3rd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and TOURISM, 26-28 November 2015, Rome, Italy

Motivation to work, labor income taxes and life satisfaction: Hungary, Estonia, Continental Europe and the United States

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Abstract

The primary findings of this paper are that the increase in hours worked per employee comes at the expense of life satisfaction, and differences in labor income taxes cannot account for differences in time allocation. Once life satisfaction is included, the hypotheses of previous neoclassical economic studies is almost irrelevant in determining the response of market hours to higher taxes. We find a negative relationship between hours worked across countries and life satisfaction. In the countries with the highest hours worked (Hungary, Estonia), leisure is generally preferred to wealth and in the lowest hours worked (France, Germany), wealth is preferred to leisure.

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Peer-review under responsibility of the Organizing Committee of BEMTUR- 2015

Keywords: motivation to work; hours worked; life satisfaction; labor income tax

1. Introduction

Recently, fervent arguments have been made in the United States and some European Union countries about taxation and labor supply. Most of the literature has focused on the impact of differences in labor market institutions. Blanchard and Summers (1986), Bentolila and Bertola (1990), and Blanchard and Jimeno (1995) have focused on the labor supply aspects of the role of institutions and labor market restrictions. However, Prescott (2002) disputes that differential taxation by itself might causes the differences in the current level of aggregate hours worked. For example, Prescott (2004) has identified the significance of tax rates in accounting for differences in labor supply for the major advanced industrial countries. Prescott's idea was defended by the statistical evidence of

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Davis and Henrekson (2003), who found that in wealthier countries a large labor supply leads to higher tax rates. Alberto et al. (2005) found that the impact of taxes on labor supply is negated by unionization management and labor market regulation. Ljungqvist and Sargent (2007, 2008a) found that unemployment benefits supplied by governments decreases the labor supply. Ohanian et al. (2008) apply Prescott's methodology to a larger sample of countries over a longer time span and conclude that much of the changing in hours worked over time and across countries can be clarified by taxes. Chen et al. (2015) contend that increases in labour taxes and unemployment benefits together explain roughly 75% of the declining labour supply in Europe relative to the United States over the past 3 decades.

This article begins with the basic facts on labor supply across countries (Hungary, Estonia, Germany, France). This paper provides an ample amount of evidence from both public finance and labor economics to draw certain conclusions. Numerous theoretical and empirical studies have identified a negative relation between tax rates (marginal and average) and work activity. However, 'work activity' is not same as 'motivation to work'. It comprises a more general explanation in comparison with work motivation. When we discuss 'work', we mean work in the market, not work overall; unpaid home production is part of ''non working time''.

Several interesting findings emerge in our paper, among them that differences in the motivation to work to tax-induced income changes are probably linked not only to the size of the labor income tax or to the characteristics of the labour market (culture, unionization, labor market regulations, generous welfare systems, unemployment compensation programs, etc.), but also to other factors that have not yet been efficiently explored. The primary finding of this section is perhaps that people who are more balanced in their approach to life are both happier and take more leisure. But a more persuasive story is that motivation to work has started to decline in Western Europe, due to high levels of life satisfaction, while in Eastern Europe motivation to work has started to increase because of low levels of life satisfaction.

The paper is organized as follows: Section 1 develops the theory; - Section 2 documents changes in hours worked, labor income tax and life satisfaction among Hungary, Estonia, France, Germany and the United States and presents quantitative findings. Section 3 concludes.

2. Theory Development and hypotheses

High tax rates and its impact on motivation to work is very broad and interdisciplinary. It draws on works from economics, accounting, psychology, and sociology. The topic is of great interest to academics, policy makers, and private-sector institutions worldwide. Because we are introducing psychological theory in addition to economic theory, this research can make a seminal contribution in the areas of taxation and economics. However, the research is not without challenges. This area has literally been researched for hundreds of years. But most of them has their own restriction. We want to fill the gap in their studies. First, neoclassical economists only state individuals as rational agents who seek utility and maximal pleasure from their economic activities. Calibrations and numerical experiments (steady-state analyses) are used to test their predictions. Most of them are using coefficient values for analyisng the validity of their hypotheses, which is not fit to the real-economy parameters.

