

## **A cross-country comparison of the personal income tax systems progressivity**

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**Abstract.** *This paper focuses on four European Union member states: Romania, Italy, France and the United Kingdom to provide a cross-country comparison for the year 2012, regarding the progressivity of personal income tax systems. By making use of the information available in the OECD dataset and OECD's Taxing Wages framework and on the basis of the tax rules in place were computed average personal income tax rates, average tax wedges and marginal tax wedges in order to measure the tax progressivity of wage earners at different wage levels and for different families types. The analysis performed reveals the fact that for families with children the United Kingdom has the highest rate of progressivity while for a single taxpayer with no children who gets an average wage, the total tax burden as a percentage of the total cost of labor is the highest in France (50.2%), followed by Italy (47.6%), Romania (44.4%) and the United Kingdom (32.3%).*

**Keywords:** personal income tax, tax progressivity, average tax wedge, marginal tax wedge.

**JEL Classification:** H24.

**REL Classification:** 8K.

## **Introduction**

Taxes have the capacity of equalizing the disposable income so they have a redistributive role by changing the income inequality. According to Pfingsten (1988) three properties are required to prove this result: each tax liability is less than the corresponding pre-tax income, taxation does not reverse ranks on the income scale, and inequality is reduced if a rich gives to a poor such that they do not interchange their ranks. The redistributive effect of taxes is given by the degree of progressivity and by the tax level measured through the average tax rate. A progressive tax system is defined by an increase in the average tax rate with income or by a marginal tax rate higher than the average tax rate at a particular income level. A proportional tax system is characterized by constant average tax rate while for a regressive tax system the average tax rate reduces with the income.

The progressivity of the taxes on wage earnings is determined by the personal income tax (PIT) system features such as the statutory PIT rate schedule (number and width of the tax brackets, the gap between the top and bottom tax rate), the PIT related tax advantages (deductions, allowances, exemptions and credits dependent on the level of income and/or specific family characteristics – the number of children, a dependent spouse, etc.) but also by social security contributions (SSCs) borne on both employee and employer.

## **Literature review**

Tax progressivity of the income tax system was highly debated by policymakers in their discussions on tax reform proposals but also by researchers since was associated to income inequality considerations and behavioural distorting responses such as labor supply.

In the public finance literature (Mirrlees, 1971) it is mentioned that the personal income tax structures should be designed in a manner that balance efficiency (taxes that are not distorting people's decisions such as their productivity response, tax evasion/avoidance response or adjustments in terms of their in efforts, occupational mobility, job reallocation, investment etc.) with equity (vertical equity being done through some tax advantages which are distorting). But in such a case in which the concept of efficiency puts doubt on equity requirements was brought the tax evasion problem. Thus, even if a higher level of tax progressivity reduces income inequality, in the presence of tax evasion both efficiency and equity could be diminished as a result of increased progressivity.

Gorodnichenko, Martinez-Vazquez and Sabirianova Peter (2009) offered evidence on the taxpayers' response to tax changes and reported an increase in reported income due to an improvement in tax compliance of households in the upper tax brackets. Moreover, those taxpayers situated in the upper tail of the income distribution are more aggressive by engaging in tax avoidance/evasion activities (Feldstein, 1995), so they have a higher sensitivity to changes in the PIT schedule.

Furthermore, Ferede (2013) concluded that a reduction in the marginal personal income tax rate that lowers the degree of tax progressivity encourages self-employment.

Duncan and Sabirianova Peter (2012) reported that a change in progressivity at the top of the tax schedule is more effective in reducing income inequality than a change in progressivity at the bottom of the income scale.

Musgrave and Thin (1948) classified the progressivity indicators into two classes: structural progressivity indicators, computed according to the statutory tax rate schedule and effective progressivity indicators: Gini index which measures before- and after-tax inequality. The former category of indicators are considered to be biased because omit the non-standard allowances, assess progressivity of one tax in isolation without considering the influences of other taxes on it and do not account for the number of taxpayers who actually face the different tax rates (are based on information about before-tax income distribution) while the second category are requiring information on both the before- and after-tax income distribution, being most appropriate for calculating a tax system's overall progressivity (Paturot et al., 2013).

### **Research methodology**

This study uses data collected from the OECD database which are computed using the OECD's Taxing Wages framework in order to estimate the progressivity of the wage income for the principal earner of the family for four family types (one earner without children, one earner with 2 children, one-earner married couple without children, one-earner married couple with 2 children) for which the wage income takes values between a range of 50% to 250% of the respective country's average wage. The analysed countries are: Romania, Italy, France and the United Kingdom and the year of reference is 2012.

Because the scope of the paper is to measure the progressivity of taxes on wage earnings along the income scale it was chosen a structural progressivity indicator to be computed.

