

The Personal Income Tax in India: Compliance Costs and Compliance Behaviour of Taxpayers

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Foreword

This is one of three related studies on income tax compliance costs carried out by the NIPFP for the Planning Commission. The other two studies are, one, on the compliance cost of the personal income tax and the other, on the cost of income tax compliance of corporations in India.

The present study focuses on the influence of compliance costs on compliance behaviour of individual tax payers in India. The study has attempted to develop theoretical models to explain behaviour of those who file their returns of income for taxation and as well as those who do not, and determine how they are influenced by costs of compliance. As in the case of the companion study on compliance costs, the data base is extremely weak particularly because the information crucially required for the study, which needed to be culled from income tax records were not available. Although the data base is deficient and the statistical results have been inconclusive, the policy conclusions drawn from the theoretical models, particularly the negative influence of high compliance costs on tax compliance, should be of some concern to designers of tax policy. It should be added that the theoretical models take into account some of the institutional features of India's income tax structure and administration. It is to be hoped that the study will receive the attention of policy makers and researchers here and abroad interested in unravelling what motivates tax payer behaviour in a society.

The study team consisted of the Principal Consultant for the project Arindam Das-Gupta (Visiting Professor, Indira Gandhi Institute of Development Research, Mumbai), Surendra Prakash Singh (Commissioner of Income Tax), Dheeraj Bhatnagar (Joint Commissioner of Income Tax) both Consultants for the project and Saumen Chattopadhyay (Senior Economist, NIPFP). Arindam Das-Gupta is the principal author. Research support was provided by Sachchidananda Mukhopadhyay. Chattopadhyay and Das-Gupta were chiefly responsible for the analysis and prepared this report. Thanks are due to Professor R. Radhakrishna, Director, Indira Gandhi Institute of Development Research, for generously permitting Das-Gupta, to travel for and work on the studies as needed.

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The Institute does not bear any responsibility for the views expressed in the study. That responsibility belongs primarily to the authors.

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The responsibility for any remaining errors is ours.

Summary

The objective of this study is to examine, with particular reference to the non-corporate income tax in India, the extent to which tax non-compliance is due to high compliance costs. The information base for this study being limited, the findings of the study are not conclusive. Nevertheless, the main finding is that there appears to be a relationship between some components of compliance costs, including bribes, and compliance which exerts a negative effect on tax revenue. Consequently, measures to reduce compliance costs, particularly components contributing to decreased revenue, are likely to have revenue benefits. However, third party compliance costs, borne by those charged with deducting tax at source (TDS), have revenue benefits that possibly exceed third party costs.

According to economic theory and previous studies, there are a large number of potential determinants of tax compliance, compliance costs being just one. For compliance costs, economic theory, including extensions made in this study, point to the differing effects of avoidance opportunities, which give rise to what are termed voluntary compliance costs, and mandatory compliance costs. While increased scope for avoidance lowers tax compliance, the impact of increased mandatory compliance costs cannot be predicted by the theoretical models examined, especially if mandatory compliance costs are tax deductible. Illegal compliance costs, or bribes, lead to lower tax compliance.

From the theory, conclusions about empirical methods that are appropriate for the study suggest that there are several problems adversely affecting the validity of inferences from statistical methods that are performed adopted here, given the limited data available.

The data base for empirical examination of the compliance versus compliance cost relationship consists of questionnaire based data from related mailed and canvassed surveys of 172 individuals, of whom 122 were salary earners. Given low response rates to some questions, actual sample sizes for different statistical inference exercises are typically much smaller. Though the initial study design envisaged important supplementary data from the income tax department on taxpayers, no such data could be obtained for this study.

The main empirical finding is a qualitative difference between time and (legal) money compliance costs, with the latter adversely affecting compliance and the overwhelming negative effect of bribe costs on tax compliance. Time compliance costs may, on the other hand, positively affect compliance. Besides bribes, the use of tax advisors may adversely affect compliance, while the opposite is true for third party costs via TDS. The estimated compliance effect of compliance costs, while not very reliable, suggests that compliance costs led to a decrease of between 51 per cent and 88 per cent of personal income tax collections in 2000-01.

For non-filers, on whom no information was available, a theoretical model is developed to study the impact of compliance costs on return filing behaviour. The model suggests that though compliance costs associated with tax filing have a negative effect on return filing, the impact of TDS in curbing both non-filing and revenue loss from non-filers is of greater importance. Using this model, non-filer costs associated with the personal income tax in India are "guesstimated" at 3.4 per cent of tax collection in 2000-01.

The major policy suggestion from this study, apart from reducing the compliance costs of return filers and reducing the scope for avoidance, is implementation of more extensive TDS and lowering the TDS threshold where possible, provided third party compliance costs do not thereby increase greatly. If possible, final withholding taxes could also be considered to reduce the need for filing by those whose taxes are withheld. Other than this, standard prescriptions to reduce non-filing, through increased automation of citizens records and improved use of third party information continue to be valid.

The negative study results pertaining to tax advisors, while tentative, suggests that closer regulation of tax practitioners to bring greater accountability, as in several advanced countries, may be worth considering.

1. Study Objectives

Defining compliance and compliance costs

Tax compliance by citizens implies compliance with all statutory obligations specified in the tax law, including registration as a taxpayer, maintaining required records, filing timely, accurate tax returns and paying taxes correctly and on time. Though non-compliance can be due to mistakes by taxpayers, with consequent over- or under-payment of taxes, it is primarily associated with deliberate tax evasion.¹

Overall costs of a tax system include “welfare costs, opportunity costs, psychic costs, social costs and so on.”² To assess the total impact of taxes on society, “the total sacrifice imposed upon the populace – total collection costs, administrative and compliance costs, should be looked into”³. Slemrod and Yitzhaki (1996) identify compliance costs as one of the five component costs of taxation. The others are administrative costs, deadweight efficiency loss from taxation, the excess burden of tax evasion and avoidance costs. This set of costs can, in principle, be identified by considering situations with and without taxation. Taxes themselves are merely a transfer of purchasing power from the non-government sector to the government sector. Costs that arise in effecting this transfer are what the Slemrod-Yitzhaki analysis points to. Compliance costs are not only incurred by taxpayers, but all agents involved in facilitating this transfer of funds from the private sector to the government exchequer. For example, employers responsible for tax deduction at source and financial institutions entrusted with collecting taxes also incur compliance costs. In defining compliance costs of taxation, we include, in this study, *all* costs due to the tax system borne by taxpayers and third parties other than cost arising from economic distortions and equity violations. In other words both genuine compliance costs and avoidance costs are included here as they are hard to distinguish in practice. Furthermore, costs of non-compliance, including costs associated with tax evasion, are also included in the definition adopted.

In modelling compliance costs, a distinction needs to be made between mandatory or involuntary compliance costs and costs incurred voluntarily in order to reduce tax liability or its uncertainty.⁴

Objectives

Though the extent of non-compliance by taxpayers with personal income tax law in India is likely to have decreased in recent years due to rate moderation and the increasing relative attractiveness, post-liberalisation, of the “formal economy”, the extent of non-compliance is suspected to be higher than in most other countries in the world.⁵ Part of the reason for this is poor administration. At the same time, in a companion report,⁶ it has been found that taxpayer compliance costs with the personal income tax are inordinately high, especially for non-salaried taxpayers.

The objective of this study is to examine the extent to which non-compliance with the personal income tax is due to high compliance costs. The information base for this study being limited, the conclusions of the study are not definitive. Nevertheless, the main finding is that the relationship between some components of compliance costs is likely to be significant, with negative effect on revenues. Consequently, measures to reduce compliance costs are likely to have significant revenue benefits.

Outline

The next section examines the link between compliance costs and compliance predicted by economic theory and also examines the limited information available on this relation from other countries. In section 3, a brief description of survey based information available to examine the compliance-

¹ This description largely paraphrases the definition used by the US Internal Revenue Service. See Hasseldine (2000).

² See Evans and Walpole (1997).

³ See Mikesell (1986).

⁴ Further discussion is in Chattopadhyay and Das-Gupta (2002).

⁵ See Das-Gupta and Mookherjee (1998) for an evaluation as well as references to earlier evaluations.

⁶ Chattopadhyay and Das-Gupta (2002).

compliance cost relationship, as well as data limitations, are discussed. Section 4 describes survey responses related to compliance and compliance costs. Section 5 presents the results of statistical examination of the compliance-compliance cost relation and also the revenue impact. In section 6 a theoretical analysis of compliance costs of non-filers, on whom no empirical information is available, is attempted. The impact of compliance requirements on non-filing and a crude, indirect, estimate of the size of non-filer compliance costs with the personal income tax in India are also presented. Conclusions are summarized and some policy suggestions are made in Section 7.

2. Compliance Behaviour and the Compliance Cost of Individuals: Predictions of Economic Theory

Overview

In this section an examination is carried out of what economic theory has to say about taxpayer compliance costs and its link with tax compliance behaviour. The purpose of this is to lay a basis for subsequent econometric examination of the relationship. Some policy suggestions also emerge from this examination.

The plan of the section is as follows. First a review of determinants of tax compliance is provided, drawing on earlier work. Second, basic economic models of tax compliance and the impact of tax compliance costs are presented. This is followed by an exposition of models which examine the link between the two. An extension not directly relevant for specification of empirical models for this study, to simultaneous sales (or Central excise) and income taxes is then discussed. This is in order to examine if compliance costs of each tax have an impact on compliance with the other tax. The implications for empirical work are then discussed.

Determinants of tax compliance: A brief review

There is an extensive literature on the determinants of tax compliance by individuals.⁷ The major impetus for tax compliance research in economic theory is a seminal paper by Allingham and Sandmo (1972), with some important earlier exceptions. Before presenting the Allingham and Sandmo (AS) model, which is the basis of compliance models developed in this paper, determinants of tax compliance are briefly reviewed.

As in all individual choice situations, there are two essential elements which determine the final outcome of tax compliance choices of individuals: What choices are feasible and what choices are considered desirable by individuals.⁸ The feasibility of different equally desirable evasion choices or, more accurately, an individual's ability to get away with different actions, is determined by the environment in which an individual is placed. This is captured, in the AS model by the probability of punishment and the penalty structure which together constitute a summary description of the effectiveness of tax enforcement.⁹ Both these factors are, to an extent, affected by corruption in tax administration. Besides enforcement, several other important factors have been found to affect tax compliance.

(a) A key determinant of tax evasion, is the tax burden, particularly tax rates. Though theoretically indeterminate in its impact, all studies we are aware of have, to date, found a negative impact on tax compliance.¹⁰

(b) Financial development, and particularly the extent of use of banking channels for making payments of dues, leads to income generating transactions being easy to observe in an economy, reducing the scope for transactions "off the books". However, sophisticated financial systems coupled with openness can make it easy for funds to cross international borders to escape taxes.¹¹

⁷ Excellent reviews are in Mookherjee (1989), Cowell (1990) and Andreoni et. al. (1998). The review here draws extensively on Das-Gupta and Mookherjee (1997). Theories of tax evasion behaviour from other social science disciplines are reviewed, for example, in Roth, Scholz and Witte (1989).

⁸ This distinction, basic to economic theory, is empirically examined by Wallschutzky (1988) who finds individual attitudes rather than opportunities to be more important for Australian taxpayers.

⁹ Most empirical studies confirm the positive effect of penalties on compliance. A particularly interesting study is Wallschutzky (1988).

¹⁰ The first important study with this finding was Clotfelter (1983). See the review in de Juan, Lasheras and Mayo (1993) for other studies. The Indian income tax is examined in Das-Gupta, Lahiri and Mookherjee (1995).

¹¹ See Hinrichs (1966) and Slemrod (1990).

(c) As the attractiveness of the formal sector vis-a-vis the cash or informal economy grows, voluntary compliance should also increase due to the lower relative attractiveness of the cash economy.¹² A successful program of structural adjustment, therefore, is likely to result in increased compliance.

(d) The ease with which evasion can be detected is linked with the number of separate transactions that have to be detected to verify a taxpayer's taxable income. If development is associated with scale economies in the size of transactions, this will tend to reduce non-compliance.¹³

(e) Similarly, high industrial concentration implies fewer large taxpayers in the economy allowing for better monitoring.¹⁴

(f) The timing of tax liabilities relative to income earning is the basis of the negative Tanzi-Olivera effect of inflation on tax revenue.¹⁵

(g) Timing issues, inexact provisions in the tax code, exemptions and deductions are the main determinants of tax avoidance which, in turn, affects tax compliance. The existence of a well developed accounting profession and of tax preparers will also help tax avoidance.¹⁶

(h) Research, primarily in the United States, suggests that what may be termed "cultural" factors may significantly influence taxpayer attitudes.¹⁷ Included in this are such things as fiscal knowledge, income and social class, risk aversion, race, age, sex, occupation, peer attitudes to evasion and bribe payment, deference to authority, and acquaintance with tax offenders.

(i) Tax complexity also influences non-compliance by, as mentioned, causing misinterpretation of rules, omissions and unintentional errors besides deliberate under-reporting.¹⁸

(j) The extent to which a taxpayer perceives that the government uses taxes efficiently to provide a desirable mix of public goods has also been found to affect taxpayer compliance.¹⁹

(k) Most important for this study, the effect of higher compliance costs in promoting non-compliance and improved taxpayer services in promoting compliance have also been confirmed.²⁰

Most of the factors outlined above have implications for the design of appropriate compliance policy. For example, the evidence suggests that a polite and helpful tax administration and simplification of tax forms could lower compliance costs and improve compliance at the margin. To take another example, a high proportion of wasteful government expenditure, which lowers the marginal benefit from additional taxation is likely to promote non-compliance. However, the factors discussed are, in the main, long run in nature, and several cannot be used to explain short run variations in tax compliance. To study cross-sectional variations in compliance, variations in the tax structure (rates, deductions and exemptions),

¹² For the Indian context, Acharya et. al. (1985) is still the definitive study. See also Das-Gupta and Mookherjee (1998).

¹³ See Das-Gupta (1994) and also Drazen (1978).

¹⁴ See, for example, Vazquez-Caro, Reid and Bird (1992).

¹⁵ See Tanzi (1980), Crane and Nourzad (1986) and, for the personal income tax in India, Das-Gupta, Lahiri and Mookherjee (1995).

¹⁶ See Alm (1988), Alm, Bahl and Murray (1990), Erard (1993) and Hasseldine (2000).

¹⁷ See the papers in Slemrod (1992) especially those by Beron, Tauchen, and Witte, Hessing et al, Sheffrin and Triest, and Steenbergen, McGraw, and Scholz. See also Witte and Woodbury (1983) and de Juan, Lasheras and Mayo (1993), Erard and Feinstein (1994) and Hasseldine (2000). An earlier study is by Dean, Keenan and Kenny (1980).

¹⁸ See Bolton (1987) and Hasseldine (2000). The latter cites an example from the UK where an attempt at simplification via a simplified tax return for small taxpayers backfired as small traders under-reported their income to reduce their compliance costs.

¹⁹ See Cowell, and Gordon (1988), Wallschutzky (1988), Alm (1992), Bordignon (1994), and Pommerehne, Hart and Frey (1994).

²⁰ See Alm (1988), Hite (1989), Mayshar (1991), Carroll (1992), Smith (1992) and Slemrod (1994).

enforcement effectiveness and corruption, compliance costs and access to income concealment opportunities need to be examined.

The basic economic model of tax evasion is now described, followed by an exposition of a model of the impact of tax compliance costs on taxpayer behaviour.

The Allingham-Sandmo model

In the classic Allingham and Sandmo (1972) paper, a perfectly amoral but risk averse taxpayer, with true income Y , chooses the fraction of income to declare to tax authorities to maximize her expected utility of income. The policy environment is given by the legally mandated income tax function, $T(Y)$, the penalty rate on detected but underpaid taxes, π , and the probability of tax audit and detection, p .²¹ For simplicity, we assume a proportional tax function with tax rate t here.²² The fraction of income reported voluntarily to tax authorities (or the level of compliance) is denoted by x . The taxpayer's decision problem can be written as:

$$\text{Max}_x E(U) = (1-p)U[Y_N] + pU[Y_C] \quad (1)$$

where $Y_N = Y - txY$ and $Y_C = Y - txY - (1+\pi)(1-x)tY$ represent, respectively, net (after tax and penalty) income if evasion remains undetected (**N**ot caught) and is detected (**C**aught) by tax authorities. $U[\cdot]$ is the Von-Neumann Morgenstern utility function of the taxpayer, assumed to be strictly concave, implying risk aversion.²³ Utility is assumed to depend only on after tax income. A further assumption made in extending the model later in the section is that $A(\cdot) = -U''(\cdot)/U'$, the Arrow-Pratt coefficient of absolute risk aversion, is constant (abbreviated CARA) or decreasing (DARA) with income. This implies that the amount (*not* proportion) of income an individual is willing to risk in a gamble, at favourable odds, is constant or increasing with income. In particular, non-increasing absolute risk aversion implies that $A_N \leq A_C$, where $A_N \equiv A(Y_N)$ and $A_C \equiv A(Y_C)$.

This model predicts that, provided the expected additional payment on detection $p(1+\pi)tY$ is below the tax due when income is reported honestly (tY), the taxpayer will not comply fully, choosing to report less than 100 percent of her income. This condition is clearly reasonable in the Indian context. However, there will be greater compliance if there is stricter enforcement either by raising p or π .

In studies attempting to empirically verify the AS model, it has been pointed out that since expected additional payments if evasion is detected observed in practice are always less than taxes due, taxpayers would always evade taxes if they behaved in accordance with the AS model.²⁴ Tax evasion, however, is not resorted to by all taxpayers, in evidence from countries like the USA. This has prompted an enormous number of extensions of the AS model over the past 30 years, leading to the identification of many of the compliance determinants reviewed above.

The impact of compliance costs in the absence of non-compliance

Slemrod and Yitzhaki (1998) describe a model of Slemrod (1994b) which examines (monetary) voluntary compliance costs or avoidance costs. In his model, avoidance reduces the tax base by S and costs C . The scope for avoidance activity, as discussed, depends on the existence of ambiguities and loopholes in the

²¹ The original model assumed the penalty to be on undeclared income. The modification of the penalty function considered here, which corresponds to Indian law, is as in Yitzhaki (1974).

²² Since Indian personal income tax rates are piece-wise linear, this will not distort results of marginal analysis qualitatively, while simplifying the presentation.

²³ While the expected utility paradigm of choice under uncertainty underlying the AS model is still used almost universally in economics, it suffers from descriptive limitations. See, for example, Hogarth and Reder (1986). Till a widely accepted alternative emerges, such as models based on prospect theory developed by the 2002 Nobel Memorial Prize winner, Daniel Kahnemann, there is little choice. However, a pioneering attempt to use prospect theory to analyse tax compliance is in Yaniv (1999).

