



## A Theory of Tax Evasion in Developing Countries

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**W.P. No. 2016-03-37**

March 2016

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## A THEORY OF TAX EVASION IN DEVELOPING COUNTRIES

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### Abstract

The literature on tax evasion assumes that taxpayers wish to evade their taxes entirely and the only reason they do not do so is that there is some non-zero probability of being caught by the government. Also, it is assumed that government uses the taxes and fines from caught evaders on goods that it consumes which produce no utility to taxpayer-citizens. In a developing country, however, we argue that taxpayers use tax evasion to compensate for imperfect financial markets as well as government expenditure patterns that do not benefit them. We demonstrate that imperfect financial markets result in situations where when individuals find the chance of earning high returns from investments, it causes them to overcome their aversion to risk and participate in actuarially unfair tax evasion gambles. Also, tax evasion increases when either public goods are underprovided, or the government is sufficiently predatory, or the government directs policies at groups that the taxpayer is not a member of. In such a situation tax evasion is viewed by the taxpayer as a means of shifting the allocation of his income in favor of investments and away from government expenditure policies that give little benefit to him.

Keywords: Tax evasion, development.  
J.E.L. Classification: H26, O17.

## A THEORY OF TAX EVASION IN DEVELOPING COUNTRIES

### Section I:

The literature on tax evasion has expanded rapidly since the seminal article of Allingham and Sandmo (1972). One part of the literature has moved away from the Allingham-Sandmo concern with income taxation towards studying how the evasion of commodity taxes affects welfare and optimal taxation (Usher, 1986; Kaplow, 1990; Virmani, 1989; Cremer & Gavhari, 1993). Explicit modeling of the interaction between tax administration and the income tax payer follow the paper by Reinganum and Wilde (1985) who showed that random audits would generally be suboptimal if a broader range of audit policies (such as cut-off rules) were available to the government (Border & Sobel, 1987; Mookherjee & Png, 1987; Scotchmer, 1988; Cremer, Marchand and Pestieau, 1990). The impact of tax evasion on efficiency and labor supply when evasion is possible in only some part of the economy has also elicited research (Alm, 1985; Jung, Snow & Trandell, 1994; Limieux, Fortin & Frechette, 1994). Finally, a part of the literature has denied that tax evasion is a gamble and viewed the phenomenon as giving rise to social stigma that generates psychic costs on evaders (Baldry, 1986) or that taxpayers evade on the basis of their perception of the fairness of their fiscal treatment (Bordignon, 1993). This article extends the literature by arguing that two characteristics of developing economies - imperfect capital markets and the nature of the state in terms of the interests it promotes - make a difference to tax evasion behavior.

A significant and important characteristic of a developing country is that its system of financial intermediation is relatively undeveloped (Bruno, 1979). There is an

absence of financial intermediaries to screen potential borrowers, to differentiate good risks from bad risks, and to pool and spread risks. Uncertainty regarding what sort of person the borrower is and what sort of use will be made of a loan, as well as the uncertainty whether debtors will settle their accounts when they are due is an inherent element of such credit markets (Stiglitz, 1988). These lead lenders to introduce collateral requirements or to add in default costs in their loan rates. An important implication of this is that individuals do not have equal access to credit markets and indeed in order to participate in such markets they need to have a certain level of income or assets that provide the collateral which enables entry into the credit market. Also, as information about high-return investments is typically sparse, the costs of identifying and transacting in such investments is usually a large fixed cost that deters entry by those with smaller levels of income. Thus, due to the lack of requisite collateral and due to fixed investment and transactions costs, individuals with incomes up to a certain moderate level face capital market conditions where the rates of return are increasing functions of their incomes. Such individuals will find themselves unable to realize on the current set of imperfect capital markets the full potential value of their incomes. They will then resort to tax evasion to get around these constraints imposed by imperfect capital markets in developing countries<sup>1</sup>. This reason for tax evasion contrasts with the standard literature where taxpayers wish to evade their taxes entirely and the only reason they might not do