The statutory progressivity of the personal income taxes paid by wage earners is reflected by the average rate of personal income tax (amount of income tax payable after accounting for any reliefs, divided by gross wage earning) and average tax wedges (the proportion of total labour costs that is taken in tax and social security contributions net of cash benefits).

In addition to the progressivity of the personal income tax system, the average tax wedge progression also takes into account the impact of employee and employer social security contributions.

Besides the tax rate thresholds, the average rate of personal income tax was computed taking into account the standard deductions, basic personal allowances, tax credits, tax exemptions and other tax related provisions.

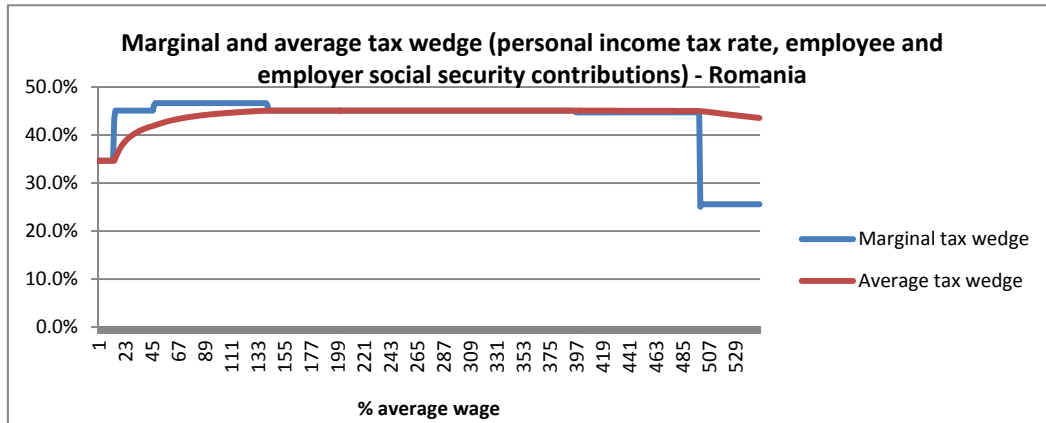
The average tax wedge progressivity is computed for 7 income intervals, which are defined as intervals between two multiples of the average wage, starting from the first (bottom) interval: 50-67% of the average wage until the seventh (top) interval: 233-250% of the average wage; each wage interval equals 33 per cent of the average wage with 2 exception for the bottom and the top interval.

## Results

The personal income tax (PIT) schedule is a complex mix of different components: the rate structure, deductions (social insurance contributions or earnings-related deductions, important in France and Romania), allowances (e.g. in the UK for old age and family policy), exemptions (social assistance and minimum income etc., more important in Italy, UK), tax credits (family policy and old age provisions).

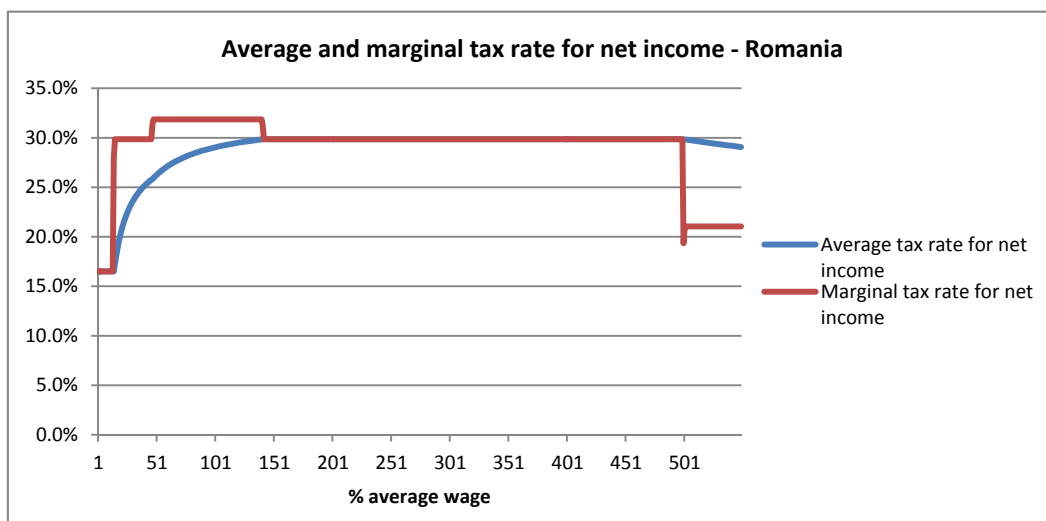
In Romania the marginal and average tax rate for the total burden of labor (income tax, employee and employer contributions) (Figure 1) is the same, 44.7% for a wage between 150-500% of the average wage, then, after this value, the average rate reduces in a small extent while the marginal tax rate drops significantly to 25.6%. Up to 141% of the average wage the marginal tax rate is above the average tax rate. The same trend (Figure 2) is exhibited in the case of the average and marginal tax rate of net income but the percentages are much lower: from a minimum of 16.5% for low income up to a maximum of 31.9% for incomes between 50-150 % of the average wage, then to drop to 21% for income in excess of five times the average wage.

