



# Tax enforcement policies, tax evasion and time allocation



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## ABSTRACT

Several studies examine the effect of tax rates on households' labor supply decisions in attempts to account for observed differences in work hours across countries. Interestingly, these studies fail to consider a fundamental action associated with taxation: tax evasion. This paper introduces, into a general equilibrium model of household labor supply, the possibility that households can evade labor income taxes. We show that the relationship between tax-enforcement policies, the elasticity of substitution between consumption and leisure and the elasticity of substitution between formal and informal work is key to explain formal labor supply in major OECD countries. In a model without informal work, there is a positive relationship between the elasticity of substitution and the tax rate on formal income and people tend to work more. This is the case for the United States, Greece, Finland and the United Kingdom. This relationship becomes negative once informal activities are introduced and the model can explain formal labor supply better in countries where agents work relative less, i.e., in Austria, Denmark, France, Germany, Spain, Norway and Sweden. We also obtain estimates of hours worked in the informal sector for these countries.

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## 1. Introduction

A number of studies examine the effect of tax rates on households' labor supply decisions in an attempt to account for observed differences in average work hours observed across countries. Interestingly, these studies fail to consider a fundamental action associated with taxation – tax evasion. We motivate our analysis in the context of Lemieux, Fortin, and Frechette (1994) and Prescott (2004) by introducing the possibility that households can evade taxes by working in the underground economy into a general equilibrium model of household labor supply. The model is calibrated to Canadian data, and the calibrated model is used to derive the effects of tax rates and tax evasion penalties on formal work hours. We explore the relevance of informal activities and tax enforcement policies to explain differences in observed hours worked in the formal sector of Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway, Spain, Sweden, the United Kingdom and the United States.

Large differences in average market work hours are observed across OECD countries. Numerous authors such as Prescott (2004), Rogerson (2007) and Olovsson (2009) have shown that differences in tax rates can account for a substantial portion of the observed differences in hours worked. Alesina, Glaeser, and Sacerdote (2005)

argue that Europeans work much less than Americans because of labor market regulations. They note that particular unions restrict the number of hours per worker so as to sustain higher employment levels. Ohanian, Raffo, and Rogerson (2006) extend Prescott's (2004) analysis to study long-term changes in labor supply in OECD countries during the period 1956–2004 and find that wedges are much smaller in a model with taxes than in a model without taxes. Dhont and Heylen (2008) show that differences in income taxes, productive government expenditures, and nonemployment transfers are sufficient to explain why Europeans work (much) less than Americans and why some Europeans work less than others.

Within Europe, home production and government spending are potential explanations for such differences. For instance, tax distortions can be partially offset by subsidies on market goods, such as day care, that are close substitutes for home goods. Burda, Hamermesh, and Weil (2008) find that Europeans engage in 15–20% more time in home production than do Americans. Ragan (2013) presents a home production model and analyzes the implications of two policies, a subsidy on market sector home services and “workfare” transfers (publicly provided day care). Public expenditures on home goods and home production, however, are insufficient to explain the pattern of hours of market work in Scandinavian countries.<sup>1</sup>

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<sup>1</sup> Informal work refers to legal but unrecorded activities with the purpose of evading taxes. These are off-the-books, under-the-table activities that otherwise

Researchers fail to consider an important choice private agents face with taxes, namely, the choice to avoid paying them by engaging in informal work. The informal sector is often defined as a sector that emphasizes small-scale, self-financed and unskilled labor intensive economic activities. Workers employed in this sector tend to be younger, have less education, and earn less than their counterparts in the formal sector (Maloney, 1999; Pratap & Quintin, 2006; Thomas, 1992).<sup>2</sup> The presence of a substantial informal sector in developed and developing countries has been well studied and documented and informal activities is an important feature of most, if not all, OECD countries.<sup>3</sup> According to Schneider and Enste (2000), among Eurozone countries the size of the informal sector (as a proportion of GDP) varies from a low of 10% of GDP in Austria to a high of 29% in Greece. Figures for the Scandinavian countries are around 18% of their GDP.

Among other factors, the decision to evade taxes and engage in informal activities is influenced by tax enforcement policy, namely evasion penalties and detection probabilities. Different countries have different approaches regarding tax administration, enforcement and auditing procedures. OECD (2010) provides comparative data on these measures for OECD countries. Alternative combinations of tax evasion penalties and detection probabilities could be interpreted as an equilibrium outcome. For instance, countries tough on the underground economy could use both policy instruments – high penalties and more auditing. On the other hand, some countries could choose to punish harder those informal workers that are eventually caught while others would approach this problem with high inspection rates. Changes in evasion penalties relate to changes in the law at almost no cost. Differently, changes in the detection probability can be obtained only by investing more money in the auditing activity. Increased enforcement through more auditing is costly and involves a portion of tax revenues. Despite the availability of data on enforcement measures and penalties for tax evasion, obtaining a comparable measure of the probability of detection across countries is quite challenging, and we approach this issue with caution.

