

Barth, Erling; Cappelen, Alexander W.; Ognedal, Tone

**Working Paper**

**Fair tax evasion**

Memorandum, No. 2006,07

**Provided in Cooperation with:**

Department of Economics, University of Oslo

*Suggested Citation:* Barth, Erling; Cappelen, Alexander W.; Ognedal, Tone (2006) : Fair tax evasion, Memorandum, No. 2006,07, University of Oslo, Department of Economics, Oslo

This Version is available at:

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# MEMORANDUM

No 07/2006

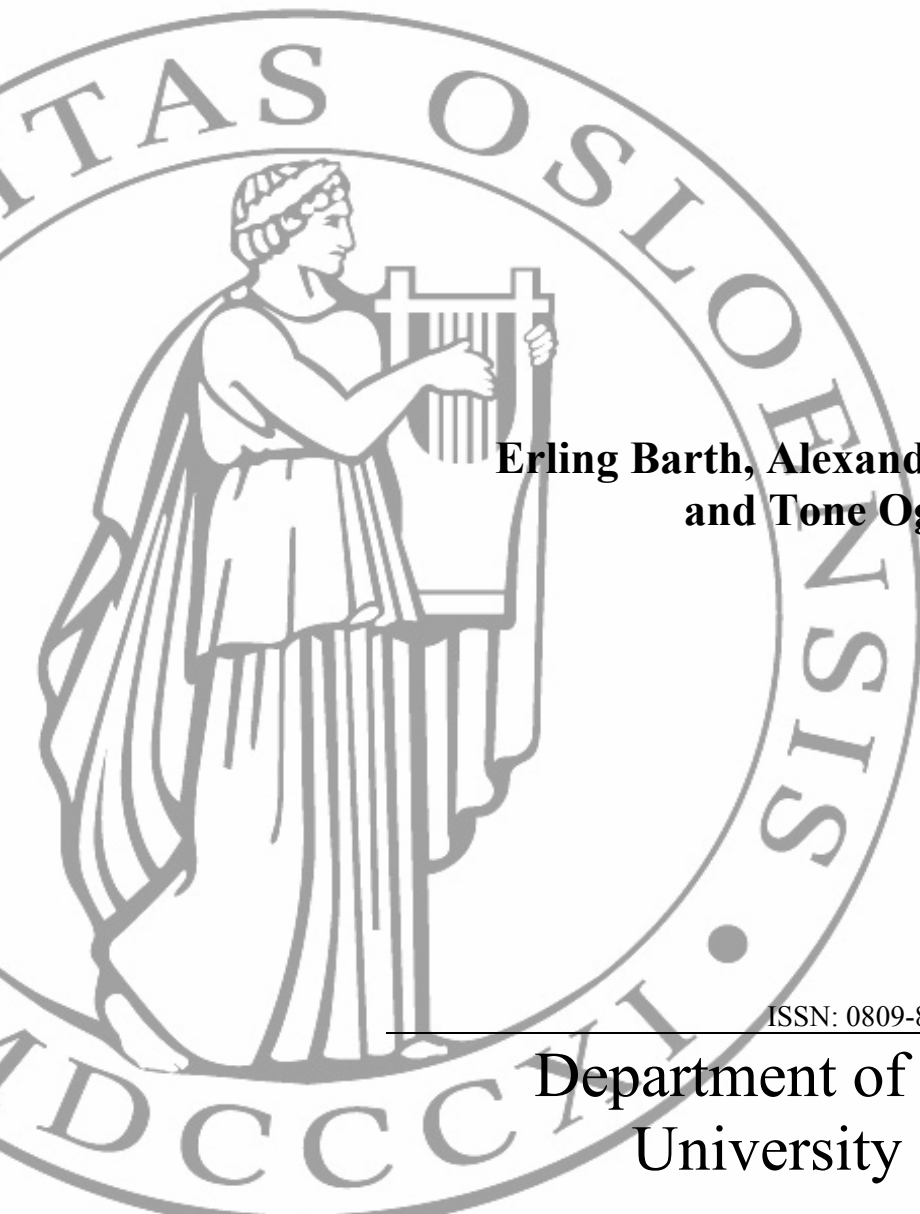
## Fair Tax Evasion

**Erling Barth, Alexander W. Cappelen  
and Tone Ognedal**

ISSN: 0809-8786

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Department of Economics  
University of Oslo



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Gaustadalleén 21  
N-0371 OSLO Norway  
Telephone: +47 22 95 88 20  
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# Fair Tax Evasion

By

Erling Barth

Alexander W. Cappelen

Tone Ognedal

## Abstract

In this paper we analyse how fairness considerations, in particular considerations of just income distribution, affect whether or not people believe tax evasion can be justified and their willingness to engage in tax evasion. Using data from the Norwegian “Hidden Labour Market Survey” we show that individuals with low wages or long working hours, individuals that are treated unfairly by most tax systems, have a higher probability of justifying tax evasion. The same individuals are also more willing to take home income without reporting it to the tax authorities. These results are consistent with a model in which individuals make a trade-off between economic gains and fairness considerations when they make decisions about tax evasion. Taken together our results suggest that considerations of fair income distribution are important for the analysis of tax evasion.

JEL Classification Codes: D63, H26.

Keywords: Tax evasion; redistributive taxation; fair income distribution.

Erling Barth, Insitute for Social Research and Department of Economics, University of Oslo.

Alexander W. Cappelen, The Norwegian School of Economics and Business Administration.

Corresponding author: Tone Ognedal, Department of Economics, University of Oslo, Pb1095

Blindern, 0317 Oslo, Phone 22 85 51 31, Fax 22 85 50 35, e-mail:tone.ognedal@econ.uio.no

We are grateful to Agnar Sandmo for valuable comments.