**Figure 1**



**Source:** own calculations according to the OECD’s Taxing Wages framework and Romanian Tax Code provisions.

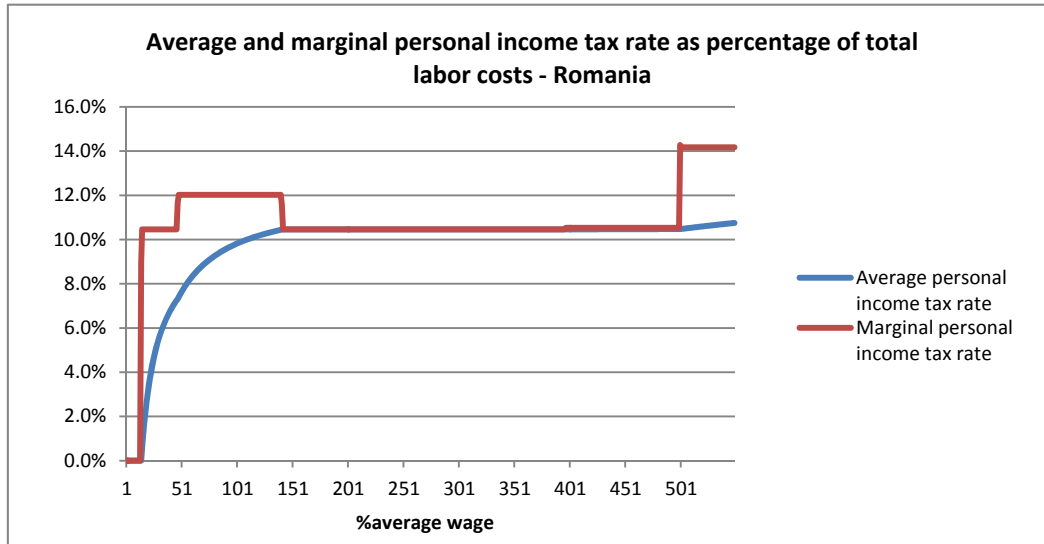
**Figure 2**



**Source:** own calculations according to the OECD’s Taxing Wages framework and Romanian Tax Code provisions.

In terms of the average personal income tax rate and marginal personal income tax rate as a percentage of total labor costs, the trend is similar to those rates mentioned above except for an income of more than five times the average wage for which the marginal personal income tax rate (14.2%) significantly exceeds the average tax rate of 10.5% (Figure 3).

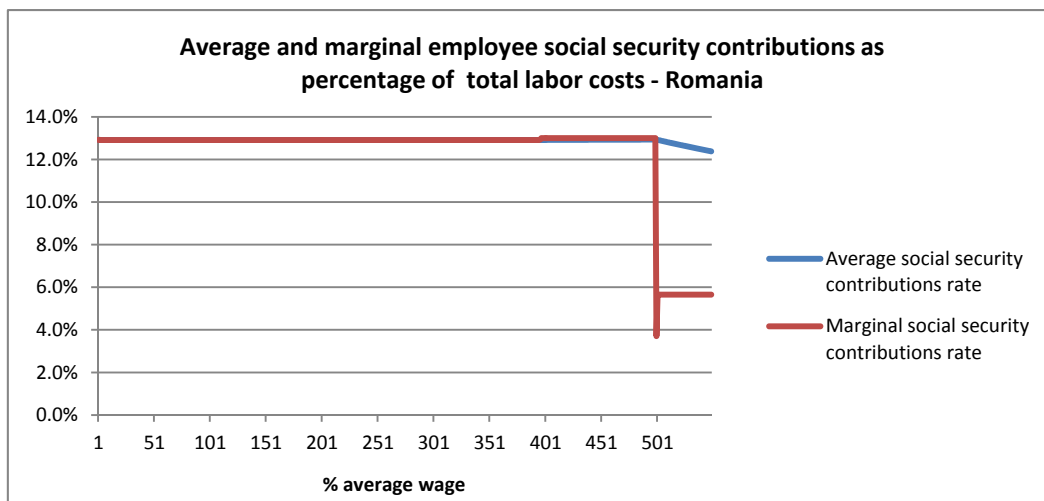
Figure 3



**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

The average employee social security contributions rate as a percentage of total labor costs is the same to marginal employee social security contributions rate as a percentage of labor costs until the marginal employee social security contributions rate drops sharply for those wages above five times the average wage, reaching up to 3.7% due to the upper limit of the pension insurance contributions (Figure 4).

