analysis. Strong similarities of results across the different methods were found. The logistic regression results for filing, reporting, and payment compliance are presented in appendix table A6.


83 Levi, supra note 77; Henry, supra note 78; and Shover and Hochstetler, supra note 78.
TABLE 1  Comparative Effect of Compliance Instruments on Filing and Reporting Compliance

<table>
<thead>
<tr>
<th>Compliance instruments</th>
<th>Panel 1 Effect on filing compliance</th>
<th>Panel 2 Effect on reporting compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TaxPen</td>
<td>Sig+</td>
<td></td>
</tr>
<tr>
<td>TaxAud</td>
<td>Sig+</td>
<td>Sig−</td>
</tr>
<tr>
<td>Imprison</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TaxServ</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TaxSimp</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MutUnd</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: Sig = Statistically significant; +/− indicates whether the coefficient showed a positive or a negative relationship; a hyphen indicates statistically non-significant.

TABLE 2  Comparative Effect of Compliance Instruments on Payment and Overall Compliance

<table>
<thead>
<tr>
<th>Compliance instruments</th>
<th>Panel 1 Effect on payment compliance</th>
<th>Panel 2 Effect on overall compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>TaxPen</td>
<td>Sig+</td>
<td>-</td>
</tr>
<tr>
<td>TaxAud</td>
<td>Sig−</td>
<td>Sig−</td>
</tr>
<tr>
<td>Imprison</td>
<td>Sig−</td>
<td>-</td>
</tr>
<tr>
<td>TaxServ</td>
<td>-</td>
<td>Sig−</td>
</tr>
<tr>
<td>TaxSimp</td>
<td>-</td>
<td>Sig+</td>
</tr>
<tr>
<td>MutUnd</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: Sig = Statistically significant; +/− indicates whether the coefficient showed a positive or a negative relationship; a hyphen indicates statistically non-significant.

involves high expenses for the taxpayers and the audit practice is fraught with corruption.84 Similarly, our findings agree with the international literature on the use of tax simplification as a means of intrinsic motivation to tax compliance.85 As regards the failure of taxpayer service, our finding is supported by Bodin,86 who argues that unless the historically entrenched mindset of tax officials and their organizational


86 Bodin, supra note 50.
culture is changed, taxpayer service, however good, is unlikely to improve tax compliance. The literature also supports the argument that violation of legal obligations can be challenged in courts of law, but disregard for taxpayer service is not a matter of law that can be pursued in the courts.87 We did not, however, find any support or explanation in the literature regarding our finding that tax penalties and mutual understanding do not have any impact on the overall tax compliance behaviour of large corporations.

In sum, our findings are twofold. First, instruments of coercion or persuasion when used separately, are less likely to improve tax compliance of large corporate taxpayers than when used in combination. Second, although both sets of instruments are important, the coercive instruments are more powerful than the persuasive. Overall, our study establishes the combination of coercive and persuasive instruments as important to promote large corporate taxpayer compliance. This finding supports Imbeau’s88 inference that coercion or persuasion as a stand-alone measure cannot fully incite tax compliance. Persuasion alone secures less tax compliance than coercion alone, but when persuasive instruments are mixed with coercive instruments, they yield better results than coercion alone.

The findings of the study are likely to be relevant to large corporate taxpayer compliance in other jurisdictions. This is because many areas of tax law and its legal framework are common to both developing and developed countries.89 For example, there are tax-law similarities among India, Bangladesh, and Pakistan; and the tax systems of Commonwealth countries are largely modelled on or look for guidance to other Commonwealth jurisdictions, especially the United Kingdom, Canada, and Australia. In addition, large corporate taxpayer compliance in different countries gives rise to similar problems regarding revenues and risks.90 For example, approximately 60 percent of large corporations in Australia were found to be underpaying taxes in the 1990s, and their compliance seemed to be below the OECD average.91 In the United Kingdom, it is reported that of the 700 largest business taxpayers covered by the Large Business Service of Her Majesty’s Revenue & Customs, 181 did

91 Braithwaite and Braithwaite, supra note 11.
not pay any taxes in the tax year 2005-6.\textsuperscript{92} A review of tax compliance risks of large corporations in Canada and New Zealand reveals a similar picture.\textsuperscript{93}

As we noted earlier, our study was not without limitations. First, the decision to draw the sample solely from the LTU in Bangladesh may affect the generalizability of the findings. Second, participants’ stated preferences measured on the basis of a Likert-type scale are subjective and may bias variable measurement. Third, the results that emerged from the analysis of the data are correlational, since no robust exploration of the causal constructs that might exist between the instruments of coercion and persuasion was undertaken. We leave this issue for future research.