²⁴ The major studies are reviewed in Mookherjee (1989) and Andreoni et. al. (1998).

tax law and on the extent of tax concessions. The model presented here is similar to that of Slemrod (1994b) but omits a labour supply response in order to focus on avoidance effects.

Net of tax income is given by $Y_A = Y - T_j - S$, where S is expenditure on avoidance (“sheltering”) activity and T_j is the tax paid. The tax function is assumed to have an exemption limit, V_1/t_1 and several marginal tax brackets. $T_j = t_j Y - V_j$, where V_j defines the income at which the j th segment of the tax function would have cut the income axis in a graph, in the absence of avoidance.²⁵ With avoidance $T_j = [t_j(1-\alpha h(S))Y - kS - V_j]$, where $1 \geq k \geq 0$, and k is the fraction of S that is deductible from the tax base. The term $(1-\alpha h(S))$ represents the impact of avoidance expenditure on taxable income. It is assumed that avoidance expenditure is subject to diminishing returns so that the avoidance function is concave and bounded above. That is (using primes and double primes to denote first and second derivatives), $h(0) = 0$, $h' > 0$, $h'' < 0$ and $\lim_{S \rightarrow \infty} h(s) = H$. α is a “shift” parameter introduced to permit the impact of greater avoidance opportunities to be studied. Substituting for T_j into the expression for Y_A gives:

$$Y_A = Y[1-t_j(1-\alpha h(S))] - (1-t_j k)S + V_j. \quad (2)$$

Given the properties of $h(\cdot)$, Y_A is maximized where the first order condition for a maximum holds provided $Y > Y^* = \max[V_1/t_1, (1-t_1 k)S^*/t_1 \alpha h(S^*)]$. S^* is the value at which income is at an interior maximum, and t_1 is the lowest marginal tax rate of the tax schedule. The first order condition, which is given by

$$t_i[Y\alpha h' + k] = 1 \quad (3)$$

states that tax savings from the marginal rupee spent on sheltering must equal the rupee spent. Here, $t_i \leq t_j$ is the post-sheltering marginal tax rate. Y^* is the critical value of Y below which avoidance expenditure will not be undertaken. Whether or not there is actually no avoidance at low income levels depends on the whether Y^* exceeds or is below the threshold (or exemption limit), V_1/t_1 . If there exists an income level above the threshold at which avoidance is optimally undertaken, it will be optimal at all $Y > Y^*$. Solving the first order condition for S gives the function $S = S(\beta)$, where $\beta = (1-t_j k)/t_i \alpha Y$ and where $dS/d\beta < 0$. This implies that $\partial S/\partial t > 0$, $\partial S/\partial Y > 0$ and $\partial S/\partial k > 0$, and, importantly for the current study, $\partial S/\partial \alpha > 0$, if the marginal tax bracket is unchanged. The pattern of avoidance will, more generally, not be a smooth function of Y , since jumps will occur when $(1-\alpha h(S^*))Y - kS$ crosses the threshold of the next marginal tax bracket.

This analysis throws up no surprises. The major predictions are that (i) low income individuals may not find avoidance optimal, while (ii) avoidance increases with income and with increasing avoidance opportunities. The major policy suggestion is the obvious one of closing loopholes and reducing tax concessions.²⁶

Mandatory compliance costs and tax compliance

A simple extension of the AS model to allow for mandatory compliance costs, is to assume that

$$Y_N = Y - t_x Y - C(xY) - A \quad \text{and} \quad (4)$$

²⁵ This is the same as the exemption limit for the lowest marginal tax rate in the tax schedule but will exceed it for higher pieces of piecewise linear tax schedules, such as that prevailing for the personal income tax in India.

²⁶ Mayshar (1991) incorporates both avoidance time and involuntary time compliance costs in his paper on taxpayer behaviour, allowing for flexibility of labour supply and hence income. The model considers a taxpayer who derives utility from net income and disutility from labour. Income is derived from labour only and is given by $w[L - s - m(E)] - T(w(L-s-m(E)), S, E)$, where w is the wage rate, L is total labour hours, s is hours spent on avoidance activity and $m(E)$ is compliance time. E is a vector of revenue instruments. The function $T(\cdot)$ represents taxes paid which depends on gross income, but also on avoidance and compliance. The taxpayer chooses L and S to maximize $U(Y, L)$. However, empirical predictions based on this model – extended to incorporate non-compliance – are even less clear cut than predictions obtained by ignoring the labour-leisure choice in analysis below.

$$Y_C = Y - txY - C(xY) - A - (1+\pi)(1-x)tY. \quad (5)$$

The specification assumes a compliance cost function given by $C(xY)+A$, where $A \geq 0$ and $C(xY) \geq 0$, $C(0) = 0$, is assumed to be concave in line with the empirical finding in Chattopadhyay and Das-Gupta (2002). The major conclusions emerging from an analysis of this model are: (a) The minimum penalty necessary to deter non-compliance is greater than in the absence of compliance costs since there are now additional benefits from non-compliance. Consequently, the set of taxpayers who declare zero income or do not file tax returns at all ($A = 0$) will be greater than in the absence of compliance costs. (b) For reported income between 0 and 100 percent of true income (i.e. interior x), compliance decreases with both the level of compliance costs and marginal compliance costs. To guide empirical work it is, however, useful to disaggregate compliance costs into mandatory and voluntary costs.

Mandatory compliance costs, voluntary compliance costs and tax compliance

The model above is now modified to incorporate tax evasion and compulsory compliance costs, while retaining the same notation. *This is the major extension which largely guides empirical specifications later in the study.* For simplicity, a proportional tax function, tY is assumed. The substantive difference of the model developed here from that of Alm (1988) is in allowing for compulsory compliance requirements besides the voluntary costs he examines. It is assumed that compulsory compliance costs have revenue benefits by increasing the probability of detection and punishment of non-compliance. Other than this, the standard AS model is used.

Accordingly, non-compliance is detected and punished with probability $p(M)$, where M is the compliance cost from compulsory compliance requirements imposed on the taxpayer, assumed to be deductible from gross income. The extension here assumes constant mandatory compliance costs for simplicity. The implications of relaxing this assumption are discussed later. Incomes after taxes and penalties are now given by:

$$Y_N = Y - S - M - T_N \quad \text{and} \quad (6)$$

$$Y_C = Y - S - M - T_N - F \quad (7)$$

depending on whether non-compliance is detected or not. T_N denotes taxes paid voluntarily and F denotes additional taxes and penalty if evasion is detected:

$$T_N = [(1-\alpha h(S))(Y - M) - kS]xt \equiv qxt \quad (8)$$

$$F = qt(1-x)(1+\pi). \quad (9)$$

Expected government revenue is $T = T_N + pF$ while expected after tax income of the taxpayer is $E(Y) = Y - S - M - T_N - pF = Y - S - M - T$. As in the AS model, the consumer maximises expected utility $E(U) = (1-p)U[Y_N] + pU[Y_C]$. However, besides x , there is now an additional choice variable, S . As in the AS model, it is assumed that the probability of detection and punishment of evasion (p) and the penalty rate (π) are not high enough to deter evasion or that $p(1+\pi) < 1$. In the analysis here, attention to interior solutions at which $1 > x > 0$ and $S > 0$. The latter assumption may not be satisfied at low levels of Y , as discussed above, so that, at low income levels, the possibility of pure non-compliance (no avoidance) arises.

Under the assumptions made above, and using the notation $U_C \equiv \partial U / \partial Y_C$, $h_s \equiv dh/dS$, the first order conditions for the choice of x and S , which are sufficient here to guarantee a maximum, are:

$$p\pi U_C = (1-p)U_N \quad (10)$$

$$t[\alpha h_s(Y-M) + k] = 1. \quad (11)$$

The condition in (10) is identical to that in the simple AS model. If $M = 0$, the condition in (11) is identical to that in (3), the optimality condition for sheltering in the absence of tax non-compliance! The implication is that *the level of avoidance activity is independent of tax evasion by an individual*: While the evasion decision depends on the level of avoidance chosen, feedback in the reverse direction is

absent.²⁷ The taxpayer's decision process may therefore be viewed as a two stage process: First deciding on avoidance and then deciding on evasion, given the amount of avoidance chosen. This property of the joint avoidance evasion model is of great help in empirical work, as measured avoidance can be treated as a predetermined variable in empirically modeling tax evasion.²⁸

Conditions (10) and (11) give rise to an optimal avoidance function: $S = S(k, Y, t, \alpha, M)$, with avoidance increasing in k , Y , t , and α and decreasing in M . For this study, the important result is that *other things equal, voluntary compliance costs and mandatory compliance costs are substitutes if mandatory compliance costs are tax deductible.*²⁹ The behaviour of reported income is more problematic. The optimal reported income fraction is:

$$x = x[Y, t, \pi, \alpha, M, p, S(Y, t, k, \alpha, M)] \quad (12)$$

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where the signs below parameters indicate signs of the partial effects on x .³⁰ Exogenous increases in enforcement variables (π, p) have the same qualitative effects as in the AS model. However, other determinants of compliance have (a) a *direct effect* and (b) an *indirect effect through their effect on avoidance costs*. For Y , the sign of the direct effect is indeterminate, but is negative under CARA. The indirect effect through S can be ignored at low income levels. Consequently, *non-compliance is likely to be increasing with income at low incomes but will, in proportionate though not absolute terms, be moderated and may even decrease at higher income levels (given concave compliance costs)*. The effect of an increase in the marginal tax rate, t , is indeterminate. For M , ignoring the induced effect through the increase in the probability of detection, the impact is exactly opposite to that of income.³¹ The impact of the increased probability of detection is to lower non-compliance. Consequently, *the impact of mandatory compliance costs on compliance is likely to be positive at low income levels, but may reduce compliance at high income levels*.

An extension was made to this model by allowing taxpayers to choose the extent of compliance with mandatory requirements. It was assumed that (a) a penalty proportional to the extent of non-compliance with mandatory requirements was applied if the taxpayer was audited, but that (b) the increase in the probability of detection from greater compliance with mandatory requirements exhibited diminishing returns. Assumption (a) is in line with Indian law. However, diminishing returns to the government implies increasing returns to non-compliance with mandatory requirements for the taxpayer. Consequently, either full compliance with mandatory requirements or full-non-compliance results. The latter case is that of non-filers, not directly relevant to the empirical analysis in the study. In the former case, the model reduces to that analysed here. If mandatory compliance costs are also made a concave function of declared income, compliance with mandatory requirements is still zero-one, but other model predictions are even more uncertain and context dependent.

²⁷ This result breaks down if the individual is reporting zero income - i.e. attempting to evade all taxes. This neutrality result is one of a series of neutrality propositions in tax evasion theory, the first one concerning the independence of the profit maximizing decision of a firm in the presence of sales tax evasion, due to Massimo Marelli (1984). For the current problem, this result is also in Alm (1988).

²⁸ Furthermore, this is strengthened in India by tax deductions having to be taken before the end of the financial year, while tax returns can be filed up to 3 months – and more in recent years – after the end of the financial year.

²⁹ Since $\frac{dS}{dM} = \frac{h_S}{h_{SS}(Y-M)}$, the extent of substitution between S and M is indeterminate, depending on the third derivative of $h(S)$. A linear empirical specification, implying perfect substitution is a reasonable first approximation. Secondly, for salaried taxpayers in India, S is independent of M since compliance expenses are not tax deductible separately but are included in the standard deduction.

³⁰ These signs determine the expected signs of coefficients in the empirical models studied below.

³¹ The exact expression is $\frac{dx}{dM} = \frac{(A_n - A_c)[xt(1 - \alpha h) - 1]}{qt(A_n + A_c\pi)} - (1 - \alpha h)(1 - x)\left(\frac{q_S}{q}\right) + \frac{p'(U_n + \pi U_c)}{p\pi U_c}$, where $q_S \equiv \partial q / \partial S$, is negative.

The existence of tax withholding (Tax deduction at source or TDS in Indian parlance) has not been taken into account above. TDS reduces the scope for non-compliance by salary earners and others from whom taxes are withheld. The analysis of Yaniv (1988) suggests that under-reporting of other income not subject to TDS (interest, dividends, capital gains, selected royalty and honorarium payments) increases in this situation. Intuitively, since a chunk of income is no longer “at risk”, greater risks can be taken with the rest of one’s income, while keeping overall risk and expected income unaltered in comparison with the situation without TDS.

Bribe costs and compliance

Mookherjee and Png (1995)³² develop a theory of bribe paying and tax evading taxpayers and tax officials who accept bribes. Bribes are of two kinds. They are either beneficial to both parties (at the expense of government revenue) or are a coercive extraction by officials. The latter is a form of harassment. Both types of bribe costs have been found in the survey of Indian income taxpayers described in Chattopadhyay and Das-Gupta (2002). In the coercive case, bribe costs have effects similar to mandatory compliance costs except that an increase in these costs need not increase the probability of detection. For the former case, Mookherjee and Png model the situation as a (simultaneous move) game between a non-compliant taxpayer and a bribe accepting tax official.

Taxpayers behave as in the AS model, except that they pay a bribe if non-compliance is detected rather than getting penalised. However, the maximum bribe they are willing to pay will not exceed extra taxes and penalties they would have had to pay if they did not pay a bribe. Tax officials, on the other hand, will not accept a bribe that is lower than the expected cost to them if their bribe taking is detected by a “vigilance” unit.³³ The equilibrium bribe is a fraction of the “surplus available” or the difference between the maximum bribe the taxpayer will pay and the minimum bribe acceptable to the tax official. Given this equilibrium bribe rule, the (risk neutral) taxpayer chooses the level of evasion and the (risk neutral) tax official, who prefers not to work other thing equal, simultaneously chooses the work effort he puts in to detect evasion. The probability of detection increases with additional effort. This determines an equilibrium level of non-compliance and an equilibrium bribe. *The equilibrium bribe and equilibrium non-compliance turn out to be positively related as would be expected, while tax revenue decreases if non-compliance increases.*

Extension to multiple taxes

While the data set used in empirical work below has no respondents who are subject to sales or excise tax levies, the existence of other taxes and their compliance requirements would need to be considered with more extensive data. Coexistence of sales (or excise) and income taxes is now examined to assess to what extent estimates of costs of compliance and their impact are affected by the existence of additional taxes. Possible problems arise from two sources: (a) in direct estimates of compliance costs it may be difficult to separate out costs associated with different taxes³⁴ and (b) compliance effects of compliance requirements for both taxes may be affected by changes in compliance requirements of either tax.

An assumption we make here is that there is no exchange of information between sales tax and income tax departments. This is realistic in the Indian context. However, we assume that sales declared to the sales tax department form the basis of declaration to the income tax department so that, in the taxpayer’s books, reported sales and reported income are consistent. Anecdotal evidence suggests that this is also realistic. We restrict attention to mandatory compliance requirements, assumed to be exogenously given and fully complied with. There are now four possible income levels:

$$\text{Income when no evasion is detected} = Y_N = R(Q) - H(Q) - M - T_N - T_{NS}$$

³² A somewhat simplified exposition is in Mookherjee (1997).

³³ Mookherjee and Png also consider rewards to tax officials for detected evasion. These are currently irrelevant for the Indian income tax.

³⁴ See, for example, Sandford (1995).

$$\text{Income when sales tax evasion is detected} = Y_S = R(Q) - H(Q) - M - T_N - T_{NS} - F_S$$

$$\text{Income when income tax evasion is detected} = Y_I = R(Q) - H(Q) - M - T_N - T_{NS} - F$$

$$\text{Income when both types of evasion are detected} = Y_C = R(Q) - H(Q) - M - T_N - T_{NS} - F_S - F$$

$R(Q)$ and $H(Q)$ are respectively the net revenue and cost of producing output, Q , with $H(Q)$ being assumed to include sales tax compliance costs (which, as in India, are not deductible). Income before tax and income tax compliance costs, Y , is $R(Q) - H(Q)$. The tax revenue terms are: $T_N = (Y - M - T_{NS})x$, $F = (Y - M - T_{NS})(1-x)t(1+\pi)$, $T_{NS} = R(Q)x_s t_s$ and $F_S = R(Q)(1 - x_s)t_s(1+\pi_s)$. M is interpreted as including all compliance costs, including for sales taxes. The two types of compliance requirements are distinguished in the model since only sales tax compliance costs enter $H(Q)$. The probability of detection of sales tax evasion is q and, as before, the probability of detecting income tax evasion is p .³⁵

Assuming interior evasion for both taxes, the three first order conditions of the taxpayer (for Q , x and x_s) are:

$$MR(1-t_s) = MC \quad \text{and}$$

$$E(U') = p[(1-q)U_I + qU_C](1+\pi) = q[(1-p)U_S + pU_C](1+\pi_s) = 0.$$

In the equations above $E(U')$ is the expected marginal utility of income. The independence of the output decision of enforcement parameters (given interior evasion) has been demonstrated in the context of sales taxes alone by Marelli (1984). *In addition, this analysis suggests that, provided production continues to be profitable, compliance costs do not distort output decisions.* The major impact on output will be through its effect on the viability of marginal firms. Further analysis of these equations shows that increased compliance costs for either tax can affect both sales tax and income tax compliance and that sign of the impact is indeterminate. Consequently, when both taxes are present, their impact on compliance behaviour cannot be predicted *a priori*.

Two additional points to note are, firstly, that, the base of actual income taxes on business income is not economic profit (after sales tax) but also the return to capital, as pointed out by Arnold Harberger (1962).³⁶ While this is important for empirical purposes, the independence of the output decision from enforcement policy remains unaffected with interior evasion. Secondly, the independence property breaks down for price taking firms in zero profit equilibrium, thus making an assessment of the impact of additional compliance costs more difficult.³⁷

Implications for empirical modelling

The major implication is the specification of compliance behaviour in equation (12) with there being no *a priori* sign expectation with respect to mandatory compliance requirements. In empirical modelling, voluntary and mandatory costs need to be separated out. However, as mandatory compliance costs may induce non-filing behaviour, this suggests that empirical specifications will suffer from a selection bias problem in the absence of data on non-filers. Unfortunately, since the nature of the specification bias depends on the distribution of risk aversion in the population, there is little hope of correcting for this bias by statistical means. So this problem is perforce ignored. An additional requirement is to empirically distinguish TDS and non-TDS cases.

For bribe costs, a negative relation with compliance and tax revenue is to be expected from the Mookherjee and Png analysis, though the potential endogeneity of bribes has to be taken into account in choosing the empirical estimation method.

³⁵ Given the lack of effective coordination between indirect and income tax administrations, p and q are assumed to be unrelated. This may not be true in other countries.

³⁶ Additional discussion of the incidence of the corporation tax is in Atkinson and Stiglitz (1979).