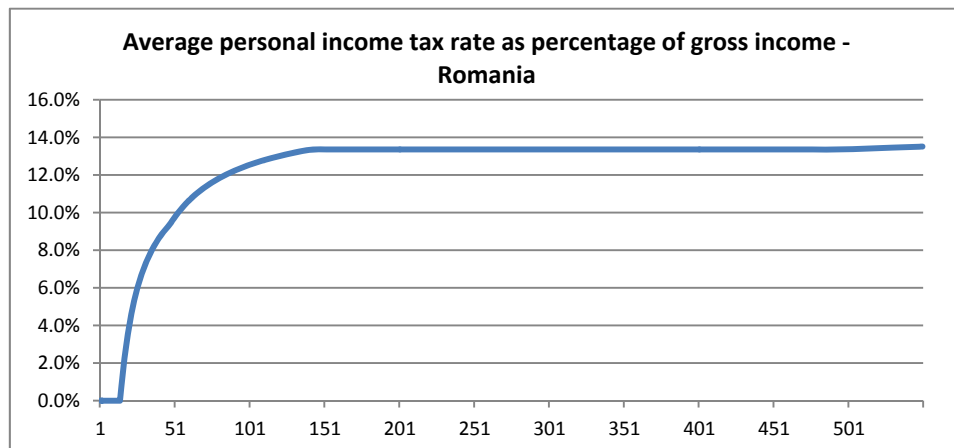
Figure 4



**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

The average rate of income tax as a percentage of gross income, the average and marginal personal income tax rate as a percentage of total labor costs are lower than the statutory personal income tax rate of 16% (Figure 3 and Figure 5).

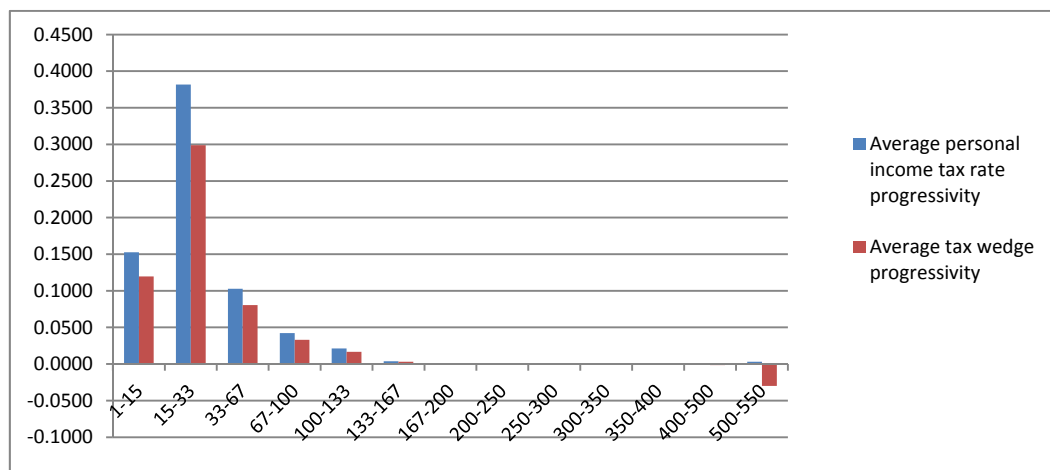
**Figure 5**



**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

The progressivity of the average personal income tax rate and average tax burden (Figure 6) is highest for the first level of income distribution, for those with incomes between 15-33% of the average wage and then decreases until it becomes 0 for wages between 167- 200% of the average wage. The progressivity of the average tax burden is negative for wages starting from 350% of the average wage.

