IIUM Journal of Economics and Management 12, no.1 (2004):

THE INFLUENCE OF PENALTIES ON TAXPAYERS' COMPLIANCE: A COMPARISON OF THE THEORETICAL MODELS

Siti Normala Sheikh Obid

Associate Professor, Department of Accounting, Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia, Jalan Gombak, 53100 Kuala Lumpur (email: snormala@iiu.edu.my)

ABSTRACT

The use of penalties and detection is a common approach used by tax administrators to combat tax evasion and avoidance in order to enhance efficient revenue collection. The government's traditional reliance (including the Malaysian Inland Revenue Board (IRB)) on penalties is analogous to the evolution of economic models of tax evasion. The increased reliance on penalties has been based on the relationships specified in the deterrence theory. The theory assumes that there is a perceived likelihood of apprehension and a severe but fair penalty for the offence. Since then many researchers have modified the traditional model(s). Recently, researchers have begun to add the non-economic factors (factors that cannot be quantified such as perceived equity and fairness, and tax education, etc.).

This paper investigates why taxpayers evade taxes and in what way the tax authorities can influence their behavior. This include a discussion of the theoretical models of taxpayers' compliance, which are influenced by factors such as perceived equity and fairness, public expenditure, public income and the substitution effect on audit rate and penalty rate, and the effect of corruption and labor supply. Besides the above factors, we also believe that the delivery mechanism that ought to deliver the work effectively, efficiently, with accurate and reliable information seems to address the need for full automation in management and administration. A good briefing for both the tax advisors and taxpayers on tax procedures and its law making may also contribute to a climate of professional cooperation and voluntary compliance.

The findings show that both the theoretical model of the tax compliance and the empirical evidence on penalty rate and detection rate do have a significant effect on the tax evasion (i.e., increased taxpayers' compliance) but their effectiveness may be greatly reduced in an economy which is perceived

to have an unfair tax administration and tax system. We also notice that a decrease in marginal tax rate is likely to increase the compliance level due to substitution effect. However, the income effect is still subject to question. Although the labor supply factor may seem inappropriate in the study of efficiency, in essence, switching from legal to illegal work and taxpayers' effort in concealing part of their income proved to be appropriate to apply in the case of evasion and compliance.

JEL classification:

Key words: Evasion, Detection, Penalty

1. INTRODUCTION

This paper compares the theoretical models of the influence of penalties on tax compliance. The paper further investigates why taxpayers evade taxes and in what way the tax authorities can influence their behavior. The use of penalties and detection is a common approach used by tax administrator to combat tax evasion to enhance efficient revenue collection. The increased reliance on penalties has been based on the relationships specified in the deterrence theory. The theory assumes that there is a perceived likelihood of being apprehended and that there is a severe but fair penalty for the offence (Rossi and Grasmick, 1985). The government's traditional reliance on penalties is analogous to the evolution of economic models of tax evasion.

The original work of Allingham and Sandmo (1972) illustrates how penalties are perceived as a cost in a purely economic decision to comply. Since then, many researchers have modified the traditional model, and only recently have researchers begun to add non-economic factors (factors that cannot be quantified such as perceived equity and fairness, and tax education). Baldry (1987) argues that the presence of a fair economic gamble does not necessarily lead to tax evasion because there are 'moral costs' to be considered. Falkinger (1988) theoretically analyzed the social psychology argument that an inequitable government-taxpayer exchange increases non-compliance.

In fact, studies on cause, effect and solution to taxpayers' compliance have been carried out by researchers in many countries. Each researcher has identified the association of their finding variables with taxpayers' compliance such as perceived equity (Kirchler, et al.,

2001; S. Normala, 1994; Vogel, 1974), public expenditure (Crane and Nourzad, 1990), the effect of corruption (Chu, 1990; Shu, 1992) and labor supply (Pancavel, 1979; Cowell, 1985a). The empirical works on the effects of the penalty rate on taxpayers' compliance found that a large fine was a more effective deterrent to tax evasion than a high probability of detection (Friedland et al., 1978; Crane and Nourzad, 1986; Christiansen, 1980). Other factors that are also found to contribute to reduction in tax evasion include public income and the substitution effect on marginal tax rate (Allingham and Sandmo, 1972). The empirical findings by Wittie and Woodbury (1983b), Dubin and Wilde (1988) and Dubin et al. (1990) support the claim that an increase in audit rate will decrease evasion. An increase in marginal tax rates leads to an increase in the amount of unreported income, hence an increase in tax evasion, but an increase in audit rate will decrease tax evasion.

Section two discusses the theoretical models that explain the problems of evasion under the assumption that income is exogenously given and fixed. Based on this basic model we extend its application to self-employed taxpayers (who are capable of varying their efforts and also concealing part of their income). This is followed by a discussion of why taxpayers are switching from legal to illegal work practices in order to evade taxes. The switch may actually be prompted in response to the change in the degree of difficulty in evading tax, as presented by Pencavel (1979) and Cowel (1985a and 1985b).

The factor of corruption in tax evasion is described in Section Four. Corruption is seen to be a solution to the 'unfair' treatment that taxpayers get from taxation system and tax administration. Socio-economic factors such as gender, perceived fairness and perceived equity are summarised in Section Five. Section Six concludes that both economic and socio-economic factors do contribute to the evasion of taxes in these models.

2. INCOME AND SUBSTITUTION EFFECT WITH PENALTY AND TAX RATE

Beginning with Allingham and Sandmo (1972), the focus of most economists' studies of tax evasion has been the utility-maximizing

behavior of taxpayers who are subject to detection and penalty parameters.[1] This is in contrast to the approach of emphasizing the minimization of administrative and compliance costs to encourage compliance and ease of revenue collection.[2] Thus, it is said that individuals 'demand' the level of evasion given the 'prices' set by the government. In this context of a supply and demand model, individuals take the structure, enforcement effort, and the punishments of the tax code as given, and determine their most preferred level of work effort and evasion.

