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**AN ECONOMIC MODEL OF TAX COMPLIANCE WITH  
INDIVIDUAL MORALITY AND GROUP CONFORMITY**

### ***Abstract***

Scholars in public finance traditionally have analyzed tax compliance using the Allighman-Sandmo model. I include in this model both moral and social payoffs from compliance. This approach can explain four pieces of evidence that have not been explained by the traditional model, namely *i*) high level of tax compliance, *ii*) honest responses when individuals pay their taxes, even in the presence of high incentives for tax evasion, *iii*) the level of evasion increases with the tax rate and, *iv*) individuals are more likely to evade when they realize that the number of evaders is large in society.

### ***Resumen***

Tradicionalmente, investigadores en el área de las finanzas públicas han analizado el cumplimiento en el pago de impuestos utilizando el modelo de Allighman-Sandmo. En el presente trabajo se incluye en este modelo los beneficios tanto morales como sociales que los individuos derivan por el cumplimiento del pago de impuestos. Este enfoque permite explicar cuatro hechos que el modelo tradicional no ha podido probar, a saber *i*) altos niveles en el cumplimiento de pago de impuestos, *ii*) respuestas honestas cuando los individuos pagan sus impuestos, aun ante la presencia de altos incentivos para la evasión, *iii*) incrementos en el nivel de evasión ante incrementos en la tasa de interés y, *iv*) los individuos son más propensos a evadir cuando perciben que el número de evasores en la sociedad es grande.

## ***Introduction***

According to the traditional model of tax compliance by Allingham-Sandmo, both the penalty and the threat of the probability of audit make people pay their taxes. Yet, when we contrast the model with the empirical evidence, the model predicts that people should be evading more than they apparently do. The contrast between evidence and theory has provoked many to develop new theories. I will present a review of the literature to show that our knowledge of compliance behavior is still very limited. I will provide evidence of the important role of moral values and social interactions play in enforcing compliance. Furthermore, I will argue that the combination of economic, psychological, and sociological theories can help us explain taxpayers' honest behavior. Clearly defining how these combined forces affect taxpayers' decision to pay is something that, to my knowledge, has not been reported in the literature.

As an introduction, the definitions of tax compliance, tax evasion, and tax avoidance are presented in the first section. In the second section, I explain the model of tax compliance proposed by Allingham-Sandmo and how this model fails to explain the high level of tax compliance. Also, evidence of other three specific cases of inconsistencies between theory and evidence is presented. Then, I describe the most reliable empirical evidence about tax compliance, and talk about its merits and limitations. In section three, I review the literature of the single-agent model of tax compliance to show the extensions that have been made that allow economic, psychological, and sociology theories to better explain the empirical evidence of tax compliance. In section four, I include in the traditional model of tax compliance both moral and social payoffs from compliance. This multidisciplinary approach can explain four pieces of evidence that have not been explained by the traditional model, namely *i*) high level of tax compliance *ii*) honest responses when individuals pay their taxes, even in the presence of high incentives for tax evasion. *iii*) the level of evasion increases with the tax rate and, *iv*) individuals are more likely to evade when they realize that the number of evaders is large in society. Section five concludes and also explores areas for further research.

## **I. Tax Compliance, Tax Evasion and Tax Avoidance**

In this section, I start by differentiating compliance from noncompliance. Then, I discuss different behaviors of taxpayers, namely, tax evasion and tax avoidance.

*Compliance* with reporting requirements means that the tax payer files all required tax returns at the proper time and that the returns accurately report tax liability in accordance with the Internal Revenue Code, regulation, and court decisions applicable at the time the return is filed. (Roth *et al.*, 1989, pp. 21)

On the surface, this definition clearly states the line between tax compliance and noncompliance. Yet, tax compliance requires adequate record keeping, timely and accurate filing of tax returns, and the payment of all taxes owed.<sup>1</sup> Consequently, a taxpayer can fail to comply either because he made a mistake when filling his tax form, or because he wanted to evade their tax liabilities from the very beginning. In the first case, the taxpayer honestly made a mistake, while in the second the omission was intentional. The result in both cases, noncompliance, is the same, but the motivation of the individual is different. For this reason, noncompliance includes situations where individuals underpaid (or overpaid) their taxes, -called underreporting (or overreporting). I will go over these cases in more detail in the following section.

Economists, aware of the differences in intentions, have attempted to isolate in their models the nuances in people's motivations and intentions when they fill out their tax forms and pay their taxes. For instance, researchers differentiate between the taxpayer's motivation when he intentionally evades and when he unintentionally fails to comply.