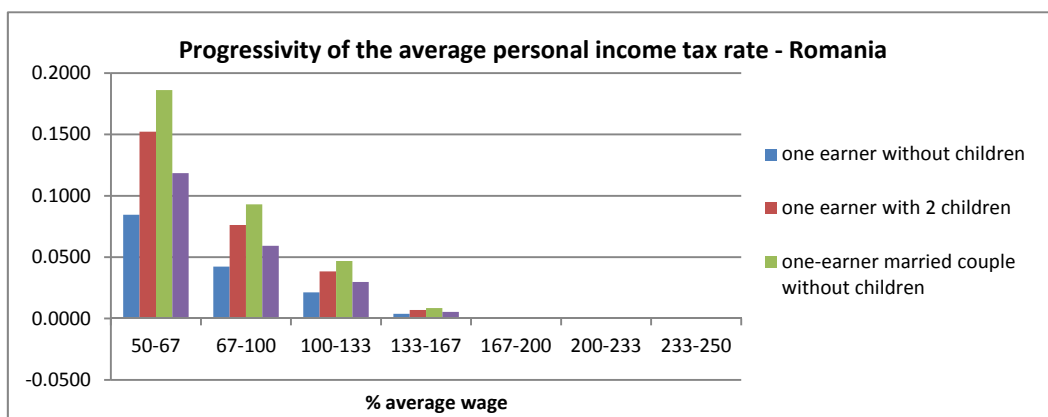
**Figure 6**



**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

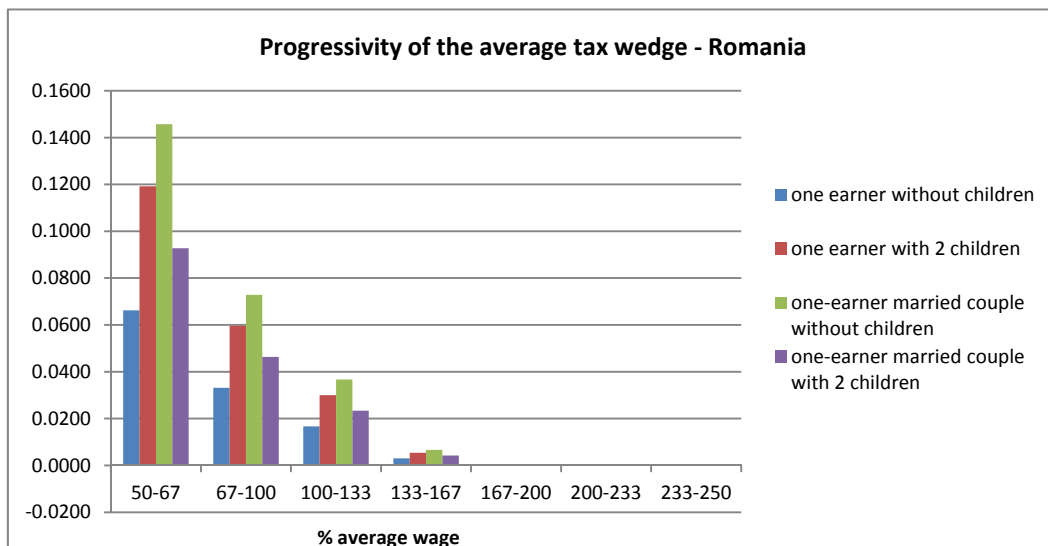
The average personal income tax rate progressivity (Figure 7) and the average tax burden progressivity (Figure 8) are highest for a one earner married couple without children who gets an income between 50-67% of the average wage (an increase in the average income tax rate of 3.16 percentage points for each percentage point of growth in the average wage for an income range between 50-67% of the average wage and an increase in the average tax burden of 2.47 percentage points) followed by single taxpayer with two children.

