DM/84/40

INTERNATIONAL MONETARY FUND

Fiscal Affairs Department

A Survey of the Determinants of Income Tax Evasion: Role of Tax Rates, Shape of Tax Schedule, and Other Factors

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June 15, 1984

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1/ The author is grateful to Ved Gandhi for his valuable suggestions. In addition, the author benefited from numerous helpful comments on earlier drafts by Vito Tanzi, Liam Ebrill, Jitendra Modi, Parthasarathi Shome, Fernando Sanchez-Ugarte, and Charles Sisson. The usual disclaimers apply.

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I. Introduction

Supply-side tax policy is based on the presumption that high tax rates and more progressive rate schedules encourage tax evasion and that lowering the rates and progressivity will reduce tax evasion. This paper reviews the theoretical literature on factors affecting tax evasion, in particular the role of the level of tax rates and the shape of the tax schedule. It also reviews empirical studies that have focused on the determinants of tax evasion. The paper will reveal the lack of consensus on these issues. In addition, it will show how the literature has ignored nontax factors affecting tax evasion. Finally, the paper attempts to hypothesize the reasons for the higher level of tax evasion in the developing than in the developed countries.

Section II presents the standard models of tax evasion. Section III reviews other theoretical studies. Section IV reviews empirical studies on the factors affecting tax evasion. Section V discusses the limitations of the literature. Section VI discusses the policy measures for deterrence of tax evasion. And Section VII explores the role of nontax factors and evaluates the relative extent of tax evasion in the developing country circumstances. Finally Section VIII is the conclusion.

II. Standard Tax Evasion Models

Since the beginning of the past decade, a number of mathematical models for analyzing tax evasion have been published in the literature. These models follow two approaches: the expected utility maximization approach developed by Allingham and Sandmo (1972) and the expected income maximization approach developed by Srinivasan (1973). In this section, the standard models of these two approaches will be described in detail. In Sections III and IV, the models developed by other authors will be referred to without going into their derivation.

1. Expected utility maximization approach

Allingham and Sandmo (hereafter referred to as A & S) assume that the tax declaration decision is a decision under uncertainty. The taxpayer has to choose between two main strategies: (a) to declare his actual income, or (b) to declare less than his actual income. If he chooses the first strategy he will have to pay the full amount of the tax. However, if he chooses the second strategy he will have to face the probability of being detected and penalized. His problem is to maximize the expected utility derived from his income after tax and penalty (if any). A & S assume that the taxpayer's behavior conforms to the von Neumann-Morgenstern axiom for behavior under uncertainty. The cardinal utility function of the taxpayer has income as its only argument and the marginal utility is assumed to be everywhere positive

and strictly decreasing so that the individual is risk averse. 1/ The taxpayer will choose his declared income so as to maximize his expected utility.

$$E(U) = (1-p)[U(W-\theta X)] + p[U(W-\theta X-\Pi(W-X))] \quad (1)$$

where

W = the taxpayer's actual income. This income is exogenously given and is known to the taxpayer but not to the tax authority,
θ = a constant tax rate, $\theta > 0$,
X = income reported to the tax authorities. This is the taxpayer's decision variable, $X > 0$,
p = probability that the evasion will be detected, and
Π = penalty rate on unreported income, $\Pi > 0$.

If we define

$Y = W - \theta X$ = disposable income of the taxpayer if the tax evasion is not detected,
$Z = W - \theta X - \Pi(W-X)$ = the disposable income of the taxpayer if the tax evasion is detected,
U = utility from disposable income, and
E(U) = expected utility.

Then the first order condition for maximization is

$$-\theta(1-p)U'(Y) - (\theta-\Pi)pU'(Z) = 0 \quad (2)$$

and the second order condition is

$$D \equiv \theta^2(1-p)U''(Y) + (\theta-\Pi)^2pU''(Z) < 0 \quad (3)$$

which is satisfied by the assumption of concavity of the utility function. The effects of the tax rate (θ) on reported income can be found by differentiating equation (2) with respect to θ.

$$\frac{\partial X}{\partial \theta} = -\frac{1}{D} X \left[\theta(1-p)U''(Y)+(\theta-\Pi)pU''(Z)\right] + \frac{1}{D}\left[(1-p)U'(Y)+pU'(Z)\right] \quad (4)$$

Using equation (2), equation (4) can be rewritten as

$$\frac{\partial X}{\partial \theta} = \frac{1}{D} X\theta(1-P)U'(Y)\left[R_A(Y)-R_A(Z)\right] + \frac{1}{D}\left[(1-P)U'(Y)+PU'(Z)\right] \quad (5)$$

1/ A risk averter is defined as one who, starting from a position of certainty, is unwilling to take a bet even when the bet is actuarially fair. Thus, he is more unwilling to take a bet if the bet is unfair to him. The utility function of a risk averter is strictly decreasing. For proof, see Arrow (1971).

where $R_A(K) = \frac{-U''(K)}{U'(K)}$ $\qquad (K = Y, Z)$

is the absolute risk aversion. 1/

Policy implications: The second term of equation (5) is unambiguously negative while the first term is either positive, zero, or negative, depending on whether the absolute risk aversion is assumed to be decreasing, constant, or increasing. Among these assumptions the decreasing absolute risk aversion is the most meaningful because it is closest to reality. 2/ A & S adopted this assumption, and showed that the sign of $\frac{\partial X}{\partial \theta}$ is indeterminate. Thus, we have an indeterminate effect of the tax rate on the reported income. The economic explanation of the result is that this indeterminate effect is the result of the combined forces of the substitution and the income effects. The substitution effect is negative because an increase in the tax rate makes it more profitable to evade taxes on the margin. The income effect is positive because an increased tax rate makes the taxpayer less wealthy, reducing both Y and Z for any level of X, and this, under decreasing absolute risk aversion, tends to reduce evasion.

The effect of a penalty rate on the reported income is derived by taking the partial derivative of equation (2) with respect to Π.

$$\frac{\partial X}{\partial \Pi} = -\frac{1}{D}(W-X)(\theta-\Pi)pU''(Z) - \frac{1}{D}pU'(Z) \qquad (6)$$

Because both terms are positive, $\frac{\partial X}{\partial \Pi}$ is positive, which implies that an increase in the penalty rate will always increase the reported income.

Now, to see how the probability of detection affects the reported income, we take a partial differentiation of equation (2) with respect to p.

$$\frac{\partial X}{\partial p} = \frac{1}{D}\left[-\theta U'(Y) + (\theta-\Pi)U'(Z)\right] \qquad (7)$$

1/ The absolute risk aversion is a measure of the insistence of an individual for more-than-fair odds as a prior condition to engaging in betting, at least when the bets are small. The measure of absolute risk aversion is developed by Arrow (1971) and by Pratt (1964).

2/ The assumption of decreasing absolute risk aversion means that the willingness of an individual to engage in a bet increases as his wealth increases. This is reflected in the decreasing odds demanded for engaging in the bet. This assumption is supported by everyday observation. For example, it is observed that an individual increases the holding of risky assets as his income or wealth increases. For further discussion on this assumption, see Arrow (1971).

This is positive and implies that an increase in the probability of detection will always lead to a larger income being declared.

2. Expected income maximization approach

Independently, Srinivasan has developed a model very similar to that of A & S but using the expected income maximization approach. Srinivasan assumes that the objective of the taxpayer is to maximize his expected income after taxes and penalties. Thus, the taxpayer's problem is to maximize the following expected income function:

$$A(y) = \Pi[y-T(y)-\lambda P(\lambda)y] + (1-\Pi)[y-T\{(1-\lambda)y\}] \tag{8}$$

where

y = an individual's true income,
$T(y)$ = tax based on true income,
λ = the proportion by which income is understated,
$P(\lambda)$ = the penalty multiplier, thus, $P(\lambda)\lambda y$ is the penalty on the understated income λy,
Π = the probability of detection, and
$A(y)$ = the expected income after taxes and penalty.

Differentiating equation (8) with respect to λ, we get

$$\frac{\partial A}{\partial \lambda} = -\Pi[P(\lambda)+\lambda P'(\lambda)]y + (1-\Pi)yT'\{(1-\lambda)y\} \tag{9}$$

$$\equiv \phi(\lambda, y, \Pi) \tag{10}$$

Taking partial derivation of ϕ with respect to λ, Π, and y we have

$$\frac{\partial \phi}{\partial \lambda} = -\Pi[2P'(\lambda)+\lambda P''(\lambda)]y - (1-\Pi)y^2T''\{(1-\lambda)y\} \tag{11}$$

$$\frac{\partial \phi}{\partial \Pi} = -[P(\lambda)+\lambda P'(\lambda)]y - yT'\{(1-\lambda)y\} \tag{12}$$

$$\frac{\partial \phi}{\partial y} = -\Pi[P(\lambda)+\lambda P'(\lambda)] + (1-\Pi)T'\{(1-\lambda)y\} + y(1-\Pi)(1-\lambda)T''\{(1-\lambda)y\} \tag{13}$$

Srinivasan assumes that $T(y) > 0$, $0 < T'(y) < 1$, $T''(y) \geq 0$ for all $y > 0$ which means that the tax is a positive, increasing, and convex function of income. He also assumes that $P(\lambda) \geq 0$, $P'(\lambda) > 0$, and $P''(\lambda) \geq 0$, which means that the penalty multiplier is a positive, increasing, and convex function of the proportion by which income is understated, λ.

Under these assumptions, $\frac{\partial \phi}{\partial \lambda} < 0$, $\frac{\partial \phi}{\partial \Pi} < 0$, and $\frac{\partial \phi}{\partial y} \geq 0$ when $\phi = 0$.

Policy implications: After evaluating the signs of all these partial derivatives, Srinivasan proceeded to derive the policy implications of the model. He denotes the optimum proportion of understated income by λ^* and argued that since

$$\frac{\partial \lambda^*}{\partial \Pi} = \frac{-\partial \phi / \partial \Pi}{\partial \phi / \partial \lambda}, \text{ then } \frac{\partial \lambda^*}{\partial \Pi} < 0 \tag{14}$$

Then, ceteris paribus, the optimum proportion of understated income (λ^*) decreases as the probability of detection (Π) increases. In other words, the higher the probability of detection the lower the proportion of income being evaded.

$$\text{Now since } \frac{\partial \lambda^*}{\partial y} = \frac{-\partial \phi / \partial y}{\partial \phi / \partial \lambda} \tag{15}$$

which is > 0 if T'' is positive. This means that given a progressive tax function, and a probability of detection, Π, independent of income, y, the richer the person, the larger the optimal proportion by which he will understate his income. In other words, under a progressive tax structure, as income increases the proportion of underreported income also increases. This result is true only when the probability of detection is independent of income. If the probability of detection is an increasing function of income and the tax rate is proportional, then the proportion of understated income will decrease as income increases.