In theory, tax evasion is the willful act of noncompliance with the tax law in order to reduce tax liability. However, failure to comply with tax reporting may be caused by mistakes, misinformation, misunderstanding, or negligence. These differences in motivations, plus the fact that the law does not have a narrow definition for tax compliance, cause lawyers and professional to disagree about the majority of the ambiguous cases. Yet, if noncompliance is proven legally to be a deliberate decision to reduce tax liability, it constitutes tax evasion.<sup>2</sup>

On the other hand, tax avoidance consists of procedures to reduce tax liability, which are arguably within the limits of the law. These include, among others, postponement of taxes or hiring a tax professional to alert one to the tax

<sup>1</sup> Kinsey, 1987.

<sup>2</sup> Taxpayers, who want to avoid taxes, usually need to hire a professional to alert them of the tax deductibility of activities already undertaken. On the contrary, individuals who want to evade taxes, can do it at no cost by hiding their income from fiscal authorities. For this reason, researchers identify tax avoidance predominantly as a prerogative of the rich and tax evasion as a typical behavior of the comparatively poor. More recently, researchers have analyzed the possibility of studying tax avoidance and tax evasion as complements. See Slemrod and Yitzhaki (1999).

deductibility of activities already undertaken. The main difference between avoidance and evasion is the illegal characteristic of the latter. But again, the line between the two is fuzzy. Consequently, tax authorities, lawyers, and taxpayers find it hard to agree where to draw the line dividing the two.

## ***II. Theory and Evidence about Tax Compliance on Personal Income Tax.***<sup>3</sup>

This section focuses on how scholars in public finance traditionally have analyzed tax compliance on personal income tax and how this model fails to explain the reality. Specifically I will provide four pieces of evidence that do not match with the theory, namely: *i*) high level of tax compliance *ii*) honest responses when individuals pay their taxes, even in the presence of high incentives for tax evasion. *iii*) evasion increases with the tax rate and, *iv*) individuals are more likely to evade when they realize that the number of evaders is large in society. Then, I present in detail the most reliable empirical evidence about tax compliance to show that it is a large body of evidence concerning the honest behavior of taxpayers.

In the economic models it has been assumed that the behavior of individuals when reporting their taxes is driven primarily by the incentives of the tax system. In this framework, the taxpayer decides how much income to report by solving an expected-utility maximization problem, hence, the choice of whether and how much income to declare is akin to a choice of whether and how much to gamble. The taxpayer faces a trade-off between the tax savings from underreporting true income against the risk of audit and the penalties for detected noncompliance. The threat of detection and punishment are responsible for the compliance of the individual. This theory stems from Becker's classic paper on the economics of crime (1968) and was first applied to the problem of tax compliance by Allingham and Sandmo (1972).<sup>4</sup>

In the simple version of the Allingham-Sandmo model, the possibility of avoidance does not exist and the taxpayer is risk neutral. He faces a fixed penalty rate if he is caught evading taxes. The taxpayer must choose how much income  $x$  to declare to tax authorities so that he maximizes his expected utility.

$$(1) \quad E[U] = (1 - p)U[v + t(y - x)] + pU[v - s(y - x)]$$

<sup>3</sup> There are other important areas of tax compliance, such as corporate tax law and sales taxes, for instance. However, I will only discuss the case of personal income tax here because of space limits.

<sup>4</sup> The basic Allingham and Sandmo model has been extended in a variety of dimensions. For instance, Pecanvel (1979) finds that the inclusion of endogenous labor supply makes ambiguous the response of the reported income to changes in the parameters of the model. Other extensions of the model include uncertainty about the true tax liability and the impact of different enforcing rules on evasion. For a comprehensive survey of this literature see Cowell (1990) and Slemrod and Yitzhaky (1999). Nevertheless, all these modifications do not consider moral aspects and social interactions in their analysis.

where  $v$  is the true after tax-income,  $y(1-t)$ ,  $y$  being the exogenous true fixed income, only known by the individual. The constant tax rate is  $t$  and  $p$  is the probability of being audited. If the taxpayer evades taxes and is audited, he must pay a constant penalty  $s$  on all unreported income.

The solution of the model indicates that an individual will report zero income whenever the audit probability he faces is less than  $t/(t+s)$ . Data from federal audits in the U.S. indicates that typically the penalty is applied at a rate of 20 per cent of the portion of the underpayment. When  $s$  equals .2, and  $t$  equals .3,  $t/(t+s)$  equals .6, far above the fraction of returns audited in the U.S., about 0.015.<sup>5</sup> Even if the penalty rate is higher, the model keeps on predicting a high level of evasion. These results hold for risk-averse individuals as well.<sup>6</sup> In other words, when we substitute the audit and penalty rates prevalent in the economy, we find that the model overestimates the rate of evasion. The puzzle then becomes why so many people pay their taxes.