**Figure 7**



**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.

**Figure 8**

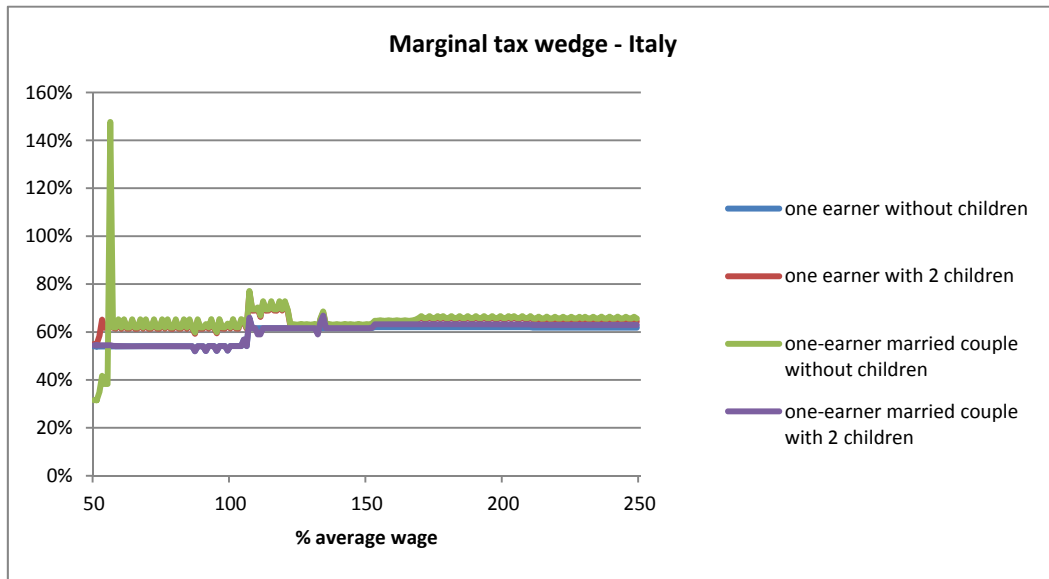


**Source:** own calculations according to the OECD's Taxing Wages framework and Romanian Tax Code provisions.



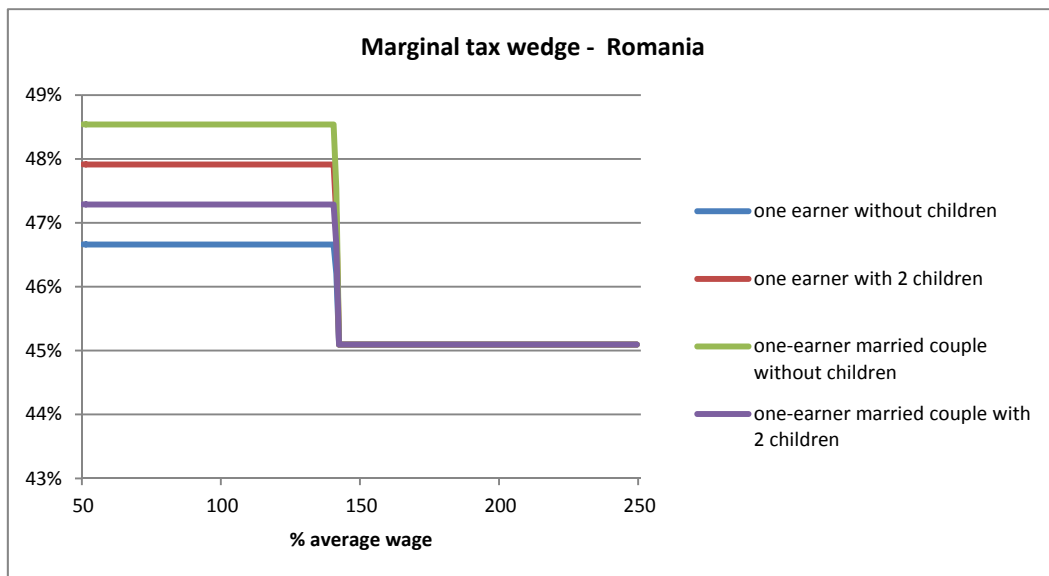
Regarding the marginal tax wedge for the analysed countries (Figures 9, 10, 11, 12), in Italy, the marginal tax wedge can reach 140% for one earner married couple without children with a low income (Figure 9).

**Figure 9**



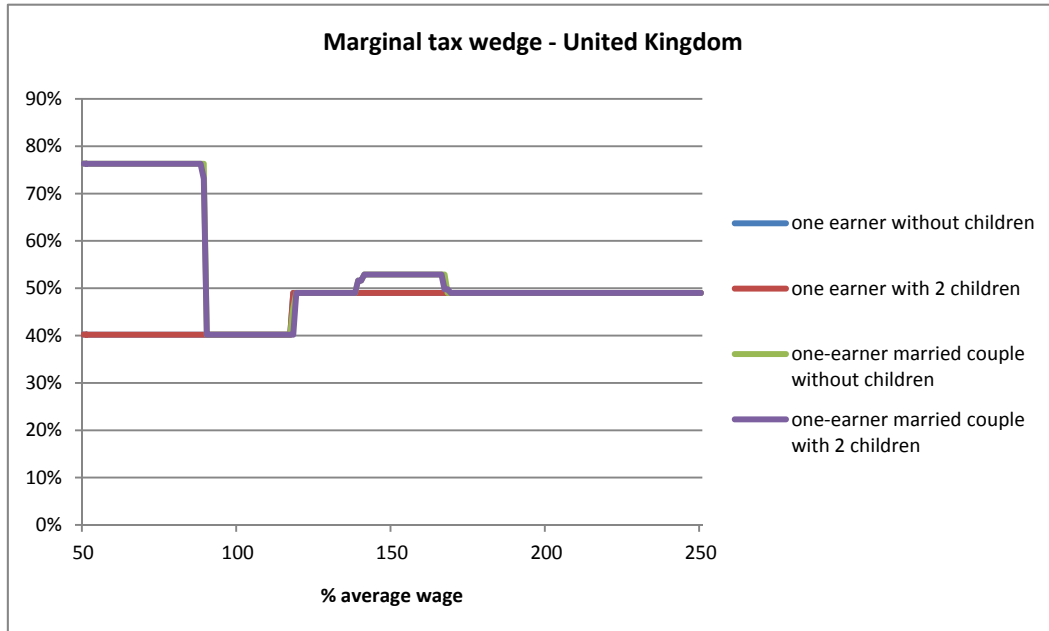
Source: OECD’s Taxing Wages (2012).