³⁷ An analysis of both evasion by and regulatory requirements put on competitive firms is in Palda (2001).

The impact of compliance costs on tax revenue, $T = T_N + pF$, will also be studied directly in empirical work. Since $T = T(Y, t, \pi, p, x, S, M, \alpha, k)$ and since x and S are themselves endogenous, no a priori sign predictions on the impact of most determinants emerges.³⁸

As will be clear, besides compliance cost, income and tax data, data on effective penalty rates, factors influencing detection probabilities and tax savings through avoidance are, ideally, needed.

³⁸ The direct effect of increasing M or α on revenue is negative due to increased deductions (M) or decreased taxable income (α). The indirect impact through changed avoidance is positive for increased M and negative for increased α . However, no clear cut prediction emerges for the impact through changed compliance behaviour.

3. Questionnaire Design, Pre-Survey, Sample Selection and Response Rate

This section summarises relevant information from Chattopadhyay and Das-Gupta (2002) on the nature of sample based compliance cost data.

Sample size and response rate

Study team members, with the help of hired canvassers, canvassed 3 different versions of the questionnaires followed by a second pre-test using revised questionnaires for salaried and self-employed individuals. Two final questionnaires were then designed, one for salaried and one for self-employed individuals. Hindi versions of these questionnaires were also made. Keeping in view the possibility of a low response rate, two shorter versions of the questionnaire (reduced from 4 to 2 pages) were also prepared. All questionnaires were anonymous, but the respondents were given the option of providing their names and contact information. Most questionnaires were mailed to respondents, while a small number were hand delivered. The list of taxpayers for mailing was obtained from a large government data base of income tax payers. The response rate to the survey was disappointing at around 2.5 percent so that, including pre-survey questionnaires, the sample size for this study is 172 individuals. The nature of non-response bias could not be ascertained as no re-survey of non-respondents could be conducted.

Areas covered in questionnaires

Areas covered in the questionnaire relevant for this study include:

Fiscal attitudes: covering information on how tax returns were completed; reasons for use of advisors, if one was used; time spent helping others; self assessed knowledge of the income tax; willingness to pay for tax simplification, clarity and stability; and assessment of benefits from government services and whether income taxes were felt to be high, about right or too low.

Reported compliance costs: including time spent and its valuation; compliance related expenditure and (for the self-employed) benefits from compliance activities, if any.

Taxes, income and administration procedures: covering tax payments, tax savings, and whether the taxpayer was facing scrutiny (i.e. a tax audit).

Tax evasion, bribe payments: Including perceptions of tax evasion by similar persons and the perceived probability of non-compliance being detected and penalised.

Background information: including education, sex, age, income level, occupation and sources of income (salary/non-salary).

Question by question response rates

Table 3.1 provides information on within questionnaire response rates to different types of questions. Since different versions of questionnaires contained different questions, the response rate out of questionnaires where the question was asked, and the number of responses convey complementary information. For example, reasons for bribe payment were asked only in long questionnaires and in a pre-survey questionnaire. Therefore, while the response rate was around 50 percent, this, in fact, provided only about 8 responses.

Area	Overall Response Rate (percent)	Average number of responses per question
Fiscal attitudes (Including "Cannot Say")	69.52	47.11
Compliance activity and costs	73.70	83.16
Willingness to pay or psychic cost questions (Including "cannot say")	80.89	51.29

Tax evasion and bribe payment (including "no comment")	90.37	75.00
Socio-demographic Information	72.86	76.12
Income and tax payment details	43.15	51.33
Overall average	65.00	60.69
Source: Chattopadhyay and Das-Gupta (2002)		

Interestingly, 23 percent of salary earners and 42 percent of non-salaried respondents in the final survey "admitted" to paying bribes, keeping in view that respondents were asked if similar persons paid bribes rather than if they themselves paid bribes.³⁹ If "no comment" and omitted responses are included, then the number of potential bribe payers goes up to 59 percent for salary earners and 79 percent for non-salaried respondents.

Eight salary earners reported bribes at between 5 percent and 20 percent of tax saved, with a median value of 10 percent⁴⁰ The three non-salary respondents reported that bribes were 50 percent, 20 percent and 10 percent of taxes saved. For non-salaried respondents, bribe costs of those paying bribes exceeded average legal compliance costs.

Interpreting survey results: Statistical issues

In statistical exercises, multicollinearity made it impossible to include all theoretically relevant variables in a single regression. Furthermore, coefficient estimates and significances were unstable, given the small sample. Consequently, for regression exercises a procedure evolved in the literature to handle estimation problems with small numbers of observations but many potential determinants was followed.⁴¹

Ordinary least squares (OLS) or, when endogenous right hand side variables were present, two stage least squares (2SLS) regressions were run in all cases. This is not completely appropriate given the selection bias due to non-filers, individuals electing to pay bribes and sample response bias. Given the unknown nature of this selection bias and the small sample size, correcting for it was not possible. However, following the chosen regression methodology, regressions were run with three basic economic determinants (gross income, the marginal tax rate and one of two alternate sets of compliance cost variables), plus all possible combinations of other determinants, taken one and two at a time, out of 14 other possible determinants or groups of determinants. That is, for each of the 5 dependent variables, 210 OLS and 2SLS regressions were run. Of these, several proved to be unviable due to collinearity. Of the remainder, regressions with fewer than 20 observations or with a regression F-statistic that was not significant at least at the 10 percent level were rejected. In particular, inclusion of instrumental variables for 2SLS regressions led to the number of observations dropping below 20 in every single case, given missing data values for some instrumental variables. Consequently only OLS regressions are reported here. Results may, therefore, be biased due to endogenous right hand side variables.

A third problem faced was heteroskedasticity. This problem was present, as is often the case in cross-section data sets, according to the White test at the 95 percent level or higher in most regressions. The natural choice of a weighting variable for weighted least squares is gross income. However, in experiments with a subset of regressions, this weighting procedure failed to remove heteroskedasticity. A further possibility is to use a two step Generalized Least Squares procedure by using the estimated variance covariance matrix from a first stage regression. Given the small number of observations and the

³⁹ However, in the first pre-survey, payment of bribes was directly asked and some respondents admitted to paying bribes.

⁴⁰ As discussed in a later chapter, for salary earners several qualitative responses indicated that bribe payments were linked to obtaining refunds, often through advisors. The going rate for such bribes was 10 percent of the refund due.

⁴¹ As in Sala-I-Martin (1997). The procedure described seeks to "take the 'con' out of econometrics" (see Leamer, 1983) by not carrying out specification searches but, instead, reporting the entire distribution of potential signs and significances.

unbiasedness (though inefficiency) of OLS coefficient estimates, this was not done. Nevertheless, the White correction was applied to standard errors as OLS standard errors are known to be biased.⁴²

Presentation of results

Basic regressions with income, the marginal tax rate and compliance cost variables are reported in full. In particular, compliance cost variables include "slope" dummies to permit impacts to differ between the salaried and the non-salaried.

When other variables are included, given the large number of regressions, the following summary statistics pertaining to regressions are reported for each dependent variable:

(a) The average number of observations per regression, the average significance of the regression F-statistic and the average R-squared and R-bar-squared statistics.

(b) For each independent variable, the following statistics:

The average coefficient value across regressions for (i) all regressions and (ii) regressions where the coefficient is positive and (iii) regressions where the coefficient is negative.

The percentage of regressions where the coefficient is positive.

The percentage of regressions where the absolute (White corrected) t-statistic exceeds 1.7⁴³ and the average absolute t-statistic for (i) all regressions, (ii) regressions where the coefficient is positive and (iii) regressions where the coefficient is negative.

⁴² Discussion of these econometric issues is available in most standard econometric texts such as Greene (2000).

⁴³ Given at least 20 degrees of freedom in all regressions reported, this represents a significance level of at least 90 percent for a 1-tail t-test and 95 percent for a 2-tail test.

4. Tax Evasion Estimates by Surveyed Respondents

The questionnaire used an impersonal question for self-reported evasion, asking what percent of income *similar* individuals under-reported. Consequently, figures must be treated with extreme caution. Self reported evasion of income tax is of the order of 30 percent for non-salaried individuals and, surprisingly, 13 percent for salaried individuals (Tables 4.1 and 4.2). Evasion is possible for salary earners whose taxes are deducted at source if their irregular income and non-salary income is substantial, as anecdotal evidence suggests is the case, particularly in the private sector.

		Estimated tax less reported tax ("Tax Evasion")(Rs)			Estimated gross income less income estimated from reported tax ("Underreporting")(Rs)					
		Non salary	Salary	All	Non salary	Salary	All			
Average		6869	4785	5316	21529	15134	16555			
Maximum		218008	177360	218008	495689	530000	530000			
Minimum		0.0	0.0	0.0	0.0	0.0	0.0			
Stan dev.		35018	18053	23445	88624	55261	63877			
Observations		39	114	153	32	112	144			
		Own estimates of income underreporting (percent)			"Tax evasion" as a percent of tax paid			Income "underreported" as a percent of estimated gross income		
		Non salary	Salary	All	Non salary	Salary	All	Non salary	Salary	All
Average		29.6	12.5	20.8	9.4	22.0	19.5	4.0	5.4	5.1
Maximum		87.5	62.5	87.5	120.1	212.8	212.8	33.7	70.0	70.0
Minimum		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stan dev.		24.7	12.8	21.1	28.2	45.2	42.5	9.6	11.5	11.1
Observations		19	20	39	24	93	117	32	112	144

	Non salary	Salary	All
0 percent	2	4	6
1-25 percent	8	15	23
26-50 percent	5	0	5
51-75 percent	3	1	4
76 -100 percent	1	0	1
Average (of midpoints)	29.6	12.5	20.8
No opinion	18	19	37
Total number of responses	37	39	76

Note: *Percent of income deliberately underreported by similar individuals in the opinion of respondents.

In analysing responses, unexplained differences were found in some cases between (a) reported income and income consistent with taxes paid and between (b) taxes consistent with reported income and taxes paid. While no explanation for this discrepancy could be found, it is conceivable that this reflects underreporting of income and tax evasion in some cases, though the discrepancy may also reflect the impact of unreported tax savings.⁴⁴ The former explanation would be plausible if respondents provided

⁴⁴ This discrepancy is, if at all, underestimated due to *upward* adjustment to taxes paid described in Chattopadhyay and Das-Gupta (2002).

actual figures on income and taxes paid without aiming for consistency with figures reported in their tax returns. These provide the alternative, "bootstrapped", estimates of compliance presented in Table 4.1. Surprisingly, due to tax savings by salaried respondents, evasion estimates for them, as a percentage of tax paid turn out to be twice as high as estimates for non-salary earners.

The next table, Table 4.3, presents subjective probability of detection estimates by surveyed respondents. These are extremely high compared to objective probabilities, offering some solace from a revenue perspective.⁴⁵

	In numbers			Percentage of responses		
	Salary	Non-salary	All	Salary	Non-salary	All
0-5 percent	6	0	6	33.33	0.00	24.00
6-10 percent	1	0	1	5.56	0.00	4.00
11-20 percent	2	2	4	11.11	28.57	16.00
21-30 percent	3	1	4	16.67	14.29	16.00
31-40 percent	0	0	0	0.00	0.00	0.00
41-50 percent	0	0	0	0.00	0.00	0.00
51-75 percent	0	0	0	0.00	0.00	0.00
>75 percent	0	0	0	0.00	0.00	0.00
No opinion	6	4	10	33.33	57.14	40.00
Average "subjective detection probability"	---	---	---	23.15	23.81	23.28
Number of observations	18	7	25			

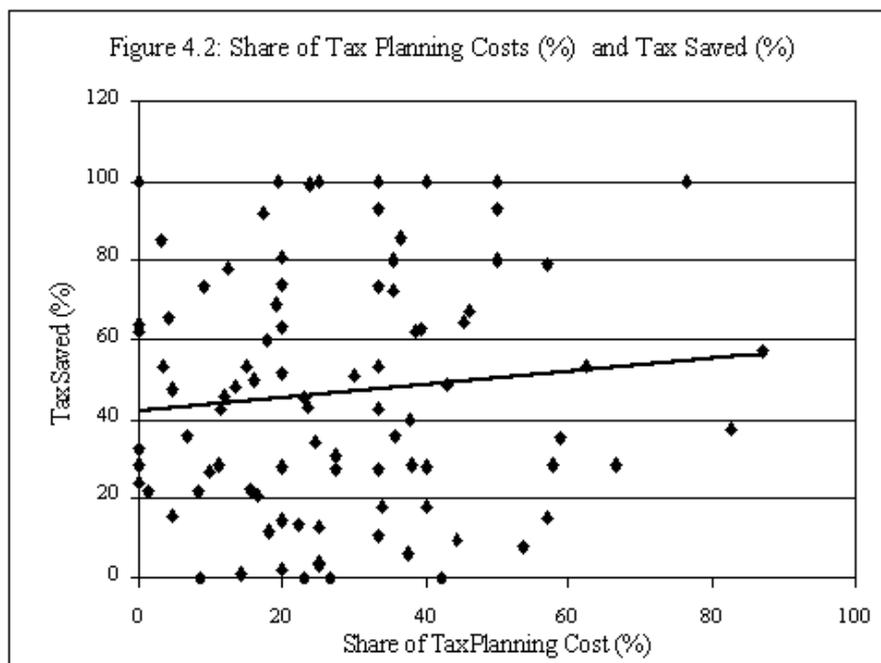
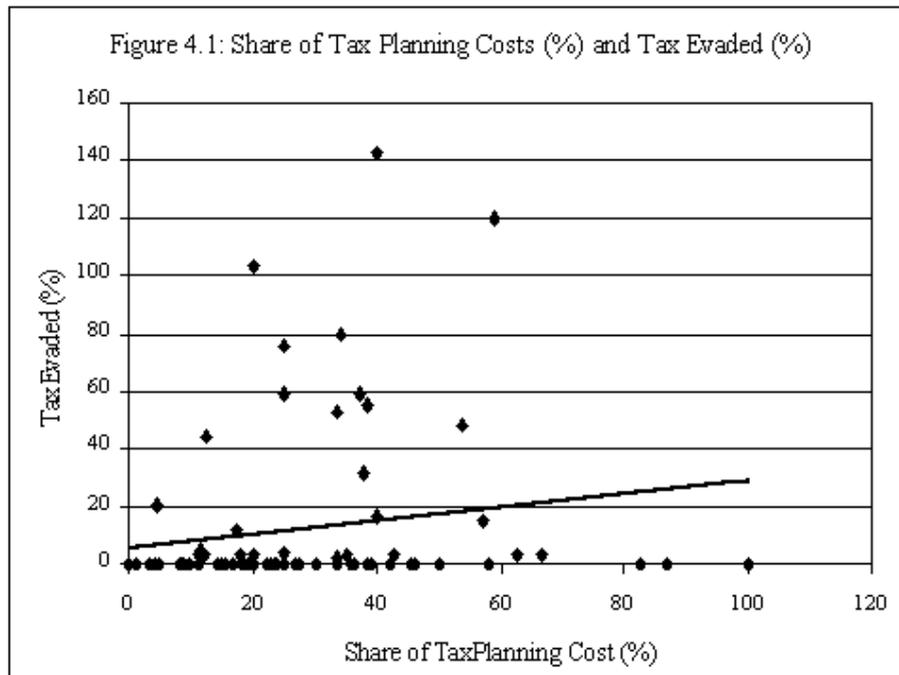
	Non-salary	Salary	Total
Value of hours spent in tax planning (Rs)	505	627	599
Value of total compliance time (Rs)	26880	2086	7614
Tax planning costs as a % of time compliance costs	1.88	30.08	7.87
Money spent on tax planning and research (Rs)	429	189	245
Total money compliance costs (Rs)	15163	921	4683
Tax planning costs as a % of money compliance costs	2.83	18.14	5.24
Total tax planning costs as a percentage of total (time + money) compliance costs	12.53	26.44	23.26
Bribe costs (Rs)	47629	1447	12993
Bribe costs as a % of tax paid	48.22	10.93	18.92
"Evaded tax" as a % of tax paid	29	156	130
"Underreporting" as a % of gross income	21	18	18
Tax saved through planning as a % of tax paid	43.0	43.8	43.6
Note: For definitions of "Tax Evasion" and "Underreporting" see Table 4.1			

Summary compliance cost statistics from Chattopadhyay and Das-Gupta (2002) are reported in Table 4.4 along with evasion and avoidance estimates. As can be seen, avoidance costs are small relative to total compliance costs, especially for non-salaried individuals. However, in contrast to the theoretical analysis, avoidance costs are not the same as voluntary costs. For example, engaging an advisor imposes voluntary costs but does not directly result in tax saving. Bribe costs are high even for salary earners.

⁴⁵ Das-Gupta and Mookherjee (1998) report an upper bound to the probability of punishment, up to the penalty initiation stage, of 4.2 percent, even if only 10 percent of individuals are tax evaders.

Tax planning is beneficial given the substantial tax savings individuals manage to achieve through tax concessions. Tax savings are likely to be somewhat underestimated, since only major tax concessions were covered in the questionnaire.

On examination of the full sample, the relationship between avoidance expenditure and tax evasion or tax saving both turn out to be positive but weak. This is shown in Figures 4.1 and 4.2.



5. The Relationship Between Compliance and Compliance Costs: Survey Results

To properly assess the link between compliance or tax revenues and compliance costs, information should ideally be available on enforcement by tax authorities for different groups of taxpayers. Of this, important information concerns the incidence and outcome of normal tax assessments (“summary assessments”), scrutiny assessments (or tax audits), and effective penalties imposed after penalty proceedings and appeals. In the initial research design, the use of actual assessment records of taxpayers, classified by income and occupation, was planned. These data were to be matched with compliance cost data from the compliance cost survey. However, no information on income tax assessments was made available for this study. Instead, the data base consists entirely of survey responses. While this may be appropriate for penalty and enforcement variables that determine taxpayer compliance behaviour, it cannot be used to provide accurate estimates of revenue effects. So estimates presented here should be treated as preliminary and subject to a large margin of error.

Functional form

Three forms of the tax and compliance functions, linear, semi-logarithmic and double log, were experimented with. The goodness of fit was compared using the R-squared statistic (computed on a comparable basis) for the “base regressions” or regressions without additional determinants absent in the theoretical models. For four of the five dependent variables used, double-log equations were found to have the best fit, while in one case the linear specification had a marginally better fit. So only double-log regressions are reported below.

Dependent and independent variables

The regression strategy, designed to maximize possible statistical inferences while keeping in view the limited number of observations, following Sala-I-Martin (1998). Accordingly 4 or 5 basic variables were included in all regression exercises. In extended regressions, besides basic variables, other variables or groups were entered two at a time from a possible 12 additional variable groups suggested by theory and 4 socio-demographic variables. Regression variables are listed and discussed in table 5.1 below.