\section*{APPENDIX}

\begin{table}[h]
\centering
\caption{Descriptive Statistics on the Tax Compliance Levels of Large Corporations ($N = 154$)}
\begin{tabular}{lccccc}
\hline
\textbf{Tax compliance components} & \textbf{Compliance status} & \textbf{Frequencies} & \textbf{Percentages} & \textbf{Cumulative percentages} \\
\hline
Filing compliance (FilCom) & Compliant & 130 & 84.41 & \\
 & Non-compliant & 24 & 15.59 & 100 \\
Reporting compliance (RepCom) & Compliant & 83 & 53.89 & \\
 & Non-compliant & 71 & 46.11 & 100 \\
Payment compliance (PayCom) & Compliant & 116 & 75.32 & \\
 & Non-compliant & 38 & 24.68 & 100 \\
Overall compliance (OvlCom) & Compliant & 57 & 37.01 & \\
 & Non-compliant & 97 & 62.99 & 100 \\
\hline
\end{tabular}
\end{table}


\textsuperscript{93} Internal Revenue Service, supra note 20.
### TABLE A2  Cross-Tabulation on Measurement of Overall Tax Compliance

<table>
<thead>
<tr>
<th>Compliance types</th>
<th>Payment</th>
<th>Reporting</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-compliant</td>
<td>Non-compliant</td>
<td>Non-compliant</td>
</tr>
<tr>
<td>Filing by payment, reporting, and overall compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliant . . . . . .</td>
<td>96</td>
<td>65</td>
<td>57</td>
</tr>
<tr>
<td>Non-compliant . . . .</td>
<td>20</td>
<td>18</td>
<td>na</td>
</tr>
<tr>
<td>Payment by reporting and overall compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliant . . . . . .</td>
<td>72</td>
<td>44</td>
<td>57</td>
</tr>
<tr>
<td>Non-compliant . . . .</td>
<td>11</td>
<td>27</td>
<td>na</td>
</tr>
<tr>
<td>Reporting to overall compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliant . . . . . .</td>
<td></td>
<td></td>
<td>57</td>
</tr>
<tr>
<td>Non-compliant . . . .</td>
<td></td>
<td></td>
<td>na</td>
</tr>
</tbody>
</table>
TABLE A3  Measurement of Dependent (Outcome) and Independent (Predictor) Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Symbols</th>
<th>Descriptions</th>
<th>Variable type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filing compliance</td>
<td>FilCom</td>
<td>Actual filing date (AFD) compared with statutory filing date (SFD). AFD occurring before SFD is considered filing compliance and AFD occurring after SFD is filing non-compliance.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Reporting compliance</td>
<td>RepCom</td>
<td>Reported income (RI) compared with audited income (AI) adjusted with appeal effects. RI equal to AI is treated as reporting compliance, and RI less than AI is treated as non-compliance.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Payment compliance</td>
<td>PayCom</td>
<td>Actual tax payment (ATP) is compared with statutory tax payment (STP). ATP higher or equal to STP leads to payment compliance, and ATP less than STP is payment non-compliance.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Overall tax compliance</td>
<td>OvlCom</td>
<td>Compliant in all three components; meaning AFD occurring before SFD, RI equal to AI, and ATP higher than or equal to STP.</td>
<td>Nominal</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax penalty</td>
<td>TaxPen</td>
<td>Measuring the usefulness of penalties for non-compliance based on respondent’s stated preference on a five-point Likert scale of 1—Strongly Agree, 2—Agree, 3—Undecided, 4—Disagree, and 5—Strongly Disagree.</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Tax audit</td>
<td>TaxAud</td>
<td>Audit adjustments made by tax audit action in the LTU are common log transformed to smooth out the possibility of distribution having very low and very high audit demand.</td>
<td>Continuous</td>
</tr>
<tr>
<td>Imprisonment</td>
<td>Imprison</td>
<td>Measuring the effectiveness of imprisonment based on respondent’s stated preference on a five-point Likert scale of 1—Strongly Agree, 2—Agree, 3—Undecided, 4—Disagree, and 5—Strongly Disagree.</td>
<td>Ordinal</td>
</tr>
</tbody>
</table>