## 1. Introduction

Most people feel the need to be able to justify their actions to themselves and to others. This is also the case when they decide whether or not to abide by a particular law. It is easier to violate a law that one believes is unfair than a law that one believes is fair. In this paper we analyse how fairness considerations affect whether or not people believe tax evasion can be justified and their willingness to engage in tax evasion. The idea that tax evasion may be affected by what the taxpayers perceive to be unfair taxation is not original. For example, Bordignon (1993) presents a theoretical framework where taxpayers are more inclined to evade taxes if they have to pay a tax rate that is higher than what they think is a fair price for the public goods they receive. Fairness effects in tax evasion are also demonstrated in several experimental studies, such as Fortin, Lacroix and Villeval (2004) and Spicer and Becker (1980). In the present paper we focus on redistributive taxation. In particular we study how considerations of just income distribution might affect people's propensity to justify tax evasion and thus their willingness to evade taxes.

It is natural to meet attempts to justify tax evasion with scepticism and ask whether it is just a way to rationalize behaviour determined by other types of considerations, such as the expected net economic gain from tax evasion. It is therefore important to distinguish between *rationalization* and *justification*. A person is able to justify her behaviour if she can argue that her behaviour is in line with her norms and if these norms are formed independent of her behaviour. An individual's ability to justify tax evasion will depend on the situation she is in, i.e. she will only be able to justify tax evasion if she is actually treated unfairly according to her own norms. People's ability to rationalize their behaviour is not limited in the same way. A creative person may always be able to find some rationale for tax evasion. An important question addressed in this paper is whether people feel a need to genuinely justify their behaviour or if they simply rationalize. The best way to analyse this question is to analyse whether people who are actually treated unfairly by the tax system are more willing to accept unregistered work and more likely to say that tax evasion can be justified.

The obvious problem with such an approach is the inherent difficulty in identifying those who are actually treated unfairly by the tax system. However, we shall argue that it is possible to identify certain groups of individuals that most people would agree are treated unfairly by a progressive tax system. Using data from the Norwegian "Hidden Labour Market Survey"

conducted in 2003, we show that a large majority of the respondents agree to principles of justice that, taken together, imply that a specific group of tax payers is treated unfairly by the tax system. This is the group of individuals who have low hourly wages and work long hours. Under a progressive tax system individuals in this group are taxed heavily even if their income opportunities are limited. Consequently, it can be argued that they are treated unfairly by the tax system.

In the empirical parts of this paper we show that among individuals with identical monthly wages, an individual with low wages and long working hours is more likely to justify tax evasion than an individual with high wages and shorter working hours. We also show that the individual with low wages and long working hours is more willing to take home income without reporting it to the tax authorities. These results are consistent with our theoretical model. The results also turn out to be robust to the inclusion of measures of human capital, measures of marginal tax and to the inclusion of norms related to tax evasion as well as the expected probability of being caught.

The rest of the paper proceeds as follows. In section 2 we argue that the idea of giving all individuals equal income opportunities have strong support as a distributive ideal. This ideal implies that we should eliminate income inequalities that arise from factors outside individual control, but accept income inequalities that are a result of choices. In section 3 we derive the conditions for unfair taxation, given this ideal of distributive justice. Our main hypothesis is that people who are unfairly taxed are more likely to believe that tax evasion can be justified. Section 4 uses data from the “Hidden Labour Market Survey” in Norway to test this hypothesis. In section 5 we analyse, how the ability to justify tax evasion is likely to affect people’s willingness to evade taxes. We use a modified version of a model used by Sandmo (1981). The predictions are tested in section 6, using the same survey data as in section 4. In the final section we conclude.

## **2. Just income distribution and equal income opportunities**

In the theoretical literature on just income distribution, the dominating contemporary view is that with equal opportunities and respect for personal freedom, people should be held responsible for their accomplishments. The revival of these liberal egalitarian ideas can be traced back to the seminal work by Rawls (1971) and has been developed further, by Dworkin (1981), Arneson (1989), Cohen (1989), Roemer (1993, 1996, 1998), Fleurbaey (1995a,b,c)

and Cappelen and Tungodden (2003). Liberal egalitarians argue that society should eliminate inequalities arising from factors beyond individual control, but consider inequalities arising from factors within individual control as legitimate. Factors beyond a person's control are often thought of as race, educational background, social environment and natural talent. For convenience we shall refer to these factors simply as talent. Our notion of factors within a person's control is fuzzier, but an individual's free and informed choices are generally considered to be under her control. Despite the inherent difficulties in drawing the line between these two types of factors, any modern society makes judgments about the extent to which a person is responsible for certain factors. A liberal egalitarian approach can be seen as consisting of two parts: The first part is the *principle of responsibility*, which states that people should be held accountable for their choices. The second part is the *principle of equalization*, which states that individuals making the same choices are entitled to the same outcomes.

A liberal egalitarian approach seems to be in line with moral intuitions present in most modern societies. By way of illustration, in the "Hidden Labour Market Survey" the statement that we should accept inequalities due to personal choices gained the support of 87 percent of respondents. Equally interesting, 88 percent of respondents supported the claim that people exercising the same labour effort should receive the same income, and close to half of the sample (48 percent) supported the claim that inequalities due to factors beyond a person's control should be eliminated. In contrast, only 12 percent of respondents supported the claim that income should be distributed on the basis of needs. The two principles underlying the liberal egalitarian view thus seem to have broad support among the respondents in the survey. This result corresponds well with other surveys of attitudes to welfare policies. Bowles and Gintis (2000, p. 47) conclude that "...egalitarian policies that reward people independent of whether and how much they contribute to society are considered unfair and are not supported, even if the intended recipients are otherwise worthy of support."

What are the implications of these two liberal egalitarian principles for redistributive policies? If all income differences were caused either only by differences in talent or only by differences in choices (for example of work effort) the answer to this would be simple. In the first case we would ideally eliminate all income inequalities and in the second case there would be no redistribution of income at all. However, both types of factors will typically be present: Inequality in income will partly be explained by differences in talent and partly by

differences in the choices made by the individuals. In such situations we would ideally want to eliminate only the first type of inequality, i.e., secure that all individuals have the same income opportunities.