Table 5.1: Variables included in Regression Exercises of Compliance Determinants		
Sl	Variable Description	Remarks
A. Dependent Variables		
A1	Tax paid in rupees	<u>Expected signs of impacts of determinants for this variable are the opposite of those given here.</u>
A2	Estimated tax evasion in rupees	"Bootstrapped" variable based on reporting discrepancies.
A3	Estimated tax evasion as a percentage of tax paid	Using bootstrapped tax evasion estimate.
A4	Estimated tax evasion as a percentage of estimated gross income.	Using bootstrapped tax evasion estimate.
A5	<i>Self-reported estimates of income under-reporting by similar individuals as a percentage of gross income.</i>	<i>Only one regression proved to be significant at 10 percent or better, but even here, some coefficients had incorrect signs. So none of these results are reported.</i>
A6	<i>Alternative “boot-strapped” measure of non-compliance, under-reported income.</i>	<i>The number of usable observations proved to be too few for meaningful analysis.</i>
B. Independent Variables: Basic variables from theoretical models included in all regressions		
B1	Marginal tax rate	Expected sign: Positive if B6 is omitted, else theoretically indeterminate.

B2	Estimated gross income	Expected sign: Positive(?) if B6 is omitted, else indeterminate.
B3	Value of time compliance costs	Expected sign: Theoretically indeterminate.
B4	Money compliance costs	Expected sign: Theoretically indeterminate.
B5	Sum of time and money compliance costs (“legal” compliance costs).	Alternative specification to joint inclusion of I4 and I5. Expected sign: Theoretically indeterminate.
B6	Percentage share of tax planning costs in total compliance costs	Formally an endogenous, but predetermined hence contemporaneously uncorrelated variable. Alternatively included or omitted in basic regressions. Always present in extended regressions. Expected sign: negative.
B7	<i>Subjective probability of detection and punishment</i>	<i>Omitted. Too few observations. Expected sign: Negative.</i>
B8	<i>Perceived penalty on detection</i>	<i>Omitted. Not available in the data set. Expected sign: Negative.</i>
C. Independent Variables: Other variables suggested by theory		
C1	“Govt services: Benefit” or respondents’ estimates of the benefit they derive from government services (in rupees).	Expected sign: positive.
C2	Respondents’ opinion about the burden of the income tax	Should be greatly reduced = 5, Should be greatly increased = 1. Expected sign: negative.
C3	Salary/non-salary dummy variable.	Salary = 1. Variable is also included in an extended set of basic regressions summarized in Table 5.6. Expected sign: Indeterminate. Since impact of TDS is controlled for, per Yaniv (1988), the marginal effect could be positive.
C4	Respondents’ impression about the Income Tax Department	Excellent = 5, very poor = 1. Expected sign: Positive.
C5	Advisor used dummy variable	Tax advisor used = 1. Expected sign: indeterminate.
C6	Bribes, if any, estimated to be paid by similar persons (in rupees)	Expected sign: negative.
C7	Self-assessed income tax knowledge	Excellent = 5, poor = 1. Expected sign: negative.
C8	Tax saving through tax concessions (in rupees)	Tax avoidance variable. Expected sign: negative.
C9	Tax deducted at source (in rupees)	Expected sign: negative.
C10	<i>“Stability”: Or the willingness of respondents to pay for stable tax laws with no changes for the next 5 years (in rupees).</i>	<i>Results not reported due to insignificant regressions or limited observations. Psychic cost variable. Included as a group with C2 (and C3). Expected sign: negative?</i>
C11	<i>“Ambiguity” or the willingness of respondents to pay for immunity in case of mistakes by them due to ambiguity in tax provisions (in rupees).</i>	<i>Psychic cost variable. Included as a group with C2 (and C3). Results not reported due to insignificant regressions or limited observations. Expected sign: negative?</i>
C12	<i>“Simplicity” or the willingness of respondents to pay for tax simplification (in rupees).</i>	<i>Omitted. Insufficient observations. Psychic cost variable. Expected sign: negative?</i>

D. Independent Variables: Socio demographic variables.		
D1	Age in years	
D2	Female/male dummy variable	Female = 1
D3	Education	Post grad = 5, no education = 1
D4	Location dummy variables	Three variables, one each for Delhi, other city, and other metro – entered as a group.

Note: Variables which were omitted or for which no results are reported are in *italics*.

Results

Basic regression results, without socio-demographic and other variables, are reported in Tables 5.2 to 5.5 and a summary of basic regression results is in Table 5.6. Results for other variables are in Annex Tables A1 to A4. In basic regressions for tax paid, only in the regression in which the share of tax planning costs in compliance costs was included did one compliance cost variable, time compliance costs, turn out to be significant and that too only at the 10 percent level. Furthermore, its estimated impact was positive. In fact, in all regressions compliance cost variables turned out to have positive signs with one exception. Though the R^2 is much poorer for tax evasion regressions, the “wrong” sign for time compliance cost effects persists. As mentioned, none of the regressions for own estimates of tax evasion proved to be significant, so these are not reported.⁴⁶

Table 5.2 Tax payment and compliance costs				
Dependent variable: Tax paid (Rs).	Legal compliance cost (Rs)		Time and money compliance cost (Rs)	
	With % share of tax planning	Without % Share of tax planning	With % share of tax planning	Without % Share of tax planning
Double log specification				
Constant	-14.55 ***	-14.64 ***	-14.54 ***	-14.59 ***
Marginal tax rate times 10 ⁴	1.14 ***	1.20 ***	1.15 ***	1.19 ***
Income (in 10s of rupees)	1.56 ***	1.44 ***	1.52 ***	1.45 ***
Time compliance cost (Rs)			0.10 *	0.04
Money compliance cost (Rs)			-0.05	0.01
Legal compliance cost (Rs)	0.03	0.06		
Share of tax planning cost (%)	-0.003		-0.003	
<i>Regression statistics</i>				
Observations (n)	105	134	102	133
R-squared	0.912	0.878	0.914	0.883
R-bar-squared	0.908	0.875	0.910	0.879
F-statistic (k and n-k-1 d.f.)	258.6	312.5	205.8	240.5
Probability of F Statistic	0.000	0.000	0.000	0.000
Mean of dependent variable	8.39	8.52	8.36	8.44
Notes:				
1. *** Statistically significant at 1% level; ** statistically significant at 5% level; * statistically significant at 10% level; White Heteroskedasticity Consistent Standard Errors were used for significance tests.				
2. 100 has been added to all rupee variables and to the marginal tax rate so that loss of observations due to zero values (logarithm is undefined) is avoided.				
3. k is the number of independent variables included in the regression apart from the constant.				

⁴⁶ An alternative specification of both basic and extended regressions was experimented with by including a "slope" dummy variable for salaried individuals for compliance cost variables and the "advisor used" dummy variable. The use of slope dummy variables was motivated by doubts expressed about the results regarding time and money costs, in an earlier draft of this report, by Professor Michael Godwin, whose important contribution is gratefully acknowledged. However, results are largely similar for the alternative specification, though the overall regression significance improves in most cases. Results are reported in Tables A5 to A13.

Dependent variable: Estimated tax evasion (Rs) Double log specification	Legal compliance cost (Rs)		Time and money compliance cost (Rs)	
	With % share of tax planning	Without % Share of tax planning	With % share of tax planning	Without % Share of tax planning
Constant	-7.23	-7.11	-7.51	-7.81
Marginal tax rate times 10 ⁴	-0.18	-0.15	-0.19	-0.16
Income (in 10s of rupees)	1.35 **	1.75 ***	1.42 **	1.84 ***
Time compliance cost (Rs)			-0.208	-0.38 ***
Money compliance cost (Rs)			0.169	0.008
Legal compliance cost (Rs)	-0.009	-0.34 ***		
Share of tax planning cost (%)	0.010		0.011	
<i>Regression statistics</i>				
Observations	105	134	102	133
R-squared	0.158	0.212	0.168	0.217
R-bar-squared	0.124	0.194	0.125	0.192
F-statistic (k and n-k-1 d.f.)	4.69	11.65	3.87	8.84
Probability of F Statistic	0.001	0.000	0.003	0.000
Mean of dependent variable	5.81	6.19	5.83	6.23

Note: See the notes below Table 5.2.

Dependent variable: Estimated tax evasion as a % of tax Double log specification	Legal compliance cost (Rs)		Time and money compliance cost (Rs)	
	With % share of tax planning	Without % Share of tax planning	With % share of tax planning	Without % Share of tax planning
Constant		6.15 ***		
Marginal tax rate times 10 ⁴	Regression not significant at 10%	-0.264 **	Regression not significant at 10%	Regression not significant at 10%
Income (in 10s of rupees)		0.108 *		
Time compliance cost (Rs)				
Money compliance cost (Rs)				
Legal compliance cost (Rs)		-0.078 **		
Share of tax planning cost (%)				
<i>Regression statistics</i>				
Observations		106		
R-squared		0.068		
R-bar-squared		0.040		
F-statistic (k and n-k-1 d.f.)		2.48		
Probability of F Statistic		0.065		
Mean of dependent variable		4.75		

Note: See the notes below Table 5.2.

Dependent variable: Estimated tax evasion as a % of income Double log specification	Legal compliance cost (Rs)		Time and money compliance cost (Rs)	
	With % share of tax planning	Without % Share of tax planning	With % share of tax planning	Without % Share of tax planning
Constant	4.604 ***	4.606 ***	4.601 ***	4.607 ***
Marginal tax rate times 10 ⁴	-0.00004	-0.00004	-0.00004	-0.00004
Income (in 10s of rupees)	0.00017 *	0.00022 ***	0.00018 *	0.00022 *
Time compliance cost (Rs)			-0.00006	-0.00009 **
Money compliance cost (Rs)			0.0011	0.00003
Legal compliance cost (Rs)	-0.0001	-0.00056 ***		
Share of tax planning cost (%)	0.00001		0.00002	

<i>Regression statistics</i>				
Observations	105	134	102	133
R-squared	0.128	0.132	0.137	0.130
R-bar-squared	0.093	0.112	0.092	0.103
F-statistic (k and n-k-1 d.f.)	3.670	6.624	3.065	4.807
Probability of F Statistic	0.008	0.000	0.013	0.000
Mean of dependent variable	4.61	4.61	4.61	4.61

Note: See the notes below Table 5.2.

Table 5.6 Summary of Basic Regression Results						
	Time Compliance Costs		Money Compliance Costs		Legal Compliance Costs	
	Significance	Sign	Significance	Sign	Significance	Sign
Tax Paid (Rs.)						
(a) With salary, tax planning share	5%	+	10%	-	N	-
(b) With salary, no tax planning share	N	+	N	-	N	+
(c) Without salary, with tax planning share	10%	+	N	-	N	+
(d) Without both	N	+	N	+	N	+
Tax-Evasion (Rs.)						
(a) With salary, tax planning share	N	-	10%	+	N	+
(b) With salary, no tax planning share	1%	-	N	+	10%	-
(c) Without salary, with tax planning share	N	-	N	+	N	-
(d) Without both	1%	-	N	+	1%	-
Tax Evasion (% of Tax)						
(a) With salary, tax planning share	Regression not significant at 10% Level		Regression not significant at 10% Level		N	+
(b) With salary, no tax planning share					N	-
(c) Without salary, with tax planning share					Regression not significant at 10% Level	
(d) Without both					N	-
Tax Evasion (% of Income)						
(a) With salary, tax planning share	N	-	N	+	N	-
(b) With salary, no tax planning share	5%	-	N	+	N	-
(c) Without salary, with tax planning share	N	-	N	+	N	-
(d) Without both	5%	-	N	+	1%	-

Notes:

1. N: Not Significant.
2. For each regression, the core variables are the marginal tax rate and income.
3. See the notes below Table 5.2 and Tables 5.2 to 5.5 for measurement units of different variables.

Results are now discussed variable by variable for variables of interest, focusing on significant regressions only.

Time compliance costs: The impact was either found to be insignificant or, in two basic regressions for tax paid, *positive* and significant at the 5 percent level. While these costs were significant in regressions for tax evasion only when the share of tax planning is excluded, the impact is uniformly negative.⁴⁷ In extended regressions, these results continue to hold (Table A1). In fact in regressions on tax paid, the coefficient was positive in all regressions and significant in 73 percent of regressions.

Money compliance costs: These costs appear to have a negative association with tax compliance in all 8 significant. However, the coefficient was significant in only 1 regression. The impact on taxes paid is mixed but negative in the only regression where it is not insignificant. In extended regressions, these costs

⁴⁷ To check for possible bias arising from our estimates of the value of time, the impact of time costs in hours (with specifications otherwise unaltered) was also examined. Results were remarkably similar.

proved to have a negative association with tax compliance in 100 percent of regressions on tax evasion in rupees or as a percentage of income (Tables A2 and A4). Furthermore coefficients were significant in a greater number of regressions (35 percent to 49 percent) than time costs. The lack of a significant effect on taxes paid carries over to extended regressions (Table A1) and insignificant effects with variable signs are found for regressions for evasion as a percentage of tax paid (Table A3).

Time + money compliance costs: As will be obvious from the discussion above, this specification performs worse than when the two cost components are included separately. This suggests that either the two cost components do not have identical effects or that time cost estimates or their valuation may be unreliable. To discriminate between these possibilities, further work is needed.

Overall, therefore, time and money compliance costs may have opposite effects on compliance and revenue, with the former having a positive impact and the latter having a negative effect. The inference for money costs is statistically more reliable than that for time costs, though overall statistical reliability is not very high. Further evidence is needed before this conclusion can be taken to be reliable.

That evasion is, by and large, related negatively to time and legal compliance costs could be due to one of two reasons. First, saving compliance costs may motivate tax evasion. Second, tax evaders have lower compliance costs because they are less compliant.⁴⁸ This possible simultaneity issue is not tackled in the analysis above and must await better data becoming available.

Use of tax advisors: Proved to have a negative impact on tax compliance in *all* regressions, being significant in 100 percent of regressions of tax evasion as a percentage of taxes paid and in 50 percent of regressions of evasion as a percentage of income. This finding is consistent with the negative impact of tax advisors on tax compliance by US taxpayers in Erard (1993). This negative impact, albeit tentative, suggests that tax advisors do not merely facilitate tax avoidance but also tax evasion. However, there was no significant impact on taxes paid, though, in partial contradiction to compliance effects, the (insignificant) impact on taxes paid was positive in 90 percent of regressions.

Bribes: Very few regressions with this variable proved to be viable, with none surviving selection criteria for 2 of the 3 tax evasion variables. Nevertheless, bribe costs had a significant negative association with tax compliance in 100 percent of regressions for evasion as a percentage of gross income. The impact on tax payment, though negative in 90 percent of cases, was invariably insignificant.

“Stability” “Ambiguity” and “Govt. services: Benefit”: None of these “psychic cost” regressions survived our selection criteria, due either to insufficient observations or an insignificant regression F-statistic.

Tax saving through tax concessions: This variable had a uniformly positive impact on tax compliance and surprisingly, also on taxes paid though the effect was small. The negative impact on tax evasion as a percentage of tax paid, furthermore was uniformly significant while the positive impact on taxes paid was uniformly insignificant. This suggests that *revenue lost due to tax concessions is offset or more than offset through the positive impact of concessions on compliance*. This result potentially contradicts predictions of theoretical models based on Allingham and Sandmo. However, it is more plausible that the endogeneity of tax savings, arising since tax savings decisions and the decision to incur added voluntary compliance cost are made jointly, which could not be corrected for, is the cause of biased results.

Tax deducted at source: TDS has a uniformly significant and positive effect on taxes paid and also a uniformly positive (but insignificant effect) on tax compliance for two of the three tax compliance variables. The latter impact (though not the insignificance) accords with the finding of Crane and Nourzad (1994) for US taxpayers. This suggests that third party compliance costs of those charged with

⁴⁸ This interpretation, due to Professor Michael Godwin, is gratefully acknowledged.

TDS have revenue benefits.⁴⁹ In fact, benefits are significant even relative to TDS costs reported in Chattopadhyay and Das-Gupta (2002). However, the finding must be taken to be inconclusive, since the TDS effect for the third tax evasion variable was uniformly positive, though uniformly insignificant and numerically small.

Respondents' opinion about the burden of the income tax: None of these regressions are reported. This is due to insufficient observations.

Respondents impression about the Income Tax Department: Though this variable proved insignificant in all regressions, a poor impression was associated with greater non-compliance or tax evasion in 100 percent of viable regressions. The sign of the (insignificant) impact on taxes paid is not uniform.

Salary/non-salary dummy variable: At the margin (controlling for compliance cost and TDS differences), salary earners paid significantly lower taxes than non-salary earners. Furthermore, though the impact is almost uniformly insignificant, results suggest that the difference between compliance by salary earners and non-salary earners, if any, is negative, supporting the theoretical prediction of Yaniv (1988).⁵⁰ That is, at the margin, salary earners are more evasion prone than non-salary earners! This does not, however, imply greater overall evasion by salary earners, given that they are subject to extensive tax deduction at source. Further study is warranted before this finding is used to infer lessons for policy.

Self-assessed income tax knowledge: None of these regressions are reported. This is due to insufficient observations.

Socio demographic variables. For these variables, the only significant finding is that females pay less taxes than males. However, tax evasion by females is also lower than that by males, though not significantly so.

The magnitude of compliance cost effects on compliance: Estimates

To estimate the impact of compliance costs on tax evasion, the method used is to compare estimated tax or evasion when the coefficient of a variable of interest is zero to that at the mean value of the variable when the coefficient is as estimated. Coefficient values are assumed to be the average coefficients given in the Annex using the estimate of evasion as a percentage of estimated gross income (Table A4). That is, for the fitted value of any dependent variable, y , and independent variable x_j , except dummy variables, using bars to denote means,

$$\log(y+100) \equiv \alpha_j + \beta_j \log(x_j+100), \text{ where } \alpha_j = \log(\bar{y}+100) - \beta_j \log(\bar{x}_j+100)$$

The impact of x on y is estimated as $\Delta y = \exp(\alpha_j)[(\bar{x}_j+100)^\beta - 1]$. Coefficients of slope dummy variables, for the salaried, are first added to the basic coefficients to get the final coefficient values.

If x is a dummy variable, then $\log(y_j+100) = \alpha_j + \beta_j x_j$, where $\alpha_j = \log(\bar{y}+100) - \beta_j \bar{x}_j$. In this case, we have $\Delta y = \exp(\alpha_j + \beta_j \bar{x}_j) - \exp(\alpha_j) = \bar{y} + 100 - \exp(\alpha_j)$.