3. Comparison of the two models

Table 1 outlines and compares the assumptions of the two models. It can be seen from the Table that the two models are different in the assumptions concerning the objective function (including the utility specification), the tax rate, and the penalty rate. The objective function of A & S's model is an expected utility function whereas, in Srinivasan's model, it is an expected income function. A & S specified the utility function such that it implies that the taxpayer is risk averse while the expected income function assumed in Srinivasan's model implies that the taxpayer is risk neutral. A & S assume a proportional tax rate but Srinivasan allows the tax rate to be either proportional or progressive. A & S's penalty rate is proportional but Srinivasan's penalty rate is a positive, increasing, and convex function of the proportion of unreported income (λ). It is interesting to analyze these differences to see how significantly they influence the policy implications of the two models.

A review of the derivation of the implication of A & S's model reveals that the assumption of decreasing marginal utility (which implies risk aversion) is employed in deriving all policy implications.

Table 1. Comparison of the Assumptions of the Allingham and Sandmo Model and Srinivasan's Model of Tax Evasion

Allingham and Sandmo's Model	Srinivasan's Model
1. Assumptions concerning the utility function	1. Assumptions concerning the utility function
1.1 The taxpayer's behavior conforms to the von Neumann-Morgenstern axiom for behavior under uncertainty.	1.1 None.
1.2 His cardinal utility function has income as its only argument.	
1.3 The marginal utility is everywhere positive and strictly decreasing, which implies that the individual is risk averse.	
2. Assumptions concerning income	2. Assumptions concerning income
2.1 Actual income, w, is exogenously given and is known to the taxpayer but not to the government's tax collector.	2.1 (implicitly) Actual income, Y, is exogenously given and known to the taxpayer but not to the government's tax collector.
2.2 The taxpayer chose X, the declared income, so as to maximize his utility function.	2.2 The taxpayer chose λ, the proportion by which income is understated, so as to maximize his expected income.
3. Assumptions concerning the tax rates	3. Assumptions concerning the tax rates
3.1 Tax is levied at a constant rate, θ.	3.1 The tax paid is a function of income and $T(X)>0$.
	3.2 The marginal tax rate is positive and strictly less than unity, that is, $0<T'(Y)<1$.

Table 1 (concluded). Comparison of the Assumptions of the Allingham and Sandmo Model and Srinivasan's Model of Tax Evasion

Allingham and Sandmo's Model	Srinivasan's Model
	3.3 $T''(Y) \geq 0$ which means that tax rate could be either proportional or progressive. If $T''(Y)=0$ for all Y we get a constant marginal tax rate, which together with $T(0)=0$ will yield a proportional tax rate. If $F''(Y)>0$, then it will correspond to a progressive tax structure.
4. Assumptions concerning the probability of detection Tax evasion may be detected at a probability of P.	4. Assumptions concerning the probability of detection Tax evasion may be detected at a probability of Π.
5. Assumptions concerning the penalty rate If the tax evasion is detected, the penalty is at the rate of Π and is imposed on the undeclared income (W-X).	5. Assumptions concerning the penalty rate The penalty multiplier, $P(\lambda)$, is a positive, increasing, and convex function of λ, that is, for all $\lambda>0$. $P(\lambda) \geq 0$ (5.1) $P'(\lambda) > 0$ (5.2) $P''(\lambda) \geq 0$ (5.3) This penalty multiplier $P(\lambda)$ is imposed on the undeclared income λy.
6. Assumptions concerning the objective function The objective function is the expected utility function of the taxpayer, which is specified to be $E(U) = (1-P)U(W-\theta X) + P[U(W-\theta X-\Pi(W-X))]$.	6. Assumptions concerning the objective function The objective function is the expected function of the taxpayer, which is specified to be $A(Y) = \Pi[y-T(y)-\lambda P(\lambda)y] + (1-\Pi)[y-T\{(1-\lambda)y\}]$.

Source: Compiled from Allingham and Sandmo (1972) and Srinivasan (1973).

This assumption is, in fact, so crucial to the model that if it had not been made there would have been no optimal solution. 1/ The assumptions of constant tax and penalty rates are also used throughout the derivation. However, it is not easy to analyze the effects of making A & S's assumptions concerning tax and penalty rates comparable to Srinivasan's assumption because to do so would involve reformulation of the model. Thus, such effects are not analyzed here.

Considering equation (5) it is seen that the indeterminate effect of the tax rate is based on an additional assumption, namely the decreasing absolute risk aversion. This assumption is crucial to the result because if the absolute risk aversion had been assumed to be either constant or increasing, the tax rate would have had a negative effect on the declared income (i.e., the higher the tax rate, the lower the declared income). Nevertheless, the decreasing absolute risk aversion seemed to be the most attractive assumption because it is supported by everyday observation. Investigating equations (6) and (7), it is seen that the effects of the penalty rate and the probability of detection are free from the assumption of decreasing absolute risk aversion. Thus, whether the absolute risk aversion is assumed to be decreasing, constant, or increasing, the effects of both the penalty rate and the probability of detection on the declared income remain positive.

In Srinivasan's model, the derivation of the effects on the proportion of reported income of both the penalty rate, $\frac{\partial \lambda^*}{\partial \Pi}$, and the income, $\frac{\partial \lambda^*}{\partial Y}$, are derived using $\frac{\partial \phi}{\partial \lambda}$, which is based on the assumptions of the nonregressivity of the tax rates ($T''(Y) \geq 0$) and the convexity of the penalty function $[P''(\lambda) \geq 0]$. If the tax rate is regressive, then $\frac{\partial \phi}{\partial \lambda}$ has an indeterminate sign. If $P''(\lambda) < 0$, then $\frac{\partial \phi}{\partial \lambda}$ also has an indeterminate sign. If the tax rate is negative and $P''(\lambda) < 0$, then $\frac{\partial \phi}{\partial \lambda}$ also has an indeterminate sign. However, $\frac{\partial \phi}{\partial \lambda}$ is, in fact, the second derivative, with respect to λ, of the objective function A. Thus, the assumption of nonregressivity of the tax rate and the convexity of the penalty function are important to the model because without either of them there is no guarantee that the model will have an optimum solution. It should be noted that these two assumptions serve as sufficient but not necessary conditions. In other words, the two assumptions are sufficient to guarantee the existence of a maximum point in the objective function. However, without either or both of the two assumptions, the objective function could also have a maximum point. In such a

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1/ The inequality in equation (3) on page 2 is satisfied only if $U''(Y)$ and $U''(Z)$ are negative, which implies a decreasing marginal utility which, in turn, implies risk aversion.

case, the existence of a maximum point would have to be dependent on the specific value of the parameters and the specific functional forms of the tax and penalty functions.

Comparing the two models, if the assumption on the tax rate is considered, it is seen that Srinivasan's model is more general than A & S's model in the sense that it allows one to analyze a situation where there is a proportional tax rate as well as a progressive tax rate while A & S's model deals with the proportional tax rate only. If one considers the assumption on the penalty rate, one also finds that Srinivasan's model is more general than A & S's model in the sense that Srinivasan allows one to analyze a situation where the penalty rate is progressive as well as where it is proportional, while A & S deal only with proportional penalty rates. The significant difference in these two assumptions is the fact that Srinivasan's model is built of tax and penalty functions whereas A & S's model is built of tax and penalty rates. The key words are functions as opposed to rates. A model with the tax and penalty functions is more flexible than a model with tax and penalty rates because the former allows one to manipulate different rate structures whereas the latter does not.

However, if one considers the objective functions, it is clearly seen that A & S's model is more general than Srinivasan's in the sense that it allows the taxpayers to have different utility functions and it takes account of the taxpayer's risk bearing behavior while Srinivasan's model does not. A & S's expected utility approach allows them to assume that the taxpayers are risk averse, which is more realistic than the risk neutral assumption implicit in Srinivasan's model. However, since A & S's utility function has only one argument which is income, then in terms of the coverage of the relevant factors affecting the taxpayers' utility, A & S's model is no different from Srinivasan's. And because of the fact that A & S's utility function has income as its only argument, ceteris paribus, the qualitative result of the two approaches would have been the same if the taxpayers' utility functions had been a monotonic transformation of the expected income. However, as assumed by A & S, the taxpayer's utility function is not a monotonic transformation of the expected income. This explains the differences in the qualitative results of the two models.

III. A Review of Theoretical Studies on Factors Affecting Tax Evasion

1. The effect of the tax rate

It is frequently claimed that high tax rates induce tax evasion. The purpose of this section is to review the existing theoretical literature to see whether there are theoretical grounds for such a claim. The effect of the tax rate on tax evasion is discussed in Allingham and Sandmo (1972), Yitzhaki (1974), McCaleb (1979), Sandmo (1981), and

Sisson (1981). As stated in Section II, Allingham and Sandmo (1972) have shown that the effect of the tax rate on tax evasion is indeterminate. However, A & S's result is derived from the assumption that the penalty is imposed on the understated income. The effect of the tax rate when the penalty is imposed on the evaded tax is discussed in Yitzhaki, who shows that if a penalty is imposed on the evaded tax (rather than on the evaded income), as is the case for Israel, Thailand, the United States, and a number of other countries, the indeterminacy disappears and the tax rate has a negative effect on tax evasion. This means that an increase in the tax rate leads to a decrease in tax evasion. Yitzhaki uses the same model as A & S but instead of assuming that the penalty is imposed on the evaded income, he assumes that the penalty is imposed on the evaded tax, $[\theta(W-X)]$. In effect, Yitzhaki's penalty (F) is equal to A & S's penalty divided by the tax rate, that is, $F = \frac{\Pi}{\theta}$. Yitzhaki shows that $\frac{\partial X}{\partial \theta} > 0$, which means that the reported income increases as the tax rate increases. Yitzhaki's result contradicts the general belief that high tax rates stimulate tax evasion. However, his economic explanation of this result is that, once the penalty is imposed on the evaded tax, the ordinary tax rate as well as the penalty rate increases proportionally with θ. Therefore, there is no substitution effect and we are left with a pure income effect which is positive. This is because, as the tax rate increases, the taxpayer is left with a smaller after-tax income, that is, he is less wealthy. Under the assumption of decreasing absolute risk aversion, he is more risk averse when he is less wealthy, thus, he tends to reduce the amount of tax evasion and increase his reported income.