To illustrate, let us assume that a person's hourly wage reflect that person's talent. The principle of equalization then implies that one should eliminate differences in income due to differences in hourly wages. All individuals should thus ideally face the same hourly wage. Let us furthermore assume that people are free to choose the number of hours they want to work. In this situation the principle of responsibility implies that we should accept inequalities due to differences in working hours. For a liberal egalitarian, the fair income distribution is then to distribute total income in proportion to people's effort. Konow (2000) has described this distribution rule as *the principle of accountability*.

It is, however, inherently difficult to design a tax system so as to equalize income opportunities, because it would require information about the number of hours each individual has worked. It would be too easy to manipulate such a tax system by pretending to work more hours than one actually does. Consequently, most tax systems are based on total income. As a result, an individual with unfavourable opportunities (low hourly wage) but high work effort (many hours worked) might pay a higher fraction of his income in taxes than an individual with favourable opportunities (high hourly wage) but low work effort (few hours worked). A progressive tax system will redistribute income from the high talented to the low talented, but also from those who work hard to those who do not. In the example above, a progressive tax system will in other words redistribute from those with high hourly wages to those with low hourly wages, but also from those who work many hours to those who have more leisure. Hence, by trying to reduce one type of unfairness, the government actually creates another type of unfairness.

### **3. The justifiable tax evasion**

The inherent limitations in the tax system imply that we are unable to create a perfectly just tax system even if everyone agreed to what constituted a just distribution of income. This insight is important in order to understand people's beliefs about the legitimacy of the tax system, and thereby their attitudes towards tax evasion



The idea that the tax system might be unjust is of course no new idea. Protests against unreasonable and unfair taxation have a long tradition, and historically such protests have had important political consequences. Both the French revolution and the American independence war were partly triggered by tax systems that were considered unfair. In France, an increasing fraction of the population was exempt from paying taxes, and the American colonies people was enraged by the perceived injustice of taxation without representation (Adams, 1993). Tax evasion may in other words be considered as legitimate in some situation, although it is illegal.

Our hypothesis is that since any tax system inevitably treats some individuals unfairly, these individuals will be more likely to believe that tax evasion can be justified. To see this, let  $l_i$  denote hours worked and  $w_i$  hourly wage for taxpayer  $i$ . As mentioned above, we assume that the hourly wage reflects talent only. In real life, of course, wages do reflect choices as well, for instance through the accumulation of human capital. In the following, the wage measure should thus be thought of as a residual wage after having swept out effects of human capital accumulation.

According to the principle of accountability, a person  $i$ 's fair income  $Y_i^*$  is given by

$$Y_i^* = \frac{l_i}{\sum_{j=1}^n l_j} \sum_{j=1}^n w_j l_j, \quad (1)$$

where  $n$  is the number of individuals in the economy. Let  $\bar{y}$  be the average income in the economy, and  $\bar{l}$  the average number of work hours. The fair hourly wage,  $w^*$ , can then be written as

$$w^* \equiv \frac{Y_i^*}{l_i} = \frac{\bar{y}}{\bar{l}} \quad (2)$$

i.e. the fair wage equals the average wage rate in the economy.

To represent a progressive tax system in the simplest possible way, we use a tax function with a constant tax rate  $t$  and a uniform transfer  $B$ . Hence, the total net tax payment for  $i$  is

$$T_i = ty_i - B \quad (3)$$

With a positive transfer  $B$ , the average effective tax rate is increasing in  $y_i$ , i.e. the tax system is progressive. To focus on the problem of designing a fair tax system, we assume that the only purpose of the tax system is to redistribute income. There is no public good that needs to be financed. Consequently, net tax payments must equal net transfers, i.e.

$$t\bar{y} = B \quad (4)$$

By inserting  $\bar{y} = w^*\bar{l}$  into (4), we obtain  $B = tw^*\bar{l}$ , and we can rewrite the net tax payment of taxpayer  $i$  as

$$T_i = t(y_i - \bar{y}) = t(w_i l_i - w^* \bar{l}) \quad (5)$$

Fair taxes, according to the liberal egalitarian norm, should give each taxpayer  $i$  his fair income  $w_i^* l_i$ . With pre-tax income equal to  $w_i l_i$ , the fair net tax payment,  $T_i^*$ , is simply the difference between the pre-tax income and the fair income, i.e.

$$T_i^* = (w_i - w^*) l_i \quad (6)$$

It follows from Equation (6) that the fair tax not only depends on the taxpayer's income, but also on his number of hours worked. The problem is that the tax system is unable to use information about the number of hours a person has worked. Taxes are therefore based on total income, and do not distinguish between individuals who have the same income, but who have worked different number of hours. Moreover, under a progressive tax system, people with the same wage rate, but who work different number of hours, will have different effective tax rates, since the effective tax rate,  $T_i / w_i l_i$ , goes up when the number of hours worked goes up. This implies that attempts to redistribute income between individuals with different hourly wages will necessarily result in redistribution between individuals with the

same hourly wage, but with different labour effort. As a consequence, there is no feasible tax system that secures everyone a fair income in the liberal egalitarian sense, even if everyone agrees that the principle of accountability describes the fair income distribution.

We assume that an individual's ability to justify tax evasion depends on the size of the unfair tax payment,  $T_i - T_i^*$ , relative to their income  $wl_i$ . We call this relation the *unfair tax rate*. This implies that an unfair tax payment of 1000 dollar for an individual with an income of 20 000 dollar is as unfair as an unfair tax payment of 10.000 dollar for an individual with an income of 200 000 dollar. The unfair tax rate, denoted  $\lambda^*$ , is given by

$$\lambda^* \equiv \frac{T_i - T_i^*}{wl_i} = \frac{[w^* - (1-t)w_i] - \frac{B}{l_i}}{w_i} \quad (7)$$

It follows from Equation (7) that while the unfair tax rate may be positive or negative, it is strictly increasing in the number of hours worked and strictly decreasing in the wage rate for  $0 < t < 1$ . The intuition behind this result is important: In any linear tax system that sets the rate between zero and unity, there will be two types of injustices. First, because the tax rate is less than unity, the tax system will treat those with a high wage rate better than those with a low tax rate for a given number of hours worked. Second, because the tax rate is higher than zero, the tax system will treat those who work many hours unfair compared to those who work few hours for a given wage rate.