**Figure 10**



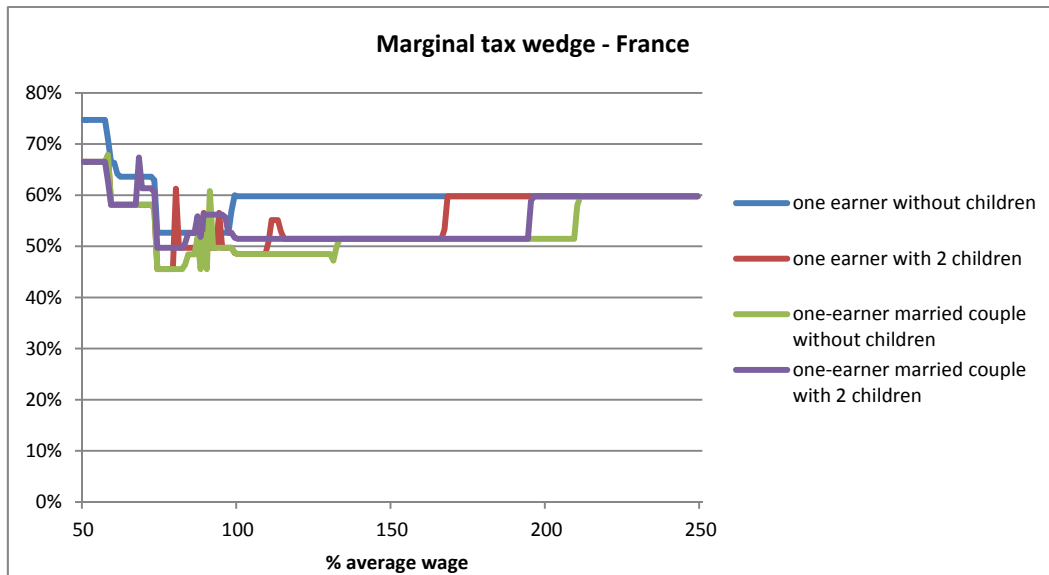
Source: own calculations according to the OECD’s Taxing Wages framework and Romanian Tax Code provisions.

Figure 11



Source: OECD's Taxing Wages (2012).

Figure 12



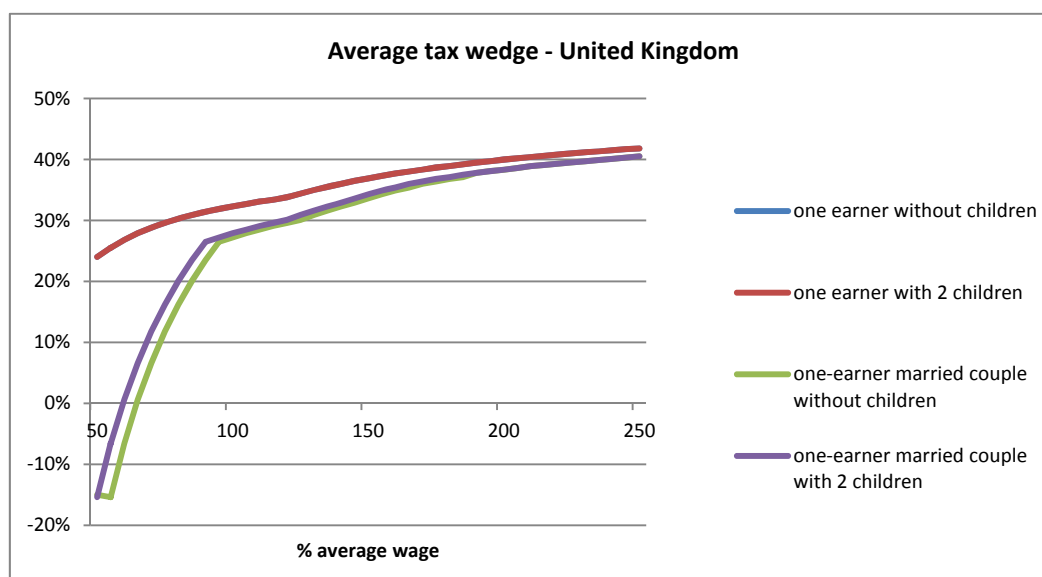
Source: OECD's Taxing Wages (2012).

Negative average tax wedge for some income brackets (low income) are exhibited by the United Kingdom due to work related tax credits and basic allowances. (Figure 13)

Also, for families with children, the United Kingdom has the highest rate of progressivity. Although progressivity tends to be the same for couples with one earner, sometimes the tax system is more progressive for married couples as a result of the deduction for dependent spouses (United Kingdom), but progressivity may decrease if the taxable income can be transferred from the earner to her/his husband/wife.