In striking contrast to these predictions, there are many survey studies that provide evidence that many taxpayers choose to report truthfully, and that even among those who do cheat, the majority do it by far less than predicted by the model. Webbley *et al.*, (1991) reports the systematic existence of hard-core nonevaders. Baldry (1986) presents another empirical study that supports the existence of honesty in individuals.

Yitzhaki (1974) modified the Allingham-Sadmo model by imposing the penalty on the tax understatement, as oppose to unreported income. In this way, the theoretical prediction is that evasion will increase with a reduction in the tax rate. However, Clotfelter (1983), Slemrod (1985), Crane and Nourzad (1986), Baldry (1987), Poterba (1987) and Friedland *et al.* (1976) offer evidence of a positive relation between evasion and tax rate. Also, empirical evidence (Geeroms and Wilmots, 1985) shows a mutual dependence between evasion and the percentage of the population who is evading.

Researchers have tried to match the traditional model with these four pieces of evidence. These attempts are presented in the next section. For the moment, it will be enough to analyze the most reliable empirical evidence about tax compliance: the Taxpayer Compliance Measure Program (TCMP) of the Internal Revenue Service (IRS).<sup>7</sup> The TCMP intensively audits individual tax returns on a stratified random national sample. Even though it fails to detect certain amount of income sources that

<sup>5</sup> Slemrod and Yitzhaky (1999), Erard and Feinstein (1994) and Andreoni, Erard and Feinstein (1998). In cases where the taxpayer is risk averse and the probability of audit is endogenous—depends on the reported income— analogous calculations indicate that the model continues to overestimate the level of evasion for a large range of audit schedules and penalty rates.

<sup>6</sup> If the utility function has the following form  $U(C) = C^{(1-e)}/(1-e)$ ,  $e$  is the individuals' constant relative risk aversion, where  $0 < e \leq 1$ . Only in the case of  $e=0$  the individual is risk neutral.

<sup>7</sup> The TCMP has been only available to certain research projects and not for the general public. The author is currently trying to get this data from the IRS. The petition was made under the Freedom of Information Act.

are exempt from reporting requirements —such as self-employed people and those whose main income is cash— it is recognized as the best data available.<sup>8</sup>

According to the most recent TCMP (1988), 40 percent of U.S. households underpaid their taxes for that year, 53 percent paid correctly and 7 percent overpaid. The median for those who overpaid was \$158. Under the assumption that these payments were due to error in their tax forms, and that a comparable proportion of those who underpay is also due to error, we can conclude that almost 67 percent of the people intended to pay their taxes correctly.<sup>9</sup> Why do people pay their taxes, if the probability of audit and the penalty are very low, and more surprisingly, why do they attempt to pay them correctly?

Part of the explanation is the increase in information reported to the IRS by magnetic media, which facilitates the matching of documents. For instance, the IRS requires that both the employee and the employer report the employee's wage. This limits opportunities for evasion in the cases where the main source of income is salaries and wages. This is also the case for income in the form of interest, pensions, and mortgage interest payments.

The IRS estimates that, taking information requirements into account, individuals appear to be more honest than might be expected: although three-fourths of income is subject to information reporting, 91.7 percent of all income that should have been reported was in fact reported for the year 1992.<sup>10</sup>

Putting these numbers in terms of the Gross Domestic Products (GDP), wages, interest income, and dividends constitute around 75 percent of the GDP. These income sources are subject to information requirements. Therefore, the scope of income that can be evaded should be less than 25 percent of the GDP, if we consider that people need to keep some income in order to consume and subsist.<sup>11</sup> These statistics lead us to believe that the scope of evasion is very low. Yet, given the low penalty and the small probability of audit, the expected gains for small amounts of evasion should be very appealing for many taxpayers. This is the reason why it is impressive to see a compliance rate that exceeds 90 percent. Why are there so many honest people, and why do evaders not cheat by a higher amount?<sup>12</sup>

Some of the main modifications to the model of compliance that attempt to answer this question are presented in the following section. Nevertheless, a natural question is why, after 25 years do researchers keep on modifying the Allingham-Sandmo model, instead of creating a whole new approach? The answer is twofold. First, the literature and the empirical evidence have not reached any definitive

<sup>8</sup> According to the IRS for the year 1992, 75 percent of the tax returns were subject to information reporting. Andreoni, Erard and Feinstein, 1998, pp. 821.

