E C O N O M I C S B U L L E T I N

Non-Compliance under a Negative Income Tax

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Abstract

In this note we model the individual decision on income underreporting in a system with a negative income tax. We show that a change in the tax rate has opposing effects on the compliance behavior of the poor and the rich.

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Economists have studied many aspects of tax evasion.[1] We consider non-compliance in an economy with a liner negative income tax (NIT). Thereby, we address a further aspect of cheating on the state, namely benefit fraud. This offense has gained relatively modest attention in the economic literature so far. This fact is surprising since there is a widespread concern with minimizing abuse and dishonesty in social welfare and health care programmes. Employing a simple model of choice under uncertainty in the spirit of the traditional tax evasion literature (Allingham and Sandmo, 1972; Yitzhaki, 1974) we show that a changing tax rate has opposing effects on the compliance behavior of citizens below versus above the tax threshold.

Consider an economy with a threshold for positive tax liabilities $\bar{W} > 0$. A citizen with an exogenous income $W < \bar{W}$ is eligible for benefits. He gets subsidized by the state by the amount of $\theta(\bar{W} - W)$ where $\theta \in [0, 1]$. If a citizen's income is higher than $\bar{W}$ he has to pay taxes in the amount of $\theta(W - \bar{W})$. If W is equal to $\bar{W}$ the citizen's net income is equal to his gross income. Since the true gross income is known by the citizen but not observable by the government without cost, the citizen is asked to declare it. We denote this declared amount by $D \in [0, W]$. Irrespective of the amount of the citizen's income he has an incentive to underreport, either to pay lower taxes or to receive (higher) benefits. The state's enforcement policy is to audit a fraction ρ of the population. In the event of an audit, the state reveals the true income W.

We can now distinguish two basic cases of non-compliance: (i) If citizen i, with a gross income W_i below the threshold income chooses to declare an amount D_i where $\bar{W} > W_i > D_i$ he will commit benefit fraud, (ii) If another citizen j earning a gross income W_j above the threshold income reports an amount D_j where $W_j > D_j > \bar{W}$ he will perpetrate tax evasion.[2] In any case we assume that if income understatement is detected by the state a dishonest citizen must repay the benefits obtained by fraud or the evaded taxes $\theta(W - D)$. In addition he has to pay a penalty based on the tax understatement where the penalty rate $\lambda > 1$. Therefore, we follow Yitzhaki (1974) and presume that the penalty depends on the tax understatement, compared to Allingham and Sandmo (1972) who define a penalty depending on the income understatement. Each convicted citizen suffers also from stigmatization where stigma cost increase with the tax understatement at rate s.

There are two possible states of the world, 'audit' and 'no audit'. We denote the citizen's available income in the first case by I_A and in the latter case by I_{NA}. The citizen's aim is to choose D to maximize a von Neumann-Morgenstern utility function, $E[U] = (1 - \rho)U[I_{NA}] + \rho U[I_A]$, where we assume that $U'[\cdot] >$ and $U''[\cdot] < 0$. The first- and second order condition are as follows:

$$\frac{\partial E[U]}{\partial D} = (\rho - 1)U'[I_{NA}] + \rho\,(s + \lambda - 1)\,U'[I_A] \leq 0, D\frac{\partial E[U]}{\partial D} = 0, D \geq 0, \tag{1}$$

$$S \equiv \frac{\partial^2 E[U]}{\partial D^2} = \theta\left((1 - \rho)U''[I_{NA}] + \rho\,(s + \lambda - 1)^2\,U''[I_A]\right) < 0. \tag{2}$$

Proposition 1: *Under the special case of constant absolute risk aversion (CARA) an increase in the tax rate has an unambiguous positive effect on compliance behavior in the context of tax evasion as well in the context of benefit fraud. While, if preferences exhibit decreasing absolute risk aversion (DARA) income understatement is unambiguously decreasing with the tax rate θ in the context of tax evasion, but the effect on compliance behavior in the context of benefit fraud is ambiguous. Conversely, if preferences exhibit increasing absolute risk aversion (IARA) income understatement is unambiguously decreasing with the tax rate θ in the context of benefit fraud, but the sign of the effect is ambiguous in the context of tax evasion.*[3]

[1] The development of the literature is surveyed by Cowell (1990).