The effect of tax rates on tax payment (rather than on the reported income) is investigated by McCaleb. In his investigation, he uses A & S's model, including the assumption that the penalty is imposed on the evaded income. He states that, for any taxpayer, the tax payment will be equal to the product of the tax rate and reported income, that is, θX. The effect of a change in the tax rate on tax payments is $\frac{\partial(\theta X)}{\partial \theta} = X + \theta\frac{\partial X}{\partial \theta}$. Because $\frac{\partial X}{\partial \theta}$ can be either positive, zero, or negative, then $\frac{\partial(\theta X)}{\partial \theta}$ can also be either positive, zero, or negative. This implies that an increase in the tax rate may cause the tax payment to increase, remain the same, or decrease. Here again, theory fails to establish a clear direction of the effect of the tax rate on tax payment.

Sandmo, in his study on income tax evasion and labor supply, also shows that, on purely theoretical grounds, one can not easily prove the popular claim that high rates of tax stimulate activities in the hidden economy. This conforms with the results of his first paper which he co-authored with Allingham (Allingham and Sandmo (1972)).

Koskela (1983 a) investigates the effects of tax rates on tax evasion when the tax rate change is accompanied by a compensatory change in the lump-sum transfer so that either the government's expected tax revenue or the taxpayer's expected utility will remain unchanged. Koskela found that if the penalty rate is imposed on the evaded income, such a compensated increase in the tax rate will increase tax evasion. However, if the penalty rate is imposed on the evaded tax, such a compensated increase in the tax rate will reduce tax evasion. Like A & S, Koskela uses the expected utility approach and assumes a decreasing absolute risk aversion. However, Koskela takes account of the lump-sum transfer from the government to the taxpayer, whereas A & S do not take such a transfer into account. Koskela's change in the tax rate is not a "pure" change, but it is a compensated change, that is, there is an accompanying change in the lump-sum transfer so that either the expected tax revenue of the government or the expected utility of the taxpayer remains unchanged. This is why Koskela obtains a different result from A & S. The economic explanation of Koskela's result is that when the penalty rate is imposed on the undeclared income then the increase in the tax rates has a positive substitution effect and a negative income effect on tax evasion. However, as a result of a compensated increase in the lump-sum transfer, the income effect disappears and we are left with the positive substitution effect; thus, tax evasion will increase. On the other hand, if the penalty rate is imposed on the evaded tax, then the amount of penalty will increase proportionally with the tax; thus, there is no substitution effect and the increase in the tax rate has only a negative income effect on tax evasion. This income effect is now stronger than in the case where the penalty is imposed on the undeclared income because the evaded tax also increases as a result of the increase in the tax rate. In fact, as long as some fraction of income remains unreported, a compensated change in the lump-sum transfer does not totally offset the negative income effect so that tax evasion is decreased. Koskela's result still does not provide grounds for the popular claim that an increase in the tax rate stimulates tax evasion. This is because, in the first place, Koskela, like Yitzhaki, produced just the opposite result, that is, if the penalty is imposed on the evaded tax, an increase in the tax rate reduces tax evasion. In the second place, where Koskela provides grounds for stating that an increase in the tax rate increases tax evasion, it is under the condition that the tax rate increase is accompanied by an increase in the lump-sum transfer (in the form of tax exemptions) from the government to the taxpayer in an amount such that either the government's expected tax revenue or the taxpayer's expected utility remains unchanged. However, such a condition is not part of the claim.

The effect of tax rates on tax evasion is also investigated by Sisson. Using Srinivasan's framework to analyze how a shift in the tax rates affects tax evasion, Sisson finds that a discretionary translation of the tax structure through either an increase in the average tax rate or a decrease in exemptions will reduce the amount and the proportion of the reported income. This result is based on the assumption that the

penalty rate is a function of the understated income. As stated by Sisson, his model is not equipped with an instrument for investigating the change in the tax rate, because the tax rate is neither a variable nor a parameter in the model, but the amount of tax liability based on the reported income ($T = T(X)$) is incorporated in the model. However, Sisson investigates the effect of the amount of the tax increase by introducing an artificial variable ε as an incremental change in the amount of the tax liability in the model. This is why Sisson's result explains the exogenous shift in the tax structure, in such a way that the tax liability increases, rather than the endogenous increase of the tax rate in the system. Moreover, the exogenous upward shift of the tax function can be due to a decrease in the exemption, to a change in deductible expenses, or simply to a change in tax regulation concerning, for example, depreciation allowances, but not to a change in the marginal tax rate. If the upward shift of the tax function is due to an increase in the tax rate then ε must be a function of X because the tax rate must be applied to the reported income. It appears that Sisson assumes that ε is exogenously determined and is not a function of X. Thus, Sisson's analysis cannot be used to establish an a priori ground for the claim that an increase in the tax rate will lead to an increase in tax evasion.

To summarize, the theoretical literature under review does not support the claim that an increase in the tax rate will lead to an increase in tax evasion. This is because theoretical investigation shows that if the penalty rate is imposed on the evaded tax, an increase in the tax rate will lead to a reduction in tax evasion rather than to an increase as claimed. If the penalty rate is imposed on the understated income, the theoretical investigation shows that the tax rate has an indeterminate effect on tax evasion. Only under the condition that the penalty rate is imposed on the understated income, and that such an increase in the tax rate is accompanied by a compensatory increase in the lump-sum transfer so that the expected tax revenue of the government remains unchanged, will the increase in the tax rate lead to an increase in tax evasion. However, the second condition is not part of the claim because the whole point of increasing the tax rate is to raise more revenue and not to keep tax revenue unchanged.

2. The effect of the shape of the tax schedule

A progressive tax schedule is based on the ability-to-pay principle and is designed not only to introduce the equity and the built-in stabilizer into the tax system but also to allow the tax system to generate sufficient revenue in order to finance government expenditures. It is believed that a progressive tax schedule will generate more tax revenue than the proportional tax schedule. However, such a belief is based on the assumption that tax evasion does not exist in society. If tax evasion exists it is uncertain whether a progressive tax schedule will generate more tax revenue or not. However, recently it is becoming a popular claim that a progressive tax schedule stimulates tax evasion

and consequently will yield less tax revenue to the government than the proportional tax schedule. Therefore, it is useful to investigate whether such a claim has theoretical grounds or not.

The effect of the shape of the tax schedule on tax evasion is considered in Srinivasan, Nayak (1978), Sisson, and Koskela (1983 b). Srinivasan, assuming a progressively increasing penalty multiplier and a probability of detection, Π, independent of the level of income, y, shows that a progressive tax function that yields the same revenue as the proportional tax function in the absence of understatement of income, will yield less expected revenue and penalties in the presence of understatement of income. Nayak examined the optimum income tax evasion under a regressive tax rate structure. Using a model along the lines of Srinivasan and assuming that the penalty is a progressive function of the fraction of income understated, λ, Nayak finds that a regressive tax function which yields the same total tax revenue as a proportional tax function in the absence of understatement of income, will yield a larger expected revenue in the presence of the optimum understatement of income. Sisson, using a model along the lines of Srinivasan, shows that individuals will be more prone to underreport their tax bases as they encounter greater progressivity in the tax system. Furthermore, in the Appendix of his paper, Sisson proves that, given an income distribution, a progressive tax system that yields the same total revenue as a proportional tax system in the absence of income understatement will yield less expected revenue in the presence of optimum income understatement.

The results of the analyses of Srinivasan, Nayak, and Sisson imply that if the progressive, proportional, and regressive tax structures, which are designed to generate the same amount of revenue in the situation where tax evasion does not exist, are enforced in the situation where tax evasion exists, the regressive tax structure will yield the highest amount of the government's tax revenue and the proportional tax structure will yield higher revenue than the progressive tax structure.

This seems to provide theoretical grounds for the claim that the progressive tax schedule will yield less revenue than the proportional tax schedule. However, the analyses of Srinivasan, Nayak, and Sisson are based on the expected income maximization approach which implies that taxpayers are risk neutral. For a discussion of the effects of the tax schedule under the assumption that the taxpayer is risk averse, let us look at Koskela's analysis.

Koskela (1983 b), using the expected utility maximization approach and assuming a general tax function, shows that given the decreasing absolute risk aversion, the direction of the change in the fraction of income reported when the actual income increases is ambiguous for progressive and regressive taxation. However, when the taxation is linear

progressive 1/, the nondecreasing relative risk aversion is a sufficient, but not a necessary, condition for the negative relationship between the fraction of income not being declared and the actual income. When the taxation is linear regressive 2/, the nonincreasing relative risk aversion is a sufficient, but not necessary condition for the positive relationship between the fraction of income not being declared and the actual income. The intuitive explanation of the ambiguity is that under the progressive and regressive tax rates, the substitution effect and the income effect are working in opposite directions. In the case of progressive taxation, the fraction of income reported tends to decrease as the actual income increases due to the substitution effect because it is more profitable to evade taxes. On the other hand, a rise in the income reported induced by an increase in the actual income raises the average taxes and thus makes the taxpayer worse off. This income effect tends to increase the fraction of income reported as the actual income increases. Thus, the effect is ambiguous. In the case of regressive taxation, the fraction of income reported tends to increase as the actual income increases due to the substitution effect because, at a lower marginal tax rate, it is less profitable to evade tax. On the other hand, a rise in the fraction of income reported, induced by an increase in the actual income, lowers the average taxes and thus makes the taxpayer better off. This income effect tends to decrease the fraction of income reported as the actual income increases. The end results depend on the size of the parameters which are unknown on a priori grounds. If the marginal tax rates are constant, then there is no substitution effect because there is no change in the relative prices, and the fraction of income not being declared depends on the behavior of the average taxes and the relative risk aversion. Thus, Koskela concluded that, given any hypothesis on the relative risk aversion, the linear regressive tax schedule, not the linear progressive, tends to induce a rise in the fraction of income not being declared when the actual income increases.

At first glance, it seems that Koskela's conclusion contradicts the conclusions arrived at by Srinivasan, Nayak, and Sisson. However, a close look indicates that the two sets of conclusions are not contradictory. Srinivasan, Nayak, and Sisson deal with the aggregate revenue under progressive, proportional, and regressive tax rate structures. They start with an ideal situation where tax evasions do not exist. They show that, if the three structures which are designed to generate

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1/ A linear progressive tax is a linear tax function with a negative lump-sum tax, e.g., $t(x) = -r + tx$. Note that here, progressivity is measured in terms of the average tax rate rather than the marginal tax rate.