<sup>9</sup> Andreoni, Erard and Feinstein pp. 820.

<sup>10</sup> Andreoni, Erard and Feinstein pp. 822.

<sup>11</sup> This 25 percent is formed by self-employed people —such as doctors and lawyers and individuals whose major source of income is cash, such as waiters. In these cases there is no way to verify the information about their income.

<sup>12</sup> The individual's constant relative risk aversion must exceed 30 to generate the compliance observed in the U.S.

conclusion about the effect of penalties.<sup>13</sup> Yet, it has been consistently reported in the literature that the probability of punishment is important to dissuade noncompliance.<sup>14</sup> Second, the model is parsimonious at its best, which is very appealing to many researchers. In short, it can not be denied that deterrence—as the Allingham-Sandmo model points out—is important to explain tax compliance; however, considering it as the only source for tax compliance overestimates the rate of noncompliance.

Up to now the only evidence that has been discussed is from the U.S. Unfortunately, comparable statistics for compliance—such as the TCMP—in other countries do not exist or are very difficult to obtain.<sup>15</sup> This makes it hard to present international comparisons. Anecdotal evidence suggests that the extent of noncompliance is larger in developing countries than in the U.S. The importance of the U.S. case is that, at least for one country, we have reliable information that can help us to contrast the model with the evidence. So far, we have one set of reliable data and the model does not pass the test. In the future, if more compliance and enforcement data are available we will be able to test it again.

### ***III. Theory and Evidence of Moral Values and Social Norms in Tax Compliance***

In the last section, I concluded by saying that, according to the traditional models of tax compliance, both the penalty and the threat of the probability of audit make people pay their taxes. Yet, according to the empirical evidence, the expected utility model predicts *i*) lower levels of compliance *ii*) that people should be evading more than they apparently do *iii*) that evasion is negatively related to the tax rate and, *iv*) that there is mutual dependence between taxpayers.

In this section, I review the literature to show how researchers have tried to match the traditional model with the empirical evidence, and conclude that our knowledge of compliance behavior is still very limited. I argue that the importance of moral values and social interactions to deter noncompliance has not been analyzed in depth. First, I present an overview of the institutional approach to explain how both—formal and informal—institutions shape economic and social outcomes. Then, I describe four single-agent models of tax compliance. The first one models how honesty and reputational cost can deter evasion. The second one

<sup>13</sup> Roth *et al.*, 1989, pp. 6. Grasmick and Bursik (1990).

<sup>14</sup> Jensen, *et al.*, (1978) provides empirical evidence that the risk of apprehension and punishment are deterrent to noncompliance. Kleppler and Nagin (1989) argue that the perception of the probability of punishment is different for each line item and find variation in the rate of evasion among different line items.

<sup>15</sup> For some international studies see Graetz, M.J. and L.L. Wilde (1985), Skinner, J. and J. Slemrod (1985), James Alm, Roy Bahl, and Matthew N. Murray (1990) on Jamaica, Dick J. Helsing *et al.* (1992) on the Netherlands, and Ana de Juan, Miguel A. Lasheras, and Rafaela Mayo (1994) on Spain.

considers how feelings of guilt and shame reduce the gains from noncompliance. The third presents how the issue of fairness related to the tax code and tax enforcement can affect the motivation of individuals to pay their taxes. The last one analyses how the performance of the government can affect the willingness to pay taxes.

I will argue that the extension of economic, psychological, and sociological approaches can help us explain taxpayers' high rate of compliance. Particularly, this multidisciplinary approach will allow us to make honesty endogenous in the utility of individuals, even in the presence of high incentives for tax evasion. Yet, first we need to understand the role of all these factors together in the taxpayer's decision.

The combination of enforcement, penalties, prices, income, and institutions limits the set of possibilities of individuals in the economy. North (1990) defines institutions as "humanly devised constraints that shape human interaction".<sup>16</sup> Institutions can be formal —like constitutions, statute law, and regulations— or informal —like self-enforced codes of behavior, norms, and conventions in society.