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<sup>1</sup>Fishlow and Friedman (1994) develop a model to show that compliance is a function of the ratio between current and permanent income. Hence, when there is a transitory negative income shock in an economy where credit is rationed the taxpayer uses evasion to substitute for the inability to secure credit and smooths his intertemporal consumption pattern. What triggers evasion in this model is random shocks to income and imperfect capital markets are unable to support optimal consumption plans. By contrast in our framework, it is the nature of financial markets in developing countries that triggers tax evasion in the first place and any transitory variations in income can only aggravate the extent of the evasion. Fishlow and Friedman concentrate on the stochastic nature of income whereas we concentrate on the direct implication of an imperfect credit market. Moreover, we emphasize that most evaded income is for investment purposes and not for immediate consumption.

so is that there is some non-zero probability of being caught by the government. Also, the standard literature has always presumed that the income evaded is fully spent as consumption expenditure. We suggest instead that the income evade in a developing country is disposed of in the form of investments. Much of the tax evaded income in a developing country is spent on consumer durables that are more in the nature of investments than actual consumption, gold and other precious metals and stones, purchases of land and real estate, and to build up inventories with a view to gain the significant returns they bring in on an inflationary market. That tax evaded incomes are spawned to further investment possibilities in an imperfect capital market does make a difference to the nature of the tax evasion problem.

The literature also largely views the relationship between taxpayers and the state simply as one of coercion<sup>2</sup>. As a result government uses the taxes and fines due from caught evaders to pay the costs of collection and enforcement and after this expenditure is catered to it is taken to spend the rest of such revenue on goods that it consumes and which produces no utility to taxpayer-citizens. However, economic activity prospers when the state promotes a stable social and legal order and enforces property rights and contracts. Taxpayers realize that in order for government to serve these essential functions, they must subject themselves to the government's sovereign powers of taxation and public expenditure. The state, however, as a relatively autonomous actor (Bardhan, 1990) and given the sovereign powers it holds, is free to choose tax and expenditure policies that further its own self interest rather than those promoting the welfare of citizens. Taxpayers realize that often instead of promoting order and public services the state uses the apparatus at its command to collect bribes for providing permits and

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<sup>2</sup>The Cowell & Gordon (1988) paper represents a departure from this.

licenses or for prohibiting the entry of competitors (Shleifer & Vishny, 1993) and this impedes legitimate business. Taxpayers may not, however, view the state as proprietarian and pursuing its own self interest (Grossman & Suk, 1994), but think of it instead as an arena of group or class competition that institutes policies which favor consumer and producer interest groups through favorable economic measures such as tax loopholes and income transfers as the Public Choice school portrays it (Tollison, 1989). In that case too, the taxpayer derives utility from the public expenditure financed by tax revenues only to the extent that those favorable economic policies are appropriable by him. In both the Proprietarian and Public Choice approaches, the taxpayer uses the electoral process as an instrument which, through the threat of non-reelection, induces the state to select public expenditure policies that more directly promote his utility. We suggest that tax evasion is another instrument used by taxpayers in the time periods when government is effectively unconstrained by electoral considerations to protect themselves from undesirable behavior from politicians and the choice of how much to evade is made in part in order to redress the balance of unfavorable public policies.

## Section II: The Model

We make the following assumptions:-

(1) The taxpayer's behavior conforms to the Von-Neumann-Morgenstern axioms for behavior under uncertainty and his cardinal utility function is additive in income and public expenditures that benefit him as arguments. Marginal utility in the arguments is assumed to be everywhere positive and strictly decreasing so that the individual is risk-averse.

(2) The income of the taxpayer,  $Y$ , is exogenously given and is unknown and is unknown to the government and its tax collection agencies. All income that is not transferred to the tax authorities is invested.

(3) There is a tax levied on the income of the taxpayer that is determined by the government.

(4) The taxpayer will with some probability  $p$  be subjected to investigation by the tax authorities who will then get to know the true value of the taxpayer's income.

(5) The tax on any income found to have been concealed from the government is subject to a penalty.

(6) An individual faces an imperfect capital market. Hence, upto a certain level of net income that is invested, the yield is an increasing function of the amount invested because increased income provides the collateral that eases accessibility to finance as well as allows the spreading of the fixed information and transactions costs of investments. Beyond a certain level of net income,  $\alpha^*$ , the rate of return on investment will be constant as such an individual has easier and cheap access to capital markets.