To convert estimated evasion, as a percentage of income into rupee estimates of aggregate tax evasion, Δy is multiplied by Y_A , the estimated aggregate income of taxpayers in 2000-01 as estimated by Chattopadhyay and Das-Gupta (2002). This is done separately for salaried and non-salaried and then summed to get the aggregate estimate.

⁴⁹ Professor Richard Bird has pointed out that TDS in some other countries is subject to a variety of non-compliance activities. For example, some firms using withheld taxes for internal finance when likely to go bankrupt. On bankruptcy, they then leave tax debts. These debts are usually legally owed by taxpayers forcing them to pay taxes twice over. No attempt was made to study these problems in the Indian context, though partial information is available in the annual reports of the Comptroller and Auditor General. On the part of companies responsible for TDS, they have expressed the view, in focus group meetings, that TDS penalty provisions are draconian and invoked indiscriminately by Income Tax officials.

⁵⁰ About evasion from the part of income not subject to TDS of individuals who are largely subject to TDS.

A “confidence interval” for these estimates is derived by using “standard errors” derived from the average t-ratios and average estimated coefficients in the Annex, assuming $N = 30$ observations, to get upper and lower values of β_j . The t-value used in the confidence interval is 1.7. Estimates are reported in Table 5.7.

Table 5.7: Estimates of Tax Evasion Effects of Compliance Costs and Tax Saving						
	In Crores of Rupees			As a % of tax		
	Mid	Low	High	Mid	Low	High
SALARY						
Legal Compliance cost	-395	-2033	1244	-2.55	-13.15	8.04
Bribe	13404	11549	15259	86.70	74.70	98.70
Total Compliance cost	13009	9514	16503	84.15	61.55	106.74
Tax Saving	-4848	-5797	-3898	-31.35	-37.50	-25.21
Advisor	546	451	641	3.53	2.92	4.14
TDS	-994	-1837	-152	-6.43	-11.88	-0.98
NON-SALARY						
Legal Compliance cost	-117	-1161	927	-0.72	-7.16	5.72
Bribe	9232	7955	10510	56.94	49.06	64.82
Total Compliance cost	9115	6793	11437	56.22	41.90	70.54
Tax Saving	-2221	-2656	-1786	-13.70	-16.38	-11.02
Advisor	1245	1029	1461	7.68	6.35	9.01
TDS	-480	-886	-73	-2.96	-5.47	-0.45
ALL TAXPAYERS						
Legal Compliance cost	-512	-3194	2171	-1.62	-10.08	6.85
Bribe	22636	19503	25769	71.47	61.58	81.36
Total Compliance cost	22125	16309	27940	69.85	51.49	88.21
Tax Saving	-7069	-8453	-5684	-22.32	-26.69	-17.95
Advisor	1791	1480	2102	5.65	4.67	6.64
TDS	-1474	-2724	-225	-4.65	-8.60	-0.71

While the magnitude of the estimated impact of bribes on taxes evaded is much too high, especially for salary earners, in relative terms *bribes are estimated to have the greatest impact on non-compliance*. The impact of legal compliance costs is small and could be either positive or negative. Other variables related to compliance costs have relatively small effects, with the use of advisors leading to a 4 per cent to 7 per cent revenue loss through increased evasion and TDS leading to a 0.7 per cent to 8.6 per cent revenue gain. The estimates for tax saving, however, suggest that evasion decreases by between 18 per cent and 26.7 per cent of tax revenue on account of evasion. Given the sample average tax saving of 26.6 percent⁵¹, of which a large fraction is in government bonds which are a capital receipt of the government, *the net impact of tax saving on the government budget may be positive*. However, on disaggregation, this result is found to be driven by salary earners, with there being a net revenue loss from the non-salaried. The finding, furthermore should be viewed with caution given the possibility of biased results due to the endogeneity of tax saving.

Conclusions

Overall, it should be borne in mind that statistical reliability is poor. Nevertheless, results suggest that legal compliance costs effect tax collection *positively* and tax evasion *negatively*. This arises given the greater average value of time compliance costs compared to money compliance costs. The results, however, are not uniform. Those with greater money compliance costs, typically non-salary earners, are less compliant. Expectedly, bribe costs adversely effect compliance and, possibly, taxes. Third party costs, through TDS, however, have a positive impact on compliance and tax payments.

⁵¹ See Chattopadhyay and Das-Gupta (2002).

Of related variables, the use of tax advisors warrants further examination as this appears to lead to non-compliance. Similarly, the statistical inference with respect to the positive impact of tax saving on compliance should be treated as merely suggestive, requiring further examination.

6. Non-Filing and Compliance Costs

Motivation

From the point of view of compliance cost assessment, voluntary costs incurred by non-filers to conceal their income add to the total costs incurred by individuals on account of the tax system. Consequently some estimate of their compliance costs and the impact of compliance requirements on non-filing is needed to obtain a complete picture.

Empirical evidence and theoretical work on non-filer characteristics and filing incentives is limited. Yaniv (1988) is the major theoretical analysis of non-filing. His major conclusion with respect to filing behaviour is that those whose taxes are withheld may evade more out of income not subject to withholding. However, as with the models developed above, he makes no distinction between filing but reporting zero income and non-filing. Crane and Nourzad (1994) examine characteristics of former non-filers who participated in a 1986 filing amnesty in the state of Michigan in the US. They find a positive correlation between income and filing and between tax withholding and filing. The latter is contrary to the theoretical prediction of Yaniv (1988). Erard and Ho (1995) analyse an invaluable US Internal Revenue Service data set on non-filers. These “ghosts” largely consist of manual, sales and service sector workers and creative arts workers. The authors point to these activities being largely in the “informal sector” in the US.⁵² For India, Aggarwal (1991) used third party data sources on 4 individual characteristics, such as ownership of phones or homes, to identify potential non-filers in Faridabad city. Compared to income tax records, he estimated that 89 percent of potential taxpayers did not file returns. However, the information base at his disposal did not adequately enable him to refine his estimate of potential non-filers, possibly leading to great over-estimation of non-filing. Given the paucity of information, there is currently no alternative to theoretical analysis, especially for the Indian income tax. A simple model of non-filing behaviour is now developed.

A model of non-filing behaviour in the presence of compliance costs and tax withholding

A problem with the filing versus non-filing decision is that it is likely to involve a comparison of costs over several years. This arises in two ways. First, on being identified in certain situations (e.g. during tax investigation or “search and seizure” operations), the tax department assesses taxes for several years. This makes the decision of whether to file or not depend on the individual’s filing history. The second problem concerns the incidence of stop-filing: Once a non-filer files, this raises the probability of his being detected and penalised in the event of his choosing not to file in future, since he is now on the rolls of the tax department.⁵³ Consequently, while models discussed in previous sections do give rise to non-filing behaviour, they are inadequate and possibly underestimate the impact of compliance costs on non-filing. Below, though a model of annual filing is developed, variations in detection probabilities take care of the second problem while assessment of taxes on income *and* undeclared wealth address the first problem. The formal model is now described.

It is assumed that individuals have differing amounts of wealth, W .⁵⁴ This can be invested either in the “formal sector”, which gives rise to income RW , or in the “informal sector”, giving rise to an income rW . Total labour supply is taken as given. R is taken as exogenous and identical for all individuals. However, individuals are heterogeneous with respect to informal investment opportunities available, with r having a minimum value of zero and a maximum value exceeding R .⁵⁵ Individuals are assumed to be risk neutral

⁵² Poapongsakorn et. al (2000), in their cost-benefit analysis of tax surveys to detect non-filers present information on *stop-filer* survival rates but do not examine non-filer behaviour.

⁵³ So, for example, Poapongsakorn et. al (2000) use an “average survival rate” for new filers in their cost-benefit analysis of non-filer surveys in Thailand.

⁵⁴ Wealth can include time and human capital endowments, so that, formally, labour income is not neglected. However, in this case the penalty on non-filers will only be on the taxable fraction of undeclared wealth.

⁵⁵ $r = 0$ can be interpreted as idle money kept as cash “under the mattress”.

income maximizers. This implies that, even if they file tax returns, they report zero taxable income assuming the AS condition $p(1+\pi) < 1$ holds.⁵⁶ Besides direct compliance costs of filers, we introduce *third party compliance costs* through the important channel of tax withholding or TDS. It is assumed that if formal income RW exceeds a threshold, Z , then taxes are withheld at rate $s \leq t$. Furthermore, for detected non-filers, a fixed penalty, N , is levied. There are now 3 possible cases:

Case g (non-filers not subject to TDS or ghosts, probability of detection = p_1):

$$Y_N = rW\beta + RW(1-\beta), \text{ with } RW(1-\beta) \leq Z.$$

$$Y_C = [rW\beta + RW(1-\beta)][1 - t(1+\pi)] - W\beta t(1+\pi) - N$$

Case nt (non-filers subject to TDS, probability of detection = p_2):

$$Y_N = rW\beta + RW(1-\beta)(1-s), \text{ } RW(1-\beta) > Z$$

$$Y_C = rW\beta[1-t(1+\pi)] + RW(1-\beta)[1-s - (t-s)(1+\pi)] - W\beta t(1+\pi) - N$$

Case f (filers, probability of detection = p):

$$Y_N = rW\beta + RW(1-\beta)(1-s) - C[RW(1-\beta)]$$

$$Y_C = rW\beta[1-t(1+\pi)] + RW(1-\beta)[1-s - (t-s)(1+\pi)] - W\beta t(1+\pi) - C[RW(1-\beta)]$$

The fraction of wealth invested in the informal sector is denoted β . There are five features to note about this specification. First even for filers, 100 percent under-reporting is assumed. Second, as discussed, in the event of detection, additional taxes and penalties are assumed to be levied not only on informal income, $rW\beta$ but also on informal wealth $W\beta$. Third, the compliance cost of filers, C , is assumed to be increasing (and concave) in formal income as empirical evidence suggests.⁵⁷ Fourth, here C includes both direct compliance costs and the opportunity cost of possible sacrifices a non-filer must make to maintain a low profile: C can be positive or negative.⁵⁸ The probability of detection is assumed to be lowest for ghosts, higher for non-filers who are nevertheless subject to TDS, and highest for filers for relevant ranges of wealth.⁵⁹ However, non-filing by the very wealthiest individuals will not go undetected though evasion may continue to do so. Though not incorporated in the equations above, this is addressed in the analysis. It should be noted that the assumption of a high probability of detection of filers indirectly

⁵⁶ This simplifies the analysis while abstracting from reporting behaviour to permit a sharp focus on under-reporting. The assumption biases the model results *in favour* of filing.

⁵⁷ The questionnaire used in the survey did not enable a clear distinction to be made between income reported to tax authorities and gross income. Consequently, though the specification of compliance costs in section 2 is as a function of taxable income, the specification here is as a function of gross income. It is probable that the actual relation is a combination of both. To obtain formal consistency with the earlier specification, C' in equation (16) below should be set to zero. However, full consistency requires that taxpayer risk aversion be introduced, which greatly complicates the analysis.

⁵⁸ For example, under the prevailing "1 in 6 scheme", filing is mandatory for individuals who have club memberships, credit cards, cellular phones, travelled abroad during the year, or own a house or a car. While detection of non-compliance with this filing requirement is by no means fool-proof, and while the introduction of this scheme led to a massive increase in filers, those wishing to continue to refrain from filing are likely to sacrifice some of these filing "perks". For a speculative press report that demand for credit cards is adversely affected by filing requirements see "Debit cards beat credit cousins", *The Times of India*, June 15, 2002, p15. Furthermore, the article "Taxes made easy" by Prayaag Joshi in *The Economic Times*, June 15, 2002, p7, claims that the 1 in 6 scheme has "failed to achieve its objectives" with respect to rich individuals.

⁵⁹ First, this assumption is relaxed below for numerical estimates. Second, in India, filers not subject to TDS in India are required to pay advance tax. In this case, s may be considered the rate of advance tax. The assumption is then that the implicit rate of advance tax chosen by taxpayers is s , given their intention of declaring no additional income in their return. Complications arising from any difference in the TDS rate and the implicit advance tax rate are ignored.

captures the increased probability of detection of future income for individuals on the rolls of the tax department.

Non-filing and filing behaviour

To analyse this model, (a) ranges of r for which individuals prefer informal to formal investment and (b) individual preferences for each of the three filing/non-filing regimes, must be determined. To do this expected income functions are needed. These are given by:

$$\text{Case g:} \quad E_g = W[r\beta + R(1-\beta)][1 - p_1t(1+\pi)] - p_1[W\beta t(1+\pi) + N] \quad (11)$$

$$\text{Case nt:} \quad E_{nt} = Wr\beta[1 - P_2t(1+\pi)] + WR(1-\beta)[1 - s - p_2(t-s)(1+\pi)] - p_2[W\beta t(1+\pi) + N] \quad (12)$$

$$\text{Case f:} \quad E_f = Wr\beta[1 - Pt(1+\pi)] + WR(1-\beta)[1 - s - p(t-s)(1+\pi)] - p[W\beta t(1+\pi)] - C[RW(1-\beta)] \quad (13)$$

From these functions, we get the conditions for informal versus formal investment:⁶⁰

$$\text{Case g:} \quad \beta = 1 \text{ if and only if } r > R + \frac{p_1t(1+\pi)}{1-p_1t(1+\pi)}, \text{ else } \beta = \beta_0 \equiv \max[1 - \frac{Z}{RW}, 0] \quad (14)$$

$$\text{Case nt:} \quad \beta = 1 \text{ if and only if } r > R - R_s \frac{1-p_2(1+\pi)}{1-p_2t(1+\pi)} + \frac{p_2t(1+\pi)}{1-p_2t(1+\pi)}, \text{ else } \beta = 0 \quad (15)$$

$$\text{Case f:} \quad \beta = 1 \text{ if and only if } r > R - R \frac{s[1-p(1+\pi)] + C'}{1-pt(1+\pi)} + \frac{pt(1+\pi)}{1-pt(1+\pi)}, \text{ else } \beta = 0 \quad (16)$$

The critical values of r at which (14) and (15) hold are denoted r_g and r_{nt} , while the locus of r values at which (16) holds is denoted $r_f(W)$. The latter is negative sloped given the concavity of C . In Case g, individuals preferring formal investment are restricted to investing $(1-\beta_0)W$ in the sector if W exceeds Z if they are to remain outside the TDS net. Furthermore, taxes and penalties on detected informal wealth make informal investment worthwhile only if r exceeds R by a margin which depends on p_1 . In Cases nt and f, this penalty is counteracted by terms which depend on the TDS rate and on compliance costs of filers, so that informal investment may be preferable even if $r < R$. Ranges of W for which, formal investors prefer to file or subject themselves to TDS must now be determined.

First consider $E_f - E_{nt}$, with $\beta = 0$:

$$E_f - E_{nt} = WR(p_2 - p)(t-s)(1+\pi) - C[RW] + p_2N \quad (17)$$

Since this expression is decreasing in RW , clearly, there exists RW^f , such that $E_{nt} > E_f$ for $RW > RW^f$. So this implies that richer individuals prefer not to file, given the lower probability of detection of income. The unrealistic implication of this model, that rich individuals prefer not to file, is because the model does not take into account the fact that for individuals already on the rolls of the income tax administration, non-filing will quickly be detected with probability close to 1 even if detection of other forms of non-compliance (e.g. tax evasion) remains difficult to detect. In practice, there is, therefore, likely to be a wealth level, say W^1 , above which individuals always file. Furthermore, some individuals on the rolls of the tax administration will also file even if their wealth is less than W^1 for the same reason. This is addressed in the empirical section below.

Now consider $E_f - E_g$ with $\beta=0$ for Case f and $\beta = \beta_0$ for E_g .

$$\frac{1}{RW} [E_f - E_g] = [t(1+\pi)(p_1 - p) - s\{1 - p(1+\pi)\}] - \frac{1}{RW} [C(RW) - p_1N] + \frac{\beta_0}{R} [p_1t(1+\pi) + (R-r)\{1 - p_1t(1+\pi)\}] \quad (18)$$

Notice that the coefficient of β_0 in square brackets is a rearrangement of the condition for non-filing and informal investment to be preferred in (14). So attention is restricted to the non-negative values of this coefficient. This equation gives rise to interesting filing and non-filing ranges with respect to RW :

⁶⁰ It is clear that, under our assumptions, filing for those who wish to avoid TDS, i.e., Case f with $\beta = \beta_0$, can never be optimal.

- (a) For very low RW , say $RW \leq RW^0$, $\beta_0 = 0$ and $C(RW)$ is small. So these individuals are filers. Since the income tax has an exemption limit, these individuals can be ignored.
- (b) Assuming that $C(RW)$ exceeds p_1N at some $RW < Z$,⁶¹ non-filing is preferred for $RW^0 < RW < W^g$, where $RW^g > Z$.
- (c) Thereafter (18) defines a positively sloped boundary, $r = f(R, W)$, $f(R, W^g) = 0$, such that non-filing is preferred at values of r above the boundary.⁶² This is intuitively obvious, given the greater sacrifice made due to the increase in β_0 with W and the falling average compliance costs.

For the model to predict any filers at all, it must be the case that $RW^f > RW^g$. This is assumed to be the case.

The upshot is that filers and non-filers are identified as in Figure 1 for the situation where $r_{nt} = R$. The parameter values defining zones giving rise to filing are shown by the lightly and heavily shaded areas in the graph. A second case is illustrated in Figure 2, where the possibility of r_f intersecting the boundary $r = f(R, W)$ is illustrated. In Figure 2, with initial parameter values, only the lightly shaded areas are filing zones. We are now ready to examine the impact of changes in C and the TDS regime on filing behaviour.

Comparative statics and compliance costs of non-filers

The impact of higher C (that is, greater direct compliance costs of filers or a smaller loss from foregone consumption) is, firstly, to shift RW^g and the $r = f(R, W)$ locus to the right. This occurs since, at any r , RW will have to be higher to offset the additional cost. Second, RW^f shifts left to, say, $RW^{f'}$. This is shown by dotted lines in Figure 1. The impact is to decrease the range of parameters giving rise to filing to the heavily shaded area labeled f' in Figure 1.