Individuals create institutions to set the limits of what people in a certain group are allowed to do, or alternatively, to determine under what conditions people are not able to take certain actions. In general, institutions also establish punishment and sanctions. According to what individuals know about how and to what extent the rest of the society respects and obeys the laws, this information provides them with the basis for the formation of their expectations about the behavior of the society. Individuals —based on these expectations— will make their strategic choices.<sup>17</sup>

In the traditional model of tax compliance this view of individual's choices within a *social* environment is missing: only the threat of external sanctions (audits and penalties) generate compliance. The fact that informal institutions can deter noncompliance has been excluded from the model. If it is true that the threat of external punishment is important, it is also true that informal institutions —such as codes of behavior and honesty— can also constrain people's choices.<sup>18</sup> Kinsey (1988) summarizes the body of literature that analyzes compliance from the sociological, psychological, and legal points of view, emphasizing how social norms and individual attitudes can explain tax behavior. For instance, the moral evaluation of crime affects the level of deterrence of the legal sanctions. Legal sanctions over immoral crimes can have higher deterrence because they are reinforced by self-imposed codes of morality of the individual.

<sup>16</sup> North, Douglass, *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, 1990, pp. 3.

<sup>17</sup> My interest is not the study of institutions *per-se*. I will only consider them as the constraints that individuals impose on themselves, either formally or informally. There is a body of literature about the origins, creation, evolution, and persistence of institutions: Calvert (1995), (1998), Eggertsson (1990), Greif, Milgrom and Weingast (1998), Kreps (1990), Milgrom, North and Weingast (1990) and North (1990).

<sup>18</sup> Becker (1996) suggests that rich people are interested in the spread norms of honesty to the rest of society, for example.

Sometimes individuals are constrained by codes of conduct, even though they could get away with violations. Alm *et al.*, (1992) finds some compliance when there is no chance of being caught. In principle, no rational actor that sees a wide possibility to evade would let it pass, so there must be something more, besides external punishment, that restrains the individual from tax cheating. Gordon (1989) incorporates this result in a model by including nonpecuniary costs of evasion in the utility of the taxpayer. The act of evading taxes may induce anxiety, guilt or a negative self-image in taxpayers. These exogenous psychic and stigma costs allow us to rationalize this sort of motivation. Unfortunately, they are exogenous and cannot explain different levels of honesty among individuals or social groups.

The process of being audited carries various social risks, such as loss of reputation among family members, friends, and colleagues. In an extreme case, an audit can put the taxpayer's job at risk. People commonly discuss issues related to their taxes among family members and at their jobs. Grasmick and Bursik (1990) found that feelings of shame and loss of respect when people evade taxes, are self-imposed costs that decrease the likelihood of noncompliance. They differentiate between shame and embarrassment. The former is something that the individual feels personally; it does not depend on others, while embarrassment includes peer pressure, family and significant others.

To reconcile theory with this piece of evidence, Erard and Feinstein (1994), based on psychological theories, introduce in the utility function of the taxpayer sentiments of shame and guilt, which reduce the perceived benefits from cheating. In general, individuals respond to both peer pressure and social sanctions.<sup>19</sup> In this way, both conscience and the attachment to significant others — friends, family, etc. — are sources of punishment, which like state-imposed legal sanctions, vary in both their certainty and their severity. The problem with Erard and Feinstein's approach is that the taxpayer will not experience the threat of embarrassment if the people whose opinion's are most valued do not discover his crime. Thus, they should incorporate how the perceived probability of detection by significant others can also act as deterrent as well.

Fairness is another social factor that can explain tax compliance. There are two factors in the perception of fairness. The first one is related to the tax burden of the taxpayer compared to the burden of other individuals. Spicer and Becker (1980) in experimental research, found that the amount of taxes evaded increase when people are told that their tax burden is higher than the rest of the group. Nevertheless, there is no agreement on the empirical evidence about this point: Webley *et al.*, (1991) found that there is no relation between the perceived inequalities and the compliance of the taxpayer. The second factor is the perception about the rate of compliance among people: the more other people pay their taxes, the more people will think that it is fair for them to pay theirs. Cowell (1990) provides evidence of the relation between perceptions and attitudes of individuals with tax compliance. Myles and Naylor (1996) modify the expected utility model to

<sup>19</sup> Meier, *et al.*, (1984).

introduce a social custom source of utility. In this way, individual gains utility when he honestly complies with the tax law.

The fourth approach to explain compliance admits the relation between the taxpayer and the government. Spicer and Lundstedt (1976) find that taxpayers will refuse to pay their taxes if they feel that the government is wasting their taxes. Webley *et al.*, (1991) found a positive relationship between government performance and compliance. Frey (1992), in a principal-agent model, considers that the motivation of the taxpayer to comply depends on internal and external factors. Regulation or pricing mechanisms (external factors) can “crowd-out” the internal motivation of the individual to comply. Tighter monitoring and higher penalties can negatively affect the taxpayer’s morale schema, since they imply that authorities do not trust taxpayers. Cowell and Gordon (1988) link the two sides of the government budget, income and expenditure, by introducing public goods. In this way they want to connect the performance of the government with the satisfaction of the taxpayers. They find that when tax rates increase evasion decreases. However, these results go against the empirical evidence. Bordignon (1993) introduces fairness considerations of the fiscal system. He rationalizes ethical norms by making them dependent on the tax structure, the supply of public goods, and the perceived behavior of other taxpayers. The perception of the taxpayer about the fairness of the system determines the willingness to pay taxes: the more the tax burden and public goods provision differs from an individual’s moral idea, the less willing individuals will be to pay their taxes. Bordignon finds that there is a percentage of the population that does not evade, even when incentives exist to cheat.