But, Veblen (1934) in his theory of the leisure class, he comprehended individauls as irrational, economic agents who follow up social status the prestige natural to a place in society with little regard to their own satisfaction. Especially, Veblen (1934) critised contemporary (19th-century) economic theoris, and indicated that economists should take account of how individuals behave, socially and culturally, rather than rely upon the abstractions of theoretic deduction to explain the economic behaviour of society (Veblen, 1934). Second, in the national tax debate, many ignore the effect of taxes on human motivation (Lowell Harris, 1985). But we know from Maslow's Hierarchy of Needs that one must satisfy lower level basic needs before progressing on to meet higher level growth needs (Maslow, 1943). Once these needs have been reasonably satisfied one may be able to reach the highest level called self-actualization. That is why, both of these theories are appealing in determining the differences of hours worked between these countries.

Following from the above discussion, it is hypothesized that:

H1.Even if labor income tax is the same between the highest hours worked countries and the lowest hours worked countries, there is a significant negative association between motivation to work and life satisfaction.

3. Data: Motivation to work, taxes and life satisfaction across countries

This section presents some data on hours worked and labor tax rates across countries. It then includes life satisfaction numbers to assess the true relationship between hours worked and labor tax rates from different perspective. That is why, this paper will focus on the role of those three factors in determining wheter tax story or life satisfaction can credibly account for the magnitude of the differences of hours worked between these countries.

3.1. Data on hours worked

The main goal of our article to investigate which policy can help clarify the employee's motivation. Employee's motivation will be measured with the aggregate hours of work. For our example countires, the measure of aggregate hours of work will be the product of two numbers: civilian employment and annual hours of work per person in employment which Ohanian et al. (2007) used this methods in their previous research as well. The employment and the hours data is taken from the OECD Labor Statistics Database. The sample of countries includes: France, Germany, Hungary, Estonia and United States. When we conduct our statistical analysis, the country sample reduce to 5 countries because we measure only differences among the highest hours worked countries (Hungary, Estonia) and the lowest hours worked countries (France, Germany). It is important to note that the hours data are meant to include differences in vacation and statutory holidays, as well as differences in workweek (Rogerson, 2008). Therefore, we should add that our statistics should be normalized by the size of the population aged 15-65. Because, these five countries differ in population size. The logic for this normalization is caused by two considerations related to our sample of countries. One reason is that individuals under 15 are full-time students and the second reason is individuals over the age of 65 are retired from market work. For measuring employee's motivation the aggregate hours of work will be calculated for all of these countries and for the period 2000-2013. To simplify comparisons, we report all values relative to the US in 2000-2013. Table one indicates the resulting distribution of relative hours of work across countries.

Table 1.Hours worked relative to the US in, 2000-2013

< .8	≥ 1.00
France (.74) Germany (.76)	Hungary (1.10) Estonia (1.09)

Table 1 divulges that there are considerable differences in hours of work across these four countries, with the lowest hours worked countries (France, Germany) working around more than 25% less than its counterparts in the US and the highest hours worked countries (Hungary, Estonia) working around more than 10% more than its counterparts in the US.

3.2. Calculating average tax rates on labor income

We know from previous studies that in the neo-classical growth model general taxes in economy are divided into four category of taxes: 1) consumption tax; 2) investment tax; 3) capital tax and 4) labor income tax. The calculation of tax rate provided in this paper is only related to labor income. To be more precise, we shall concentrate on taxes on labor income paid by individuals. Another three taxes will be excluded from our research. Because, in our investigation we want to focus on average labor income tax rate and its impact on aggregate hours of work. Because, individuals reduce their labor supply significantly more in response to an income tax than to an equivalent consumption tax Blumkin et al. (2012).

Here, this question can be raised among the readers 'why we are using average labor tax '. Because, according to economic theory, income taxes affect the incentives to supply labor by lowering the real wage (Ohanian et al., 2008). On the other hand, using labor income tax for macroeconomic models is necessary to measure the general effect of total tax rates (tax on wage income, tax on capital income, tax on consumption and etc.) on the people's motivation to work. But collecting data to measure total tax rates is not easy. Therefore, we used labor tax rates for labor income which this type of measure in taxes has been developed by McDaniel (2007). Because, tax systems often include different forms of taxation affecting the same tax base. On the other hand, difficulty and diversity of

tax exemptions, deductions and credits complicate the situation for scientists to estimate the actual tax burden from information on statutory tax rates. It is obvious that to produce time-series and cross-country samples of tax rates are severely limited by data availability. That is why, this paper proposes a utilization of three most widely used methods:

1) One of them is called as an effective tax rate. Mendoza et al. (1994) computed the time series of effective tax rates on consumption, capital income and labor income. They measured these tax rates for G7 countries using information from publicly available data sources. Mendoza et al. (1994) provide a method for calculating average tax rates that does not rely on data from individual tax returns or taxes paid by income bracket.