We assume an individual is able to justify tax evasion as long as the fraction evaded does not exceed the unfair tax rate. The tax evasion that an individual finds justifiable, hereafter called the *fair tax evasion*, is thus equal to the unfair tax rate,  $\lambda^*$ , as given by (7). It follows from (7) that if  $(1-t)w_i > w^*$ , the unfair tax rate  $\lambda^*$  is negative for any number of hour's work. Consequently, tax evasion is never justifiable if  $(1-t)w_i > w^*$ . The negative  $\lambda^*$  can then be interpreted as a moral cost of evading taxes. Since the unfair tax rate becomes less negative the higher the number of hours worked, the moral cost is reduced. If  $(1-t)w_i < w^*$ , tax evasion is justifiable if the number of work hours is sufficiently large. More precisely, by inserting  $B = tw^*\bar{l}$  we find that tax evasion is justifiable if

$$l_i > \frac{t\bar{l}}{1 - (1-t)\frac{w_i}{w^*}} \equiv \tilde{l}_i \quad (8)$$

i.e., if his number of work hours is above a critical level  $\tilde{l}_i$ . It follows from inspection of (8) that  $\tilde{l}_i$  is increasing in  $w_i/w^*$ ,<sup>1</sup> i.e. the number of work hours that makes evasion justifiable is higher the higher the wage rate.

Similarly, tax evasion is justifiable if a person's wage rate is below a critical value,

$$w_i < \frac{l_i - t\bar{l}}{(1-t)l_i} w^* \equiv \bar{w}_i \quad (9)$$

The critical value is increasing in the tax rate and decreasing in the number of hours worked.

To summarize, our hypothesis is that those who pay more than their fair tax can more easily justify that they evade taxes than those who pay less than their fair tax. More precisely we expect that the belief that tax evasion can be justified should be more prevalent among those who work long hours and among those with a low wage.

#### 4. Empirical analysis of the propensity to justify tax evasion

The model above predicts that the propensity to justify tax evasion is increasing in the number of hours worked. We now test this prediction using data from "The Hidden Labour Market Survey" from 2003. The survey was designed by the Frisch centre for economic research, and

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<sup>1</sup> Moreover, it is easy to show that  $\tilde{l}_i$  is increasing in  $t$  if  $w_i < w^*$ , but decreasing in  $t$  if  $w_i > w^*$ . The reason is the following: An increase in  $t$  makes the tax function  $ty_i + B$  more progressive. Since  $ty_i = B$ ,  $B$  is increased when  $t$  is increased, and the average tax rate is a steeper function of  $y_i$  the higher  $B$  is. A simultaneous increase in  $t$  and  $B$  makes the tax payment more fair for individuals with a wage rate below the fair one, i.e. with  $w_i < w$ . Consequently, the number of hours that make tax evasion justifiable becomes higher for this group. The opposite is the case for individuals with a wage rate above the fair one.

undertaken as a postal survey by the Markeds og Mediatitutttet A/S. 1062 individuals were interviewed. For our analysis we have selected a sample of 532 individuals who are of the age 18-64 and wage earners, working at least 20 hours in regular employment the week before the survey. The main question we use as our dependent variable is the following:

*Can tax evasion be justified?*

The alternatives were yes, no and do not know. Of the 1042 valid answers to this question, 162 (16%) answered yes, 720 (69%) answered no, while the remaining 160 (15%) answered do not know. In our sample of 545 individuals, the answers were distributed as follows:

*Table 1. Distribution of answers to the justification question. Wage earners.*

Yes	96 (18%)
No	364(68%)
<u>Don't know</u>	<u>72 (13%)</u>
N	532

A dummy variable was constructed, taking the value of 1 if the individual answered YES . Working hours is reported in categories only. In our sample, the intervals are 20-29, 30-39, 40-49, 50-59 and 60 hours and more. A continuous variable is constructed, taking the values 25, 35, 45, 55 and 65 accordingly.

#### **4.1. The relationship between justification and working hours**

Table 2 reports the average values of justification for the different intervals of working hours. Regular weekly working hours in Norway are 37,5 hours per week. As predicted by our model, we find an increasing tendency to justify tax evasion as the number of working hours increases.<sup>2</sup>

*Table 2. The average level of justification by working hour category. Wage earners.*

*Average value of dummy variable for justification*

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<sup>2</sup> At least, the pattern holds up to a level of 50 hours per week. The number of observations in the last two groups is very small, only 19 and 6 individuals, so we cannot put much weight on these observations.

Working hours	Number of observations	Average level of justification
20-29	44	11.4
30-39	364	15.1
40-49	99	31.3
50-59	19	21.1
60 +	6	16.7

Clearly, this pattern may be due to a host of factors other than fairness considerations. To control for these factors, we undertake a series of simple (probit) regression analyses.

In table 3 we first report the results of three simple probit models. The dependent variable is the dummy for being willing to justify tax evasion. The main prediction from our theoretical model of the fairness effect is that an individual who works more should be more likely to justify tax evasion. To test this prediction, we include as our main explanatory variable the log of weekly hours worked. In model 1 we control for individual characteristics: Gender, age, and education. It turns out that women are less likely than men to justify tax evasion and that the probability of justifying tax evasion is declining with age. However, there is no significant effect of education on the probability of justifying tax evasion<sup>3</sup>. We find a positive, but not statistically significant relationship between hours worked and the probability of justifying tax evasion.

[Table 3 about here]

To test our theoretical implications of the fairness effect, we would like to compare individuals who work different hours, but who earn the same. In this way we are able to sweep out effects of different earnings levels or marginal tax rates on the probability of justifying tax evasion. In model 2 we thus include the log of monthly earnings in the analysis. The effect of working hours now almost doubles, and is significant at a 10 percent level. The coefficient of 0.98 implies a marginal effect of 21 percentage points on the probability of justifying tax evasion of doubling working hours, keeping monthly earnings constant.