The purpose of this section has been to show the incomplete knowledge about the effect of moral and social dynamics on the models of tax compliance. A proposal about how to incorporate both elements in a theoretical analysis of tax compliance is presented in the following section.

#### ***IV. A Model of Tax Compliance with Individual Morality and Group Conformity***

The economic approach of the Allighman-Sandmo model considers that the probability of audit and the penalty deter taxpayer from evading their taxes. This approach has a fundamental problem: it does not fit with the empirical evidence. As it has been shown, it is hard to reconcile this view with the high rate of compliance reported for the U.S. and with the vast experimental literature that suggests that there are people who never evade, even when the probability of detection is zero [Alm *et al.* (1992), Baldry (1986) and Webbley *et al.* (1991)].

There is also empirical evidence that supports the positive relation between tax rate and evasion [Clotfelter (1983), Slemrod (1985), Crane and Nourzad (1986), Baldry (1987), Poterba (1987) and Friedland *et al.* (1978)]. On the other hand, Geeroms and Wilmots (1985) show a mutual dependence between evasion and the percentage of the population who is evading. In the previous section, I have

described how internalized moral beliefs and social norms can complement the theory of deterrence.

I have also shown in the previous section that little has been done to integrate all these elements. I propose to combine factors of honesty and conformity payoffs in the taxpayers' utility function to fill the gaps between the economic, psychological, and sociological approaches to fully understand tax compliance. Defining clearly how these forces *together* affect the decision of individuals is something that has not been done in the literature. This model reconciles theory with four pieces of empirical evidence, namely: *i*) high level of tax compliance *ii*) honest responses when individuals pay their taxes, even in the presence of high incentives for tax evasion. *iii*) higher levels of evasion when the tax rate increases and, *iv*) individuals are more likely to evade when they realize that the number of evaders is large in society.

I use the Gordon (1989) model and the Myles and Naylor (1996) model to include both individual morality and group conformity in the analysis. In this way, the utility of the taxpayer depends on his final level of income ( $Y$ ) and on the income concealed from the tax authority ( $I$ ).

$$(1) \quad U\left\{Y^+, I^+\right\}$$

Where:

$$Y = y(1-t) + xI$$

$Y$  (random variable) depends on  $y$  which is the exogenous initial level of income, the uniform tax rate ( $t$ ) and  $x$  which is a random variable. The probability of being caught is  $p$ . Thus,  $x$  equals one with probability  $1-p$ , and  $x$  equals  $-s$  with probability  $p$ , where  $s$  is the fine on the income evaded. The utility level for a taxpayer who chooses to evade is given by:

$$U^E = \underset{\{v\}}{\text{Max}} \left\{ p U[y(1-t) - stI] + (1-p) U[y(1-t) + tI] - vI - NI(1-\mu) \right\}$$

The model differs from the traditional model of Allingham-Sadmo in three ways. First, the penalty for discovered evasion depends on the tax understatement, rather than on the income understatement, as Yitzhaki first suggested in 1974. Hence, the model reflects more accurately what happens in the real world.<sup>20</sup> Second, there is a fixed cost that represents the anxiety the individual will feel for not complying ( $v$ )

<sup>20</sup> This modification means that as  $t$  rises, the reward for a successful understatement of a dollar rises, but the cost of detected understatement rises proportionately. In this way, the tax rate has no effect on the terms of the tax evasion gamble.

per unit of evasion. Third, taxpayer's utility decreases per unit of income concealed from knowing that he is not following the social norm ( $N$ ). This cost depends on the number of non-evaders that exist in his group ( $1-\mu$ ), where  $\mu$  is the fraction of evaders in the group ( $0 < \mu < 1$ ).