(Table A3 is concluded on the next page.)
<table>
<thead>
<tr>
<th>Variables</th>
<th>Symbols</th>
<th>Descriptions</th>
<th>Variable type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxpayer service</td>
<td>TaxServ</td>
<td>Measuring the quality of taxpayer service based on respondent’s stated preference on a five-point Likert scale of 1—Very Good, 2—Good, 3—Fair, 4—Poor, and 5—Very Poor.</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Tax simplification</td>
<td>TaxSimp</td>
<td>Measuring whether tax law is simple based on respondent’s stated preference on a five-point Likert scale of 1—Strongly Agree, 2—Agree, 3—Undecided, 4—Disagree, and 5—Strongly Disagree.</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Mutual understanding</td>
<td>MutUnd</td>
<td>Measuring how good is mutual understanding between the corporation and the LTU administration on a five-point Likert scale of 1—Very Good, 2—Good, 3—Fair, 4—Poor, and 5—Very Poor.</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Control variables</td>
<td>Symbol</td>
<td>Description</td>
<td>Variable type</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Corporate size</td>
<td>CorSiz</td>
<td>Measured on the basis of corporate total assets. To normalize the distribution, asset values are common log transformed.</td>
<td>Continuous</td>
</tr>
<tr>
<td>Corporate ownership</td>
<td>CorOwn</td>
<td>Defined on the basis of whether the shares of the corporation are traded in the stock market.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Corporate location</td>
<td>Corloc</td>
<td>Decided on the basis of foreign equity finance in the corporation; 25% or more foreign equity is treated as multinational and all other as local.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Corporate sector affiliation</td>
<td>CorSect</td>
<td>Decided on the basis of goods and services produced by the corporation. The categories are finance, manufacturing, and service.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Marginal tax rate</td>
<td>MarTaxRate</td>
<td>Actual corporate marginal tax rates imposed. Three rates are used: 27.5%, 37.5%, and 45%.</td>
<td>Ordinal</td>
</tr>
<tr>
<td>Employee salaries</td>
<td>EmpSal</td>
<td>Measured on the basis of total salary paid to the staff divided by staff number. To normalize the distribution, figures are common log transformed.</td>
<td>Continuous</td>
</tr>
<tr>
<td>Corporate age</td>
<td>CorAge</td>
<td>How long the corporation has been running the business, determined by the period of time from the date of incorporation to the current date. Three age groups are used: 7-10 years, 11-14 years, and 15 years or more.</td>
<td>Nominal</td>
</tr>
<tr>
<td>Type of tax adviser appointed</td>
<td>TaxAdv</td>
<td>How corporate tax compliance issues are resolved. Three major categories are in-house tax department; temporary contract tax professional; both in-house and temporary contract professionals.</td>
<td>Nominal</td>
</tr>
</tbody>
</table>
### TABLE A5 Logistic Regression Outputs on Overall Compliance

<table>
<thead>
<tr>
<th>Compliance instruments</th>
<th>Categories</th>
<th>$\beta$</th>
<th>Wald $\chi^2$</th>
<th>Stand. error</th>
<th>Sig. ($p$)</th>
<th>Exp. ($\beta$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TaxPen</strong></td>
<td>Agree</td>
<td>0.884</td>
<td>1.212</td>
<td>0.803</td>
<td>0.271</td>
<td>2.420</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>0.707</td>
<td>0.805</td>
<td>0.788</td>
<td>0.370</td>
<td>2.027</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>TaxAud</strong></td>
<td>Agree</td>
<td>-1.207</td>
<td>27.099</td>
<td>0.134</td>
<td>0.000**</td>
<td>0.498</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>-0.293</td>
<td>0.082</td>
<td>1.020</td>
<td>0.774</td>
<td>0.746</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>Imprison</strong></td>
<td>Agree</td>
<td>-1.207</td>
<td>27.099</td>
<td>0.134</td>
<td>0.000**</td>
<td>0.498</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>-0.293</td>
<td>0.082</td>
<td>1.020</td>
<td>0.774</td>
<td>0.746</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>TaxServ</strong></td>
<td>Very good</td>
<td>-3.064</td>
<td>9.154</td>
<td>1.013</td>
<td>0.002**</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>-2.434</td>
<td>6.834</td>
<td>0.963</td>
<td>0.012*</td>
<td>0.088</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>TaxSimp</strong></td>
<td>Agree</td>
<td>1.826</td>
<td>3.130</td>
<td>1.032</td>
<td>0.051*</td>
<td>6.208</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>0.109</td>
<td>0.006</td>
<td>1.412</td>
<td>0.038*</td>
<td>1.115</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>Mutual understanding</strong></td>
<td>Very good</td>
<td>0.534</td>
<td>2.720</td>
<td>1.022</td>
<td>0.602</td>
<td>1.705</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>1.159</td>
<td>2.164</td>
<td>0.788</td>
<td>0.141</td>
<td>3.185</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>0.000</td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td></td>
<td>3.293</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Overall model evaluation

- $\chi^2$ .......................... 84.613  
- $-2$ log likelihood (baseline) ........ 180.715 
- $-2$ log likelihood (intended) ........ 96.095 

Wald test .............. 10.189  0.001**

Cox and Snell $R^2$ .... 0.458

Nagelkerke $R^2$ ....... 0.628

Goodness of fit test—Hosmer and Lemeshow ........ 8.433  0.392

Note: Enter method was followed.