(7) The tax revenue is spent by either a proprietarian government pursuing its self interest or by a government instituting policies favorable to various interest groups so that the quantity of public expenditure services enjoyed by each taxpayer is some proportion of the total tax revenue raised by the government. The taxpayer takes account of the impact of his decision to evade on the supply of public goods and policies that he is able to appropriate.

The taxpayer chooses the proportion  $\theta$  by which to evade taxes so as to maximize his expected utility  $E\{U\}$  given by

$$E\{U\} = (1-p)[U\{\alpha_e(1+R(\alpha_e))\} + U\{g\}] + p[U\{\alpha_d(1+R(\alpha_d))\} + U\{g\}] \quad \text{---(1)}$$

where,

$$\alpha_e = Y - t(Y) + \theta t(Y) \quad \text{---(2)}$$

is the net income in the situation where the individual escapes the audit of the tax authorities, and

$$\alpha_d = Y - t(Y) - \pi\theta t(Y) \quad \text{---(3)}$$

is the net income in the case of detection by the tax authorities. The description of the other expressions is as follows:

$t(Y)$  = tax function over income that should be paid to comply with the law

$\pi$  = penalty associated with evasion

$p$  = probability of being caught evading

$\theta$  = proportion of income by which taxes are evaded

$R = R(\alpha_i)$  = rate of return on investment of net income<sup>3</sup>, where,  $i = e, d$ , and  $R' > 0$   
for  $0 < \alpha_i \leq \alpha^*$ , and  $R' = 0$  for  $\alpha_i > \alpha^*$

$g$  = extent by which public expenditures benefit the taxpayer

Taking a lead out of Brennan and Buchanan (1980)<sup>4</sup>, if  $G$  is the aggregate tax collection of revenues, then, a predatory government or one that caters to exclusive

<sup>3</sup>There are really three possibilities on  $\alpha_i$  : (i)  $\alpha_d < \alpha_e \leq \alpha^*$ , (ii)  $\alpha_d \leq \alpha^* < \alpha_e$ , and (iii)  $\alpha^* < \alpha_d < \alpha_e$ . Even though in what follows we write explicitly in terms of possibilities (i) and (iii), the results follow for possibility (ii) also.

<sup>4</sup>In the Brennan & Buchanan (1980) work the individual placed in a situation of constitutional choice makes two analytical distinctions. Either he makes a prediction regarding the proportion of revenues spent by a revenue-maximizing government on providing goods and services he desires and so selects a constitutionally appointed tax regime with restrictions on tax bases and rate structures that given this exogenous proportion will yield the quantity of public goods estimated to be efficient. Or, realizing that the government will seek to maximize revenues that accrue to it for discretionary use he places restrictions on tax institutions in the form of earmarked expenditures. Our set up, however, is a post-constitutional choice one and we do not endogenize the way in which the proportion of revenues that directly benefit the



interest groups will attempt to maximize the 'surplus' income that promotes these objectives. Thus, a taxpayer will benefit only from a proportion of the public expenditure on goods and services financed from the aggregate revenues collected. He then uses tax evasion as an adjustment mechanism in an attempt to influence the aggregate tax collection of government, a proportion of which he benefits from. In doing so he takes into account his expected tax payments and the effect of his decision to evade on other taxpayers' decisions on how much to evade. The response of other taxpayers to the individual taxpayers' decision to evade captures the non-excludability dimension of public expenditures, whereas the proportion by which the total quantity of public expenditures directly benefits the individual taxpayer captures the degree of rivalry between taxpayers and so the non-rivalness dimension of public goods. As the expected tax revenue from the individual taxpayer is  $(1 - p)(1 - \theta)t(Y) + p(1 + \pi\theta)t(Y)$ , the quantity of public goods and services that benefit the taxpayer can be written as

$$g = \beta G[(1 - p)(1 - \theta)t(Y) + p(1 + \pi\theta)t(Y)] \quad \text{---(4)}$$

where,

$\beta$  = proportion of total public expenditures which is of direct benefit to the individual taxpayer under consideration.