If the individual does not evade, his level of utility will be:

$$U^{NE} = U(y(1-t))$$

Assuming that taxpayers maximize their expected utility, the first order condition (FOC) is:

$$U_y Y_l - v - N(1-\mu) = 0$$

Where:

$$Y_l = xt$$

$$\Rightarrow t E \{U_y x\} - v - N(1-\mu) = 0$$

$$(3) \Rightarrow \text{FOC} : \varepsilon \equiv E \{U_y Y_l\} = \underbrace{\frac{v + N(1-\mu)}{t}}_C$$

The right hand side of (3) represents both the moral cost and the social cost of evasion for the individual ( $C$ ).

SOC requires  $\varepsilon_l < 0$

$$\varepsilon_l = t E \{U_{yy} Y_l x\}$$

$$= t^2 E \{U_{yy} x^2\}$$

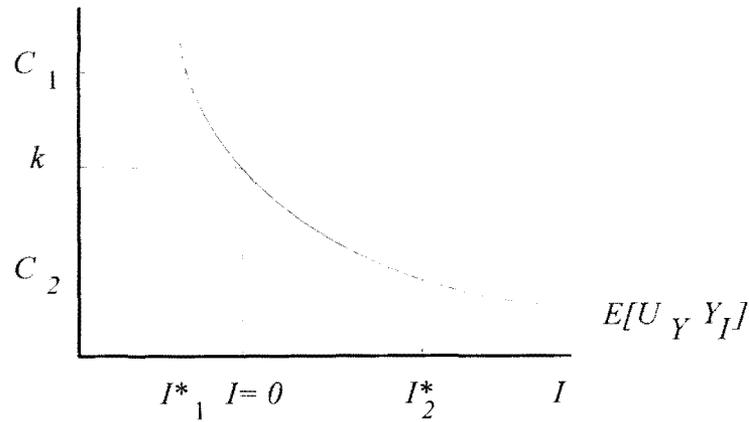
$< 0$ , because  $U_{yy} < 0$

Hence, SOC is satisfied. We substitute  $I=0$  in (3) to find the expected return of evasion ( $k$ ):

$$\begin{aligned}
 &= (1-p) U' (y (1-t))t + p U' (y (1-t))(-st) \\
 &= k \equiv \underbrace{U' (y (1-t))}_+ t (1-p-ps) > 0
 \end{aligned}$$

If  $(1-p-ps) \leq 0$  then  $k \leq 0$  and nobody evades. Then  $I = 0$ . If  $(1-p-ps) > 0$ ,  $k$  is positive and we have two cases: if  $[V+N(1-\mu)]/t \leq k$  people will evade. In contrast, if  $[V+N(1-\mu)]/t \geq k$  people will not evade. In the latter case, we reconcile theory with the fact that there are honest responses when individuals pay their taxes, even when the return of evasion is positive [Baldry (1996), Webbley et al (1991) and Alt *et al.* (1992)]. As an illustration, consider figure 1, where  $C_i$  represents the moral and social cost of those individuals that  $[V+N(1-\mu)]/t$  is greater than  $k$ . Consequently, they do not evade, even though the expected return of evasion is positive.

*Figure 1*



Alternatively,  $k$  can be written as:

$$\begin{aligned}
 \varepsilon|_{I=0} &= E \{ U_Y (Y)|_{I=0} x \} \\
 \Rightarrow \underbrace{(Y)|_{I=0}}_{>0} &= y (1-t) \\
 \Rightarrow \varepsilon|_{I=0} &= \underbrace{(Y)|_{I=0}}_{>0} \underbrace{E \{ x \}}_{\substack{>0 \\ <0}}
 \end{aligned}$$

From (3) we can see that the motivation to comply is different among individuals. That is to say, dishonest taxpayers will evade more than honest:

$$\frac{\partial I}{\partial v} = -1 < 0$$

This allows us to explain high levels of tax compliance in society. Also, the fact that more people pay their taxes when the percentage of taxpayers who comply is high, is captured by:

$$\frac{\partial I}{\partial \mu} = N > 0$$

In other words, individuals are more likely to evade when they realize that the number of evaders is large in the society (Geeroms and Wilmots, 1985). In this way, the social context affects the taxpayer when making the decision of how much income to declare.