2/ A linear regressive tax is a linear tax function with a positive lump-sum tax, e.g., $t(x) = r + tx$. Similar to footnote 1/, here again, the regressivity is measured in terms of the average tax rate rather than the marginal tax rate.

the same amount of revenue under the ideal situation are enforced in a nonideal situation where tax evasion exists, the progressive tax structure will generate less revenue than the proportional tax structure, whereas the regressive tax structure will generate more. However, Koskela deals with the effect of the change in the actual income of a single taxpayer on the fraction of income that he reported under different tax rate structures, namely, the progressive, proportional, and regressive tax structures. In Koskela's analysis, there is no restriction that the three tax structures will yield the same amount of revenue to the government. Koskela's finding is that the effects are indeterminate. Furthermore, Koskela investigated the effect of a change in the actual income of a single taxpayer on the fraction of income not being declared under the linear progressive and linear regressive tax structures. He shows that, under the linear progressive tax structure an increase in the actual income would lead to a reduction in the fraction of income not being declared; whereas under the linear regressive tax structure an increase in the actual income will lead to an increase in the fraction of income not being declared. This is where the seeming contradiction comes in because it implies that, under the linear regressive tax structure, as income of the individual increases, the fraction of income reported decreases, which tempts one to think that the amount of revenue will be reduced. This is not necessarily the case because it depends on the relative change in the fraction of income reported with respect to the relative change in the actual income. Only if the percentage reduction of the income reported is greater than the percentage increase of the actual income, will there be a decrease in the total tax revenue to the government. The tax rate does not have any effect here because, first, the marginal tax rate is imposed on the marginal income and, second, under the linear regressive tax structure, the marginal tax rate is constant. Thus, as long as there is an increase in the absolute amount of reported income, there would always be an increase in the revenue no matter how much the fraction of income reported changes. After all, we are not comparing apples with apples because the two conclusions do not derive from comparable circumstances. The key differences are that (a) Srinivasan, Nayak, and Sisson deal with aggregate revenue to the government, whereas Koskela dealt with the fraction of income not being reported by a single taxpayer; and (b) Srinivasan, Nayak, and Sisson assumed that the progressive, proportional, and regressive tax structures were designed to generate the same revenue in an ideal situation in which no evasion exists, whereas Koskela put no constraints on the three tax structures.

Among the five types of tax schedules discussed in this section, namely, the progressive, the proportional, the regressive, the linear progressive, and the linear regressive, the progressive tax schedule seems to be the most realistic. The regressive, the linear progressive, and linear regressive schedules will not be discussed further because they exist only in theory and they are not likely to be implemented. Attention will be concentrated on the progressive and the proportional

tax schedules because the former prevails in most countries and the latter appears more frequently in the tax policy literature and is a possible candidate to replace the former.

After narrowing down to two types of tax schedules we still have different results. Although Srinivasan and Sisson's results are not exactly comparable with Koskela's result as discussed above, they do suggest the same area of policy concerns and they suggest them differently. According to Srinivasan and Sisson, a progressive tax should not be implemented because it yields less revenue in the presence of tax evasion. However, Koskela's result suggests that whether a progressive tax will yield more or less revenue is uncertain because it is not certain whether the fraction of income reported will be increased or decreased when the actual income increases. The source of the difference in the result and consequently the policy implication, lies in the difference in the assumption concerning the risk-bearing behavior of the taxpayer. Srinivasan and Sisson's assumptions imply that the taxpayer is risk neutral while Koskela assumes that the taxpayer has a decreasing absolute risk aversion. If the assumption of the risk neutral were assumed in Koskela's analysis, there would be no income effect, leaving only a positive substitution effect of an increase in income on tax evasion; thus, as income increases tax evasion will increase because it is more profitable to evade tax at a higher rate of tax. Consequently, under the progressive tax structure an increase in income will lead to a decline in the fraction of income reported. Then there will be no difference in policy suggestions.

Thus, it can be concluded that the popular claim that a progressive tax schedule stimulates tax evasion and consequently will yield less tax revenue to the government than the proportional tax schedule has theoretical support. However, such support is based on the assumption that the taxpayer is risk neutral. If the taxpayer is assumed to have a decreasing absolute risk aversion behavior, then the claim has no theoretical support.

3. The effect of the penalty rate

The penalty is introduced into the tax system for the purpose of discouraging tax evasion. It is a general belief that the effect of a penalty is to deter tax evasion. This section will survey the theoretical literature in order to see whether such a belief has theoretical grounds or not.

The effect of the penalty rate on tax evasion is discussed in A & S, Singh (1973), McCaleb, Sandmo, Koskela (1983 b), and Sisson. In Section II we have shown that A & S demonstrated that $\frac{\partial X}{\partial \Pi}$ is positive, which means that an increase in the penalty rate will always increase the fraction of actual income declared. Singh, using the maximization of

expected income approach, shows that the higher the penalty rate the lower the magnitude of tax evasion. By using a numerical exercise 1/ based on the tax structure of India, he demonstrates that at no evasion ($\lambda = 0$, λ being the fraction of income concealed), the optimum value of Π, the probability of detection for each level of income, declines, as the penalty rate, α, increases. This implies that for each level of taxpayer's income, the higher the penalty rate, the smaller the cost for the detection of evasion, or with the same cost the lower the magnitude of tax evasion.

McCaleb (1976), in investigating the effect of the penalty rate on tax payment, finds that an increase in the penalty rate will lead to an increase in the tax payment. This result is based on the assumption that all policy parameters, namely, the tax rate (θ), the penalty rate (Π), and the probability of detection and conviction (P) are independent. However, if the probability of detection and conviction (P) depends on the penalty rate (Π), that is, $P=P(\Pi)$, and $\frac{\partial P}{\partial \Pi} < 0$, then the signs of $\frac{\partial X}{\partial \Pi}$ and $\frac{\partial(\theta X)}{\partial \Pi}$ are ambiguous. This implies that if the probability of detection and conviction is a function of the penalty rate then the effect of an increase in the penalty rate on the amount of unreported income and on the amount of tax is indeterminable. McCaleb said that the reason for assuming that the probability of detection and conviction depends on the penalty rate is because it is likely that the probability of conviction by a judge or jury may vary inversely with the severity of the punishment.

Sandmo also shows that an increase in the penalty rate will lead to a decrease in the supply of hours worked in the irregular market, which implies that the proportion of unreported income will decrease and the proportion of reported income will increase.

Sisson does not discuss the pure effect of the penalty rate on tax evasion. However, he investigates the effects of a shift in the penalty function on the proportion of income reported. Sisson says that he specifies three functional forms for penalty, which are: (a) penalty is a function of the absolute amount of unreported income, $P(X, y) = P(y-X)$; 2/ (b) penalty is a constant proportion of the evaded tax $P(X, y) = kE$, where $k > 1$ and $E = T(y)-T(X)$; and (c) penalty is a function of

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1/ Singh could have derived this result mathematically from his model. Equation (4) of Singh's model states that $\frac{\Pi}{1-\Pi} = \frac{T'(y)}{\alpha}$ where Π is the probability of detection, α is the penalty rate, and $T'(y)$ is the first derivative of the tax function. This equation can be rearranged so that $\Pi = \frac{T'(y)}{\alpha+T'(y)}$ which is now seen clearly that Π decreases as α increases.

2/ Where X = reported income and y = true income.

the relative amount of the reported tax base, $P(X, y) = P(X/y)$. Sisson finds that in cases (a) and (b), the financial incentives imposed under these penalty forms encourage improved reporting as an individual's tax base grows, whereas in case (c) the effect is indeterminate. Sisson's analysis does not demonstrate the pure effect of change in penalty (P) on the change in the reported income, holding other variables constant (that is, he does not find $\frac{\partial X}{\partial P}$ because his P is a function of X and y). Instead he specifies different arguments 1/ of his penalty function in terms of X and y, and plugs these specific arguments into the first order condition, then solves for $\frac{dX}{dy}$. In other words, Sisson studies the effect of the change in actual income (y) on the reported income (X) under the penalty functions with different argument forms.

Koskela (1983 b), using the expected utility maximization approach and assuming a general tax function (that is, the tax structure could be either progressive 2/, proportional, or regressive 3/) as well as the endogenous probability of detection, found that a penalty is a deterrent to tax evasion.

To summarize, theoretical results indicate that the penalty has a negative effect on tax evasion except in cases where the probability of detection is a function of the penalty. In such cases the effect of the penalty on tax evasion is indeterminate. Thus, it can be concluded that, generally, the belief that the penalty is a deterrent to tax evasion has theoretical support.

4. The effect of the probability of detection

The effect of the probability of detection on tax evasion is discussed in A & S, Srinivasan, Singh, McCaleb, Christiansen, Sandmo, Koskela, and Sisson.

A & S have shown that the effect of an increase in the probability of detection is to increase the reported income. Srinivasan also shows that an increase in the probability of detection will lead to a decrease in the optimal proportion of understated income. Singh bases his calculation on the tax structure of India and shows that, at a constant penalty rate, the higher the value of probability of detection (Π),

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1/ Sisson does not specify different functional forms for P but only different arguments of P in terms of X and y, e.g., $P(X, y) = P(X-y)$.

2/ A progressive tax rate is defined to be a function in which $t'' > 0$, and $t-t'(x) < 0$ (i.e., the average tax is less than the marginal tax).

3/ A regressive tax is one in which $t'' < 0$, $t-t'(x) > 0$ (i.e., the average tax is greater than the marginal tax).

the lower the proportion of income understated (λ). This means that an increase in the probability of detection is a deterrent to tax evasion.

McCaleb, in examining the effect of the probability of detection on the tax payments (not reported income), shows that an increase in the combined probability of detection and conviction would lead to an increase in the tax payment. Christiansen discussed the relative effectiveness of the penalty rate and the probability of detection as deterrents of tax evasion which implies that an increase in the probability of detection reduces tax evasion. Sisson, assuming an endogenous penalty function, also shows that an increase in the probability of detection will increase the proportion of income reported.

Koskela, assuming an endogenously determined probability of detection, shows that an increase in the probability is a deterrent to tax evasion. Specifically, Koskela assumes that the probability of detection depends positively, but linearly, on the ratio of the undeclared income to the actual income, that is, $P = P(\frac{W-X}{W})$; $P' > 0$, $P'' = 0$. The reasons for assuming that P is endogenously determined and is a function of X and W is because the tax authorities might base their audit and investigation policy on a statistical hypothesis that, in the absence of any knowledge about the actual income, a person with a low reported income is more likely to be an evader than a person with a higher reported income; thus, the former is more likely to be subject to audit and investigation than the latter. Moreover, the authorities may have some crude indication from the general observation that the actual income of some specific taxpayers in certain sectors is increased but the reported income is unchanged. This will lead to an audit of the taxpayer's account, which suggests that P is related to W.