$G[ \cdot ]$  = expected sum of all tax revenues raised by the government for public expenditure expressed as a function of the conjectured response of all taxpayers to the expected tax payments of the taxpayer under consideration<sup>5</sup>.

The first order condition for the maximization of (1) with respect to  $\theta$  is :-

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individual is arrived at. However, once arrived at the individual uses tax evasion to influence the extent of benefits derived from public expenditure policies.

<sup>5</sup>If development by integrating small societies into larger and less personalised markets, involves a "transition of trust" [Lipton (1985)], then, each individual will be especially sensitive to the reactions of others to any decision of his as new institutions such as the authority of a government are still in the process of replacing old institutions and the pattern of behavioural responses is assumed to be similar.

$$\begin{aligned} \frac{\partial E\{U\}}{\partial \theta} &= (1-p)t(Y)U'\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)+\alpha_e R'(\alpha_e)\} \\ &\quad - p\pi(Y)U'\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)+\alpha_d R'(\alpha_d)\} \\ &\quad - (1-p-p\pi)t(Y)\beta U'\{g\}G'[\cdot] = 0 \end{aligned}$$

---(5)

The second order condition is :-

$$\begin{aligned} D &= (1-p)\{t(Y)\}^2 U''\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)+\alpha_e R'(\alpha_e)\}^2 \\ &\quad + p\{\pi(Y)\}^2 U''\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)+\alpha_d R'(\alpha_d)\}^2 \\ &\quad + (1-p)\{t(Y)\}^2 U''\{\alpha_e(1+R(\alpha_e))\}\{2R'(\alpha_e)+\alpha_e R''(\alpha_e)\} \\ &\quad + p\{\pi(Y)\}^2 U''\{\alpha_d(1+R(\alpha_d))\}\{2R'(\alpha_d)+\alpha_d R''(\alpha_d)\} \\ &\quad + [\beta\{1-p-p\pi\}t(Y)]^2 U''\{g\}\{G'[\cdot]\}^2 \end{aligned}$$

---(6)

As can be seen the second-order condition for a maximum is not automatically satisfied as  $D > 0$  is a distinct possibility for an individual when his net income  $\alpha_i \leq \alpha^*$ . This implies that there is a section of the expected utility function that is convex for a taxpayer with  $\alpha_i \leq \alpha^*$  and along with the gamble of being detected for evasion being available on a fair basis, this type of taxpayer has a risk-preferring range on his expected utility curve. The taxpayer with  $\alpha_i \leq \alpha^*$  can never be at an optimum in this risk preferring range of his expected utility curve and to leave such a range would accept even enormous riches-or-ruin gambles. Such a taxpayer willingly goes in for a tax-evasion gamble that is actuarially unfair. The curvature of this taxpayers' utility function is by assumption such that he is risk averse and despite this he accepts an unfair gamble. The underlying reason for this sort of behavior can be seen from (6) to be due to the curvature of the rate of return function - the effect of an increase in income invested on the returns to that investment. With a sufficiently large value of  $R'(\cdot)$ ,  $D > 0$  occurs and that results in the taxpayer overcoming his risk aversion and evading taxes despite this involving an unfair gamble. Such tax evasion behavior allows the investment that was barred by an imperfect

capital market and enables the earnings of the high rewards associated with that investment. In the case  $\alpha_i \leq \alpha^*$ , when  $D > 0$ , using penalties and the tax enforcement machinery more effectively so as to increase the probability of detection and induce greater compliance does not yield the expected results. The individual engages in unfair bets, the source of the problem stems from the imperfect credit market, and the policy tools of fiscal enforcement are largely ineffective.

For the other type of individual where  $\alpha_i > \alpha^*$ , the second order condition reduces to (7) which is clearly negative:-

$$\begin{aligned}
 D^* = & (1-p)\{t(Y)\}^2 U''\{\alpha_e(1+R(\alpha_e))\}^2 \\
 & + p\{\pi(Y)\}^2 U''\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)\}^2 \\
 & + \{(1-p-p\pi)t(Y)\beta\}^2 U''\{g\}\{G'[\cdot]\}^2
 \end{aligned}$$

---(7)

Such a taxpayer resorts to evasion by simply balancing the expected marginal costs and benefits of reporting an additional rupee of income. The expected cost of reporting an additional rupee will be  $(1-p)t(Y)(U'\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)\} - \beta U'\{g\}G'[\cdot])$ .