[2] In principal, there is a further case: If this citizen j chooses to report an amount $D_j^{'}$ where $W_j > \bar{W} > D_j^{'}$ he would commit both benefit fraud and tax evasion.

[3] Note, income understatement is strictly decreasing in the probability of detection ρ, in the fine rate λ and in the stigma cost s, i. e. the signs of $\frac{\partial D^*}{\partial \rho}$, $\frac{\partial D^*}{\partial \lambda}$ and $\frac{\partial D^*}{\partial s}$ are unambiguously positive. These comparative static effects are identical in both contexts.

Proof of Proposition 1: Consider a regular interior optimum ($D^* < W$). By implicit differentiation of the first order condition (1) we get

$$\frac{\partial D^*}{\partial \theta} = \frac{(1-\bar{\rho})U'[I_{NA}]}{-S} \left\{ (D - \bar{W}) \left(AR[I_A] - AR[I_{NA}] \right) + (s + \lambda) (W - D) \, AR[I_A] \right\}, \tag{3}$$

where $AR[\cdot] \equiv -U''[\cdot]/U'[\cdot]$ is the Arrow-Pratt measure of absolute risk aversion. To determine the sign of $\frac{\partial D^*}{\partial \theta}$ we check the sign of the term in curly brackets and define $\Upsilon \equiv \frac{AR[I_A]-AR[I_{NA}]}{AR[I_A]}$. If the following condition holds,

$$\frac{(D-\bar{W})}{(D-W)} \Upsilon < (s+\lambda)\,, \tag{4}$$

the term in curly brackets is positive and $\frac{\partial D^*}{\partial \theta} > 0$ is true. However, if

$$\frac{(D-\bar{W})}{(D-W)} \Upsilon > (s+\lambda) \tag{5}$$

is fulfilled, the term in curly brackets is negative and $\frac{\partial D^*}{\partial \theta} < 0$ holds. In the context of tax evasion $\left(D^* > \bar{W}\right)$ $0 < \frac{D-\bar{W}}{D-W} < 1$, while in the context of benefit fraud $\left(D^* < \bar{W}\right)$ $\frac{D-\bar{W}}{D-W} > 1$. Under the assumption of CARA ($\Upsilon = 0$), condition (4) is always fulfilled since $s + \lambda$ is by definition greater than one and $\frac{\partial D^*}{\partial \theta} > 0$ holds unambiguously in each context. Under the assumption of DARA ($0 < \Upsilon < 1$) condition (4) is always fulfilled in the context of tax evasion and $\frac{\partial D^*}{\partial \theta} > 0$. In the context of benefit fraud the sign is ambiguous. Conversely, under the assumption of *IARA* ($\Upsilon < 0$) condition (4) is always fulfilled in the context of benefit fraud and $\frac{\partial D^*}{\partial \theta} > 0$. While in the context of tax evasion the sign is ambiguous. ■

In general, a change in the tax rate has both an income and a substitution effect. Since we follow Yitzhaki (1974) and assume that the penalty is related to the tax understatement and the benefit overstatement respectively, there is no substitution effect. In the context of tax evasion an increase in tax rate is equivalent to an income reduction, and given that the citizen has DARA switching to a less risky position is optimal. As a result an increasing tax rate decreases tax evasion. This result is analogous to Yitzhaki (1974). However, in the context of benefit fraud an increase in tax rate is equivalent to an income increase, and switching to a less risky position is only optimal if citizens have IARA.

Notwithstanding, this neglected discrepancy has an insightful policy implication. Under the assumption of DARA an increase in the tax rate unambiguously improves compliance behavior of citizens with an income above the threshold (the 'rich'). The effect on the citizens with an income below the threshold (the 'poor') is ambiguous. Conditioning on (5) we observe an opposing effect and compliance behavior of the poor deteriorates. Conversely, if citizens exhibit IARA, an increasing tax rate unambiguously improves compliance of the poor. However, conditioning on (5), it deteriorates the compliance of the rich. Therefore, under a system of NIT the state has to note that a change in the tax rate has potential opposing effects on the compliance behavior of the poor and the rich.

References

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