Allingham and Sandmo (1972) were the first to construct a model of tax evasion on the concept of decision-making (i.e., based on income and substitution effects). They divided economic sectors in two; namely, sector 1 which represents governmental-controlled sectors (certainty) and sector 2 as nongovernmental-controlled (uncertainty). The assumptions are as follows:

a. Taxpayers will choose an amount of tax to evade so as to maximize expected utility after taxes and penalties (represented as $E(U)$);
b. Taxpayers' behavior conforms to the Von Neumann-Morgenstern axioms for behavior under uncertainty;
c. Marginal utility of a taxpayer is everywhere positive and strictly decreasing, i.e., the taxpayer is risk averse;
d. Amount earned by each individual under certainty, w, in sector 1;
e. Actual income under uncertainty condition, W, is exogenously given and is known by the taxpayer but not by the tax office in sector 2;
f. Tax is levied at a constant rate, t, on the taxpayer's declared income;
g. Taxpayers will be subject to audit by the tax authorities with some probability, and the tax authorities will then be assumed to know the exact amount of taxpayers' incomes if audited;
h. Taxpayers will have to pay tax on the under-declared income, (X), therefore, W-X, at a penalty rate of π if audited, where π is supposed to be greater than t.

The above argument, developing the relationship between risk aversion and the penalty rate and audit rate, is exemplified in diagrammatic form in Figure 1 and Figure 2, respectively. Figure 1 suggests that an increase in the penalty rate will always increase the

fraction of actual income declared. Thus the penalty rate is regarded as a tool to combat tax evasion. The figure shows that an individual does not evade tax if s(he) has a disposable income of $(1 - t)W$ in both sectors. However, if s(he) evades tax s(he) has a usable income of w in state 1 and $(1 - \pi)W$ in sector 2. The line PR thus describes trade-offs between honest reporting and evasion, and has a slope of $(\pi\text{-}t)/t$. As the penalty rate, π, increases, the line PR will become steeper and the amount of evasion will thus be reduced.

FIGURE 1

FIGURE 2

In the second case, the audit rate is also seen as a tool to combat evasion, where an increase in the rate of detection is believed to reduce the amount of evasion. In other words, it will increase the fraction of actual income declared. The relationship between risk aversion and audit rate is shown in Figure 2. The figure shows that an increase in the probability of detection will not affect the slope of the trade-off line but will increase the curvature of the indifference curve and shift the equilibrium point from Q to Q^1 and thus reduce the amount of evasion.

In a combination of ideas centering on the audit rate and the penalty rate, Allingham and Sandmo (1972) show that where the probability of detection is not exogenously given but varies with the level of declared income, an increase in the penalty rate will again lead to an increase in declared income. (Here it is assumed that a person reporting an income below the average of his/her profession increases the probability of investigation and, therefore, of detection.)

The above analysis suggests that an important aspect of the Inland Revenue Board's (IRB) task will centre on effective audit and the employment of penalty rates to counter, to some extent, those other forces driving individuals towards evasion. However, in this utility-based analysis it becomes less clear how we can explicitly incorporate the wider issues perceived equity, psychic costs of evasion, etc., other than

to simply say that these force will operate differently for each individual taxpayer and will mean that the utility that they each derive from their post-tax income will reflect their perceptions of the 'justice' of the taxation system. In practice, the utility based analysis of aversion tends to characterize taxpayers in the narrow terms of their risk aversion as it relates to levels of wealth. The other forces that may be shaping the subjective utility function are effectively taken as being constant.

FIGURE 3
Relationship between Risk Adversion and Income Declared

Figure 3 summarizes the relationship between risk aversion and income declared. The figure shows that when actual income varies, the fraction of the income declared increases, stays constant, or decreases according to whether relative risk aversion is an increasing, constant or decreasing function of income. Therefore, we can see that as income increases then, other things being equal, both the before and after-tax income increases. This shifts the whole trade-off line outwards. The final equilibrium point will shift from Q to A or B or C, depending on the relative risk aversion of the individual. If the relative risk aversion is an increasing function of income, then the final equilibrium point will be at A where the fraction of income declared increases. If relative risk aversion is decreasing function of income, the final equilibrium point will be at B where the fraction of income declared remains constant. If relative risk aversion is decreasing function of income, the final equilibrium point will be at C where the fraction of income declared decreases.

Thus, the result shows that an increase in average tax rate makes taxpayers less wealthy, and together with the assumption of decreasing absolute risk aversion, the taxpayer will then reduce evasion accordingly (i.e., income effect). However, an increase in the marginal tax rate makes it more profitable to evade taxes at the margin and, therefore, declared income decreases as the marginal tax rate increases, which means evasion will increase (i.e., substitution effect). Therefore, with an increase in the average tax rate as a result of an increase in marginal tax rates, it becomes impossible to determine *a priori* whether an

individual taxpayer will increase or decrease his/her level of evasion.

Using a similar approach of exploring income and substitution effects as laid down by Allingham and Sandmo, but this time employing different assumptions, Srinivasan (1973) came to a more definite result with regard to the relationship between evasion and changes in income. His assumptions are as follows:

a. Taxpayers will choose an amount of tax to evade so as to maximize expected utility after taxes and penalties;
b. The probability of being detected depends on the income level;
c. Tax paid is a function of income;
d. Tax on income is positive, increasing, convex function of income;
e. The marginal tax rate is strictly less than unity;
f. The marginal rate of tax is zero at zero income;
g. The penalty multiplier, i.e., the penalty rate charged on the understated income, is a positive, increasing and convex function of the proportion of income being understated;
h. The penalty multiplier equals zero when there is no understatement of income.

Srinivasan's work is shown in Figure 4. We can see from the figure that it produces the same result as Allingham and Sandmo with regard to the effect of the audit rate, i.e., an increase in the probability of detection always leads to an increase in declared income. In addition, his model also give two corollaries: (i) the richer a person, the larger is the optimal proportion by which s(he) will understate income given a progressive tax function and a probability of detection independent of income, as shown in Figure 4a. (ii) If the marginal rate of tax is constant and the probability of detection is an increasing function of income, then the optimal proportion of understatement of income decreases as income increases as shown in Figure 4b.