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<sup>3</sup> Which is an interesting result given the fact that individuals with higher education are less likely to actually perform black market work.

The result of model 2 implies that if we compare two individuals with *identical average monthly earnings* (and average values of the other covariates), but where one works 10 percent more hours than the other in order to obtain these earnings, the hard-working individual has 2.1 percentage points higher probability of justifying tax evasion than the less hard-working individual. 2.1 is about 12 percent of the average level of justification, which is 18 percent, so the effect is economically significant as well. This experiment of comparing individuals who has identical monthly earnings but whose earnings arises from a different mix of hours and wages, is exactly what we need to test the predictions of our theory.

Another possible experiment to test our theory is to compare individuals with *identical hourly wages*. Again we depart from a reference point made up by individuals with average values on all covariates. If we now consider the experiment of increasing working hours of one individual by 10 percent, keeping hourly wage constant, both working hours and monthly earnings increase. In this case, the probability of justifying tax evasion is  $0.211 * (0.9805 - 0.3262) / 10 = 1.38$  percentage point higher for the hard-working individual compared to the one who work average hours. The positive effect of higher work effort dominates a negative effect of higher monthly earnings.

#### *The probability of detection*

One potential problem with this result, as mentioned earlier, is that there may be a relationship between reported earnings to the tax authorities, and the probability of being audited by the same authorities. If there is a relationship between actually performing tax evasion and the probability of justification, because people rationalize their behaviour, then this relationship may create a spurious correlation between working hours in regular employment and the probability of justifying tax evasion. We control for such effects in two ways. First, we report in model 3 results where we also include the individual's perceived probability of being caught by the tax authorities, as well as the individual's perception of other's acceptance of tax evasion. We note that these variables have strong effects and considerable explanatory power on our dependent variable, but that the effects of working hours is unaffected by the inclusion of these variables. We also include the individual's assessment of own marginal tax rate. This variable does not have a significant effect. In model 4 we include a set of industry dummies. These are not jointly significant and the coefficients for the other variables changed very little when controlling for industry. Model 3 is thus our preferred specification.

### *Endogenous hours*

Since working hours is a choice variable for the individual, we undertake a simple Hausman type of test to check for potential endogeneity bias. In model 5 we instrument working hours with marital status and the presence of children in the household, interacted with gender. The idea is that these variables do affect the choice of working hours, but may reasonably be assumed to be exogenous in terms of justification. The F-value of the instruments is 6.53, which is acceptable, but not very impressive. We also include the residual of the first step regression in the model. It turns out that the residual does not have a significant effect on justification (conditional on the predicted working hours). We may thus conclude that endogeneity bias is not a significant problem in model 3. Of course, this result is dependent on the quality of the instruments. We have made some attempts at including industry indicators in the first step, but since this brings down the F-value, we do not report this. We also included only a few industry dummies, which produced a somewhat higher F-value. In both cases the residual of the first step equation turned out highly insignificant in model 5. We thus again resort to model 3 as our preferred specification.

### *Actual performance of unreported work*

One may argue that this type of justification is just caused by rationalization of actual performance of unreported work. Actual unreported work may be correlated with working hours in regular work. If this is the case, what we are picking up may be a spurious relation rather than a causal effect of fairness norms. To check for this, we include the answer to the question if the individual actually performed unreported work during the last 12 months. The first column reports from the same specification as column 3 of table 3. The second column reports a specification where actual tax evasion is included as a covariate. The result for working hours changed very little, and we find a strong positive relationship between justification and action.

[Table 4 about here]

However, actual tax evasion is obviously an endogenous variable, possibly jointly determined with justification. In model 3, we report from a bivariate probit model where both these outcomes have been jointly estimated. We report the equation for justification only. We find a significant and similarly sized effect of working hours on justification, and a positive conditional correlation between justification and action. This shows that the working hours



effect is not a result of a correlation between working hours and actual performance of unreported labour. All in all, our result fits well with the predictions from our theoretical model.

## 5. Justification and willingness to evade taxes

Laboratory experiments with games such as the ultimatum game and the dictator game have shown that people are willing to sacrifice pecuniary gains in order to avoid large deviations from what they consider to be fair (Camerer, 2003). When people decide whether or not they are willing to evade taxes, it is reasonable to assume that both economic and fairness considerations play a role. Consequently, a person that believes he would have a net economic gain from tax evasion may not be willing to evade taxes because he finds it difficult to justify such behaviour. Similarly, a person may choose to evade although he does not find it justifiable because the economic gain is high. To study the relationship between the ability to justify tax evasion and the willingness to evade taxes, we merge the results from our analysis of justifiable tax evasion with a model of economically optimal tax evasion of the types used in the seminal papers by Allingham and Sandmo (1972) and Sandmo (1981)).

We assume that the decision to evade is made regularly, and that the evasion is relatively small, such that the potential penalty is small relative to the lifetime income. This allows us to analyse the tax evasion decision as if the individual is risk neutral, such that he only cares about the expected net income, not the degree of uncertainty<sup>4</sup>. In this respect we depart from the Allingham-Sandmo models.

Individuals are motivated by a desire for income and leisure and by a desire to act in accordance with what they consider to be fair. For our purpose, we lose no insight by using a utility function that is additively separable in a “selfish” and a moral part, instead of a more general formulation:

$$V = U(y, l; z) - \beta f\left(\frac{ut}{wl} - \lambda^*(l; w)\right) \quad (10)$$

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<sup>4</sup>As demonstrated by Rabin and Thaler (2001) it may lead to unreasonable results to apply risk aversion in choices where the stakes are small compared to life income.