We argue that taxes are relevant to explain labor supply, not only because people pay them but also because people can evade them. The possibility of avoiding taxes introduces an additional margin of substitution for the household. In addition to substituting leisure for market work, agents can also substitute informal, non-taxed work for formal work. We consider the existence of an informal sector where its total factor productivity (TFP) is different than the formal sector TFP. The elasticity of substitution between consumption and leisure and the elasticity of substitution between formal and informal labor play important roles in this analysis.

The introduction of this extra margin implies that tax rates will have a large effect on the labor supply decision of households. How large of an effect depends on tax enforcement policies. In order to determine the size of the effect it is necessary to calibrate a model using estimates of tax rates, tax evasion penalties and probabilities of being caught. To proceed, we calibrate our model to the Canadian economy, making different assumptions about the two key elasticities. We then examine the implications of the model for formal

and informal time allocation in Canada and other economies that are the same in all aspects except for their tax and enforcement policies.

We find that differences in tax rates and tax enforcement policy can potentially account for observed differences in formal work hours in these countries. The elasticity of substitution between formal and informal labor plays a critical quantitative role in how formal hours change in response to changes in tax enforcement policies. We observe that, for a given elasticity of substitution between consumption and leisure, the effect of changes in formal labor supply is stronger in the presence of informal activities. Also, the effect of an increase in labor income tax is stronger the lower the elasticity of substitution of labor between formal and informal sectors. In general as the income tax rate increases, both formal and informal labor supply decrease. Since the evasion penalty is proportional to the tax evaded, an increase in taxes also increases the expected penalty for tax evasion, reducing informal hours. The formal (informal) labor supply increases (decreases) as either the detection probability or the evasion penalty increases. The effects of changes in the tax and enforcement policies are stronger for a lower elasticity of substitution between leisure and consumption.

Once the model is calibrated to Canada we address the question of how much a model with informal activities can account for the observed patterns in hours worked in major OECD countries. It is clear that a single model cannot explain the labor supply behavior in all countries. We show through this exercise that for some OECD countries this additional margin and policies are relevant, while for others they do not help explain formal labor supply. We show that the relationship between tax-enforcement policies, the elasticity of substitution between consumption and leisure and the elasticity of substitution between formal and informal work is key to explain formal labor supply in major OECD countries. More precisely, in a model without informal work, there is a positive relationship between the elasticity of substitution and the tax rate on formal income and people tend to work more. This is the case for the United States, Greece, Finland and the United Kingdom. This relationship becomes negative once informal activities are introduced and the model can explain formal labor supply better in countries where agents work relative less, i.e., in Austria, Denmark, France, Germany, Spain, Norway and Sweden.

Assuming a high elasticity of substitution between consumption and leisure, the model performs well in explaining the magnitude of formal work hours in France, Greece, Spain, Sweden, the United Kingdom and the United States. On the other hand, for a lower elasticity of substitution between leisure and consumption, the model explains more than 80% of hours worked in Denmark, Germany and Norway and almost 70% of market labor supply in Finland and Ireland. We conduct several experiments to assess the quantitative significance of particular parameters and find that the results are robust to these changes.

Our results show that a model with informal activities does relatively well in explaining the magnitudes of observed formal work hours and provides estimates of informal worked hours for a broad range of OECD countries. To the best of our knowledge, this information is not available in the literature and, thus, is a major contribution of this paper. We conclude that three elements are relevant to explain cross-country differences in hours worked in the formal sector when agents can evade taxes by working in the informal sector: tax and enforcement policies, the utility curvature parameter, and the elasticity of substitution between formal and informal labor.

The structure of the paper is as follows. Section 2 presents an informal sector model. In Section 3 the model is solved and calibrated to assess the quantitative effects of tax enforcement policies on agent's time allocation. In Section 4, we study the effects of

would imply tax collection. On the other hand, homework or home production are self-providing activities, such as child care and cleaning, done to save time and money.

<sup>2</sup> The International Labour Organization (ILO) defines the informal sector as enterprises with all or most characteristics in a list that includes "family ownership, small scale of operations and labor-intensive methods".

<sup>3</sup> See Johnson, Kaufmann, and Zoido-Lobaton (1998), Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000), Fugazza and Jacques (2003), Dessy and Pallage (2003), Busato and Chiarini (2004), Choi and Thum (2005), Antunes and Cavalcanti (2007) and Dabla-Norris, Gradstein, and Inchauste (2008).

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