The expected marginal benefit of reporting an additional rupee is given by the expression  $p\pi(Y)(\beta U'\{g\}G'[\cdot] + U'\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)\})$ . The expected marginal benefit is none other than the evaded penalty associated with the probability of detecting the taxpayers' non-reporting of an additional rupee of income weighted by the rate of return on the marginal utility of that rupee,  $U'\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)\}$  and the effect of the conjectured evasion of other taxpayers on the marginal utility of public goods expenditure appropriated strictly by the taxpayer,  $\beta U'\{g\}G'[\cdot]$ . It is evident that the amount evaded is sensitive to the taxpayers' conjecture regarding evasion by others when he evades,  $G'[\cdot]$ , and the marginal utility of public goods expenditure that the taxpayer

benefits from,  $\beta U'\{g\}$ . Both these factors play a role in the decision to evade which is in addition to and distinct from the role of risk-aversion that has been emphasized in the literature on tax evasion. Thus, for instance, the impact of an increase in income on the proportion of income by which taxes are evaded is given by:-

$$\begin{aligned} \frac{\partial}{\partial Y} = \frac{1}{D^*} & \left( (1-p)t(Y)U''\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)\}^2\{1-(1-\theta)t'(Y)\} \right. \\ & - p\pi t(Y)U''\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)\}^2\{1-(1-\pi\theta)t'(Y)\} \\ & + (1-p)t'(Y)U'\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)\} \\ & \left. - p\pi t'(Y)U'\{\alpha_d(1+R(\alpha_d))\}\{1+R(\alpha_d)\} - (1-p-p\pi)t'(Y)\beta U'\{g\}G'[\cdot] \right) \end{aligned} \quad \text{---(8)}$$

or,

$$\begin{aligned} \frac{\partial}{\partial Y} = \frac{1}{D^*} & (1-p)t(Y)U'\{\alpha_e(1+R(\alpha_e))\}\{1+R(\alpha_e)\} \\ & + R_r\{\alpha_d(1+R(\alpha_d))\}\{1-(1-\pi\theta)t'(Y)\} - \frac{1}{\alpha_e} R_r\{\alpha_e(1+R(\alpha_e))\}\{1-(1-\theta)t'(Y)\} \\ & - \frac{1}{D^*}(1-p)t(Y) \left( \frac{1}{\alpha_d} R_r\{\alpha_d(1+R(\alpha_d))\}\{1-(1-\pi\theta)t'(Y)\} - (1-p-p\pi)t(Y)\beta U'\{g\}G'[\cdot] \right) \end{aligned} \quad \text{---(9)}$$

where,  $R_r$  is the relative risk-aversion function.

The first part of the expression in (9) is positive or negative depending on by how much the relative risk aversion function is a decreasing or increasing function of the total return on income. The second part of the expression in (9) is unambiguously negative and takes on larger negative values the greater is  $\beta U'\{g\}$  and  $G'[\cdot]$ . Hence, as income increases even if the relative risk-aversion function of a taxpayer decreases sharply he may very well evade a smaller proportion of his income than before the increase due to the consideration given to the effects of his evasion on the propensity of other taxpayers to evade and the marginal utility of the public expenditure he benefits from. In the standard literature by contrast, if relative risk aversion decreases with income, then, the

proportion of income evaded must necessarily increase. Equation (9) will reduce to the standard result if the taxpayer conjectures that any evasion by him is compensated for by other taxpayers so that  $G'[\cdot] = 0$ , or if  $(1 - p - p\pi) = 0$ , which represents a tax system with costless auditing and zero evasion.