Figure 4
Income and Substitution Effect: Penalty Rate and Audit Rate

Figure 4a
Tax Function and Probability of Detection (for higher income)

Figure 4b
Tax Function and Probability Detection (when MR is constant)

However, Yatzhaki (1974) argues that contrary to the substitution effect as propounded by Allingham and Sandmo, an increase in the marginal tax rate can actually lead to a reduction in evasion. His findings show that if fines are imposed on the evaded tax rather than on the undeclared income as in the Allingham and Sandmo case, then an increase in the tax rate will reduce tax evasion.

Figure 5
Trade-off Line between Detection Rate and Penalty Rate

Christiansen (1980) explored the relationship between fines and detection and questioned whether a large fine with small probability of detection is a more powerful deterrent to tax evasion than a high probability of detection with a small penalty (see Figure 5). The following results were obtained from his analysis:

(i) If the penalty rate is increased and at the same time efforts to detect tax evaders are adjusted so as to keep the expected gains from tax evasion unaltered, i.e., a decrease in the detection rate, risk averters will always reduce their tax evasion. The figure shows that an increase in the penalty rate will shift the trade-off line downwards. Were the probability of detection to have been held constant, the amount of evasion would be reduced, as shown by the dotted indifference curves. However, if probability of detection is reduced to an extent that the expected gain from tax evasion is unaltered, the curvature of the indifference curve will become more vertical (illustrated by continuous line of indifference curve). The final equilibrium point, Q^1, shows that the amount of evasion is more than that at point Q^2 but less than at the original equilibrium point Q. This suggests that a large fine is always a

more effective deterrent to tax evasion than a high probability of detection.

(ii) If the initial penalty rate is small enough, an increase in the penalty rate will give an incentive to extended tax evasion when the probability of detection is adjusted to keep the expected fines unchanged. The intuitive explanation for this position is that for the initial low penalty rate to have had any meaningful impact on evasion behavior would implicitly require a high audit or detection rate. Therefore, if the expected fines are to remain unchanged after an increase in the penalty rate, then there must be a fairly dramatic reduction in the audit or detection rate. This means a sharp vertical increase in the individual's preference curve and a move to increased evasion. This is illustrated in the movement between the lowest and the intermediate penalty rates in the figure.

On the other hand, if the initial penalty rate is already large enough (e.g., actually starts at the level of the intermediate penalty rate in the figure), an increase in the penalty rate will discourage tax evasion when the detection probability is adjusted to keep the expected fine unchanged. This conclusion is, of course, consistent with his analysis as reported earlier in Figure 5.

If the initial penalty rate is very small, an increase will move the equilibrium point from Q to Q^1 where the amount of evasion is increased. However, further increases in the penalty rate will shift the equilibrium point inwards, for example, at point Q^2, where the amount of evasion is less than both points Q^1 and Q. The indifference curves in this diagram have already taken into account the adjustments in probability of detection. In this latter example, Christiansen makes an additional assumption that relative risk aversion is of the order of unity. Figure 6 illustrates both these points:

Figure 6
Relationship between Risk Aversion and Trade-off Line of Audit Rate and Penalty Rate

A study conducted by Friedland et al. (1978) also shows that a large fine was a more effective deterrent to tax evasion than a high probability of detection. Their work was later tested by Christiansen and Crane and Nourzad (1986). Both sets of results show in favor of Friedland's argument. However, Christiansen has some reservations about the issue of a raised penalty. His proposal shows that it is not possible to raise a penalty indefinitely as it should bear a reasonable relationship to the crime committed. A study made by Witte and Woodbury (1983a) shows that taxpayers' attitude has significant effects on tax compliance, but the type of action likely to be most effective may vary according to the type of taxpayer. For example, audits usually have relatively large effects on the compliance behavior of small proprietors but only very small, although significant effects on the compliance of middle income wage and salary workers.

The effects of the penalty rate on taxpayer compliance is also supported by Crane and Nourzad (1986), Witte and Woodbury (1983a) and Graetz and Wilde (1985). The empirical findings by Witte and Woodbury (1983b), Crane and Nourzad (1990), Dubin and Wilde (1988) and Dubin et al. (1990) support the claim that an increase in audit rate will decrease evasion.

The prediction made by Allingham and Sandmo (1972) that high marginal tax rates lead to an increase in the amount of unreported income is supported by the empirical findings of Clolfelter (1983), Slemrod (1984), Crane and Nourzad (1986, 1990), and Baldry (1987). Another study of factors that affect compliance conducted by Aaron and Harvey (1985), found that high marginal tax rates and complexity made tax evasion and avoidance increasingly more profitable.

However, Graetz and Wild (1985) found that lowering tax rates has no effect on compliance either theoretically or from empirical evidence. Instead, they state that to improve tax compliance requires further legislative or administrative action.

3. FACTOR OF LABOR SUPPLY

Although the labor supply factor seems inappropriate in the study of efficiency, the type of taxpayer that we are addressing, the self-employed, are capable of varying their efforts and also of concealing part of their income[3] (Musgrave, 1981) and S. Normala (1994). We have singled out this group as being one which both presents major

problems for tax administrators but which also has the opportunity of obtaining real revenue gains from successfully tackling their evasion.

All the models concerned in section 2 are based on the assumption that income is exogenously given and is fixed. However, this may not be the case since an individual taxpayer such as a self-employed taxpayer, may be able to change number of hours worked or even be able to switch from legal to illegal work practices, and this switch may actually be prompted in response to the change in the degree of difficulty in evading tax (Pencavel, 1979; Cowell, 1985).

Pencavel (1979) extended the theoretical analysis of tax evasion by treating the individual's income as endogenous and variable rather than as exogenous and fixed. Moreover, he also tried to relax the assumption of a linear income tax schedule.

The following assumptions are made in Pencavel's model:

i. The taxpayer's behavior satisfies the axioms permitting the construction of a von Neumann-Morgenstern utility function which is defined over total income (Y) and hours of worked (h):

(1) $U = U(Y, h)$

$R(Y) = -\left[U^2(Y)/U^1(Y)\right] > 0$

ii. The marginal utility of income is positive and strictly decreasing as the individual is risk averse.

iii. The marginal utility of hours of work is negative and strictly decreasing.

iv. The absolute risk aversion function,

(2)

where R is a decreasing function of income.

v. The utility function is strongly separable in income and hours of work.

