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# Tax evasion and work in the underground sector

Anders Frederiksen<sup>a</sup>, Ebbe Krogh Graversen<sup>b</sup>, Nina Smith<sup>a,\*</sup>

<sup>a</sup>*IZA, CIM and Department of Economics, Aarhus School of Business, Prismet, Silkeborgvej 2,  
DK-8000 Aarhus C, Denmark*

<sup>b</sup>*CIM, CLS and The Danish Centre for Studies in Research and Research Policy, Finlandsgade 4,  
DK-8200 Aarhus N, Denmark*

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## Abstract

A bivariate random effect panel data model is estimated for male labour supply in the taxable and the non-taxable sectors in Denmark. The wage rates and non-labour income have significant effects on labour supply in both sectors. The average own wage elasticity with respect to underground labour supply is found to be small, 0.02, while the cross price elasticity from regular wages is larger,  $-0.52$ . Simulations of potential tax reforms show that a reduction of the marginal taxes has minor effects on male labour supply to the untaxed sector, while the effect on male labour supply to the taxed sector is larger.

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## 1. Introduction

It is commonly expected that taxes have an effect on the leisure-labour choice. Normally, it is also assumed that labour income taxes stimulate labour market activities in the untaxed sectors of the economy through tax evasion. Despite the fact that many theoretical investigations of this assumption exist, there are relatively few

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\* Corresponding author. Tel.: +45 8948 6413; fax: +45 8948 6197.

*E-mail addresses:* [afr@asb.dk](mailto:afr@asb.dk) (A. Frederiksen), [ekg@cfa.au.dk](mailto:ekg@cfa.au.dk) (E.K. Graversen), [nina@asb.dk](mailto:nina@asb.dk) (N. Smith).

empirical analyses of labour supply to the untaxed “underground” sector.<sup>1</sup> The lack of data on labour supply and wage rates in the underground sector is the major reason for this. In this paper, we have access to a unique database which consists of a panel survey sample with information on hours of work and wages in the untaxed sector. This information is merged to extensive information from administrative registers. The labour supplies to the taxed and untaxed sectors are modelled jointly, and the model is estimated for male Danish workers who, due to the high Danish tax pressure and the tax structure, face relatively high marginal tax rates on wage income compared to workers in most other countries.

One of the first papers discussing underground labour supply is the theoretical paper by [Allingham and Sandmo \(1972\)](#). Since then, several other models of tax evasion have appeared.<sup>2</sup> They typically combine conventional labour supply theory with a standard portfolio model, i.e. how much labour to supply all in all and how much in each sector. We pursue this way of modelling and set up a model where individuals choose the labour supply in the two sectors given a known tax rate on the regular labour income, i.e. the regular sector net wage rate, and a known gross wage rate in the underground sector. Based on this model, we estimate the incentive effect of regular sector income taxes on regular as well as underground labour supply.

The survey information consists of two successive waves in 1994 and 1996 which are merged with register information on non-labour income and background characteristics of the individuals stemming from administrative registers from Statistics Denmark. Based on self-reported labour supply and wage rate measures in the regular and in the underground sectors, we estimate a random effect bivariate Tobit model on the labour supply in both sectors. Thus, we can control for permanent individual-specific effects and transitory random errors in and between the two sectors.

The results show that regular sector wage rates and non-labour income have significant effects on labour supply in both sectors so income taxes seem to twist the labour supply away from taxed regular to untaxed underground supply. We also find a significant permanent individual-specific effect. For the untaxed labour supply, the cross wage elasticity varies considerably across groups, the highest average cross wage elasticities are found for men who also work in the regular (taxed) sector.

In Section 2, we introduce a theoretical model similar to that of [Cowell \(1985\)](#) and develop it further to our purpose. In Section 3, we introduce the empirical specification and the estimation strategy for the econometric model. In Section 4, we present the panel survey data set together with some descriptive and preliminary analysis. The estimation results and the results from two reforms of the tax system are presented in Sections 5 and 6. Finally, Section 7 concludes the paper.

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<sup>1</sup> Among these studies are [Lemieux et al. \(1994\)](#) and [Lacroix and Fortin \(1992\)](#) for Canada, [Isachsen et al. \(1985\)](#) for Norway, [van Eck and Kazemier \(1988\)](#) for the Netherlands and [Wolff \(1990\)](#) for Germany. Only the Canadian studies estimate the joint labour supply in the regular and the underground sectors.

<sup>2</sup> See for example [Feige \(1989\)](#) and [Cowell \(1990\)](#) for a collection of contributors in the field. [Schneider and Enste \(2000\)](#) give a recent survey on theories and evidence of shadow economies.

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