To summarize, all existing theoretical analyses indicate that the probability of detection affected tax evasion in a negative way, that is, an increase in the probability of detection will lead to a decrease in tax evasion.

5. The effect of type of income

It is an appealing proposition to say that the degree of income tax evasion varies with the type of income. For example, it is easier to underreport capital income than to underreport labor income. This is because, based on intuition, one would think that the existence of the tax withholding scheme for the labor income should make it more difficult to evade tax than the nonwage income. Moreover, since the concept of deduction applies mainly to capital income, it is easier to evade capital income than labor income because evaders have the opportunity of underreporting receipts as well as overstating expenses while such an opportunity does not exist in the case of labor income.

However, up until now there has been no theoretical study directly addressed to this issue. The closest one is McCaleb (1976) in which he set out to investigate tax evasion and the differential taxation of labor and capital income. However, McCaleb's point is not whether the capital income is easier to evade than the labor income. McCaleb neither discussed the effect of the income sources on the relative easiness of tax evasion nor the relative sizes of the underreported capital income compared to that of labor income. He assumes that capital income is subject to evasion and showed that an increase in the penalty rate and the probability of detection will lead to a decrease in the tax payment of capital income receivers, and that an increase in the tax rate would lead to an indeterminate result on the tax payment of the capital income receiver. This means that an increase in the tax rate does not necessarily lead to an increase in the tax payment of capital income receivers. Thus, he concludes that there is no theoretical justification for imposing a higher tax rate on the capital income than on the labor income because, by imposing a higher rate, it is not certain whether there will be a higher tax payment or not. Thus, the effect of the type of income is still left unsupported by the theoretical literature. 1/

6. The effect of fiscal inequity

So far, we have concentrated our attention on five factors, namely, the tax rate, the progressivity of the tax system, the penalty rate, the probability of detection, and the type of income. All these five factors were analyzed within the framework of the conventional tax evasion models. However, these models are being criticized for being overly simplified because they view tax evasion as only a special form of gambling, namely, the gambling for extra income in light of the likelihood of detection and penalties imposed on detected tax evaders. This view takes account of only one element in the relationship between the government and the taxpayer. According to Spicer and Lundstedt (1976), the relationship between a taxpayer and his government contains at least three elements, namely, the element of coercion, the element of internalized norm or role expectation, and the element of exchange. The conventional tax evasion model takes account of only the coercive element of the relationships, the element of internalized norm will not be discussed.

In the element of exchange, a taxpayer is seen as exchanging purchasing power in the market in return for government services. Thus, the taxpayer's behavior is affected by his satisfaction or lack of satisfaction with his terms of trade with the government. Tax evasion is seen partly as an attempt by the taxpayer to adjust his terms of

1/ For a related issue concerning the effect, under uncertainty, of partial income taxes on factor prices, see Ratti and Shome (1977).

trade with the government in response to dissatisfaction stemming from a perceived inequity in his terms of trade when compared to other taxpayers. Thus, another factor affecting tax evasion is the perceived relative inequity in the taxpayer's terms of trade with the government. The idea of the perceived relative inequity in the taxpayer's terms of trade has been developed further by Spicer and Becker (1980) to become the link between (horizontal) fiscal inequity and tax evasion. In this context, the taxpayer's utility functions are assumed to be interdependent so that the utility derived from extra income accrued through tax evasion depends on the taxpayer's sense of equity regarding his relationship with the government. If the taxpayer perceives himself as a victim of inequity, his anger increases the marginal utility which he derives from an extra dollar of tax evasion income and hence increases the amount of taxes evaded. On the other hand, if he perceives himself to be the beneficiary of fiscal inequity, his guilt feelings reduce his marginal utility from tax evasion and hence decrease the amount of tax evaded. Proponents of this hypothesis realized that it is not possible for the taxpayer to assess the exact value of what he pays and what he receives from the government in return. However, they argue that it seems reasonable to assume that the taxpayer has general impressions and attitudes concerning his own and others' terms of trade with the government. As far as evidence is concerned, a number of survey research and simulation studies have reported positive correlations between the perception of fiscal inequity and tax evasion. 1/

IV. Empirical Studies on Factors Affecting Tax Evasion Behavior

Empirical studies analyzing factors affecting tax evasion take two approaches: the Simulation Approach and the Survey Approach. These two approaches will be discussed below.

1. Simulation or experimental approach

Arguing that theoretical models of optimal evasion, though yielding interesting insights, are often beset by key, ambiguously signed derivatives, Friedland et al. (1978) conduct a tax evasion study using the game-simulation approach. They simulate taxpaying situations and conduct experiments on 15 subjects. Their purposes are to find out (a) how sensitive income tax evasion is to changes in tax rates; (b) which socioeconomic variables are related to tax evasion; (c) whether the decisions to evade tax and the extent of tax evasion are separate and distinct decisions; and (d) whether large fines are a more effective deterrent than frequent audits. Their subjects are seven male and eight female Israeli undergraduate psychology students whose

1/ See, for example, Strumpel (1968), Spicer and Lundstedt (1976), and Spicer and Becker (1980).

average age was 25. Before beginning the simulation, background information is obtained concerning the subject's age, sex, marital status, ethnic background, whether the subject is employed, whether the subject owns a car, and whether the subject habitually buys lottery tickets. The values of the parameter used in the experiment are: two proportional tax rates (t) of 25 percent and 50 percent; two pairs of probability of detection and penalty rates (a) (1/3, 3) and (b) (1/15, 15). After the simulation, correlation and regression analyses are performed using as dependent variables the probability of evasion (P), the fraction of income not declared (X), and the overall fraction of income reported (q) and, as independent variables, the background variables. It is found that the relation between underreporting and the tax rate can be experimentally determined (at t = 25 percent the incidence of underreporting occurred 50 percent of the time, at t = 50 percent the incidence occurred 80 percent of the time). Correlation results indicate that the decision to evade tax (P) and the extent to which taxes are underreported (X) are distinct and separate decisions. Large fines with a small probability of detection are a more effective deterrent than small fines with a large probability of detection. And finally, concerning socioeconomic variables it is found that women are more likely to evade, but understate a much smaller fraction of their income than men, and that those who habitually buy lottery tickets are not more likely to evade than those who do not. However, lottery ticket buyers conceal much more income when they do evade.

Spicer and Becker (1980), use a simulation approach to test the relationship between tax evasion and perceived fiscal inequity. Specifically, their hypothesis is that evaded taxes increase for victims of fiscal inequity but decrease for beneficiaries of fiscal inequity. Their experiment is conducted on 57 subjects, 21 of which are male, and 36 female. Inequity is simulated by providing some participants with false information regarding relative tax rates. The result is that the perceived high tax group evaded 33 percent, the perceived medium tax group evaded 25 percent, and the perceived low tax group evaded 12 percent. A regression analysis is performed using the percentage of evaded taxes as a dependent variable, and the perceived relative tax rates, sex, age, and income, as independent variables. It is found that the perceived relative tax rates, sex and age, are significant in explaining the variation in the percentage of tax evaded but the income is not significant. This regression result supports the hypothesis that perceived inequity is another factor that affects tax evasion and that the amount of evaded taxes increases for victims of fiscal inequity but decreases for beneficiaries of fiscal inequity.

2. Survey approach

The survey approach to the analysis of factors affecting tax evasion is less restrictive than the theoretical model and the simulation approach in that it allows the investigator to consider a wider

range of factors. However, the survey approach is subject to sampling biases and sampling errors as well as to the problem of the reliability of the responses. Factors affecting the tax evasion examined in the survey studies can be classified into four types, namely, factors related to the degree of sanctions, administrative capabilities, fiscal inequity, and social norms. Spicer and Lundstedt (1976) investigate these four types of factors. Particularly, their hypotheses are: (a) tax evasion is less likely when sanctions against it are perceived to be severe; (b) tax evasion is less likely when the probability of detection is perceived to be high; (c) tax evasion is more likely when a taxpayer perceives his terms of trade with government as inequitable when compared to other taxpayers; and (d) the more tax evaders a taxpayer knows, the more likely he is to evade taxes himself. Spicer and Lundstedt have conducted a survey on 130 households selected from two suburbs in a large metropolitan area in central Ohio. From the survey data, a "tax resistance scale" has been constructed. This scale measures a relative propensity to evade taxes rather than tax evasion itself. Two indices also have been constructed, namely, the tax evasion index and the inequity index. The tax evasion index provided a way to assess the extent to which a taxpayer evades taxes. The inequity index measures the perceived fiscal inequity. Two regression analyses were performed using the tax resistance score and the tax evasion index as the dependent variables, and the independent variables, which are the same in both equations, are the inequity index, the perceived severity of sanctions, the perceived probability of detection, the number of tax evaders that the taxpayer personally knows, and seven background variables. 1/ It has been found that the inequity index and the number of tax evaders known personally (a proxy of factors related to social norms) are significantly and positively related to tax evasion in both regressions. The perceived probability of detection is significant in the first but not the second regression, whereas the perceived severity of sanctions is not significant in either regression.

Spicer and Lundstedt have found that the level of family income was negatively related to tax resistance and that the proportion received in wages, salaries, and pensions is positively related. The first finding is in conflict with Srinivasan's theoretical result (which indicates that $\frac{\partial \lambda^*}{\partial y} > 0$; λ^* being the optimal proportion by which income is understated) and with Mork's finding, which is reviewed on the next page. The second finding goes against the general belief that tax evasion opportunities decrease as the proportion of income received in wages, salaries, and pension increases. Spicer and Lundstedt explain

1/ The background variables are: experience with tax audits, age, education, whether or not the respondent was self-employed, income, the proportion of income received in wages, salaries, or pensions, and party affiliation.

that these discrepancies may have arisen because those with higher incomes or smaller proportions of wage income have greater opportunities to resort to tax avoidance which is legal, therefore the motivation to undertake risky acts of tax evasion is reduced. Concerning background variables, age is significant and negatively related to tax resistance and the experience with tax audits is significant but positively related to tax resistance.

Mork (1975) uses interview data from the Norwegian Occupational Life History Study which are compiled by the Institute of Applied Research, Oslo. This data source, which is composed of 3,479 observations, is extraordinarily extensive, and includes data on the 1970 income of the interview respondents. The income data from the survey are then compared with the assessed income 1/ and pension-giving income 2/ from the income tax return of each respondent. These income data are tabulated by income classes and the average reported assessed income (X_1) and the average reported pension-giving income (X_2) for each class are then divided by the interview income (W) obtaining X_1/W and X_2/W. If we consider the interview income (W) as actual income, then X_1/W, and X_2/W are the proportion of income reported in the context of the standard tax evasion models. It is found that as income moves to the higher brackets the proportion of income reported is smaller. Thus, Mork concludes that empirical evidence indicates that $\frac{\partial(X/W)}{\partial W} < 0$, that is, as income increases the proportion of income reported decreases. This, in the framework of A & S, implies that the relative risk aversion is a decreasing function of income. This result is consistent with Srinivasan's theory but inconsistent with Spicer and Lundstedt's survey result.