Now, we can do some comparative statics to analyze the effect of an increase in  $t$  over the amount of income concealed from the tax authority ( $I$ ):

$$\frac{\partial I}{\partial t} = - \frac{((v + N(1-\mu))/t) + \varepsilon_t}{\varepsilon_t} \quad (4)$$

SOC requires  $\varepsilon_t < 0$

$$\Rightarrow \text{sign} \left\{ \frac{\partial I}{\partial t} \right\} = \text{sign} \{ \text{numerator} \}$$

First, consider only the term  $\varepsilon_t$

$$\varepsilon_t = U_{YY} (y(1-t) + xI) - xt (-y + xI)$$

Where

$$Y_t = (xI - y)$$

$$\Rightarrow \varepsilon_t = \{U_{YY} Y_t - x\}$$

$$Y = y - yt + xtI$$

$$Y = y + tY_t$$

$$\Rightarrow Y_t = \frac{Y - y}{t}$$

$$\varepsilon_t = E \left\{ U_{YY} \left( \frac{Y - y}{t} \right) x \right\}$$

$$(5) \quad t\varepsilon_t = E \{ U_{YY} Y x \} - y E \{ U_{YY} x \}$$

The Arrow-Pratt measure of absolute risk aversion is:

$$A_Y \equiv - \frac{U_{YY}}{U_Y}$$

And the parameter of relative risk aversion is:

$$R_Y \equiv - \frac{YU_{YY}}{U_Y}$$

So (5) becomes:

$$t \varepsilon_t = y E \{ A_Y U_Y x \} - E \{ R_Y U_Y x \}$$

Hence,

$$\varepsilon_t > 0 \text{ if } A_x < 0 \text{ and } R_x > 0$$

Therefore, it is possible to have a positive relation between the level of evasion and the tax rate in the economy. As I mentioned at the beginning of this section, this model is a primitive attempt to reconcile theory with the four pieces of empirical evidence that I have already described. Nevertheless, it is a necessary step in order

to make endogenous aspects of honesty and group conformity in the utility of taxpayers.

## ***V. Conclusions and an agenda for future research***

The IRS enforces compliance by the threat of audits and the penalty imposed on those who fail to fill their returns correctly. The proportion of all individual returns that are audited is under one percent, and penalties are applied at a rate of 20 percent for the cases of non-fraudulent evasion. These facts —low probability of being audited, and low and small penalties— according to the model of Allingham-Sandmo, should produce a rate of evasion higher than the reported in the TCMP. This contrast between evidence and theory has provoked many researchers to develop new theories to answer why many people pay their taxes.

Our knowledge of compliance behavior is still very limited. I present evidence of the importance of moral values and social interactions in preventing noncompliance. Traditionally, the economic models predict that individuals will pay their taxes because of the threat of external sanctions. However, looking only at formal rules give us an incomplete notion of constraints in society. Economic models in general have neglected the presence of codes of conduct —such as moral and ethical constraints that can prevent people from cheating their income tax forms. There is empirical evidence that supports the claim that norms decrease the possibility of committing a fraud. I recognize that people react to external sanctions —otherwise police and jails would not be necessary in societies— but there is also evidence that shows that external punishment cannot completely explain why people pay taxes. In this paper I argue that the combination of economic, psychological, and sociological factors can help us explain honest behavior of the taxpayers. A multidisciplinary approach is the solution to make endogenous honesty responses in individuals, even in the presence of high incentives for tax evasion. The model presented in this paper is very primitive and should be consider as a first step to formally address these complex issues.

The big question of my research agenda is when and to what extent people follow the rules and codes of behavior. For this reason, the literature that stems from the economics of crime approach provides a relevant starting point to address the big picture of my investigation.<sup>21</sup> People follow the rules when they do not commit a crime, when they do not offer bribes to get special privileges, or to evade sanctions. In this paper I analyze the particular case of tax compliance.

Public policies can contribute to the willingness of people to comply. The amount of resources that governments assign to access community education and job opportunities can also create internal constraints to individuals choices. These policies affect the quality of public goods that people consume which can contribute

<sup>21</sup> Becker (1968) published a seminal paper that proposed using economic theory to determine optimal levels of law enforcement.

to create internal restrictions in the individuals that motivate them to pay their taxes. If all these types of constraints are included in economic models, we can have a better explanation of why and to what extent people respond to an institutional framework.

The problem of why people follow the rules can be analyzed from different disciplines: economic, sociological, and psychological. I want to put them together using the economic approach because it will allow me to generalize my results to other types of those rules that are enforced and monitored. The economic approach uses mathematics as a language to clearly state the main point of the problem. It allows the researcher to construct a parsimonious analysis that can shed light on how future research should be conducted. If I can explain why and to what extent people follow the rules, for example, pay their taxes correctly, I may generalize my analysis to cases such as why people obey traffic lights, follow environmental rules or minimum wage legislation, among others.<sup>22</sup>

This research is important because the extent to which people follow the institutional framework is key in the formation of their expectations. These expectations will shape the actions of the individuals in society, and —at the same time— determine the set of possibilities for the society in the future.

<sup>22</sup> For more examples of the application of the economic approach and its advantages over other approaches, see Becker (1993).

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