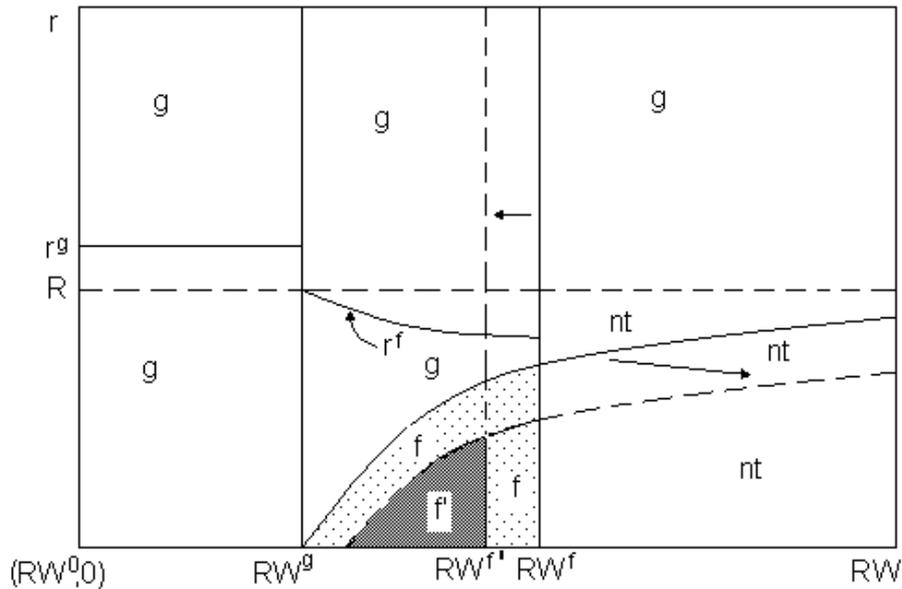


Figure 6.1 Filers and non-filers: impact of increasing C

The impact of more stringent TDS (higher s and lower Z) on the $r = f(R, W)$ locus is indeterminate. However, RW^f shifts right implying, counter-intuitively, an increase in filers. This may be part of the explanation for the empirical finding of Crane and Nourzad (1994). This occurs because the marginal

⁶¹ This is likely in view of the extremely high and regressive compliance costs found by Chattopadhyay and Das-Gupta (2002).

⁶² For a positive slope it suffices for $RWp_1N - ZC$ to be positive over the relevant range. This is true for sufficiently large values of RW . Since N is relatively small in the Indian context, this is assumed to be the case throughout the relevant range.

loss to filers, who already have a high probability of detection, p , is smaller than for non-filers. This is shown by the dotted lines in Figure 2, assuming no change occurs in the $r = f(R,W)$ locus. The addition, the filing zone is shown by the heavily shaded area.

The impact of removal of TDS ($s=0$ and Z not being binding) is, firstly, to make case g coincide with Case nt and secondly to cause W^f to shift leftward to W^0 . In other words filers will be restricted to those whose probability of detection of non-filing is close to 1, who are not captured in the model: No one else files tax returns.

Thus, overall, TDS leads to lower non-filing, while higher filer compliance costs lead to increased non-filing.

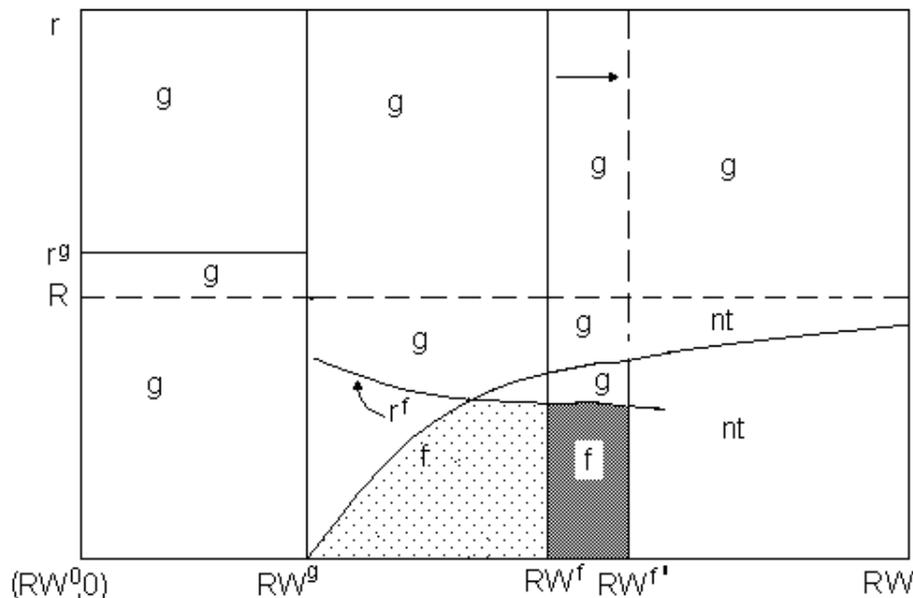


Figure 6.2 Filers and non-filers: impact of increasing TDS

This model over-predicts non-filing for three reasons. First, due to such activities as door-to-door survey and pursuit of stop-filers, or those who are on the income tax rolls but stop filing, there are individuals with $RW < RW^1$ for whom non-filing is detected with high probability.⁶³ Second, risk aversion itself gives rise to “psychic” non-filing costs, so that some risk averse individuals close to RW^g and RW^f will file even if this entails a loss in expected income. Third, honesty, guilt, shame and other cultural factors do play a role in the filing/non-filing choice for at least some individuals.

A guesstimate of income tax compliance costs of non-filers in India

To measure non-filer compliance costs, two elements need to be taken into account. First is the distortion in investment patterns induced by TDS (or third party compliance requirements). Second, the direct and opportunity cost of non-filers $P_jN + C_2(RW)$, $j = 1,2$, where C_2 , discussed further below, is the non-filer opportunity cost of foregone consumption benefits. The indirect compliance costs of third parties, however, need not be taken account of, since TDS obligations are independent of filing behaviour.

Investment distortions occur when those who would have invested in either the formal or the informal sector in the absence of TDS or filing compliance costs, are induced to invest in the other sector. They can be identified by setting $p = p_1$, $p_2 = p_1$, and $s = Z = C(RW) = 0$ in equations (14) to (16).⁶⁴ This means

⁶³ CAG (2001) reports that 124,283 premises were surveyed by the income tax department in 2000-01 with a further 105 cases of ostentatious expenditure being investigated. However, no information is available about the number of non-filers identified through these surveys. Furthermore, no data are available on the “survival rate” of new income tax return filers.

⁶⁴ However, if the condition in (14) is not satisfied, $\beta_0 = 0$.

that, in the presence of TDS, a fraction of wealth, β_0 , is misallocated to informal investment for Case g individuals. For Cases nt and f, misallocation of resources depends on the size and direction of the shifts of the r_f locus and r_{nt} , since the middle terms in both (15) and (16) drop out while the third terms in both equations decrease.

Assumed parameter values for estimates of non-filing compliance costs are now described.

(a) The *distribution* of RW is assumed to be the same as the NCAER⁶⁵ estimates for 1996-97 as reported by the Comptroller and Auditor General (2001). However, the NCAER distribution is scaled upward for inflation here, using the Consumer Price Index for Urban Non-Manual Workers, population growth and per capita income growth. Cumulative inflation, population growth and per capita income growth for 1996-97 to 2000-01 are 31.1 percent, 14.1 percent, and 8.1 percent respectively according to the *Economic Survey* (2002). Potential filers are taken, following CAG (2001), to be urban households with incomes above Rs 1 lakh in 2000-01 prices. Since the NCAER distribution is that of *households* and not *individuals*, the data are not entirely consistent, though no alternative is currently available. Details are in Table 6.1. The number of individual filers with gross income exceeding Rs 1 lakh, is estimated at 5.5 million and the total number of potential filers from data in CAG (2001) is estimated at 33.5 million.⁶⁶ This suggests that only 1 in 6 potential taxpayers actually file returns.

Income range (1996-97 rupees)	NCAER estimates for 1996-97		Income range (2000-01 rupees '000)	Own estimates for 2000-01			
	Households (thousands)	Gross income (Rs crore)		Gross income (Rs crore)	Households (thousands)	Income tax filers# (thousands)	Potential non-filers (thousands)
Above 10 lakh	97	12869	Above 1310.95	20813	105	27.6	77.4
5 lakh to 10 lakh	211.5	4658	524.38 - 1310.95	7533	229	412.3	0
2 lakh to 5 lakh	1897	8246	262.19 - 524.38	13336	2051	106.3	1944.8
1 lakh to 2 lakh	4362	27376	131.1- 262.19	44276	4716	2873.3	1842.7
Rs 76,278* to Rs 1 lakh	24224	23441	100 to 131.1	37911	26191	2113.9	24077.1
TOTAL	30,791.5	76,590		123,869	33,475**	5533.4	27941.9

Notes: * Rs 76,278 equals Rs 1 lakh in 2001-02 rupees. So the range and number of households is estimated at 50 percent of the income fraction $(10-7.6278)/5$, given an exemption limit of Rs 50,000. Gross income is conservatively estimated to equal this fraction of gross income between Rs 50,000 and Rs 1 lakh.
 **: Adjusted for filers between Rs 2 lakh to Rs 5 lakh.
 #: Projected from data for 1999-2000.
 Source: CAG (2001) and computations.

(b) The value of s is taken to be 0.1 for non-salary earners. Non-filing by salary earners is assumed to be zero as $s = t$, and non-filing is, in practice, limited.

(c) The value of Z is taken to be Rs 20,000.

(d) Relying on estimates by Chattopadhyay and Das-Gupta (2002), direct compliance costs are assumed to be given by $C_1(RW) = 0.21914(RW)^{0.77813}$. To take account of opportunity compliance costs of non-filers, C_2 , it is assumed that $C = C_1 - C_2 = 0.5C_1$. That is $C = C_2 = 0.10957(RW)^{0.77813}$ is assumed.

(e) The value of R is taken to be the commercial bank 1 year term deposit rate of 9 percent.

⁶⁵ National Council of Applied Economic Research.

⁶⁶ In the second row after the header row in Table 6.1, the estimated number of filers exceed the estimated number of households in 2000-01. While this is not necessarily inconsistent if there is more than one household per filer, for the current exercise, the number of non-filers is taken to be zero in the range.

(f) It is assumed that $0 \leq r \leq 3R$ and that individuals have a uniform distribution on the interval below R but a triangular distribution on the interval above R at each level of formal income.⁶⁷ This implies that exactly 50 percent of individuals have access to informal investment opportunities yielding $r \geq 9$ percent.

(g) For detection probabilities, since subjective probabilities determine filing behaviour, the sample average in Chattopadhyay and Das-Gupta (2002), $p = 23.28$ percent, is taken. For case nf, $p_2 = 0.9p = 20.95$ percent and for case g, $p_1 = 0.8p = 18.62$ percent are arbitrarily assumed.

(h) For N , while the stated penalty in the Income Tax Act, 1961, is Rs 5,000, this is not always levied. So a value equal to 80 percent of this or Rs 4000 is taken.

(i) While the use of subjective probabilities is appropriate in calculations of critical RW and r values, for expected non-filing costs, p_1N and p_2N , objective probabilities should be used. Based on Das-Gupta and Mookherjee (1998), it is assumed that $p_1 = p_2 = 0.0005$ (that is, 1 in 2000 non-filers are detected and penalised).

(j) The penalty for concealment of income in Indian income tax law has a maximum value of 300 percent of taxes sought to be evaded. However, a 300 percent penalty is not always imposed and penalties are frequently overturned on appeal. The effective value of π , therefore, is assumed to be 100 percent.

(k) Since the actual number of filers in each income class, according to data extrapolated from CAG (2001), is used in calculations, this takes account of both filers induced to file in our model as well as filers whose probability of detection of non-filing is high enough so that they always file. It may be recalled that the latter class of filers has not been taken account of in the formal model above.

With these assumptions, firstly, RW^g exceeds RW^f , so that all individuals are predicted to be in zone nt. *In other words, given numerical parameters assumed, our model suggests that neither TDS nor non-filing penalties induce filing.* Since the 1 in 6 scheme⁶⁸ did induce a substantial increase in filing, the exercise here is likely to have underestimated the opportunity cost of not filing due to foregone consumption benefits. Consequently, our cost estimates for non-filers provide a lower bound to actual costs.

Estimated non-filer compliance costs work out to be Rs 1089 crore, of which Rs 751.7 crore is due to foregone consumption benefits, Rs 5.6 crore is from expected non-filing penalties and Rs 331.5 crore is due to the income loss from distorted investment. This amounts to 3.4 percent of non-corporate income tax collections for the year 2000-01. Though substantial and much higher than Income Tax Department administrative expenditure, these costs are dwarfed by compliance costs of income tax filers, even with a 100% margin of error.⁶⁹

7. Conclusions, Handicaps and Policy Suggestions

For tax filers, the impact of compliance costs on compliance is mixed. While money compliance costs, both legal and illegal, have a negative impact on compliance, the opposite is true for time compliance cost and third party costs through TDS. The use of tax advisors, which contributes to money compliance costs, possibly adversely affects compliance. Lowering money compliance costs and curbing corruption in tax administration are likely, therefore, to have positive effects on compliance and revenues. However, improved taxpayer services to reduce time compliance costs, while possibly desirable on independent grounds, may not lead to revenue and compliance benefits.

In rupee terms the size of the compliance effect of compliance costs is not small, amounting to between 51 per cent and 88 per cent in 2000-01. This does not take into account the negative impact of non-filer compliance costs, which are estimated at around 3.4 percent of tax collections.

⁶⁷ This assumption may underestimate informal rates of return where compound rates of 2 percent a month, or 26.8 percent a year, are not uncommon. See Das-Gupta, Nayar and associates (1990).

⁶⁸ See footnote 58.

⁶⁹ Estimated at around 50% of personal income tax collections by Chattopadhyay and Das-Gupta (2002).

The major policy suggestions emerging from this study, are, of course, reducing filer compliance costs and reducing scope for avoidance.⁷⁰ Other suggestions include the following.

Implementation of more extensive TDS and lowering the TDS threshold where possible, provided third party compliance costs do not thereby increase greatly, is likely to be effective, though procedures to curb non-compliance by tax with-holders will have to be instituted.⁷¹

Increased efforts to improve the Permanent Account Number (PAN) data base of the Income Tax Department, first to increase its coverage and second, to remove incorrect, duplicate and incomplete records, may also pay dividends. To do this effectively, improved usage of third party information to identify potential taxpayers is important.⁷²

For example, the 1 in 6 scheme is a third party information based scheme which is reportedly not being administered as well as it could. Since the scheme has been in operation for 2 years an analysis of the link between 1 in 6 data and taxable income could prove useful. For example, to reduce the extent of returns filed where no tax is assessed, might a "2 in 6" scheme be instituted instead? Alternatively, should an aggregate monetary value for such things as cars, club memberships and foreign travel be imposed? On the other hand, what is the impact of this scheme on businesses (e.g. foreign tour operators) indirectly affected by this scheme? What of additional compliance costs of taxpayers and third parties?⁷³

To the extent possible, final withholding taxes ($s = t$) could also be considered to reduce the need for filing by those whose taxes are withheld. Other than this, standard prescriptions to reduce the incidence of non-filing, through increased automation of citizens' records and improved use of third party information continue to remain valid.

The negative study results pertaining to tax advisors, while tentative, point to the possible need for greater accountability via closer regulation of tax practitioners, as in Australia, Mexico, the USA, and UK may be considered.

It should be borne in mind that the conclusions and suggestions made here are tentative, given the limited data base and the absence of crucial information on tax administration.

⁷⁰ Detailed suggestions are made in Chattopadhyay and Das-Gupta (2002).

⁷¹ The recent expansion in the scope of TDS is, therefore, likely to improve compliance and revenue. See, for example, "TDS may soon invade sickbeds", *The Economic Times*, June 7, 2002, pg 1 and 5.

⁷² A review of usage of third party information is in Das-Gupta and Mookherjee (1998).

⁷³ Professor Richard Bird has our grateful thanks for suggesting additional discussion of the 1 in 6 scheme.

Annex: Regression Results

Table A1: Regression Results for Tax Payment								
Method: OLS; Dependent: Tax paid in Rs; Double-log form; Number of regressions 111								
<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	Stdev	maximum	minimum	N eqns
Constant	-11.30	0.00	N.A.	-11.30	3.23	-2.26	-16.68	111
Marginal tax rate times 10 ⁴	1.11	100.00	1.11	N.A.	0.19	1.94	0.77	111
Estimated gross income in 10s of rupees	1.42	100.00	1.42	N.A.	0.27	1.87	0.86	111
Legal compliance cost (Rs)	0.07	92.73	0.08	-0.01	0.07	0.23	-0.02	55
Time compliance cost (Rs)	0.14	100.00	0.14	N.A.	0.08	0.54	0.07	56
Money compliance cost (Rs)	-0.06	19.64	0.04	-0.08	0.07	0.18	-0.20	56
Share of tax planning cost (%)	-0.71	0.00	N.A.	-0.71	0.44	-0.05	-2.23	111
Delhi	-0.12	5.00	0.07	-0.13	0.09	0.07	-0.35	20
Other city	-0.05	15.00	0.03	-0.07	0.10	0.05	-0.39	20
Other metro	-0.21	0.00	N.A.	-0.21	0.07	-0.08	-0.43	20
Govt services: Benefit (Rs)	0.01	100.00	0.01	N.A.	N.A.	0.01	0.01	1
Salary dummy	-0.30	5.00	0.03	-0.32	0.15	0.03	-0.47	20
Advisor used dummy	0.14	90.00	0.15	-0.01	0.11	0.29	-0.02	20
Bribe paid (Rs)	-0.03	10.00	0.00	-0.04	0.03	0.01	-0.10	20
Age in years	0.00	90.00	0.00	-0.01	0.00	0.01	-0.01	20
Female dummy	-0.37	0.00	N.A.	-0.37	0.15	-0.05	-0.54	20
Tax saving (Rs)	0.10	100.00	0.10	N.A.	0.03	0.16	0.03	20
Tax deducted at source (Rs)	0.35	100.00	0.35	N.A.	0.02	0.37	0.27	20
Impression about IT Dept (Excellent = 5)	-0.01	40.00	0.03	-0.03	0.04	0.06	-0.10	20
Education (post grad = 5)	-0.04	20.00	0.07	-0.07	0.08	0.10	-0.23	20

<i>Goodness of Fit</i>	% t > 1.7	Ave t	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t
Constant	89.19	4.06	89.19	-4.06	N.A.	N.A.
Marginal tax rate times 10 ⁴	100.00	12.47	N.A.	N.A.	100.00	12.47
Estimated gross income in 10s of rupees	100.00	9.02	N.A.	N.A.	100.00	9.02
Legal compliance cost (Rs)	30.91	1.09	0.00	-0.16	33.33	1.16
Time compliance cost (Rs)	73.21	1.95	N.A.	N.A.	73.21	1.95
Money compliance cost (Rs)	10.71	0.92	13.33	-1.03	0.00	0.48
Share of tax planning cost (%)	18.02	1.15	18.02	-1.15	N.A.	N.A.
Delhi	0.00	0.33	0.00	-0.34	0.00	0.14
Other city	0.00	0.26	0.00	-0.26	0.00	0.24
Other metro	0.00	0.72	0.00	-0.72	N.A.	N.A.
Govt services: Benefit (Rs)	0.00	0.19	N.A.	N.A.	0.00	0.19
Salary dummy	45.00	1.51	47.37	-1.58	0.00	0.10
Advisor used dummy	0.00	0.73	0.00	-0.08	0.00	0.80
Bribe paid (Rs)	0.00	0.19	0.00	-0.21	0.00	0.02
Age in years	0.00	0.62	0.00	-0.44	0.00	0.64
Female dummy	80.00	1.77	80.00	-1.77	N.A.	N.A.
Tax saving (Rs)	0.00	0.97	N.A.	N.A.	0.00	0.97
Tax deducted at source (Rs)	100.00	5.40	N.A.	N.A.	100.00	5.40
Impression about IT Dept (Excellent = 5)	0.00	0.28	0.00	-0.25	0.00	0.34
Education (post grad = 5)	10.00	0.71	12.50	-0.78	0.00	0.44
	Average	Stand Dev	Maximum	Minimum		
R squared	0.922	0.017	0.989	0.904		
R bar-squared	0.912	0.020	0.966	0.879		
Probability of F statistic	0.000	0.000	0.005	0.000		
Number of regressions	79.89	26.46	105.00	25.00		

Notes: 1. White Heteroskedasticity-Consistent Standard Errors are used.
2. 100 has been added to all rupee variables and to the marginal tax rate to prevent lost observations due to zero values (log is undefined).