* Significant at the 0.05 level.

** Significant at the 0.01 level.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Filing compliance</th>
<th>Reporting compliance</th>
<th>Payment compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Categories</td>
<td>$\beta$</td>
<td>Stand. error</td>
</tr>
<tr>
<td></td>
<td>Agree</td>
<td>3.204</td>
<td>1.176</td>
</tr>
<tr>
<td></td>
<td>Undecided</td>
<td>3.080</td>
<td>1.156</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>0</td>
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<td></td>
<td>TaxPen</td>
<td>0.543</td>
<td>0.198</td>
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<tr>
<td></td>
<td>TaxAud</td>
<td>−0.098</td>
<td>1.168</td>
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<tr>
<td></td>
<td>Imprison</td>
<td>1.945</td>
<td>1.424</td>
</tr>
<tr>
<td></td>
<td>TaxServ</td>
<td>−1.683</td>
<td>1.399</td>
</tr>
<tr>
<td></td>
<td>MutUnd</td>
<td>−2.765</td>
<td>1.931</td>
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<td>MutUnd</td>
<td>−2.781</td>
<td>2.165</td>
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<td>MutUnd</td>
<td>−1.628</td>
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<td></td>
<td>MutUnd</td>
<td>−0.898</td>
<td>1.247</td>
</tr>
<tr>
<td></td>
<td>MutUnd</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Constant</td>
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<td>9.84</td>
<td>6.630</td>
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TABLE A6  Concluded

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<tr>
<th>Overall model evaluation</th>
<th>Categories</th>
<th>Filing compliance</th>
<th>Reporting compliance</th>
<th>Payment compliance</th>
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<tr>
<td></td>
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<td>$\beta$</td>
<td>Stand. error</td>
<td>Sig. ($p$)</td>
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<tr>
<td>$\chi^2$ .........................</td>
<td>47.785</td>
<td>0.001**</td>
<td>142.396</td>
<td>0.000*</td>
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<tr>
<td>$-2 \log$ likelihood (baseline)</td>
<td>116.548</td>
<td>190.845</td>
<td>154.376</td>
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<tr>
<td>$-2 \log$ likelihood (intended)</td>
<td>66.426</td>
<td>48.448</td>
<td>124.350</td>
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<tr>
<td>Cox and Snell $R^2$ .................</td>
<td>0.493</td>
<td>0.644</td>
<td>32.029</td>
<td>0.000**</td>
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<td>Wald test ...................</td>
<td>53.87</td>
<td>0.463</td>
<td>0.496</td>
<td>0.194</td>
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<td>Nagelkerke $R^2$ ...............</td>
<td>0.520</td>
<td>0.859</td>
<td>0.288</td>
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<tr>
<td>Goodness of fit test—Hosmer and Lemeshow</td>
<td>9.722</td>
<td>3.17</td>
<td>0.923</td>
<td>7.552</td>
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Note: Enter method was followed.
* Significant at the 0.05 level.
** Significant at the 0.01 level.
The following models are estimated and run for each of the compliance components:

\[
\ln \left( \frac{\text{probFilCom}}{1 - \text{probFilCom}} \right) = \beta_0 + \beta_1 \text{TaxPen} + \beta_2 \text{TaxAud} + \beta_3 \text{Imprison} \\
+ \beta_4 \text{TaxServ} + \beta_5 \text{TaxSimp} + \beta_6 \text{MutUnd} \\
+ \beta_7 \text{CorSiz} + \beta_8 \text{CorOwn} + \beta_9 \text{Corloc} + \beta_{10} \text{CorpSect} \\
+ \beta_{11} \text{MarTaxRate} + \beta_{12} \text{EmpSal} + \beta_{13} \text{CorAge} \\
+ \beta_{14} \text{TaxAdv} + \epsilon,
\]