The first term  $U(y, l; z)$  is the utility derived from expected income  $y$  and labour effort  $l$ <sup>5</sup>. The parameter  $z$  allows us to study differences in the relative preferences for consumption versus leisure between individuals. We assume that  $U$  is strictly quasi-concave in  $y$  and  $l$ . We denote the unreported income by  $u$ , such that  $ut$  is the tax evaded. The term  $f(\frac{ut}{wl} - \lambda^*)$  captures the disutility or moral cost of deviating from what the individual considers to be the fair tax evasion, hereafter called *the fairness effect* on evasion.  $f' > 0$  and  $f''$  is assumed. The weight a person attaches to fairness considerations relative to his pecuniary self-interest is given by  $\beta$ . The fair fraction evaded  $\lambda^*$ , as given by (7), is increasing in  $l$  and decreasing in  $w$ . The actual fraction evaded is given by the total evasion  $ut$  over the actual income  $wl$ . Hence, the deviation from the fair tax evasion is  $\frac{ut}{wl} - \lambda^*(l, w) \equiv D(l, u; w)$ , where  $D_l(l, w) < 0$ ,  $D_u(l, u; w) > 0$  and  $D_w(l, w)$  cannot be signed.

The individual is supposed to pay a tax rate  $t$  on his gross income  $wl$ . If he does not, he is detected and penalized with probability  $p$ . The penalty tax  $T(u)$  is an increasing and convex function of evasion  $u$ <sup>6</sup>. The penalty tax is always higher than the evaded tax. We assume that the probability of being detected is a decreasing, convex function of reported income, i.e.  $p = p(wl - u)$  where  $p' < 0$  and  $p'' > 0$ <sup>7</sup>. Hence, the expected penalty is  $p(wl - u)\tau(u) \equiv E(u, wl)$ . It follows from the assumptions about  $p(\cdot)$  and  $\tau(\cdot)$  that  $E_u > 0$ ,  $E_{uu} > 0$ ,  $E_w > 0$  and  $E_{ww} > 0$ , where  $W \equiv wl$ . The expected net income of an individual who evades  $ut$  is then

$$y(u, wl) = (1 - t)wl + tu - E(u, wl) \quad (11)$$

Maximizing  $V$  with respect to  $l$  and  $u$ , using (11), yields the two first order conditions

<sup>5</sup> In this section, we can leave out subscript  $i$  for individual without causing misunderstanding.

<sup>6</sup> The distinction between penalizing evaded income and evaded tax does not matter for our problem as long as we do not discuss changes in the tax rate.

<sup>7</sup> The case where probability of detection depends on the reported income is discussed in Allingham and Sandmo (1972), but for a given total income  $wl$ . As in their paper, we do not analyse the game between evaders and tax authorities, such as Reinganum and Wilde (1985 and 1986) and Erard and Feinstein (1994), but simply assume that the taxpayers expect the probability of detection to be a decreasing function of his reported income.

$$w[(1-t) - E_w(u, wl)] = - \frac{[U_l(y, l; z) - \beta f'(D)D_l(l, u, w)]}{U_y(y, l; z)} \quad (12)$$

$$t = E_u(u; wl) + \beta f'(D)D_u(l, u; w) \quad (13)$$

The right hand side of (12) is the individual's marginal rate of substitution between income and leisure. The marginal rate of substitution tells us by how much the individual's expected income  $y$  must be increased to compensate for one more work hour. Hence, equation (12) says that the required compensation for one more work hour must equal the actual compensation, which is the net wage rate plus the reduced expected penalty when the reported income is increased (for a given  $u$ ). Equation (13) says that the marginal gain from one dollar evaded, the saved tax payment  $t$ , should equal the marginal expected penalty  $E_u$  plus the increase in the moral cost,  $\beta f'(D)D_u(l, u; w)$ .

To be able to test if fairness considerations affect peoples' willingness to evade taxes, we must be able to separate the fairness effect from other effects. We do this by analysing a change in the parameters  $z$  and  $w$  that does not affect the actual evasion  $u$  when fairness considerations play no role ( $\beta = 0$ ), but that affects  $u$  when fairness considerations play a role. Let us compare individuals who have the same total income  $wl$ , but who may differ with respect to both their wage rates and their relative preferences for consumption over leisure. To simplify, we may think of two distinct groups, A and B, where members of group A work fewer hours at a higher wage rate than members of group B. The reason why members of group B work more hours at a lower wage is that they have a higher relative preference for consumption than members of group A, measured by a higher value of  $z$ . We assume that the higher the value of  $z$ , the lower is the marginal rate of substitution  $-\frac{U_l(y, l; z)}{U_y(y, l; z)}$ , which measures the increase in income necessary to compensate for one more work hour.

When  $\beta = 0$ , i.e. when fairness considerations play no role, equation (13) becomes

$$t = E_u(u, wl) \quad (13)'$$

Since the total income  $wl$  is the same for members of both groups, it follows from (13)' that they will evade the same amount  $u$ . Moreover, it follows from (11) that their expected net incomes  $y$  will be the same. As a consequence, inspection of (12) shows that members of the low-wage group B must have lower values of the marginal rate of substitution between income and leisure,  $-\frac{U_l(y,l;z)}{U_y(y,l;z)}$ , than members of the high-wage group A. To sum up, if we compare individuals who have the same total labour income  $wl$ , but differ with respect to their wage rates and their relative preferences for consumption and leisure, we would expect no differences in their evasion if fairness considerations play no role.

If fairness considerations play a role, i.e. if  $\beta > 0$ , it follows easily from (12) and (13) that evasion will differ between individuals when  $z$  and  $w$  differ in such a way that  $wl$  is the same. To see this, let us assume that  $u$  did not differ between the two groups. If both  $u$  and  $wl$  are the same for the two groups, it is easy to show that  $D$  must be lower for members of the low-wage B-group than for members of the high-wage A-group, while  $D_u = \frac{t}{wl}$  is the same for both groups.<sup>8</sup> As a consequence, the right hand side of equation (13), the marginal cost of one dollar more unreported income, is lower for the B-group than for the A-group. It follows that it cannot be optimal for both groups to evade the same amount. Since members of the B-group have lower wages and a higher relative preference for consumption than members of the A-group, they are treated more unfairly by the tax system. As a consequence, they are willing to evade more taxes.