Method: OLS; Dependent: Tax evasion in Rs; Double-log form; Number of regressions 78								
<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	stdev	maximum	minimum	N eqns
Constant	-15.81	0.00	N.A.	-15.81	4.53	-3.44	-25.97	78
Marginal tax rate times 10 ⁴	-0.12	12.82	0.21	-0.16	0.14	0.46	-0.34	78
Estimated gross income in 10s of rupees	1.62	100.00	1.62	N.A.	0.54	2.73	0.75	78
Legal compliance cost (Rs)	0.00	53.66	0.04	-0.06	0.06	0.12	-0.12	41
Time compliance cost (Rs)	-0.24	0.00	N.A.	-0.24	0.08	-0.15	-0.44	37
Money compliance cost (Rs)	0.24	100.00	0.24	N.A.	0.12	0.52	0.04	37
Share of tax planning cost (%)	1.56	100.00	1.56	N.A.	0.48	2.37	0.16	78
Delhi	0.31	93.75	0.36	-0.31	0.22	0.56	-0.31	16
Other city	0.47	100.00	0.47	N.A.	0.08	0.61	0.34	16
Other metro	0.06	62.50	0.14	-0.07	0.13	0.24	-0.30	16
Salary dummy	0.73	94.12	0.79	-0.21	0.34	1.14	-0.21	17
Advisor used dummy	0.61	100.00	0.61	N.A.	0.10	0.78	0.44	16
Age in years	-0.01	0.00	N.A.	-0.01	0.00	0.00	-0.01	16
Female dummy	-0.49	0.00	N.A.	-0.49	0.06	-0.39	-0.66	17
Tax saving (Rs)	-0.19	0.00	N.A.	-0.19	0.07	-0.07	-0.34	18
Tax deducted at source (Rs)	-0.03	18.75	0.01	-0.04	0.03	0.01	-0.12	16
Impression about IT Dept (Excellent = 5)	-0.26	0.00	N.A.	-0.26	0.03	-0.21	-0.29	6
Education (post grad = 5)	-0.16	0.00	N.A.	-0.16	0.06	-0.05	-0.28	17

<i>Goodness of Fit</i>	% t > 1.7	Ave t	% -ve t < -1.7	Ave neg t	% +ve t > 1.7	Ave pos t
Constant	82.05	2.13	82.05	-2.13	N.A.	N.A.
Marginal tax rate times 10 ⁴	0.00	0.76	0.00	-0.80	0.00	0.47
Estimated gross income in 10s of rupees	80.77	2.88	N.A.	N.A.	80.77	2.88
Legal compliance cost (Rs)	0.00	0.29	0.00	-0.34	0.00	0.25
Time compliance cost (Rs)	24.32	1.37	24.32	-1.37	N.A.	N.A.
Money compliance cost (Rs)	35.14	1.33	N.A.	N.A.	35.14	1.33
Share of tax planning cost (%)	7.69	1.24	N.A.	N.A.	7.69	1.24
Delhi	0.00	0.45	0.00	-0.39	0.00	0.45
Other city	0.00	0.87	N.A.	N.A.	0.00	0.87
Other metro	0.00	0.15	0.00	-0.09	0.00	0.19
Salary dummy	17.65	1.29	0.00	-0.42	18.75	1.34
Advisor used dummy	25.00	1.40	N.A.	N.A.	25.00	1.40
Age in years	0.00	0.45	0.00	-0.45	N.A.	N.A.
Female dummy	5.88	1.07	5.88	-1.07	N.A.	N.A.
Income tax knowledge (5=excellent)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Tax saving (Rs)	5.56	1.29	5.56	-1.29	N.A.	N.A.
Tax deducted at source (Rs)	0.00	0.26	0.00	-0.32	0.00	0.05
Impression about IT Dept (Excellent = 5)	0.00	1.16	0.00	-1.16	N.A.	N.A.
Education (post grad = 5)	0.00	0.76	0.00	-0.76	N.A.	N.A.
	Average	Stand Dev	Maximum	Minimum		
R squared	0.213	0.057	0.352	0.121		
R bar-squared	0.151	0.059	0.286	0.060		
Probability F statistic	0.011	0.019	0.095	0.000		
Number of regressions	94.35	9.03	122.00	66.00		

Note: See the notes below Table A1.

<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	stdev	maximum	minimum	N eqns
Constant	3.61	100.00	3.61	N.A.	0.45	4.28	2.74	30
Marginal tax rate times 10 ⁴	-0.15	0.00	N.A.	-0.15	0.03	-0.08	-0.20	30
Estimated gross income in 10s of rupees	0.19	100.00	0.19	N.A.	0.06	0.28	0.12	30
Legal compliance cost (Rs)	-0.03	0.00	N.A.	-0.03	0.01	-0.01	-0.05	13
Time compliance cost (Rs)	-0.04	0.00	N.A.	-0.04	0.02	-0.02	-0.08	17
Money compliance cost (Rs)	0.02	64.71	0.04	-0.02	0.03	0.08	-0.03	17
Share of tax planning cost (%)	0.18	100.00	0.18	N.A.	0.06	0.36	0.09	30
Delhi	-0.09	0.00	N.A.	-0.09	0.07	-0.05	-0.17	3
Other city	0.09	100.00	0.09	N.A.	0.04	0.12	0.04	3
Other metro	0.01	66.67	0.03	-0.03	0.04	0.04	-0.03	3
Salary dummy	0.07	80.00	0.09	-0.02	0.07	0.15	-0.02	5
Advisor used dummy	0.19	100.00	0.19	N.A.	0.02	0.23	0.16	16
Age in years	0.00	0.00	N.A.	0.00	0.00	0.00	0.00	4
Female dummy	0.06	100.00	0.06	N.A.	0.01	0.07	0.06	4
Tax saving (Rs)	-0.03	0.00	N.A.	-0.03	0.01	-0.01	-0.06	14
Tax deducted at source (Rs)	0.01	100.00	0.01	N.A.	0.00	0.01	0.00	3
Education (post grad = 5)	-0.07	0.00	N.A.	-0.07	0.01	-0.05	-0.08	6

<i>Goodness of Fit</i>	% t > 1.7	Ave t 	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t
Constant	100.00	3.18	N.A.	N.A.	100.00	3.18
Marginal tax rate times 10 ⁴	3.33	1.25	3.33	-1.25	N.A.	N.A.
Estimated gross income in 10s of rupees	86.67	2.50	N.A.	N.A.	86.67	2.50
Legal compliance cost (Rs)	30.77	1.28	30.77	-1.28	N.A.	N.A.
Time compliance cost (Rs)	5.88	1.34	5.88	-1.34	N.A.	N.A.
Money compliance cost (Rs)	11.76	1.06	0.00	-0.60	18.18	1.31
Share of tax planning cost (%)	6.67	0.92	N.A.	N.A.	6.67	0.92
Delhi	0.00	0.90	0.00	-0.90	N.A.	N.A.
Other city	0.00	0.97	N.A.	N.A.	0.00	0.97
Other metro	0.00	0.31	0.00	-0.30	0.00	0.32
Salary dummy	0.00	0.84	0.00	-0.27	0.00	0.98
Advisor used dummy	100.00	2.65	N.A.	N.A.	100.00	2.65
Age in years	0.00	0.33	0.00	-0.33	N.A.	N.A.
Female dummy	0.00	0.60	N.A.	N.A.	0.00	0.60
Tax saving (Rs)	7.14	1.34	7.14	-1.34	N.A.	N.A.
Tax deducted at source (Rs)	0.00	0.31	N.A.	N.A.	0.00	0.31
Education (post grad = 5)	0.00	1.51	0.00	-1.51	N.A.	N.A.
	Average	Stand Dev	Maximum	Minimum		
R squared	0.195	0.032	0.255	0.143		
R bar-squared	0.115	0.029	0.183	0.069		
Probability F statistic	0.038	0.027	0.097	0.003		
Number of observations	74.83	4.06	82	65		

Note: See the notes below Table A1.

<i>Information on coefficients</i>	Average#	%+ve	avg+ve#	avg-ve#	stdev#	maximum	minimum	N eqns
Constant	4602.923	100.00	4602.923	N.A.	0.641	4605.417	4601.595	77
Marginal tax rate times 10 ⁴	-0.023	15.58	0.036	-0.034	0.028	0.084	-0.047	77
Estimated gross income in 10s of rupees	0.208	100.00	0.208	N.A.	0.073	0.360	0.022	77
Legal compliance cost (Rs)	-0.001	62.50	0.004	-0.010	0.008	0.021	-0.019	40
Time compliance cost (Rs)	-0.040	0.00	N.A.	-0.040	0.010	-0.028	-0.062	37
Money compliance cost (Rs)	0.040	100.00	0.040	N.A.	0.015	0.071	0.012	37
Share of tax planning cost (%)	0.128	90.91	0.151	-0.095	0.090	0.251	-0.229	77
Delhi	0.077	100.00	0.077	N.A.	0.024	0.110	0.007	16
Other city	0.045	100.00	0.045	N.A.	0.011	0.067	0.030	16
Other metro	0.052	100.00	0.052	N.A.	0.017	0.075	0.012	16
Salary dummy	0.053	88.24	0.069	-0.067	0.058	0.140	-0.102	17
Advisor used dummy	0.103	100.00	0.103	N.A.	0.018	0.129	0.076	16
Bribe paid (Rs)	0.118	100.00	0.118	N.A.	0.025	0.147	0.103	3
Age in years	-0.002	0.00	N.A.	-0.002	0.001	-0.002	-0.004	16
Female dummy	-0.023	0.00	N.A.	-0.023	0.008	-0.003	-0.034	16
Tax saving (Rs)	-0.035	0.00	N.A.	-0.035	0.012	-0.010	-0.061	19
Tax deducted at source (Rs)	-0.007	0.00	N.A.	-0.007	0.004	-0.001	-0.016	16
Impression about IT Dept (Excellent = 5)	-0.044	0.00	N.A.	-0.044	0.018	-0.033	-0.066	3
Education (post grad = 5)	0.005	81.25	0.008	-0.005	0.010	0.027	-0.009	16

<i>Goodness of Fit</i>	% t > 1.7	Ave t	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t
Constant	100.00	4756.54	N.A.	N.A.	100.00	4756.54
Marginal tax rate times 10 ⁴	0.00	1.07	0.00	-1.16	0.00	0.58
Estimated gross income in 10s of rupees	51.95	2.20	N.A.	N.A.	51.95	2.20
Legal compliance cost (Rs)	0.00	0.27	0.00	-0.44	0.00	0.17
Time compliance cost (Rs)	35.14	1.71	35.14	-1.71	N.A.	N.A.
Money compliance cost (Rs)	48.65	1.71	N.A.	N.A.	48.65	1.71
Share of tax planning cost (%)	1.30	0.95	0.00	-0.40	1.43	1.01
Delhi	0.00	0.71	N.A.	N.A.	0.00	0.71
Other city	0.00	0.65	N.A.	N.A.	0.00	0.65
Other metro	0.00	0.53	N.A.	N.A.	0.00	0.53
Salary dummy	0.00	0.82	0.00	-0.87	0.00	0.81
Advisor used dummy	50.00	1.79	N.A.	N.A.	50.00	1.79
Bribe paid (Rs)	100.00	2.24	N.A.	N.A.	100.00	2.24
Age in years	0.00	0.97	0.00	-0.97	N.A.	N.A.
Female dummy	0.00	0.34	0.00	-0.34	N.A.	N.A.
Tax saving (Rs)	31.58	1.59	31.58	-1.59	N.A.	N.A.
Tax deducted at source (Rs)	0.00	0.37	0.00	-0.37	N.A.	N.A.
Impression about IT Dept (Excellent = 5)	0.00	1.10	0.00	-1.10	N.A.	N.A.
Education (post grad = 5)	0.00	0.27	0.00	-0.16	0.00	0.29
	Average	Stand Dev	Maximu m	Minimu m		
R squared	0.206	0.077	0.423	0.132		
R bar-squared	0.139	0.069	0.296	0.061		
Probability F statistic	0.021	0.024	0.099	0.000		
Number of observations	92.19	15.30	105	25		

Notes:

1. Note: See the notes below Table A1.

2. #: Coefficient values have been multiplied by 1000.

Table A5: Tax Payment and Compliance Costs (in Rupees): Alternative Specification				
	Legal Compliance costs		Time Compliance costs	Money Compliance costs
	With dummies, with % share of tax planning	With dummies, without % share of tax planning	With dummies, with % share of tax planning	With dummies, without % share of tax planning
Dependent variable: Tax paid in Rupees. Double log specification.				
Constant	-14.84***	-14.55***	-14.98***	-14.53***
Marginal tax rate 10 ⁴	1.15***	1.2***	1.15***	1.21***
Income (in 10s of rupees)	1.57***	1.44***	1.58***	1.46***
Compliance costs: Non-salaried				
Legal compliance cost (Rs)	0.026	0.057		
Time Compliance costs (Rs)			0.092	0.042
Money compliance costs (Rs)			-0.058	-0.006
Compliance costs: Salaried				
Legal compliance cost (Rs)	0.008	0.046		
Time Compliance costs (Rs)			0.140	0.038
Money compliance costs (Rs)			-0.172	-0.034
Advisor salary dummy	-0.148	-0.224	0.083	-0.137
% Share of tax planning	-0.003		-0.002	
Regression statistics				
Number of Observations	105	132	102	131
R -squared	0.914	0.883	0.918	0.887
R-bar-squared	0.908	0.878	0.911	0.881
F-statistic (k and n-k-1) d.f.	173.7	190.24	131.75	139.02
Probability of F statistic	0.000	0.000	0.000	0.000
Mean of dependent variable	8.39	8.56	8.36	8.45
Notes: 1. *** Statistically significant at 1% level, ** Statistically significant at 5% level, *Statistically significant at 10% level; White Heteroskedasticity –Consistent Standard Errors were used for significance tests.				
2. 100 has been added to all the rupee variables and to the marginal tax rate so that loss of observations due to zero values (logarithm is undefined) is avoided.				

Table A6: Tax Evasion and Compliance costs (in Rupees): Alternative Specification				
	Legal Compliance costs		Time Compliance costs	Money Compliance costs
	With dummies, with % share of tax planning	With dummies, without % share of tax planning	With dummies, with % share of tax planning	With dummies, without % share of tax planning
Dependent variable: Tax evasion (Rs.) Double log specification.				
Constant	-6.38	-7.50*	-6.27	-8.25*
Marginal tax rate 10 ⁴	-0.21	-0.172	-0.237	-0.206
Income (in 10s of rupees)	1.32**	1.79***	1.35**	1.89***
Compliance costs: Non-salaried				
Legal compliance cost (Rs)	-0.064	-0.353***		
Time Compliance costs (Rs)			-0.141	-0.179
Money compliance costs (Rs)			0.053	-0.198
Compliance costs: Salaried				
Legal compliance cost (Rs)	-0.053	-0.3524		
Time Compliance costs (Rs)			-0.279	-0.468
Money compliance costs (Rs)			0.273	0.137
Advisor salary dummy	1.00**	0.818**	0.667	0.548
% Share of tax planning	0.008		0.0076	
Regression statistics				
Number of Observations	105	132	102	131
R -squared	0.217	0.249	0.228	0.260
R-bar-squared	0.169	0.22	0.161	0.218
F-statistic (k and n-k-1) d.f.	4.53	8.39	3.43	6.19
Probability of F statistic	0.0004	0.000	0.0016	0.000
Mean of dependent variable	5.80	6.15	5.82	6.20
Notes: See Table A5.				

	Legal Compliance costs		Time	Money
	Compliance costs	Compliance costs	Compliance costs	Compliance costs
Dependent variable: Tax evasion as a % of tax; Double log specification.	With dummies, with % share of tax planning	With dummies, without % share of tax planning	With dummies, with % share of tax planning	With dummies, without % share of tax planning
Constant	5.70***	6.08***	6.10***	6.79***
Marginal tax rate 10 ⁴	-0.253**	-0.263**	-0.281**	-0.303**
Income (in 10s of rupees)	0.111*	0.114**	0.115*	0.115**
Compliance costs: Non-salaried				
Legal compliance cost (% of tax)	-0.06	-0.087**		
Time Compliance costs (% of tax)			-0.022	-0.062
Money compliance costs (% of tax)			-0.082*	-0.112**
Compliance costs: Salaried				
Legal compliance cost (% of tax)	-0.069	-0.084		
Time Compliance costs (% of tax)			-0.191	-0.245
Money compliance costs (% of tax)			0.081	0.073*
Advisor dummy	0.213***	0.139*	0.203***	0.138*
% Share of tax planning	0.001		0.001	
Regression statistics				
Number of Observations	82	105	79	102
R –squared	0.204	0.119	0.213	0.129
R-bar-squared	0.14	0.075	0.123	0.064
F-statistic (k and n-k-1) d.f.	3.2	2.69	2.37	1.98
Probability of F statistic	0.007	0.025	0.025	0.064
Mean of dependent variable	4.71	4.74	4.72	4.75

Notes: See Table A5.