We now investigate how tax evasion is used as an instrument to compensate for the undesirable public expenditure policies of politicians. The coefficient  $\beta$  represents the extent to which public expenditure policies benefit the taxpayer. To investigate the effect of a change in  $\beta$  on the proportion by which taxes are evaded it is necessary to look at the following expression that is derived from the first-order condition:-

$$\frac{\partial}{\partial \beta} = \frac{1}{D^*} \left[ (1 - p - p\pi)t(Y)G'[\cdot]U'\{g\} \left[ 1 + \frac{U''\{g\}g}{U'\{g\}} \right] \right] \quad (10)$$

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The term  $(U''\{g\}g)/U'\{g\}$  in (10) is the ratio of the proportionate change in  $U'\{g\}$  to the proportionate change in  $g$ , i.e., the elasticity of the marginal utility of benefits from public expenditure to the taxpayer. Given the properties of the utility function, a sufficient condition for the proportion of income evaded to fall with a rise in public goods expenditure that benefits the taxpayer is for  $(U''\{g\}g)/U'\{g\} > -1$ . If there is a reversal of this inequality then tax evasion actually increases despite the increased disposition of public revenues that benefit the taxpayer. Thus evasion depends on the marginal utility of dispositional public expenditures that benefits the taxpayer and the speed by which this marginal utility diminishes. If this marginal utility is low and the marginal utility diminishes rapidly then evasion falls with increased public expenditures that directly benefit the individual i.e.,  $\frac{\partial}{\partial \beta} < 0$ . The conjecture by the taxpayer as to how other taxpayers will react to his decision to evade,  $G'[\cdot]$ , and the extent of the government's policies to enforce compliance,  $(1 - p - p\pi)$ , are factors that amplify the extent of the tax

evasion reaction to an increase in beneficiary public expenditures.  $G'[\cdot]$  is a shorthand for the interdependencies between individuals in terms of their beliefs about how others react to their tax evasion behavior. If the Nash assumption is employed, then, the behavior of others is taken as given by any taxpayer and  $G'[\cdot] = 1$ . If others' behavior is taken to be of the bandwagon type, then,  $G'[\cdot] > 1$  and if the conjecture is one of regarding others' behavior as being somewhat compensatory,  $G'[\cdot] < 1$ . The government machinery that enforces compliance will determine  $p$  on the basis of auditing costs and the level of  $\pi$  with regard to its effects on social cohesion and political ethics (Kolm, 1973). The more efficient is the government machinery, the higher will be  $p$  and higher values of  $p$  and  $\pi$  negate any attempt by a taxpayer to control for inappropriate public policies through tax evasion.

### Section III: Conclusions

The model outlined above demonstrates how taxpayers in a developing country use tax evasion to compensate for imperfect financial markets as well as government expenditure patterns that do not benefit them.

The model suggests that if public goods such as stable and well enforced social and legal order are underprovided, or if the government and its various organs of administration is sufficiently predatory, or if the government directs tax-expenditure policies to benefit certain segments of society that a taxpayer is not a member of, then, equation (10) states that tax evasion is high provided the elasticity of the marginal utility of benefits from public expenditure is inelastic for a taxpayer. This is likely to be the case for a taxpayer whose net income in the two states of the world of escape and detection is

high ( $\alpha_i > \alpha^*$ ), because such a high-income taxpayer's marginal utility from public expenditure policies will be low. Such a taxpayer will view the payment of taxes to be not much worth for the public expenditure policies of the government as his more urgent demands for such beneficial policies would already have been catered to. He views tax evasion as a means of shifting the allocation of his income in favor of investments and away from government expenditure policies that give little benefit to him. Such a taxpayer also accounts for the effect of his evasion on the evasion decision of others which in turn affects the revenues of government and the extent of public expenditure programs. Tax evasion at the macroeconomic level grows the more there are bandwagon types of behavior whilst it is not as large when there is non-conformism in behavior patterns.

Imperfect capital markets result in individuals with up to moderate levels of net income ( $\alpha_i \leq \alpha^*$ ), finding that the chance of earning high returns from investments causes them to overcome their aversion to risk and participate in the actuarially unfair tax evasion gamble. In such a situation increased government resources devoted to the detection of evasion and the imposition of penalties does not have effects on the taxpayers' decision to evade. Such a situation occurs when a major proportion of incomes are devoted to investment activities and such investment are of the high-productivity type which would not otherwise be realized given the incompleteness of financial markets in developing countries.

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