The income tax system is as follows:

(3) $X = -S + ty^{\sigma}$

where;

$0 < t \leq (S + y)/y^{\sigma}$

$0 < \sigma < 1$ or

S = welfare payment from the government to the individual who would otherwise have no income.
t, = parameters governing the relationship between changes in reported income and changes in tax payments.
y = income reported to tax authorities.

Note: $\sigma > 1$ means marginal tax rate increases with y.
$\sigma < 1$ means marginal tax rate decreases with y.
$\sigma = 1$ means marginal tax rate is independent of y.
t = marginal tax rate and average tax rate provided that S=0 and σ=1.

The individual is assumed to select y and h so as to maximize expected utility.

(4)

where;
π = probability of detection
Y^o = amount of consumption available if not caught
= $Z(h) + S - ty^\sigma$
Y^c = amount of consumption available if caught

Z = individual's true taxable income (a function of h)
σ = the penalty multiplier which is assumed >1

The results of Pencavel's model are summarized as follows:

In contrast to the outcomes of the models in section 2, there is no clear-cut relationship between each of the above parameters, π,σ, t and the amount of income declared in this model (except in the case of $\sigma = 1$, where the difference between true taxable income and reported income decreases as π increases, i.e., less evasion). Pencavel explained such ambiguities may be due to the fact that the change of these parameters will change the taxpayer's hours of work which, in turn, induces change in true taxable income. For example, an increase in the penalty rate (π) may decrease hours of work which causes a decline in true income which inclines the taxpayer to reduce reported income. Therefore, the final results in response to the change of any of the above parameters will be indeterminate.

TABLE 1

Qualitative Effects on Difference Between True Taxable Income and Reported Income

Increases in Parameters	$\sigma<1$	$\sigma=1$	$\sigma>1$
π	ambiguous	<0	ambiguous
λ	ambiguous	<0	ambiguous
σ	ambiguous	<0	ambiguous
t	ambiguous	<0	ambiguous
S	ambiguous	>0	>0

Cowell (1985a) on the other hand, supposed that taxpayers are able to switch some legal work to illegal work. The income from the former is assumed to be properly reported to the tax authorities whereas the income from the latter is assumed to be not reported to the authorities, i.e., the evasion portion.

Cowell's model first assumes that the taxpayer is an immoral expected utility maximizer whose utility function has disposable income and leisure as components. In other words, the taxpayer seeks to maximize:

$$V = EU(c, 1-H) \tag{5}$$

subject to:

(6) $H = h_0 + h_1$

(7) $$\text{with probability} \begin{cases} 1-p \\ p \end{cases}$$

where,

(8) $w_i = [1 - t_i]W_i, \quad i = 0,1$

The meanings of the parameters are as follows:

h_0 = proportion of time spent in legal work
h_1 = proportion of time spent in illegal work
$1 - H$ = proportion of time spent in leisure
c_a = disposable income of the taxpayer
c_β = disposable income where evasion is successful
W_0 = wage rate of legal work
W_1 = wage rate of illegal work
t_0 = tax rate imposed on the taxable income
t_1 = penalty rate on evaded income
B = lump sum grant from the government, where (B/t_0) will be the exemption level

A linear progressive tax system is assumed in this model which is given by:

(9) $T = t_o y_o - B$

where,

T = tax received by the government
$y_o = W_o h_0$
$y_1 = W_1 h_1$

Up to this point the expected return on illegal activities and the variances of such a return can be obtained from equation (7). They are as follows:

(10) Expected return = $(1 - pt_1)\, W_1$

(11) Variance of return $= p(1-p)t_1^2 W_1^2$

Equation (10) shows that an increase in t_1 (penalty rate) or p (probability of detection) will reduce the expected returns on illegal activities. However, the variance of such returns increases with t_1 and increases or decreases according to whether p is > ½ or < ½. With the help of an analogy with portfolio theory, it can be seen that a change in either parameter is sufficiently complex to preclude any clear-cut comparative static result. Such a result is consistent with the findings of Pencavel noted above.

However, the Cowell model does not end here. Instead of leaving the argument at the point of the ambiguous results given above, Cowell tried to use a graphical approach to investigate comparative static results given any change in particular parameters.

In order to do so, one more assumption has to be made. This assumption is that the utility function can be structured in such a way that the decision about how much labor to supply overall is effectively separated from that of how to divide the labor between legal and evasion activities. This assumption will be subsequently referred to as the 'separability assumption'. The structure of Figure 7 is as follows:

FIGURE 7
Separability Assumption

Quadrant I

The (c_α, c_β) – space is the same as that in which the Allingham-Sandmo analysis occurs. The taxpayer is able to consume an amount P_1P_2 if totally honest. By switching entirely from honesty to evasion (s)he is able to consume 0R2 if s(he) does not get caught cheating, but only R_1R_2 if the authorities are nimble enough to catch him or her. The slope of the trade-off line P_1R_1 is $1\text{-}t_1/t_0$. The position of this line is determined by the height P_1P_2 which depends on optimum labor supply.

Quadrant II

There are 'honesty equivalent' indifference curves in the (*c*,*H*)-space. These are sets of points which yield the same value of *V* given *p*=1 as obtained by maximizing (5) subject to constraints that actually exist. Where the separability assumption holds, these curves are invariant, and so optimal H is determined in the usual way from the budget line in that quadrant with intercept B and slope w_0.

Quadrant III

This reflects the 'work' axis onto the 'allocation of labor time' axis.

Quadrant IV

The total working hours are divided into legal and evasion activities by drawing the line P_2K with slope $-1/t_0$. Legal work is represented by X_1X_2 and evasion by OX_1.