	Legal Compliance costs		Time	Money
	Compliance costs	Compliance costs	Compliance costs	Compliance costs
Dependent variable: Tax evasion as a % of income; Double log specification.	With dummies, with % share of tax planning	With dummies, without % share of tax planning	With dummies, with % share of tax planning	With dummies, without % share of tax planning
Constant	4.60***	4.60***	4.60***	4.60***
Marginal tax rate 10 ⁴	0.00000	0.0000*	-0.00004	-0.000049*
Income (in 10s of rupees)	0.0002*	0.0002***	0.00017*	0.00023***
Compliance costs: Non-salaried				
Legal compl. cost (% of income)	-0.0003	-0.0004*		
Time Compl. costs (% of income)			-0.0005	-0.0006
Money compl. costs (% of income)			0.0009	-0.000055
Compliance costs: Salaried				
Legal compl. cost (% of income)	-0.0003	-0.0004	-0.001288	-0.001874
Time Compl. costs (% of income)			0.001685	0.001225
Money compl. costs (% of income)				
Advisor dummy	0.0002***	0.0001	0.00015**	0.00008
% Share of tax planning	0.0000		0.0000	
Regression statistics				
Number of Observations	105	132	102	131
R –squared	0.2008	0.1518	0.209	0.156
R-bar-squared	0.151	0.121	0.141	0.108
F-statistic (k and n-k-1) d.f.	4.1	4.6165	3.08	3.25
Probability of F statistic	0.001	0.0007	0.0039	0.003
Mean of dependent variable	4.60	4.60	4.60	4.60

Notes: See Table A5.

Table A9: Summary of Basic Regression Results: Alternative Specification							
		Legal Compliance costs		Time Compliance costs		Money Compliance costs	
		Significance	Sign	Significance	Sign	Significance	Sign
Tax Paid (Rs)							
(a) With dummies, tax planning share	Non-Salaried	N	+	N	+	N	-
	Salaried	N	+	N	+	N	-
(b) With dummies, no tax planning share	Non-Salaried	N	+	N	+	N	-
	Salaried	N	+	N	+	N	-
Tax Evasion (in Rs)							
(a) With dummies, tax planning share	Non-Salaried	N	-	N	-	N	+
	Salaried	N	-	N	-	N	+
(b) With dummies, no tax planning share	Non-Salaried	1%	-	N	-	N	-
	Salaried	N	-	N	-	N	+
Tax Evasion (as % of tax)							
(a) With dummies, tax planning share	Non-Salaried	N	-	N	-	10%	-
	Salaried	N	-	N	-	N	+
(b) With dummies, no tax planning share	Non-Salaried	5%	-	N	-	5%	-
	Salaried	N	-	N	-	10%	+
Tax Evasion (as % of income)							
(a) With dummies, tax planning share	Non-Salaried	N	-	N	-	N	+
	Salaried	N	-	N	-	N	+
(b) With dummies, no tax planning share	Non-Salaried	10%	-	N	-	N	-
	Salaried	N	-	N	-	N	+
Notes:							
1. N: Not significant.							
2. For each regression, the core variables are the marginal tax rate and income.							
3. See the notes below table 5.1 to Tables 5.4 for measurement units of different variables.							

Table A10: Regression Results for Tax paid Determinants: Alternative Specification								
Regression method: OLS; Dependent Variable: Tax paid in Rs; Double-log form; Number of regressions 112								
<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	stdev	maximum	minimum	N eqns
C	-11.92	0.00	N/A	-11.92	3.22	-1.65	-16.62	112
Marginal Tax rate	1.12	100.00	1.12	N/A	0.18	1.44	0.78	112
Income	1.44	100.00	1.44	N/A	0.26	1.81	0.63	112
Legal Compliance cost	0.07	83.93	0.09	-0.01	0.07	0.24	-0.02	56
Time Compliance cost	0.11	98.21	0.11	-0.13	0.06	0.22	-0.13	56
Money Compliance cost	-0.03	33.93	0.08	-0.10	0.12	0.44	-0.26	56
Share of tax planning cost	-0.60	0.00	N/A	-0.60	0.44	-0.04	-1.87	112
Advisor used salary dummy	-0.18	35.71	0.09	-0.32	0.33	0.20	-1.33	112
Legal C.cost salary dummy	0.00	44.64	0.03	-0.02	0.03	0.09	-0.07	56
Time C.cost salary dummy	0.09	80.36	0.11	-0.02	0.13	0.45	-0.07	56
Cash C.cost salary dummy	-0.13	14.29	0.03	-0.16	0.14	0.10	-0.52	56
Advisor used dummy	0.74	100.00	0.74	N/A	0.27	1.25	0.18	20
Delhi	-0.07	30.00	0.04	-0.12	0.10	0.07	-0.29	20
Other City	-0.06	10.00	0.03	-0.07	0.09	0.04	-0.42	20
Other Metro	-0.26	0.00	N/A	-0.26	0.08	-0.10	-0.49	20
Stability in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Ambiguity in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Benefit in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Salary Dummy	-0.20	30.00	0.32	-0.43	0.39	0.53	-0.70	20
Bribe paid in Rs	-0.02	35.00	0.01	-0.03	0.03	0.02	-0.11	20
AGE	0.00	90.00	0.01	-0.01	0.00	0.01	-0.01	20
FEMALE dummy	-0.36	0.00	N/A	-0.36	0.15	-0.05	-0.57	20
Income Tax knowledge(5=excellent)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Tax Saving in Rs	0.08	95.00	0.09	0.00	0.04	0.15	0.00	20
Tax deducted at source	0.35	100.00	0.35	N/A	0.02	0.38	0.29	20
Opinion about IT rate	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Impression about ITD	-0.04	15.00	0.03	-0.06	0.06	0.05	-0.21	20
Education (5=post grad)	-0.02	50.00	0.04	-0.08	0.08	0.11	-0.22	20
Goodness of Fit	% t > 1.7	Ave t	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t		
C	87.50	4.35	87.50	-4.35	N/A	N/A		
Marginal Tax rate	100.00	13.08	N/A	N/A	100.00	13.08		
Income	100.00	8.68	N/A	N/A	100.00	8.68		
Legal Compliance cost	25.00	0.99	0.00	-0.16	29.79	1.15		
Time Compliance cost	8.93	1.08	0.00	-1.06	9.09	1.08		
Money Compliance cost	14.29	0.72	18.92	-0.83	5.26	0.52		
Share of tax planning cost	12.50	0.95	12.50	-0.95	N/A	N/A		
Advisor dummy	12.50	0.76	19.44	-0.98	0.00	0.36		
Legal C.cost dummy Salary	10.71	0.71	19.35	-0.88	0.00	0.51		
Time C.cost dummy Salary	0.00	0.50	0.00	-0.19	0.00	0.57		
Cash C.cost dummy Salary	0.00	0.73	0.00	-0.82	0.00	0.25		
Advisor used dummy	75.00	2.06	N/A	N/A	75.00	2.06		
Delhi	0.00	0.25	0.00	-0.32	0.00	0.10		
Other City	0.00	0.29	0.00	-0.30	0.00	0.25		
Other Metro	0.00	0.92	0.00	-0.92	N/A	N/A		
Stability in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Ambiguity in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Benefit in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Salary Dummy	0.00	0.37	0.00	-0.37	0.00	0.39		
Bribe paid in Rs	0.00	0.15	0.00	-0.21	0.00	0.04		
AGE	0.00	0.78	0.00	-0.41	0.00	0.82		
FEMALE dummy	70.00	1.75	70.00	-1.75	N/A	N/A		
Income Tax knowledge(5=excellent)	N/A	N/A	N/A	N/A	N/A	N/A		
Tax Saving in Rs	0.00	0.79	0.00	-0.08	0.00	0.83		

Ambiguity in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Benefit in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Salary Dummy	0.00	0.78	0.00	-0.86	0.00	0.14		
Advisor used dummy	0.00	0.44	0.00	-0.44	N/A	N/A		
Bribe paid in Rs	N/A	N/A	N/A	N/A	N/A	N/A		
AGE	0.00	0.54	0.00	-0.54	N/A	N/A		
FEMALE dummy	11.11	1.33	11.11	-1.33	N/A	N/A		
Income Tax knowledge(5=excellent)	N/A	N/A	N/A	N/A	N/A	N/A		
Tax Saving in Rs	0.00	1.11	0.00	-1.11	N/A	N/A		
Tax deducted at source	0.00	0.26	0.00	-0.29	0.00	0.05		
Opinion about IT rate	N/A	N/A	N/A	N/A	N/A	N/A		
Impression about ITD	0.00	0.83	0.00	-0.83	N/A	N/A		
Education (5=post grad)	0.00	1.03	0.00	-1.03	N/A	N/A		
	Average	Stand Dev	Maximum	Minimum				
R squared	0.26	0.05	0.37	0.17				
R bar-squared	0.17	0.05	0.28	0.08				
Probability F statistic	0.01	0.02	0.10	0.00				
Number of observations	93.30	9.20	105.00	66.00				

Table A12: Regression Results for Tax Evasion as a Percentage of Tax Paid: Alternative Specification								
Regression method: OLS; Dependent Variable: Tax evasion as a % of tax, Double-log form; Number of regressions 59								
<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	stdev	maximum	minimum	N eqns
C	-13.63	72.88	5.93	-66.18	32.46	9.18	-76.10	59
Marginal Tax rate	-0.30	0.00	N/A	-0.30	0.04	-0.24	-0.38	59
Income	0.13	100.00	0.13	N/A	0.03	0.21	0.08	59
Legal Compliance cost	-0.06	0.00	N/A	-0.06	0.02	-0.01	-0.09	37
Time Compliance cost	-0.04	4.55	0.00	-0.05	0.03	0.00	-0.11	22
Money Compliance cost	-0.09	0.00	N/A	-0.09	0.02	-0.06	-0.12	22
Share of tax planning cost	0.20	100.00	0.20	N/A	0.05	0.32	0.12	37
Advisor used salary dummy	0.20	100.00	0.20	N/A	0.04	0.27	0.08	59
Legal C.cost salary dummy	-0.01	10.81	0.03	-0.01	0.02	0.07	-0.02	37
Time C.cost salary dummy	-0.20	0.00	N/A	-0.20	0.02	-0.14	-0.26	22
Cash C.cost salary dummy	0.19	100.00	0.19	N/A	0.02	0.26	0.15	22
Delhi	-0.07	0.00	N/A	-0.07	0.01	-0.05	-0.08	9
Other City	0.10	100.00	0.10	N/A	0.01	0.11	0.08	9
Other Metro	0.06	100.00	0.06	N/A	0.02	0.08	0.02	9
Stability in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Ambiguity in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Benefit in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Salary Dummy	-0.09	36.36	0.13	-0.21	0.23	0.33	-0.46	11
Advisor used dummy	0.02	75.00	0.05	-0.05	0.05	0.10	-0.05	12
Bribe paid in Rs	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
AGE	0.00	9.09	0.00	0.00	0.00	0.00	0.00	11
FEMALE dummy	0.07	100.00	0.07	N/A	0.02	0.11	0.03	12
Income Tax knowledge(5=excellent)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Tax Saving in Rs	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Tax deducted at source	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Opinion about IT rate	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Impression about ITD	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Education (5=post grad)	-0.07	0.00	N/A	-0.07	0.02	-0.05	-0.11	15
Goodness of Fit	% t > 1.7	Ave t	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t		
C	91.53	3.52	68.75	-1.86	100.00	4.13		
Marginal Tax rate	100.00	2.43	100.00	-2.43	N/A	N/A		
Income	94.92	2.19	N/A	N/A	94.92	2.19		
Legal Compliance cost	2.70	1.05	2.70	-1.05	N/A	N/A		

Time Compliance cost	0.00	0.72	0.00	-0.75	0.00	0.07		
Money Compliance cost	22.73	1.45	22.73	-1.45	N/A	N/A		
Share of tax planning cost	0.00	1.03	N/A	N/A	0.00	1.03		
Advisor dummy	77.97	2.37	N/A	N/A	77.97	2.37		
Legal C.cost dummy Salary	0.00	0.67	0.00	-0.71	0.00	0.37		
Time C.cost dummy Salary	63.64	1.77	63.64	-1.77	N/A	N/A		
Cash C.cost dummy Salary	54.55	1.76	N/A	N/A	54.55	1.76		
Delhi	0.00	0.70	0.00	-0.70	N/A	N/A		
Other City	0.00	1.13	N/A	N/A	0.00	1.13		
Other Metro	0.00	0.60	N/A	N/A	0.00	0.60		
Stability in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Ambiguity in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Benefit in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Salary Dummy	0.00	0.31	0.00	-0.37	0.00	0.21		
Advisor used dummy	0.00	0.49	0.00	-0.40	0.00	0.52		
Bribe paid in Rs	N/A	N/A	N/A	N/A	N/A	N/A		
AGE	0.00	0.23	0.00	-0.23	0.00	0.24		
FEMALE dummy	0.00	0.50	N/A	N/A	0.00	0.50		
Income Tax knowledge(5=excellent)	N/A	N/A	N/A	N/A	N/A	N/A		
Tax Saving in Rs	N/A	N/A	N/A	N/A	N/A	N/A		
Tax deducted at source	N/A	N/A	N/A	N/A	N/A	N/A		
Opinion about IT rate	N/A	N/A	N/A	N/A	N/A	N/A		
Impression about ITD	N/A	N/A	N/A	N/A	N/A	N/A		
Education (5=post grad)	20.00	1.51	20.00	-1.51	N/A	N/A		
		Average	Stand Dev	Maximum	Minimum			
R squared		0.24	0.05	0.36	0.13			
R bar-squared		0.15	0.05	0.28	0.06			
Probability F statistic		0.02	0.03	0.10	0.00			
Number of observations		80.19	8.63	102.00	66.00			

TableA13: Regression Results for Tax Evasion as a percentage of income: Alternative Specification

Regression method: OLS; Dependent Variable: Tax evasion as a % of income; Double-log form; Number of regressions 76								
<i>Information on coefficients</i>	Average	%+ve	avg+ve	avg-ve	stdev	maximum	minimum	N eqns
C	4.63	100.00	4.63	N/A	0.05	4.77	4.60	76
Marginal Tax rate	-0.36	2.63	0.06	-0.37	0.14	0.07	-0.54	76
Income	2.10	100.00	2.10	N/A	0.70	3.59	1.58	76
Legal Compliance cost	-2.18	10.53	0.26	-2.47	1.27	0.74	-4.32	38
Time Compliance cost	-5.31	0.00	N/A	-5.31	1.41	-2.12	-8.24	38
Money Compliance cost	9.39	100.00	9.39	N/A	4.02	16.71	1.45	38
Share of tax planning cost	1.32	97.37	1.36	-0.05	0.46	2.23	-0.08	76
Advisor used salary dummy	1.73	100.00	1.73	N/A	0.51	2.89	0.69	76
Legal C.cost salary dummy	-2.52	0.00	N/A	-2.52	4.65	-0.07	-16.56	38
Time C.cost salary dummy	-6.92	2.63	9.36	-7.36	3.47	9.36	-14.39	38
Cash C.cost salary dummy	1.86	76.32	6.84	-14.17	9.41	10.59	-21.12	38
Delhi	0.64	100.00	0.64	N/A	0.12	0.86	0.43	16
Other City	0.60	100.00	0.60	N/A	0.19	0.79	0.13	16
Other Metro	0.82	100.00	0.82	N/A	0.26	1.10	0.16	16
Stability in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Ambiguity in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Benefit in Rs.	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Salary Dummy	79.35	100.00	79.35	N/A	34.93	163.70	36.97	16
Advisor used dummy	-0.79	12.50	0.35	-0.96	0.49	0.40	-1.22	16
Bribe paid in Rs	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
AGE	-0.02	0.00	N/A	-0.02	0.01	-0.01	-0.03	16
FEMALE dummy	-0.44	0.00	N/A	-0.44	0.27	-0.19	-1.13	16
Income Tax knowledge(5=excellent)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0

Tax Saving in Rs	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Tax deducted at source	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Opinion about IT rate	N/A	0.00	N/A	N/A	N/A	N/A	N/A	0
Impression about ITD	-0.26	0.00	N/A	-0.26	0.03	-0.24	-0.28	2
Education (5=post grad)	0.03	62.50	0.06	-0.03	0.08	0.22	-0.06	16
Goodness of Fit	% t > 1.7	Ave t	% -ve t > 1.7	Ave neg t	% +ve t > 1.7	Ave pos t		
C	100.00	1318.74	N/A	N/A	100.00	1318.74		
Marginal Tax rate	15.79	1.29	16.22	-1.32	0.00	0.19		
Income	82.89	2.54	N/A	N/A	82.89	2.54		
Legal Compliance cost	0.00	0.72	0.00	-0.80	0.00	0.08		
Time Compliance cost	0.00	1.10	0.00	-1.10	N/A	N/A		
Money Compliance cost	0.00	0.70	N/A	N/A	0.00	0.70		
Share of tax planning cost	0.00	0.90	0.00	-0.04	0.00	0.93		
Advisor dummy	94.74	2.41	N/A	N/A	94.74	2.41		
Legal C.cost dummy Salary	21.05	1.20	21.05	-1.20	N/A	N/A		
Time C.cost dummy Salary	0.00	0.63	0.00	-0.63	0.00	0.57		
Cash C.cost dummy Salary	0.00	0.58	0.00	-0.61	0.00	0.57		
Delhi	0.00	0.64	N/A	N/A	0.00	0.64		
Other City	0.00	0.95	N/A	N/A	0.00	0.95		
Other Metro	0.00	0.89	N/A	N/A	0.00	0.89		
Stability in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Ambiguity in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Benefit in Rs.	N/A	N/A	N/A	N/A	N/A	N/A		
Salary Dummy	0.00	1.06	N/A	N/A	0.00	1.06		
Advisor used dummy	0.00	0.75	0.00	-0.81	0.00	0.31		
Bribe paid in Rs	N/A	N/A	N/A	N/A	N/A	N/A		
AGE	0.00	0.88	0.00	-0.88	N/A	N/A		
FEMALE dummy	0.00	0.62	0.00	-0.62	N/A	N/A		
Income Tax knowledge(5=excellent)	N/A	N/A	N/A	N/A	N/A	N/A		
Tax Saving in Rs	N/A	N/A	N/A	N/A	N/A	N/A		
Tax deducted at source	N/A	N/A	N/A	N/A	N/A	N/A		
Opinion about IT rate	N/A	N/A	N/A	N/A	N/A	N/A		
Impression about ITD	0.00	0.97	0.00	-0.97	N/A	N/A		
Education (5=post grad)	0.00	0.18	0.00	-0.08	0.00	0.24		
	Average	Stand Dev	Maximum	Minimum				
R squared	0.278	0.101	0.487	0.203				
R bar-squared	0.199	0.107	0.432	0.121				
Probability F statistic	0.007	0.007	0.032	0.000				
Number of regressions	95.07	7.88	105.00	66.00				

Note: All coefficients have been multiplied by 10,000, except that of the constant.

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