2) Prescott (2004) modifies the procedure of Mendoza et al for producing the effective marginal tax rate on labor income

3) McDaniel (2007) produced series for effective average tax rates on labor income which indicates taxes levied on labor income, payroll and consumption for 15 OECD countries from the mid of 1950s through the early 2000s. She found that the effective average labor tax is around 30% in the highest hours worked countries, while it is around 50% in the lowest hours worked countries.

There are some differences in details among these three methodologies and McDaniel's work modifies the previous estimates of average tax rates across countries by Mendoza et al (1994) and Prescott (2004). To obtain a correspondence from the actual tax systems to the taxes in the model, we use the method of McDaniel (2007).

Table 2 displays all tax revenues, domestic income, and private expenditures from OECD National Accounts Volume to calculate tax rates from 2000-2013.

Table 2: SNA 2000-2013 National Account Data

GDP	Gross Domestic Product
TPI	Taxes on production and imports
Sub	Subsidies
HHT_L	(hh) Taxes on income and profits
SS	(gov) Actual Social contributions, receivable

Source: McDaniel (2007) Note: 'hh' denotes a value comes from the houshold accounts and 'gov' from the government accounts

So the average tax rate on labor income τ^h is then obtained as

$$\tau^h = \frac{SS + HHT_L}{(1-\theta)(GDP - (TPI - Sub))} \tag{1}$$

We set $1-\theta = 0.7$. Because, Gollin (2002) found further evidence for this labor share and it is roughly constant over countries, in the range of 0.65 and 0.80. Following McDaniel (2007), we found that the effective average labor tax in the highest hours worked countries (Hungary, Estonia) and the lowest hours worked countries (France, Germany) is around 35-40 %, while the same rate is around 20-25% in the US (more information see Appendix A). If we can see that average labor tax rates is the same for both the highest and lowest hours worked countries, then this question can be raised: 'What is the key factor that can account for the differences in hours work, if it is not labor tax? '. In the next section, we make an attempt at shedding some light on this question using data on life satisfaction.

3.3. Isn't a life satisfaction is great thing?

Life satisfaction measures how people evaluate their life as a whole rather than their current feelings. When asked to rate their general satisfaction with life on a scale from 0 to 10, people across the OECD gave it a 6.6 grade**.** Life satisfaction is not evenly shared across the OECD however. Some countries – Estonia, Hungary– have a

relatively low level of overall life satisfaction, with average scores of less than 5.6**.** At the other end of the scale, scores reach 7-7,5 in Germany, France**.** There is almost no difference in life satisfaction levels between men and women across OECD countries. Life satisfaction numbers are means taken from Eurobarometer data. These data show a significant effect of hours worked on happinies in the 2013 survey: fewer hours worked is associated with more life satisfaction.

4. Model

To estimate responsiveness of hours worked per employee to the life satisfaction and labor income tax, we employ firstly impulse response analysis based on unrestricted Vector Autoregressive (VAR) model and secondly panel multiply linear regression model.

Here, $HOURS_{WORKED_t}$, SAT_{INDEX_t}, and $LABOR_{TAX_t}$ denote hours worked per employee, life satisfaction index, and labor income tax, respectively at t time period. $DUMMY$ is a binary variable takes the value 1 for the observations from the countries with low working hours (Germany and French), and 0 for those of the countries with high working hours (Hungary, and Estonia). $X_{i,t}$ covers all institutional variables (*benefit replacement rates, unemployment benefit duration, net union density, and employment protection*) added to the model to control such effects. Institutional variables used in our regressions are taken from Institutional Comparisons (DICE Database) (more information, see Appendix B).
ε_t and ϑ_t are the error terms.

5. Empirical results and interpretation

Based on the estimation results, impulse response simulations are reported in figure 1. Simulations reveals no response in hours worked per employee to the one standard deviation in labor income tax. However, the dependent variable is responsive to the life satisfaction index. There is negative impact of one standard deviation in life satisfaction index over the hours worked per employee. Both findings support our arguments.
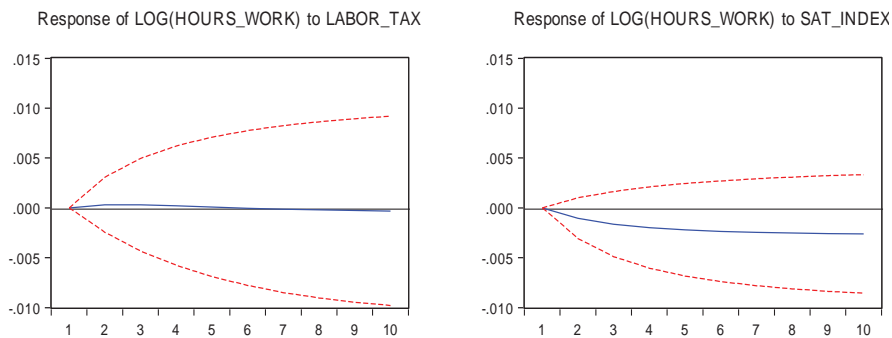