The effects arising from changes in the parameters are discussed below:

i. Penalty Rate, t_1

An increase in t_1 will rotate the trading line in quadrant 1 to P_1R_3, as shown in the diagram. The optimum thus shifts from Q_1 to Q_3, and evasion is reduced and is now shown as OX_3 in Figure 8.

ii. Probability of Detection, *p*

An increase in *p* increases the curvature of the indifference curves in quadrant 1, thereby shifting the optimum Q_1 to the left along P_1R_1, thus evasion is also reduced. This is illustrated in Figure 9.

iii. Tax Rate, t_0

An increase in t_0 will shift P_1P_2 towards the origin and the slope of P_1R_3 in quadrant II becomes flatter and the slope of P_2K in quadrant IV also becomes stagger. The overall effect on evasion will depend on the relative strength of the income and substitution effects as discussed by Allingham and Sandmo. Figure 10 illustrates this point.

However, if the penalty rate is based on the tax evaded rather than on the undeclared income, the slope of P_1R_1 will be as follows: slope = $-[Ft_0 - t_0]/t_0 = -[F-1]$, where F = the fine rate on evaded tax, and is assumed as > 1.

Thus, the slope will not change as the tax rate increases. Therefore, in this case only the income effect prevails, as described by Yitzhaki, and as a result, an increase in the tax rate will always reduce evasion.

FIGURE 8
The Effect of Increasing Penalty Rate

FIGURE 9
The Effect of Increasing Audit Rate

FIGURE 10
The Effect of Tax Rate

Figure 8 works only as far as the separability assumption holds, otherwise, the analysis becomes much more complicated. For example, an increase in π will not always rotate the line P_1R_1 but also affects the marginal rate of substitution between leisure and consumption so that the indifference curves in quadrant II are shifted, total work hours change and the length and position of AB in quadrant I also changes. Thus, the comparative static result is not clear.

Perhaps the best that can be said is that the interrelated effects of the penalty rate, the audit/detection rate and the tax rate are such that improvements resulting from changes in one area can be swamped by changes elsewhere, particularly changes in the tax rate. In these circumstances it is difficult to isolate and gauge the benefits to be derived from, say, improved audit, nevertheless it is certainly safe to conclude that the absence of an audit, or a largely ineffective audit will completely underminethe role of the penalty rate and the IRD's ability to raise revenue whatever the tax rate. Based on the above models, we believe that the role of audit and detection in reducing the rate of evasion, i.e., improved taxpayer compliance, could be improved by considering other factors such as increasing the level of audit frequency and 'field audit'.

4. FACTOR OF CORRUPTION

Corruption of tax administration can manifest itself in a number of ways, e.g., there may be an attempt by an official to directly benefit from coming to illegal arrangements with a taxpayer. However, at the other end of a continuum defining corruption there could be an 'unfairness' in the handling of taxpayers' affairs from which a tax official does not directly benefit. The sources of corruption in both the above cases arise from the complexity of the tax system and the inadequacy of resources applied to its administration. Where tax officials are poorly paid and their morale is low, then they may well have an incentive to engage in corrupting the tax system that directly improves their personal welfare.

All forms of corruption lead us to question the degree of fairness in implementing the tax legislation, and more importantly, corruption is a problem that is found in many developing countries (Virmani, 1987; Gray, 1987). The act of corruption inevitably undermines both the equity of the tax system and the efficiency of the tax administration. The incidence and effects resulting from corruption are largely dependent on tax administration and will, in turn, determine tax yield.

Hendricks et al. (1991), in their paper claimed that corruption, evasion and abuse of power are not only pervasive in economic activity but also a prominent instance in tax collection. To them, the optimal compensation scheme must take into account the strategic interaction between taxpayers and tax inspectors. This includes "Pure Tax Farming", which means that paying tax inspectors a share of their tax collections is optimal only when all tax inspectors are corruptible. Where there are both honest and corruptible inspectors, the optimal compensation scheme lies between tax farming and a pure wage scheme. Paradoxically, when inspectors are hired beforehand, it may be optimal to offer contracts that attract corruptible inspectors but not the honest ones.

Chu (1990) and Shu (1992) proposed theoretical models of tax evasion which take into account the problem of corruption. Both researchers believed that the problem needs to be addressed appropriately in order to obtain real revenue gains.

Shu's model assumes that the taxpayer is a risk-averse utility maximizer, as in the Allingham-Sandmo model, and seeks to maximize the following expected utility function:

(12) $E(U) = [1 - p(X, B, D)]U(Y) + p(X, B, D)]U(Z)$

where

(13) $Y = W - tX - B,$ and;

(14)

Parameters are explained as follows:

Y = disposable income if not caught
Z = disposable income if caught
U = utility function, where the usual concavity assumption applies
p = probability of detection
X = amount of income declared to the tax office
B = amount of bribery
D = government level of discipline when the officers fail to do the job well
W = actual exogenous income received by the individual, which is known by the taxpayers but not by the tax office.
t = constant tax rate
f = the penalty that tax invaders have to pay on the undeclared income

$Z = W - tX - B - f(W - X)$

Further explicit assumptions are made with respect to the determinants of the probability of investigation:

(i) $p_x < 0$

A person with a profession who reports a lower income is more likely to be investigated than one reporting higher income. This is the same assumption as Allingham and Sandmo made when they treated the probability is endogenous.

(ii) $p_{xx} > 0$

When declared income increases, the probability of investigation further declines but at a decreasing speed.

(iii) $p_B < 0$

When bribery, *B*, increases, the probability of and audit, *p*, is lower.

(iv) $p_D > 0$

An increase in the discipline level makes the tax collector work harder.

(v) $p_{XD} < 0$

When declared income increases, the probability of investigation will be reduced, more so if disciplinary action is taken against unfit officials than if there were no disciplinary measures taken.

(vi) $p_{BD} > 0$

For a given amount of bribery, the probability of detection cannot be lowered as much as before when there is such a discipline

The comparative static results, Shu reported are as follows:

is ambiguous.