(1)

\[
\ln \left( \frac{\text{probRepCom}}{1 - \text{probRepCom}} \right) = \beta_0 + \beta_1 \text{TaxPen} + \beta_2 \text{TaxAud} + \beta_3 \text{Imprison} \\
+ \beta_4 \text{TaxServ} + \beta_5 \text{TaxSimp} + \beta_6 \text{MutUnd} \\
+ \beta_7 \text{CorSiz} + \beta_8 \text{CorOwn} + \beta_9 \text{Corloc} \\
+ \beta_{10} \text{CorpSect} + \beta_{11} \text{MarTaxRate} + \beta_{12} \text{EmpSal} \\
+ \beta_{13} \text{CorAge} + \beta_{14} \text{TaxAdv} + \epsilon,
\]

(2)

and

\[
\ln \left( \frac{\text{probPayCom}}{1 - \text{probPayCom}} \right) = \beta_0 + \beta_1 \text{TaxPen} + \beta_2 \text{TaxAud} + \beta_3 \text{Imprison} \\
+ \beta_4 \text{TaxServ} + \beta_5 \text{TaxSimp} + \beta_6 \text{MutUnd} \\
+ \beta_7 \text{CorSiz} + \beta_8 \text{CorOwn} + \beta_9 \text{Corloc} \\
+ \beta_{10} \text{CorpSect} + \beta_{11} \text{MarTaxRate} + \beta_{12} \text{EmpSal} \\
+ \beta_{13} \text{CorAge} + \beta_{14} \text{TaxAdv} + \epsilon,
\]

(3)

where

\[
\ln \left( \frac{\text{probFilCom}}{1 - \text{probFilCom}} \right) \text{ on the left-hand side of the estimating equation 1 measures filing compliance as the dependent variable,}
\]

\[
\ln \left( \frac{\text{probRepCom}}{1 - \text{probRepCom}} \right) \text{ in the estimating equation 2 measures reporting compliance, and}
\]

\[
\ln \left( \frac{\text{probPayCom}}{1 - \text{probPayCom}} \right) \text{ in the estimating equation 3 measures payment compliance.}
\]

In all the estimating equations, the right-hand side contains the independent and the control variables, which are the same across all estimating models described in the text and in appendix tables A3 and A4.

**Survey Questionnaire**

Responses to the following survey were collected from the sample of large corporate taxpayers.

1. Name of your organization:

2. Which of the following types of corporation is this? (Please tick one)
   a) Public limited       b) Private limited       c) Other (Please specify)
3. To which corporate sector do you belong? (Please tick one)
   a) Finance  b) Manufacturing  c) Service  d) Other (Please specify)

4. Do you have foreign shareholding of more than 25% of your assets?
   (Please tick one)
   Yes  No  Other (Please specify)

5. Do you have an in-house tax advisor, or do you appoint an outside advisor to
   settle your tax matters or both? (Please tick one)
   In-house tax advisor  Appointed tax advisor  Both

6. A significant goal of tax administrations is to provide quality service to taxpayers.
   The LTU has developed a taxpayer service wing to provide quality service. Please
   show which of the following best reflects your choice for the statement below by
ticking a box on the line.

   The quality of taxpayer service provided to large corporate taxpayers by the LTU is:

   Very Good  Good  Fair  Poor  Very Poor
   □  □  □  □  □

7. Tax simplification is one of the goals of the LTU, which improves large corporate
   taxpayers’ ability to understand their tax obligations and reduce undesirable legal
   disputes. Please show which of the following best reflects your choice for the state-
   ment below by ticking a box on the line.

   The tax simplification measures undertaken by your tax office have been useful:

   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree
   □  □  □  □  □

8. Mutual understanding between large corporations and the LTU helps in solving
   common concerns and establishing an enhanced relationship. Please show which
   of the following best reflects your choice for the statement below by ticking a box
   on the line.

   The level of mutual understanding between you and your tax office is:

   Very Good  Good  Fair  Poor  Very Poor
   □  □  □  □  □

9. The LTU imposes penalties (Tax Codes 124, 125, 127 and 128 of the FTO, 1984) to
   control various kinds of non-compliance by large corporate taxpayers. Please show
   which of the following best reflects your choice for the statement below by ticking
   a box on the line.

   Tax penalties imposed by the LTU on its large corporate taxpayers are useful:

   Strongly Agree  Agree  Undecided  Disagree  Strongly Disagree
   □  □  □  □  □
10. Imprisonment of corporate taxpayers for committing tax offences (Tax Codes 164, 165 and 166) is seen as an effective step by the LTU administration. Please show which of the following best reflects your choice for the statement below by ticking a box on the line.

Imprisoning large corporate taxpayers is an effective way to reduce tax related offences:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Undecided</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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