Figure 1: Impulse-response simulations

Estimation of panel multiply linear regression model also reveals similar findings. Estimated equation is presented as below where numbers in brackets are the t-statistic values for the corresponding coefficient.

$$Log\left(HOURS_{WORKED_t}\right) = 7.3052 + 0.0889 * SAT_{INDEX_t} - 0.1186 * SAT_{INDEX_t} * DUMMY +$$
$$+ 0.2248 * LABOR_{TAX_t} + 0.6037 * LABOR_{TAX_t} - 0.5111 * Log(rates_t) - 0.0064 * Log(duration_t) + \quad (2)$$
$$+ 0.0286 * Log(density_t) - 0.0137 * Log(protection_t)$$

Equation (2) provides useful findings reveal the direction and significance of the relationship from independent variables to the hours worked per employee. Due to space limitation, we will interpret only coefficients representing the impact of life satisfaction index, and labor income tax. According to the model results, life satisfaction has statistically significant and positive impact over hours worked per employee in countries with high working hours while it is statistically significant and negative for the countries with low working hours. In other words, 1 point higher life satisfaction index increases hours worked per employee 8.89% in countries with high working hours and decreases 2.71% ((0.1186-0.0889)*100%) in countries with low working hours. Although the coefficient of labor income tax is economically significant representing the relationship in countries with high working hours, it is not statistically significant at conventionally adopted significance levels (1%, 5%, and 10%). However, impact difference in countries with low working hours compared with the other group is large and statistically significant. Nevertheless, it can be concluded that increasing labor income tax increase motivation of employees to work more, and this motivation effect is considerable higher in in countries with low working hours.

6. Conclusion

In this article, we argue that empirical approach to the tax–work motivation relationship that takes into account the distinction between the highest hours worked countries and the lowest hours worked countries helps to generate significant insights.To prove this argument, we constructed both impulse response analysis based on unrestricted Vector Autoregressive (VAR) model and panel multiply linear regression model in which countries with high working hours and low working hours enter as separate factors into the process. The econometric model was estimated and tested for four countries (Hungary, Estonia, Germany and France) over the period 2000–2013. The primary points from these models can be summarized as follows. Increases in the life satisfaction exert negative effects on working hours in countries with low working hours, while it has positive effects on working hours in countries with high working hours.

Acknowledgements

Appendix A. Table 3: Average Tax on Labor, τ^h

	Estonia	France	Germany	Hungary	United States
2000	0.359	0.363	0.385	0.390	0.239
2001	0.362	0.360	0.380	0.374	0.237
2002	0.356	0.354	0.379	0.370	0.215
2003	0.355	0.356	0.379	0.368	0.205
2004	0.358	0.363	0.381	0.365	0.238
2005	0.363	0.361	0.380	0.386	0.236
2006	0.358	0.355	0.383	0.384	0.215
2007	0.360	0.354	0.382	0.382	0.210
2008	0.359	0.361	0.385	0.390	0.240
2009	0.364	0.360	0.382	0.388	0.242
2010	0.358	0.359	0.381	0.380	0.239
2011	0.361	0.357	0.379	0.383	0.243
2012	0.359	0.362	0.388	0.396	0.241
2013	0.363	0.360	0.386	0.388	0.238

Appendix B. Table 4. Institutional variables

• Employment protection. This variable is higher the stricter the employment protection legislation, with range {0, 2}.
• Net union density. This variable measures the fraction of workers that were union members over the sample period covered.
• Benefit replacement rates. This variable measures the percentage of (average before tax) earnings covered through unemployment and social insurance programs.
• Benefit duration. This variable is a proxy for the duration of unemployment benefit specified above. A value of zero indicates that the unemployment benefit provision stops within the first year. A value of one indicates that unemployed receive the amount defined in BRR for five years.

Source: Author's own elaboration based on: (Ohanian et al., 2008)

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