$\partial B / \partial t$ is ambiguous

The results show that there is no clear-cut effect on declared income as a result of changing the tax rate (for the same reason noted in the Allingham-Sandmo model; income and substitution effects). As the amount of corruption is assumed to be related to evasion, the effect of a change in *t* on the amount of corruption is also ambiguous.

$$\frac{\partial B}{\partial f} > 0; \text{ when } A < \frac{p_B}{p}, \text{ and } \frac{\partial B}{\partial f} < 0, \text{ when } A > \frac{-p_B}{p}$$

where A = absolute risk aversion

Under normal circumstances, the individual is assumed to be risk averse, therefore, the effect of an increase in the penalty rate leads to more income being declared. However, the effect on corruption in response to an increase in the penalty rate is ambiguous. On the one hand, the taxpayer may no longer find it necessary to corrupt the tax official in order to reduce the probability by the same proportion as before because the income now declared is increased. On the other hand, if the individual still declares less income and has to face a higher penalty for evasion, then the risk adverse taxpayer has an incentive to further reduce the probability of detection. Thus the total effects are ambiguous and depend on absolute risk aversion. In general, the less risk averse the taxpayer is, the more likely it is that they will corrupt to further reduce the probability, p, in order to offset the effects of higher fines, f.

$$\partial X / \partial D > 0$$

$$\partial B / \partial D > 0$$

For the above case, the reported income X will be higher if there is more severe D, since the tax collector will work harder and as a result the probability of investigation will be higher.

Corruption is minimized when severe discipline is imposed amongst the tax officials. Working under this condition, the corrupt officials may ask for more from the individual in order to reduce the probability of investigation. However, taxpayers may find it less tempting to evade tax now, as it is not worthwhile to pay more or even the same amount of corruption to reduce the probability of detection, p, by the same proportion as before.

The results suggest that in cases where the practice of corruption prevails, increasing the level of discipline may be a viable option to combat those aspects of evasion which are dependent on the corruption of tax officers arising from the self-interested behavior of the tax officers.

Chu offered the same conclusion as Shu with regard to corruption. The point of difference is that Chu's model assumes that the probability

of detection, p, is exogenously determined. Thus, an additional result in relation to p is produced: $\partial X / \partial p$ is ambiguous.

This is because when p is increased, on the one hand, it decreases the marginal expected utility arising from evasion. On the other hand, when the tax system is corrupt, an increase in p will further encourage the taxpayer to corrupt the tax officials and after more funds have been invested to establish closer 'friendship' with tax officials, taxpayers will want to hide more of their real income from the authorities. Thus, there are two conflicting forces at work and the final net effect is unpredictable.

At the start of this section, we suggested that the concept of corruption could be broadened to encompass the notion of corruption in tax administration that does not necessarily directly benefit individual tax officials, i.e., the delivery of the tax legislation should be done in a manner that is fair to all taxpayers, if not it is corrupt. We could, for example, hypothesize a case where corporation managers felt their businesses were more sharply exposed to scrutiny than unincorporated businesses, or where recipients of wages felt more closely observed by the Inland Revenue Board than were the self-employed.

Such a hypothesis may be very pertinent in any study of the tax administration of a developing country. However, much of the analysis conducted in this section has centred on the more usual concept of corruption that of self-interested tax officials behaving in an opportunistic manner. In concluding this section, we would like to briefly reconsider the first of these two forms of corruption and argue that, in fact, whatever the form of corruption the steps to be taken to remove it are (insofar as they are clear at all) the same. So, what may be appropriate for opportunistic corruption will also apply for general bias in the delivery of the tax legislation.

It can be seen that two factors under the direct control of the tax administrationhave featured prominently in the discussion. These are the probability of detection, p, and the discipline imposed within the tax administration, D. Just as these have been shown to have an important bearing on opportunistic corruption, so will they also have an impact on the way a systematically biased delivery of tax legislation might be corrected. Taxpayers will perceive a level of fairness in the tax system where both p and D are high. However, to achieve this is a resourcing issue and part of that discussion must focus on the appropriate technology

for delivering a complete tax system.

5. SOCIO-ECONOMIC FACTORS

Taxpayers' incentives to evade taxes may be due to other factors but many of these are out of the direct control of the tax authorities (e.g., inflation, unemployment, gender, and others). Table 2 presents a brief summary of how these socio-economic factors impact on evasion generally. However, although these factors are beyond the direct control of the authorities, consideration of them may enhance the effectiveness and efficiency of audits (e.g., more frequent audits on young taxpayers than old taxpayers may result in more evaders being spotted as the latter have been found to be more 'honest'.)

Dubin et al. (1990) concluded in their study that a state with a high unemployment rate may have an unsound ceremony and thus yield lower reported taxes per return. The effect is reinforced if unemployment is associated with the underground economy and thus produces non compliance. On the other hand, if most unemployed taxpayers have a relatively low income, then reported tax per return will rise as a portion of the lower tail of the distribution of income is eliminated. To them changes in real income per capita also have confounding effects on reported tax return where higher income taxpayers have increased opportunities to evade, but there is a strong direct relationship between real income per capita and reported taxes per return.

Finally a significant finding on the farm variable was also noted. In their study, farms measured through farms per capita, and known to have low levels of voluntary compliance are found to be negatively related with reported tax returns.

Konishi (1991) reported that high tax evasion in Indonesia and Thailand was due to factors such as the inefficiency of the tax administration and unwillingness of taxpayers to pay taxes. The tax codes of both countries are seen as too simple and detailed rules and regulations are not officially announced. The tax burden is often decided through negotiations between tax officers and taxpayers. At the same time, tax administrators are seen to be unfair and knowledge about tax is not prevalent (Konishi, 1993).