To sum up, if there is a fairness effect ( $\beta > 0$ ), we would expect people who are unfairly treated by the tax system, i.e. those who work long hours for a low wage, to be more willing to evade than those who work less for a lower wage. As shown above we expect no such difference in the willingness to evade if there is no fairness effect ( $\beta = 0$ ). Our model predicts that peoples willingness to evade taxes does not only depend on their total income, but also on

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<sup>8</sup>The change in  $D$  only depends on the change in the fair tax evasion  $\lambda^*$  since  $D = \frac{ut}{wl} - \lambda^*(l, w)$ . Since  $\lambda^*$  is increasing in  $l$  and decreasing in  $w$ ,  $D$  is lower for the B-group members who work long hours at a low wage than for the A-group who work short hours at a high wage.

whether this income is earned as a result of many work hours or a high wage rate. For the same total income, an individual who has earned his income as a result of many work hours at a low wage is willing to evade more than an individual who earn the same total income with a higher wage rate and fewer work hours.

Our prediction of how fairness consideration affects the willingness to evade taxes differs from that of other models. While many other types of fairness arguments implies that an individual's income affects his moral cost of evasion, our model is the first to suggest that it matters whether his income is a result of long work hours or a high wage rate. For example, the fairness argument of Bordignon (1993) implies that the income of an individual matters for his moral cost of evasion since it determines whether or not he pays too much taxes compared to his gain from the public expenses. Allingham and Sandmo (1972) discuss moral costs that depend directly on the amount evaded, such as bad conscience or social stigma. Also in this case, we would not expect the willingness to evade to be affected by whether the income is earned as a result of long hours or high wage rates.

## **6. Empirical analysis of the willingness to evade.**

As in section 4, we test the prediction about the willingness to evade using data from the "The Hidden Labour Market Survey". We base the empirical analysis of the willingness to evade on the answer to the following question:

*If you had the possibility to take home income without reporting it to the tax authorities, would you have been willing to do so?*

In our sample of wage earners from 2003, 38 percent said 'yes', 28 percent said 'no' and 34 percent said 'don't know'. In table 5 we report from a probit analysis of the probability of replying 'yes' to the above question. We find that willingness to evade taxes follows a similar pattern as the ability to justify tax evasion, even though significance levels vary slightly. Willingness declines with age and is lower for women than for men. The perceived probability of being caught and the beliefs about others' acceptance of tax evasion has significant effects on the willingness to evade taxes.

We find a positive and significant (10 percent level only) effect of log working hours, conditional on monthly pay. This supports the main result of the model in section 5: For the

same total income, an individual who has earned his income as a result of many work hours at a low wage is willing to evade more than an individual who earn the same total income with a higher wage rate and fewer work hours. Peoples willingness to evade taxes does not only depend on their total income, but also on whether this income is earned as a result of many work hours or a high wage rate.

There are several caveats to the analysis of the willingness to evade taxes, the most important is that log working hours is endogenous in our model. There may be some heterogeneity component in the error term of the willingness function that is correlated with the willingness to take home unreported income. In particular, the level of unreported income ( $u$  in the theoretical model) enters the first order condition for working hours. If there is a relation between the willingness to take home unreported income and actual unreported income, we have an endogeneity problem.

Again we test for endogeneity using exogenous determinants of working hours as instruments for hours. The instruments are marital status and children (interacted with gender). Model 5 report the Hausman type of test. Again we do not find significant evidence of an endogeneity bias in our data.

The different empirical models include a host of insignificant variables. Notably, industry dummies and the human capital variables are not significant. This observation may appear to run counter to the fact observed in many other studies that industry affiliation and human capital variables are strong predictors of tax evasion. However, as noted by Barth and Ognedal (2005) the difference between the willingness to evade taxed and actual performance of unreported work may be due to constraints on actual performance.

We conclude that fairness considerations do affect the willingness to evade taxes. Consistent with our theoretical model, the willingness to evade taxes is higher for those who work more to obtain the same level of earnings, since these are unfairly treated by the tax system. In particular, we show that among individuals with identical monthly wages, workers with low wages and long working hours have a higher probability of justifying taxes than those with high wages and shorter working hours.

## **7. Conclusions**

In this paper we have addressed the questions of whether or not people's claim that they can justify tax evasion only is a result of rationalization or if it is genuine justification. The empirical analysis suggests that it is genuine justification; since people's tendency to justify tax evasion is affected by the extent to which they are fairly treated by the tax system. In particular, we show that individuals with low wages or long working hours, both groups that are treated unfairly by most tax systems, have a higher probability of justifying tax evasion.

Our analysis also shows that fairness considerations play a role when people decide whether or not they are willing to evade taxes. We show that individuals with low wages and long working hours, i.e., those groups who are more likely to justify tax evasion, are more willing to take home income without reporting it to the tax authorities. These results are consistent with a model in which individuals make a trade-off between economic gains and fairness considerations when they make decisions about tax evasion. Taken together our results suggest that considerations of fair income distribution are important for the analysis of tax evasion.

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Table 3 *The probability of justifying tax evasion*

	Model 1	Model 2	Model 3	Model 4	Model 5
log(working hours)	0,5250 (0,3945)	0,9805z (0,5037)	1,1720* (0,5351)	1,2640* (0,5533)	2,0907 (2,5891)
Log (monthly earnings)		-0,3262 (0,2248)	-0,4046 (0,2558)	-0,4387z (0,2657)	-0,4866 (0,3415)
Woman	-0,5119* (0,1458)	-0,5563* (0,1493)	-0,3362* (0,1613)	-0,3418* (0,1752)	-0,2586 (0,2677)
Age	-0,0284* (0,0068)	-0,0256* (0,0071)	-0,0180* (0,0076)	-0,0174* (0,0078)	-0,0159z (0,0095)
Secondary education	0,0875 (0,2088)	0,1300 (0,2115)	0,2201 (0,2259)	0,2311 (0,2290)	0,2240 (0,2261)
Tertiary education	0,1234 (0,1982)	0,2454 (0,2163)	0,4015z (0,2335)	0,4464* (0,2505)	0,4220z (0,2400)
Marginal Tax Rate			0,0058 (0,0080)	0,0061 (0,0082)	0,0044 (0,0089)
Prob(revealed) %			-0,0177* (0,0039)	-0,0177* (0,0039)	-0,0178* (0,0039)
Acceptance by others			0,4940* (0,1544)	0,4953* (0,1560)	0,4905* (0,1546)
Residual log(working hours)					-0,8688 (2,3948)
Industry dummies				10	
p-value				0,9906	
F-value instruments first stage					6,5300
Pseudo R-square	0,0814	0,0856	0,1745	0,1795	0,1747
N	532	532	532	532	532

Note: \* (z) significance level 5 (10) percent.  $\phi(z\text{-mean})=0.211$ . In model 5 log working hours is instrumented by marital status and the number of children interacted with gender. The variable Residual log(working hours) is the residual from the first stage regression.