Enrich (1963), using the survey approach, investigates U.S. taxpayers' income tax consciousness or awareness. Particularly, his purposes are to examine (a) how accurately individuals estimate their own tax liabilities, apart from the particular day near April 15 when a final return must be filed; (b) if they tend to make errors in estimation, in what direction are these likely to fall; and (c) whether the withholding has a demonstrable effect on the accuracy or inaccuracy of estimation. Enrich argued that the study of tax consciousness or

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1/ Assessed income is full income (including capital income) minus legal deductions, such as interest payments and cost incurred in connection with one's occupation, etc. but it does not exclude "special deductions" which are a part of income made tax-free because of illness, infirmity, etc.

2/ Pension-giving income is roughly the income from active work, whether the worker is employed by someone else or is his own employer. Legal deductions have not been deducted, and pure capital income is not included.

awareness is important because if we do not know peoples' tax consciousness it does not make much sense to claim that we know the extent to which changes in their tax burden will affect their behavior. In Enrich's survey, first, without looking it up in his income tax return, each participant is asked to guess and write down the total amount of federal income tax he thought he had paid in the previous year and then after looking it up, write down the actual amount he paid. Enrich's survey result indicates that the respondents do not accurately know the amount of federal income taxes they paid. In addition, a slight tendency to underestimate rather than overestimate the amount of tax paid is noted. And finally, there is no demonstrable effect of withholding on the degree of income tax awareness. Schmölders 1/ has conducted a similar study for Germany but has reported a moderate degree of tax overestimation. According to Enrich, the difference between his result and Schmölders' is possibly due to the difference in questionnaire technique. The German taxpayer is asked to estimate his tax burden as a percent of gross income. The taxpayer's error is then evaluated based on statistical data on average income taxes paid by various craft, business, and professional groups of taxpayers. Enrich argued that by being asked only one figure, the respondent may possibly have felt inclined to exaggerate his tax burden. In Enrich's study, the taxpayers are asked both the estimated and the actual tax paid in juxtaposition.

V. Limitations of the Literature

This section further clarifies the nature of tax evasion and highlights the scope and limitations of the available literature. This is done for the purpose of putting the literature in perspective.

1. Forms of tax evasion

There are three possible cases of tax evasion, namely, (a) providing false values of the socioeconomic variables which enter into the determination of the tax base such as underreporting income or claiming nonexistent dependents; (b) intentionally misinterpreting the law so that the tax liability is minimized; and (c) doing both (a) and (b). Case (a) includes actions such as underreporting or unreporting of income, claiming nonexistent dependents, claiming fictitious expenditures and any other illegal action having the effect of reducing the tax base (net income). Case (b) includes actions such as intentionally applying wrong tax rates, intentionally claiming unentitled tax credits, and any other illegal action leading to the reduction of the legal tax liability. 2/ The theoretical literature covers only Case (a) and part of Case (b), which involve underreporting of net income. It does not

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1/ As reported in Enrich.

2/ Without reporting net income differently from the true income.

cover tax evasion under Case (b) and the remaining part of Case (c). Thus, the scope of the literature is rather limited.

2. Types of evaded income

Generally, there are two types of income, the taxation on which is evaded; namely, income derived from illegal activities and income derived from legal activities. For the former, the decision to evade taxes is dictated by the fact that the activities are illegal and need to be kept secret; therefore, the income derived therefrom is not reportable. This decision is independent of tax policy and tax administrative parameters. For the latter, the decision to evade the taxes stems from the expected utility maximization or the expected income maximization behavior of the taxpayer. In this case, the decision to evade taxes is affected by tax policy and tax administrative parameters. The literature reviewed deals only with tax evasion of income derived from legal activities.

3. Individual versus aggregate tax evasion behavior

Tax evasion behavior is like consumption behavior in the sense that it can be analyzed either at the individual or micro-level, or at the aggregate or macro-level. Literature on the theoretical and empirical analysis of tax evasion reviewed in the previous sections is all micro-analysis 1/, because it deals with the decision making of individual taxpayers rather than the aggregate pattern of tax evasion in the economy as a whole. Thus, it cannot directly answer the question as to why tax evasion in one country is different from in another. It can only provide some indirect suggestions explaining the differences.

4. Types of factors affecting tax evasion

Factors affecting tax evasion can be classified into two types; namely, tax and nontax. The tax factors are factors within the tax system, such as the tax rate, the tax base, the tax structure, the penalty rate, and the probability of detection. Nontax factors are factors outside the tax system which influence the decision of an individual to evade tax--such as the government price controls, the extent of regulation in the economy, and the government's expenditure policies as well as the individual's personal moral fiber. Whereas tax factors are more relevant to tax evasion on income derived from legal activities

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1/ Although, in analyzing the effects of tax schedules on tax evasion Srinivasan, Nayak, and Sisson deal with the total government tax revenue from income taxes, their primary concern is not the aggregate tax evasion. Their approaches are still micro-approaches because they derived the total tax revenue by integrating overall individual taxpayers rather than relating one aggregate variable to other aggregate variables within the system of the aggregate economy.

and nontax factors are more relevant to evasion on income derived from illegal activities, both factors have certain influences on evasion of both types of income. On the one hand, tax factors such as excessively high tax rates and overly progressive tax schedules may constitute a cause for illegal activities from which the income derived is not reportable. On the other hand, nontax factors may constitute a cause for tax evasion on income derived from legal activities. For example, an excessive government expenditure leakage through corruption may influence the taxpayer's decision to evade tax by underreporting of income from legal activities.

Literature reviewed in this paper deals only with tax factors, not with nontax factors. Thus, the literature is limited in the sense that it takes account of only part of the whole range of factors affecting tax evasion.

To summarize, the literature reviewed in Sections II, III, and IV is limited insofar as (a) it deals with tax evasion through only underreporting income; (b) it deals with evasion of legal income only; (c) it is a micro analysis; and (d) it takes account of only tax factors.

VI. The Role of Tax Factors

1. The tax rate

The effectiveness of the tax rate as a policy instrument for the deterrence of tax evasion depends on the relationship between the tax rate and tax evasion, that is, whether the high tax rate is a cause of tax evasion or not. Unfortunately, such a relationship is still an unsettled topic of debate and has not been definitely established one way or the other. On the one hand, there is a general belief that a high tax rate is the main cause of tax evasion. Such a belief is supported by observations, reports, and studies of experts and committees on taxation as well as by statements of tax policymakers. For example, Kaldor (1956), in his well-known report on Indian tax reform, states that the incentive to evade taxes depends on the marginal rates of taxation, because these governed the gains from evasion as a percent of the sum evaded. Kaldor's statement is reinforced by the Direct Taxes Administration Enquiry Committee (1959) of India, which finds that high personal income tax rates are one of the major factors responsible for tax evasion. The Committee observes in its report that many witnesses state that the prevailing high rates of taxation are one of the main causes for tax evasion and that the high rates of tax in the high income brackets are said to be tolerated only because of the considerable evasion that takes place. Moreover, the then Finance Minister of India, in his budget speech, states that he has come to the conclusion that, in India, the tax rate of direct tax

at top levels encouraged large-scale evasion. Tanzi (1983 a) in the discussion of the erosion of tax bases in the developing countries states that "High tax rates, of course, make the problem of evasion worse." 1/ Herschel (1978), in discussing the relationship between tax evasion and tax avoidance states that both of them can be considered as alternative means to face extremely high tax rates. This implies that high tax rates are one source of tax evasion. In addition, a simulation study by Friedland et al. suggests that, beyond some rate of tax, the fraction of reported income becomes very elastic with respect to the tax rate and that the positive relationship between the decision to underreport is increased as the tax rate increases. Moreover, survey data used by Mork indicates that taxpayers in higher income brackets who pay tax at higher rates tend to have a higher proportion of under-reported income. Furthermore, in an analysis of individual tax returns, Clotfelter (1983) finds that higher tax rates tend to stimulate tax evasion.

On the other hand, as reviewed in Section III, the results of theoretical analyses do not directly confirm the belief that a high tax rate is the cause of tax evasion. Such theoretical results are supported by the experience of tax administrators, tax committees, and some empirical observations. For example, Gupta (1982), a Senior Assistant Commissioner of Income Tax, Department of Revenue, India, in his study on tax evasion, states that a high tax rate is not the most important factor responsible for the tax evasion in India because tax evasion exists at all income levels and not only the high income brackets where the marginal tax rate is stated to be high. Moreover, the Working Group on Central Direct Taxes Administration of the Administrative Reform Commission of India (1969), which investigated the causes of tax evasion by studying the figures of detected concealed incomes, reported that an increase in the rate of taxation is not followed by an increase in the tax evasion nor has a decrease in the rates brought about a higher tax responsiveness. Furthermore, the experience of tax administration in India suggests that lower tax rates do not secure better tax compliance; for example, during 1970/71 to 1978/79 when the marginal tax rates were steeply reduced, the income tax collection as a proportion of national income in the nonagricultural sector was also reduced. All these are evidence that there is no relation between high tax rates and tax evasion.

The empirical results for both sides as cited above are sketchy and indirect. This indicates that more empirical studies are needed before making a definitive conclusion regarding the effect of the tax rate on tax evasion. Thus, one may conclude that the effectiveness of the tax rate as a policy measure for the deterrence of tax evasion is unclear.

1/ Tanzi (1983 a), p. 5.