Krichler et al. (2001) hypothesized a correlation between tax

TABLE 2
Socio-Economic Factors which Influence Compliance Level

Socio–Economic Factors	Effects on Compliance Level	Researchers
Age	Positive	Vogel (1974), Spicer and Lundstedt (1976), Friendland et al. (1978), Clotfleter (1983), Slemrod (1984)
Education	Positive	Witte and Woodbury (1983a), S. Normala (1994)
Gender	More males evade than females	Dubin et al, (1990), Friendland et al. (1978), Spicer and Becker (1980)
Income	Positive	Crane and Nourzad (1986), Dubin et al. (1990)
Inflation Rate	Negative	Crane and Nourzad (1986 and (1990)
Marital Status	Married couples evade and ignore than singles	Friendland et al. (1978), Clotfleter (1983), Crane and Nourzad (1990)
Moral Commitment to Society	Positive	Mason and Calvin (1984), Kaplan and Reckers (1985)
Tax Withholding	Positive	Witte and Woodbury (1983b), Dubin and Wilde (1988)
Unemployment	Negative	Dubin and Wilde (1988), Dubin et al. (1990)
Attitude and Behavior	Positive	S. Normala (1994)
Tax Knowledge	Positive	Kirchler et al. (2001), Kasipillai (1999), Singh and Renuka (2002), Mei and Chin (2000)
Tax Administration	Positive	Konishi, S. (1991, 1993)

knowledge with tax compliance. They found that taxpayers with tax knowledge positively correlated with attitudes towards legal tax avoidance and at the same time negatively correlated with the attitudes

towards illegal tax evasion. Thus, profound tax knowledge is found to lead one's perceived tax avoidance more positively than tax evasion, whereas little tax knowledge is found to imply the opposite, namely to perceive tax evasion more positively than tax avoidance.

Evidence in Japan shows that recognizing those who had done their best in complying with tax law (as the Japanese government practised in their "Blue Tax Reform System") could also improve taxpayers' compliance.[4] For example, the Japanese taxation system recognizes the contribution of responsible taxpayers and that contribution entitles them to such privileges as protection against arbitrary reassessment.

In the USA, it was estimated that approximately one third of the tax revenue could be recovered by using existing enforcement sources, but the remaining revenue could be collected with the cost effect programs (American Bar Association Commission, 1987). Thus, the group suggested that public education and moral persuasion be considered.

Also, developing good public relation and dispersing information could improve taxpayers' morals and hence bring about social change that adds to the confidence of the public (Tanzi, 1991). Long queues at the tax office and endless red tape increase the hardship on the taxpayers at the moment that they are burden conscious. As for public relations, briefing both the tax advisors and taxpayers on the tax procedures and its law making may help to create a climate of professional cooperation and voluntary compliance.

Working towards improving taxpayers' compliance through various approaches, as mentioned above the work cannot be implemented in a vacuum. Thus, we believed that the delivery mechanism that ought to deliver the work effectively, efficiently, with accuracy and reliable information seems to address the need of computerisation within the tax office.

Also, voluntary compliance on the part of the public will be facilitated as tax administration will be equipped with better and faster machines to process tax payments. Thus, the priority change in tax administration should address full computerization along with other administrative change. For example, the application of the automatic data processing system (ADP) and electronic filing system (E-filing) in many tax

administrations (in both developed and developing countries) has shown a tremendous help in both assessment and collection, as well as other related tasks. This mechanism not only helps by reducing the paper work involved but, most importantly, it helped to speed up the action taken by the department while improving accuracy.

6. CONCLUSION

The discussion on the theoretical model of tax compliance and the empirical evidence shows that the penalty rate and detection rate do have a significant effect on tax evasion (i.e., increased taxpayers' compliance) but the question remains is what resources should the tax department put into audit. In this instance, they believed that the influence of audit rate and its detection and lowering tax rates do not work in isolation. Instead, the 'vacuum in relationship' that exists between taxpayers and the tax office needs to be filled. Hence, further tax legislative, tax administration, tax system and acknowledgement on the importance of taxpayers should take place in tandem.

We believe that the use of audit and detection can be further improved by taking into consideration other factors such as 'audit frequency' and 'field audit'. The former refers to the degree of rigorousness of the audit conducted by the tax office and the latter is the visit to taxpayers' premises. From the researcher's experience working with the IRB, Malaysia, frequent visits to taxpayers' premises could improve taxpayer compliance, perhaps due to a psychological effect, namely 'fear factors'. These fear factors would presumably create both a positive and negative impact on taxpayers. The positive impact would be that taxpayers are kept up-to-date with the taxation system, hence an increase in tax literacy. While the negative impact creates pressure on taxpayers for true and honest disclosure. Perhaps this could be an area that needs to be explored in the future by both the compliance researchers and tax administrators.

We also noticed that a decrease in marginal tax rate is likely to increase the compliance level due to the substitution effect. However, the income effect is still subject to question. Although the labor supply factor may seem inappropriate in the study of efficiency, in essence, switching from legal to illegal work and the taxpayers' effort in

concealing part of their income proved to be applicable in the case of evasion and compliance.

Therefore, due to the limited effectiveness of these theoretical models in building up taxpayers' voluntary compliance, compliance researchers and tax administrators are beginning to recognize the influence of non-economic factors such as services offered to taxpayers and shaping taxpayers attitude through tax education.

ENDNOTES

1. Their works were further developed by researchers such as Srinivasan (1973, 1976), Sandmo (1980), Yitzhaki (1984), and Witte and Woodbury (1983a).

2. Unpublished data of "Administrative/Compliance Efficiency" (S. Normala, 1994).

3. Referred to by Musgrave (1981) as the 'hard-to-tax' groups, an appellant which is now widely used.

4. See report of Shoup Mission on Japanese Taxation (Tokyo, 1950), Vol. 11, p. 213, and Vol. IV, App., p. D56.

REFERENCES

Aaron, H., and Harvey. *Assessing Tax Reform*. Washington, DC: Brooking Institute, 1985.

Allingham, M. G., and A. Sandmo. "Income Tax Evasion: A Theoretical Analysis." *Journal of Public Economics*, November (1972).

American Bar Association Commission. *American Bar Association Commission Taxpayers Compliance, Report and Recommendation*. Chicago: American Bar Foundation, 1987.

Baldry, J. C. "Income Tax Evasion and the Tax Schedule: Some Experimental Results." *Public Finance* 42, no. 3 (1987).

Christiansen, V. "Two Comments on Tax Evasion." *Journal of Public Economics* 14 (1980).

Chu, C. Y. C. "A Model of Income Tax Evasion with Venal Tax Officials: The Case of Taiwan." *Public Finance* 45, no. 3 (1990).