Table 4 *The probability of justifying tax evasion*

	Model 1	Model 2	Model 3
	Probit		Bivariate probit
Log (working hours)	1,1720* (0,5351)	0,9962z (0,5432)	1,1196* (0,5315)
Log (monthly earnings)	-0,4046 (0,2558)	-0,3327 (0,2591)	-0,3909 (0,2543)
Woman	-0,3362* (0,1613)	-0,2759z (0,1649)	-0,3463* (0,1613)
Age	-0,0180* (0,0076)	-0,0174* (0,0077)	-0,0177* (0,0075)
Secondary education	0,2201 (0,2259)	0,2112 (0,2317)	0,2383 (0,2257)
Tertiary education	0,4015z (0,2335)	0,4440z (0,2394)	0,4089z (0,2333)
Marginal tax rate	0,0058 (0,0080)	0,0072 (0,0082)	0,0057 (0,0080)
Prob(revealed) %	-0,0177* (0,0039)	-0,0161* (0,0039)	-0,0176* (0,0039)
Acceptance by others	0,4940* (0,1544)	0,4448* (0,1568)	0,4721* (0,1537)
Performed unregistered work		0,7728* (0,1962)	
Correlation, error terms			0,4032* (0,0977)
Pseudo R square	0,1745	0,2050	
N	532	532	532

Note: \* (z) significance level 5 (10) percent.  $\varphi(z\text{-mean})=0.211$ . In model 3 a bivariate probit is run with the indicator variable: Performed unregistered work as the other endogenous variable (not reported). The equation for performed unregistered work also includes industry dummies as explanatory variables. The reported Correlation, error terms, is the estimate of the correlation between the error terms of the two equations.

Table 5 *The probability of being willing to receive unreported income*

	Model 1	Model 2	Model 3	Model 4	Model 5
log(working hours)	0,4607 (0,3443)	0,7632z (0,4375)	0,8992z (0,4742)	0,8095z (0,4895)	1,1684 (2,2077)
Log (monthly earnings)		-0,2168 (0,1919)	-0,1895 (0,2162)	-0,0926 (0,2246)	-0,2131 (0,2876)
Woman	-0,4381* (0,1218)	-0,4702* (0,1252)	-0,2424* (0,1377)	-0,2849z (0,1518)	-0,2197 (0,2284)
Age	-0,0196* (0,0058)	-0,0178* (0,0060)	-0,0069 (0,0066)	-0,0104 (0,0068)	-0,0064 (0,0081)
Secondary education	-0,2722 (0,1681)	-0,2481 (0,1695)	-0,2125 (0,1818)	-0,2698 (0,1874)	-0,2107 (0,1824)
Tertiary education	-0,4802* (0,1600)	-0,3991* (0,1751)	-0,3044 (0,1892)	-0,3721z (0,2094)	-0,2982 (0,1956)
Marginal Tax Rate			-0,0040 (0,0070)	-0,0016 (0,0072)	-0,0044 (0,0077)
Prob(revealed) %			-0,0171* (0,0030)	-0,0183* (0,0032)	-0,0171* (0,0031)
Acceptance by others			0,8085* (0,1270)	0,8162* (0,1292)	0,8076* (0,1272)
Residual log(working hours)					-0,2548 (2,0404)
Industry dummies				10	
p-value				0,1333	
F-value instruments first stage					6,5300
Pseudo R-square	0,0526	0,0551	0,1891	0,2109	0,1892
N	532	532	532	532	532

Note: \* (z) significance level 5 (10) percent.  $\phi(z\text{-mean})=0.365$ . In model 5 log working hours is instrumented by marital status and the number of children interacted with gender. The variable Residual log(working hours) is the residual from the first stage regression.

Table 6 *The probability of being willing to receive unreported income*

	Model 1 Probit	Model 2	Model 3 Bivariate probit
log(working hours)	0,8992 (0,4742)	0,8245 (0,4827)	0,9266 (0,4751)
Log (monthly earnings)	-0,1895 (0,2162)	-0,1541 (0,2203)	-0,2030 (0,2179)
Woman	-0,2424 (0,1377)	-0,1805 (0,1398)	-0,2400 (0,1374)
Age	-0,0069 (0,0066)	-0,0061 (0,0066)	-0,0066 (0,0065)
Secondary education	-0,2125 (0,1818)	-0,2548 (0,1850)	-0,2200 (0,1820)
Tertiary education	-0,3044 (0,1892)	-0,3015 (0,1922)	-0,3067 (0,1899)
Marginal Tax Rate	-0,0040 (0,0070)	-0,0027 (0,0071)	-0,0038 (0,0070)
Prob(revealed) %	-0,0171 (0,0030)	-0,0161 (0,0031)	-0,0173 (0,0030)
Acceptance by others	0,8085 (0,1270)	0,7897 (0,1286)	0,8044 (0,1272)
Performed unreported work		0,7854 (0,2074)	
Correlation error terms			0,4310 (0,0950)
Pseudo R square	0,1891	0,2098	
N	532	532	532

Note: \* (z) significance level 5 (10) percent.  $\phi(z\text{-mean})=0.365$ . In model 3 a bivariate probit is run with the indicator variable: Performed unregistered work as the other endogenous variable (not reported). The equation for performed unregistered work also includes industry dummies as explanatory variables. The reported Correlation, error terms, is the estimate of the correlation between the error terms of the two equations.