2. The penalty rate and the probability of detection

Unlike the tax rate, the theoretical result of the effect of the penalty rate on tax evasion is much clearer. According to the tax evasion model, a penalty has a negative effect on tax evasion except when the probability of detection is a function of the penalty; in such a case the effect of a penalty on tax evasion is indeterminate. For the probability of detection, the message from the theoretical result is even clearer because all theoretical analyses, without any exception, indicate that an increase in the probability of detection is a deterrent to tax evasion. The next legitimate question is, if both the probability of detection and the penalty rate are deterrents to tax evasion, what is their relative effectiveness? A number of theoretical analyses have been devoted to this particular issue. We will review them here chronologically. Singh finds that, at a given proportion of underreported income, there is a negative relationship between the penalty rate and the probability of detection. He also finds that, for India, if the penalty rate is at 200 percent of the evaded income, then the probability of detection must be one-third for the proportion of underreported income to be zero, that is, no evasion at all. McCaleb, based on theoretical grounds alone, argues that, without knowledge of the parameter values, the penalty rate and the probability of detection are superior instruments to tax rates in generating increased tax payments through the reduction of tax evasion. This is because the tax rate gives indeterminate results, whereas both the penalty rate and the probability of detection give a definite result. Further, he argues that if the implementation cost is also taken into account, then the penalty rate is superior to the probability of detection. Thus, he draws a general conclusion that only the penalty rate on unreported income is a preferred instrument on the grounds of both certainty of the effect and the cost of implementation. Christiansen, in analyzing the relative effect of the penalty rate and the probability of detection, under a constant expected gain from tax evasion, finds that, if the penalty is increased and the probability of detection is adjusted downward accordingly, risk averters will always reduce their tax evasion. This implies that a high penalty rate is a more effective deterrent to tax evasion than the high probability of detection. Further, given an adjustment in the probability of detection so that the expected gain from tax evasion is constant, if the penalty rate is "small enough," then an increase in the penalty rate will increase tax evasion. However, given the same adjustment, if the initial penalty rate is "large enough," an increase in the penalty rate will reduce tax evasion. This indicates that when the penalty rate is initially low, then an increase in the probability of detection is more effective than an increase in the penalty rate. When the penalty rate is high enough, then an increase in the penalty rate is more effective than an increase in the probability of detection.

Koskela (1983 b), introducing cost of detection into his model, finds that provided that the ratio of marginal cost of detecting tax evasion is "small," large penalties seem to be more effective deterrents to tax evasion than high probability of detection. He explains that an intuitive interpretation of this result is that an increase in the penalty rate and a decline in the probability of detection that results in a constant expected gain from a given tax evasion induces a greater loss for the taxpayer in the case of detection. Greater risk will thereby be involved and tax evasion will decline assuming that the taxpayers are risk averse. Further, Koskela demonstrates that a high penalty rate is a more effective deterrent to tax evasion than large lump-sum fines. This is because the lump-sum fine does not vary with the amount of undeclared income and thus leaves more incentive to risk-taking than the penalty rate which varies with the declared income. Friedland et al., report that their simulation study indicates that a high penalty with low probability of detection is a more effective deterrent than a low penalty with a high probability of detection. 1/

To summarize, both the probability of detection and the penalty rate are effective deterrents of tax evasion and the penalty rate is relatively more effective than the probability of detection.

3. Other tax administrative measures

a. The withholding scheme

Evidence from the Tax Compliance Management Program (TCMP) 2/ indicates that the wage and salary income which is under the withholding scheme has a high rate of compliance or a low rate of evasion. 3/ Moreover, statistics in many developing countries indicate that a sizable amount of income tax is collected from wages and salaries which are deducted at the source (for example, in Thailand 78 percent, in Cyprus 73 percent, in Indonesia 70 percent, and in Turkey 67 percent of individual income taxes are from wages and salaries). This indicates that a tax withholding scheme is an effective measure for preventing tax evasion. However, the problem with the withholding scheme is that it cannot be applied to many types of income because, for the withholding scheme to be effective, there must be a relatively small number of easily identifiable payers of the income. Many types of income, for example, rental income, income of professionals, and income from small

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1/ The simulation approach to tax evasion of Friedland et al. was studied before that of Christiansen's theoretical analysis. In fact, their result is the subject of investigation by Christiansen.

2/ For more discussion about the TCMP, see Henry (1983).

3/ The 1976 TCMP result reported a 99 percent "Voluntary Compliance Level" (VCL) for wages and salaries income. The VCL is defined to be the ratio of the reported tax to the sum of the reported tax and the tax unreported.

businesses, do not lend themselves to the withholding schemes because there are more payers than receivers of such income. However, capital income, such as dividend and interest paid by banks, does lend itself to withholding schemes because there are a lot fewer payers of such income than receivers. Agricultural income of farmers, whose products are mainly for export or for further processing by domestic factories (for example, sugar cane in Thailand and rubber in Indonesia) also lends itself to withholding schemes. However, care should be taken in introducing the withholding scheme on these types of income because if not properly practiced, the withholding tax becomes the final tax and the tax will be more like an export tax or a sales tax imposed on agricultural products of the farmers rather than an income tax. This is because the tax is based on turnover rather than on income and the tax does not vary with income of the taxpayer. Farmers who experience losses still have to pay this tax.

b. The self-enforcement tax system

Economists have attempted to design an interlocking tax system in such a way that it will rely on self-interest of the taxpayers to encourage them to reveal information to the tax department. Kaldor, in his well-known report on India, suggests that the five taxes, namely, the income tax, the capital gains tax, the wealth tax, the personal expenditure tax, and the gift tax be filed in a single comprehensive return and should be assessed simultaneously. Kaldor explains that the advantage of filing in a comprehensive single return and assessing simultaneously is that the taxes are self-checking in character both in the sense that concealment or understatement of items in order to reduce liability in some taxes may increase liability in other taxes and in the sense that the information furnished by a taxpayer in order to prevent over-assessment of his own liabilities automatically reveals the receipts and gains made by other taxpayers. Higgins carries Kaldor's idea further by introducing a self-enforcing incentive tax system for the developing countries. Higgins' system includes (1) a personal income tax (including capital gains), (2) a corporation income tax, (3) a general sales or turnover tax, (4) a wealth tax, (5) a tax on excess inventory, and (6) a personal expenditure tax. Theoretically, the Kaldor-Higgins system is self-checking because personal expenditure is defined as the excess of income over savings and savings are equal to the increase in net wealth. Thus, taxpayers who underreport their expenditure by overstating their savings increase their wealth tax liability. A seller of a property who understates his capital gains hurts the buyer because the buyer cannot claim the full amount of the investment thereby forcing him to declare higher expenditures and increasing his expenditure tax liability. The excess inventory tax is designed to discourage underreporting of sales thus helping enforce sales and income tax. However, the system is not practical and can not be implemented. Goode, in his paper on some economic aspects of tax administration comments that:

"These proposals appear so unrealistic that a detailed critique is not worthwhile. In my opinion their authors exaggerated the proclivity of taxpayers to refined calculations, the capacity of tax departments for using the great mass of data that would be generated, and the receptivity of governments to fiscal innovations. I suspect that most tax administrators will regard the idea of a self-enforcing tax system as fantastical. Even if put into operation, the proposed systems would not prevent evasion in cases in which both parties to a transaction omit it from their records or understate its amount. Both parties could evade the related taxes, and as no conflict of interest would arise between them, neither would have an economic incentive to report correctly." 1/

c. Other administrative measures

Other tax administrative measures for the prevention of tax evasion include the simplification of tax laws and procedures, taxpayer education, the tax amnesty scheme, the publicizing of names of tax law offenders, and the honesty of the tax enforcing department. These measures are practiced in a number of countries with varying degrees of success.

VII. The Role of Nontax Factors Especially in Developing Countries

1. Nontax factors 2/

As pointed out in Section V, the theoretical models of tax evasion deal only with micro-analysis of tax evasion and account for only tax factors affecting tax evasion. Such analysis does not directly or fully explain why tax evasion is different from one country to another. We now explore nontax factors affecting tax evasion with a view to explaining aggregate tax evasion behavior in the developing country circumstances.

Generally, there are two types of nontax factors affecting tax evasion; namely, the micro-nontax factors and the macro-nontax factors. The micro-nontax factors are factors pertaining to the individual taxpayer--such as sex and educational background--which influence the decision to evade tax. These factors are relevant only to the micro-analysis of tax evasion behavior because their effects tend to be cancelled when the variables are aggregated. Macro-nontax factors relate to the characteristics of the economy as a whole, such as the

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1/ Goode (1981), p. 266.

2/ Tanzi (1983 b) listed four causes of underground economy, namely, taxes, regulations, prohibition, and bureaucratic corruption.

price policy and the income policy of the economy. These factors are relevant to both the micro-analysis and the macro-analysis of tax evasion behavior. Since the focus here is on the intercountry comparison of tax evasion, only macro-nontax factors will be explored.

a. The degree to which prices are distorted through price control policies

Price control tends to generate black markets and tax evasion. This is the case whether the control is in the goods and services market, the factor market, the money market, or the foreign exchange market. In the goods and services market, price control imposed on any goods or service usually leads either to the understatements of sale receipts in the accounts that are prepared for the inspection of the tax authorities, or to the disappearance of such goods or services from the regular market; they can be purchased only in the black market at higher prices. In the factor markets, price control usually leads to the declaration of false prices of the factor being controlled. For example, rent control usually leads to tax evasion either through the understatement of rental income in the tax return of the landlords, or through an unreported substantial amount of premium 1/ which is received in cash before the premises are let at the controlled rent. In an economy where the minimum wage is artificially set higher than the equilibrium wage, one is likely to find the overstatements of wages paid in the tax returns of the employers, unreported employment on the part of the employees, and even illegal manufacturing plants because the plant owners could not register their plants since all or almost all employees receive salaries lower than the minimum wage. In the money market, the ceiling imposed on the interest rates often drives funds from the officially organized market to the unorganized market because interest rates in the organized market are closely controlled, while it is not possible to enforce such interest ceilings on loans in the unorganized market. The result is that a sizable amount of interest income from loans in the unorganized market is not taxed because they have never been reported to the tax authorities. In the foreign exchange market, if the exchange rates are fixed artificially and differently from the equilibrium rates, then it is likely that there will be black markets for foreign exchanges. The existence of such markets is not only illegal in itself but also lubricates the operation of other illegal activities such as drug trafficking, smuggling, and illegal ammunition trade, by making available foreign currencies needed to facilitate such activities, which otherwise would be available only through official channels.