Clotfelter, C. T. "Tax Evasion and Tax Rates: An Analysis of Individual

Returns." *Review of Economics and Statistics* 65 (1983).

Cowell, F. A. "Tax Evasion with Labour Income." *Journal of Public Economics* 26, no. 1 (1985a).

———. "The Economic Analysis of Tax Evasion." *Bulletin of Economic Research* 37 (1985b).

Crane, S. E., and F. Nourzad. "Inflation and Tax Evasion: An Empirical Analysis." *Review of Economics and Statistics*, 68 (1986).

———. "Tax Rate and Tax Evasion: Evidence from California Amnesty Data." *National Tax Journal* 43 (1990).

Dubin, J. A., and L. L. Wilde. "An Empirical Analysis of Federal Income Tax Auditing and Compliance." *National Tax Journal* 41 (1988).

Dubin, J. A., M. J. Graetz, and L. L. Wilde. "The Effect of Audit Rates on the Federal Individual Income Tax, 1977-86." *National Tax Journal* 43 (1990).

Falkinger, J. "Tax Evasion and Equity: A Theoretical Analysis." *Public Finance* 43, no. 3 (1988).

Friedland, N., S. Maital, and A. Rutenberg. "A Simulation Study of Tax Evasion." *Journal of Public Economics* 8 (1978).

Graetz, M. J., and L. L. Wilde. "The Economics of Tax Compliance: Fact and Fantasy." *National Tax Journal* 38 (1985).

Gray, C. W. "The Importance of Legal Process to Economic Development: The Case of Tax Reform in Indonesia." Unpublished paper. Washington, D.C: World Bank: 1987.

Hendricks, J., M. Keen, and A. Mathoo. "Corruption, Extortion and Evasion." *Journal of Public Economics* 74 (1999).

Kaplan, S. E., and P. M. J. Reckers. "A Study of Tax Evasion Judgments." *National Tax Journal* 38 (1985).

Kasipillai, J. "Malaysian Self-Assessment Tax System." *MIT Seminar of Current Year Basis of Assessment and Self-Assessment System*, 1999.

Kirchler, E., M. Boris, and S. Friedrich. "Everyday Representation of Tax Avoidance, Tax Evasion and Tax Flight: Do Legal Differences Matter?" http://www.economics.uni-linz.ac.at/Schneider/Maciejovsky.PDF.2001

Konishi, S. "Tax Administration and Tax Evasion in Thailand and Indonesia – An Empirical Approach." *Kwansei Gakun Annual Studies* 40 (1991). http://www.stylebuilt.co.yp/konishi/asia/p8-

13.htm

————. "An Empirical Analysis of Tax Evasion and Tax Administration of ASEAN Countries." *Kwansei Gakun Annual Studies* 42 (1993). http://www.stylebuilt.co.yp/konishi/asia/p8-13.htm

Manson, R., and L. D. Calvin. "Public Confidence and Admitted Tax Evasion." *National Tax Journal* 37 (1984).

Mei, T., and F. Chin. "The Impact of Tax Knowledge on the Perceptions of Tax Fairness and Attitudes Towards Compliance." *Asian Review of Accounting* 8, no. 1 (2001).

Musgrave, R. A. *Fiscal Reform in Bolivia*. Cambridge: Harvard Law School International Tax Programme, USA, 1981.

Pencavel, J. H. "A Note on Income Tax Evasion, Labour Supply and Nonlinear Tax Schedules." *Journal of Public Economics* 12, no. 1 (1979).

Rossi, P. H., and H. G. Grasmick. "Appeals within Our Social Structure that can Enhance Voluntary Compliance." In *Conference on Tax Administration Research*. Washington, D.C.: Internal Revenue Service, 1985.

Sandmo, A. "Income Tax Evasion, Labour Supply and the Equity-Efficiency Trade-Off." *Journal of Public Economics*, 16 (1981).

Shu, W. "Income Tax Evasion and Enforcement: A Purely Theoretical Analysis of Chinese Income Tax System." *Public Finance* 47 no. 2 (1992).

Singh, V., and B. Renuka. "The Malaysia Self-Assessment System of Taxation: Issues and Challenges." *Akauntan Nasional*, Jan/Feb (2002).

S. Normala, *Administrative/Compliance Efficiency in IRD, Malaysia*. Unpublished Thesis, 1994.

Slemrod, J., and N. Sorum. "The Compliance Cost of the Individual Income Tax System." *National Tax Journal* 37 (1984).

Spicer, M., and L. Becker. "Fiscal Inequity and Tax Evasion: An Experimental Approach." *National Tax Journal* 33 (1980).

Spicer, M. W., and S. B. Lundstedt. "Understanding Tax Evasion." *Public Finance* 31 (1976).

Srivinasan, T. N. "Tax Evasion: A Model." *Journal of Public Economics* 2 (1973).

Tanzi, V. "Stabilisation and Growth." In *Public Finance in Developing*

Countries. Worcester, England: Billing and Sons Ltd, 1991.

Virmani, A. "Tax Evasion, Corruption, and Administration: Monitoring the People's Agents under Symmetric Dishonest." *World Bank Development Research Department Discussion Paper no. DRD 271*. Washington, D.C.: World Bank, 1987.

Vogel, J. "Taxation and Public Opinion in Sweden: An Interpretation of Recent Survey Data." *National Tax Journal* 27 (1974).

Witte, A. D., and F. Woodbury. "The Effect of Tax Laws and Tax Administration on Tax Compliance." *Working Paper 83-1*, Department of Economics, University of North Carolina, Chapel Hill, North Carolina, USA, 1983a.

———. "What We Know about the Factors Affecting Compliance with the Tax Laws." In *Income Tax Compliance: A Report of the ABA Section of Taxation Invitation Conference on Income Tax Compliance*, edited by Phillips Sawicki, Washington, D.C.: American Bar Association, 1983b.

Yitzhaki, S. "A Note on Income Tax Evasion: A Theoretical Analysis." *Journal of Public Economics* 3 (1974).

———. "On the Excess Burden of Taxation." *National Bureau of Economic Research Working Paper*, Cambridge, USA, 1982.