1/ For example, in India, rent controls have given rise to a system, called "Pugree," in which a substantial amount of money is received by the landlord, in cash, before the premises are let at controlled rent. Pugree is a premium paid illegally to the landlord, outside the books of account at the time of change of tenancy of the premises. The payment is usually made out of unaccounted money.

b. The extent to which the government regulates the economy through rules and regulations

The preponderance of rules and regulations tends to increase tax evasion. This is because in an economy where there are too many and too complicated rules and regulations governing business practices, it is generally difficult, often not profitable, and sometimes impossible to do business legally. Thus, businesses have to find some ways to get around such rules and regulations and often have to do business illegally. For example, rules laid down to restrict trade--such as import quotas, import licensing, and import prohibitions--often lead to the problem of smuggling, which in itself is an evasion of customs duties and which generates other black markets. Once the black markets are started, tax evasion follows automatically. Other examples of rules and regulations governing business practices are prohibitions, rationing, forced sales of commodities to the government or to the marketing board, town and city planning regulations, factory acts, permits to produce certain goods, and licenses required to start a shop.

c. The extent to which the salaries of public employees are lower than the level of income needed for a reasonable standard of living

Public officials are usually charged with a certain responsibility and authority which can be used either for the provision of public service and justice or abused for private benefit. If the salaries of such officials are not comparable to the responsibility and authority charged to them, the temptation for them to abuse such authority and responsibility is high. Moreover, if their salaries are so low that they do not have sufficient income to maintain a reasonable standard of living, it is likely that they will find ways to supplement their income via either legal or illegal means. If the latter means is used by officials other than tax officials, it is likely to have an indirect effect on increasing tax evasion. If such means are used by tax officials, it is likely to have both indirect and direct effects in increasing tax evasion because such means facilitate tax evasion.

d. Faith in the expenditure policy of the government

Taxes are raised for the purpose of financing government expenditures while such expenditures are expended for the well-being of taxpayers. This is the justification for the existence of taxes and government expenditures. However, when taxpayers start to question the justification for either the size or the pattern of expenditures, or both, then they are unwilling to pay taxes, at least in the amount for which they are liable. For example, taxpayers may see no justification for the large size of the budget because they do not see why the government has to be so luxurious, or why they have to pay tax to support public servants who are living much more lavishly than they

are. Or, taxpayers may disagree with the government's spending policies such as defense spending or spending on welfare. In such a case, they will be unwilling to pay tax and such an unwillingness leads them to find some way to reduce their tax liability through either legal or illegal means. This leads to either tax avoidance or tax evasion. Such evasion is based purely on political considerations.

e. Other factors

Other nontax factors affecting tax evasion are, for example, the level of education of the population and the stage of development of the economy. The level of education of the population influences tax evasion in two ways. First, a better educated population is more likely to have a better understanding of the tax system and its purposes; thus, the chance that they will violate tax laws because of ignorance or because not enough attention is paid to the tax system, is reduced. Second, a well-educated population is more likely to know how the tax system works and thus can reduce its tax liabilities through utilization of various relief provisions available in the tax laws, thereby reducing the necessity to evade tax.

The stage of development of the economy can indirectly affect tax evasion. In less-developed countries, economic activities are conducted in a manner which does not lend itself to easy tax enforcement. In such countries, the agricultural sector is relatively large, the share of the self-sufficient economy in the total economy is high, the share of the nonmonetized economy to total gross domestic product is high, and small and scattered production units are more prevalent. Such circumstances hinder the effectiveness of the tax enforcement mechanism and create a great temptation and opportunity for tax evasion.

It seems as if not only the validity of the above argument concerning the tax factors and the nontax factors affecting tax evasion, but also the extent to which such factors influence tax evasion, can be tested empirically by using the regression technique. Such tests will enable us to explain why and how tax evasion differs between the developing countries and the developed countries. However, the absence of a well-defined and generally accepted measurement of tax evasion prevents us from making such a test. Thus, we have to rely on qualitative evaluation of such factors and we will do so for the developing countries in the next section.

2. Tax evasion under the developing country circumstances

We have investigated both the tax factors and the nontax factors affecting tax evasion. We are now in the position to evaluate such factors, with a view to shedding some light on the extent of tax evasion in the developing country circumstances.

In most developing countries, income tax laws are adapted from the tax laws of well-developed societies. As a result, on the one hand, one can find a very sophisticated income redistribution scheme as well as built-in stabilizing measures in most of the tax laws of the developing countries--regardless of their stage of development. On the other hand, one also finds generous exemptions and relief for the purpose of development promotion in almost every country. Because of the government's revenue needs and the existence of such generous exemptions and relief, the tax rates in developing countries are generally highly progressive with respect to the absolute amount of income. Such high progressivity can lead to high tax evasion, since, as has been shown, a progressive tax structure stimulates tax evasion.

Considering the penalty rates in the developing countries, one finds that they are quite varied. Some countries have rather high rates while others are low. In many developing countries, only fixed fines are imposed and such fixed amounts are out of date because they have not been changed for a long time. With high rates of inflation, unless fixed fines are changed frequently, they become obsolete very rapidly. Many developing countries do not distinguish between penalties and interest, and charge only penalties without charging interest on the evaded tax. The penalties are charged as a percentage of either the evaded income or the evaded tax without any time dimension. Thus, the absence of interest charged on the evaded tax weakens the effect of penalties even further. If one takes into account the fact that high penalty rates are rarely enforced, the deterrent effects of the penalty rates in the developing countries are likely to be low and tax evasion is likely to be high because of the lack of the forceful deterrent effect of the penalty.

The probability of detection is a function of the efficiency of tax administration. Since tax administration in the developing countries is relatively inefficient, the probability of detection is likely to be low. Thus, because of such a low probability of detection, tax evasion is likely to be high.

In developing countries, the horizontal equity of the tax system is impaired by the preponderance of special exemptions, special relief, and many other favorable tax treatments (such as tax holidays, deduction of the cost of water and electricity in an amount higher than the actual cost). Although such exemptions, relief, and treatments are legal, they weaken the principle of fair competition. Thus, the motivation for the "nonpreferred" enterprises to evade taxes is very strong and tax evasion is likely to be high.

Price control is normally implemented out of equity considerations and is generally designed either to make goods or services which are subject to such control available to the public at the controlled low prices or to guarantee a certain minimum income level (in the case of

the price of labor--the minimum wage). Price control is practiced more frequently in the developing countries than in the developed countries because the need to take account of equity considerations in conducting public policy is greater in the developing countries than in the developed countries. This is because, generally, personal income is more unequally distributed in the former than in the latter. 1/ In the goods and services market one generally finds price control of necessary goods either because of shortage of supply due to low productive capacity (in the case of goods domestically produced and consumed), because of higher prices in foreign markets (in the case of domestically produced goods for domestic consumption as well as for export), or because of the lack of foreign exchange (in the case of imported goods). All these happened more frequently in the developing countries than in the developed countries. Thus, one finds price control practiced more often in the developing countries than in the developed countries. In the factor market, rent control and the minimum wage are widely practiced in the developing countries. In the money market, interest rates in the organized market are relatively inflexible, but the unorganized or parallel money market is very popular, whereas such a market is insignificant in the developed countries. In the foreign exchange market, most developing countries use some form of fixed exchange rates, while the exchange rates in the major industrialized countries are floating. Furthermore, most developing countries often experience balance of payments deficits and foreign exchange shortages because their foreign exchange earnings depend mainly on the exports of primary products which fluctuates greatly due either to the weather conditions or to the fluctuation of the world market prices, over which they have no control. Fixed exchange rates, coupled with a high frequency of balance of payments deficits, lead to a black market for foreign exchange, which in turn leads to tax evasion.

On the extent to which the government regulates the economy through rules and regulations, there are no a priori reasons to allow one to make a general statement regarding whether it is more or less widely practiced in the developed or the developing countries. However, in some specific areas, for example, in import control, one can find a higher frequency of controls in the developing countries than in the developed countries, because foreign currency shortages occur more often in the developing countries.

In the developing countries, there is often a large gap between the salaries of public employees and the income level needed for a reasonable standard of living, while such a gap is rarely observed in the developed countries. This gap usually leads to either legal or illegal supplementary income. One has heard innumerable stories of government servants in developing countries having made unexplainable

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1/ See, for example, Sen (1980).

fortunes on the basis of their salaries and other known sources of income. All this unexplainable supplementary income of public officials contributes directly or indirectly to higher tax evasion.

In general, taxpayers in developing countries are less concerned about national and international politics and have less freedom to express their opinions or to act differently from the policy of the government. Thus, tax evasion stemming from unsatisfactory expenditure policy is likely to be less in developing countries than in developed countries. Concerning the level of education and the stage of economic development, it is obvious that these are lower in the developing countries than in the developed countries. Thus, tax evasion, due to these factors, is likely to be higher in the former than in the latter.

To summarize, the developing country circumstances are characterized by a highly progressive nominal tax structure, ineffective penalty deterrents, low probability of detection, impaired horizontal fiscal equity, prevailing price controls in all markets, a moderate degree of government rules and regulations, a large gap between public servant salaries and a reasonable standard of living, low level of taxpayer education, and low stage of development but less concern about public expenditure policy. Such circumstances stimulate tax evasion, thus, tax evasion in the developing countries is likely to be higher than in the developed countries.

VIII. Conclusion

This paper has reviewed the theoretical and empirical literature concerning factors affecting tax evasion behavior and the policy measures for the deterrence of such behavior. Since the factors analyzed in the literature are only the tax factors, for the sake of completeness, the paper has also explored the nontax factors in a separate section and has evaluated the developing country circumstances concerning such tax and nontax factors.

Theoretical and empirical studies concerning the effect of tax rates on tax evasion give contradictory and inconclusive results. On the one hand, theoretical studies indicate that such effects are indeterminate if the penalty is a function of the evaded income, negative if the penalty is a function of the evaded tax, and will be positive only when the penalty is imposed on the evaded income and the increase in the tax rate is accompanied by a reduction in the lump-sum transfer in such a way that the government's revenue remains unchanged. On the other hand, empirical studies suggest that such an effect is positive without any condition on the revenue of the government. However, both the theoretical and empirical studies indicate that the effects of the penalty and the probability of detection on tax evasion are negative. In addition, theoretical studies indicate that, under the situation

where tax evasion exists, a regressive tax structure tends to generate the highest government revenue, and the proportional tax structure tends to generate higher revenue than the progressive structure. On the effect of fiscal inequity, empirical studies confirm the belief that tax evasion is high among victims of fiscal inequity and low among beneficiaries of fiscal inequity.

On policy measures for the deterrence of tax evasion, both the theoretical and the empirical studies suggest that the penalty rate is more effective than the probability of detection in deterring tax evasion. Among administrative measures for the prevention of tax evasion, the withholding scheme seems to have empirical support of success.

The nontax factors explored are the price distortion, the extent of government rules and regulations governing business practices, the extent to which the public servant salaries are lower than the level of a reasonable standard of living, the faith in the government's expenditure policy, as well as the level of education of the population and the stage of development of the economy. Evaluations of both the tax and nontax factors in the developing countries suggest that such factors (except for the faith in the government's expenditure policy) appear to exist in the developing countries in such degrees that they constitute a circumstance which is highly inducive to tax evasion. The existence of such a circumstance leads one to question whether supply-side tax policy, which is designed to stimulate growth and development of the economy by assigning a primary task to tax instruments and which works well in the United States, will also work well in developing countries.

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