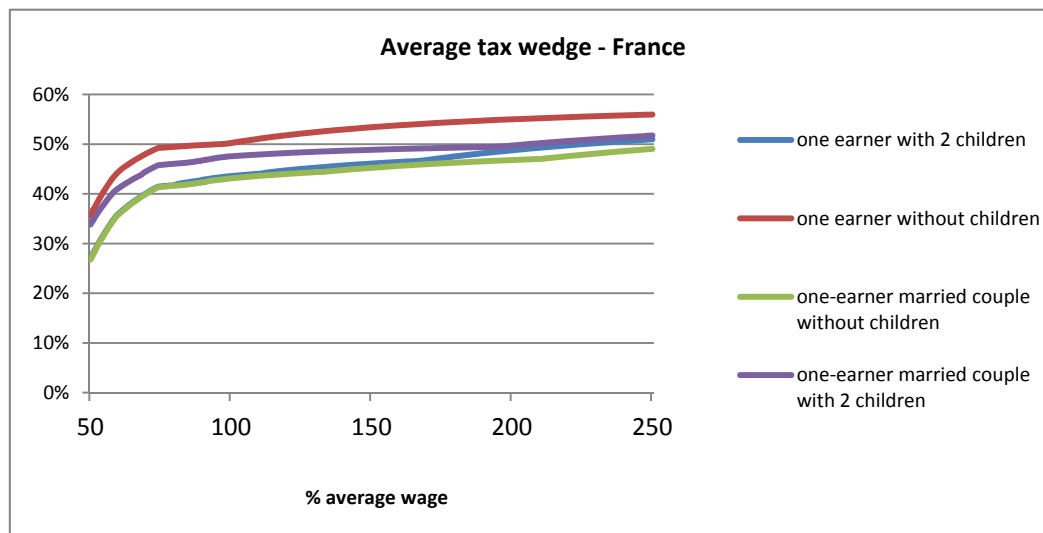
In conclusion, for a single taxpayer with no children who gets an average wage, the total tax burden as a percentage of the total cost of labor is the highest in France (50.2%) (Figure 14), followed by Italy (47.6%), Romania (44.4%) and the United Kingdom (32.3%) (Figure 13).

**Figure 13**



Source: OECD's Taxing Wages (2012).

Figure 14



Source: OECD's Taxing Wages (2012).

## Conclusions

The analysis performed on four European Union member states: Romania, Italy, France and the United Kingdom, for the year 2012, sets out the scene on the level of tax progressivity for the income taxes paid by wage earners of these countries as it was reflected by the average effective income tax rates and tax wedges (which also include employers and employees' social security contributions) computed using the OECD's Taxing Wages framework.

While marginal rates may be higher, lower or equal to the statutory rates for different income levels, the average PIT rates are usually lower than the statutory PIT rates (for a single taxpayer with an average income) as a result of basic personal deductions or tax credits.

Thresholds with zero tax rates, personal deductions and tax credits contribute to the progressivity of the tax system as the value of the tax relief they provide as a percentage of income decreases as income increases which implies an increase in the average PIT rates.

The PIT systems exhibit a progressive structure even for flat tax systems, as is the case of Romania, as a fact that various tax advantages in the forms of deductions, allowances, exemptions or tax credits borne a gap between the taxable and gross income.

Even when the flat tax is levied at a low rate, the overall effective rate of tax on labor income may be quite high – and this needs to be a significant policy concern.

For families with children the United Kingdom has the highest rate of progressivity. Although progressivity tends to be the same for couples with one earner and one single earner without children, sometimes the tax system is more progressive for married couples as a result of the deduction for dependent spouses (United Kingdom).

A tax system that levies taxpayers at an individual level and not at household level (such is the case of France) can decrease the progressivity of the tax system.

Social security contributions diminish progressivity of the tax system because mostly they are applied at fixed rate or proportional rate and there are no exceptions for those with low incomes (or thresholds are lower than for income tax). Often are set caps for social security contributions which result in a higher tax burden for low-income taxpayers compared to those with high income. Moreover, the tax system could become regressive when the social security contributions ceiling has been reached.

There is no optimum regarding the progressivity level of income taxes because taxpayers present a high elasticity in terms of labour supply and achieving an equity-efficiency trade-off could threaten also the social welfare function.

But according to the Europe 2020 Strategy “Member States should seek to shift the tax burden from labour to energy and environmental taxes”, because those that support the highest degree of progressivity are low income and second income earners. Thus, lower income earners should be protected by limiting their wage tax burden through an increase in personal allowances/deductions.

Further research should take into consideration a broader interval of time and other types of families to measure their progressivity in order to establish if whether multi-earner families are any better off than single earner families after taxes.

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**References**

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- Bengtsson, N., Bertil, H., Waldenström, D. (2012). "Lifetime versus Annual Tax Progressivity: Sweden, 1968-2009", *IZA DP* 6641
- Duncan, D., Sabirianova Peter, K. (2012). "Unequal Inequalities: Do Progressive Taxes Reduce Income Inequality?", *IZA DP* No. 6910
- Feldstein, M. (1995). "The Effect of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act", *Journal of Political Economy*, 103(3), pp. 551-572
- Ferede, E. (2013). "Tax progressivity and self-employment: evidence from Canadian provinces", *Small Business Economics*, 40, pp. 141-153
- Gorodnichenko, Y., Martinez-Vazquez, J., Sabirianova Peter, K. (2009). "Myth and Reality of Flat Tax Reform: Micro Estimates of Tax Evasion Response and Welfare Effects in Russia", *Journal of Political Economy*, 117(3), pp. 504-554
- Mirrlees, J.A. (1971). "An Exploration in the Theory of Optimum Income Taxation", *Review of Economic Studies*, 38(114), pp. 17-208
- Musgrave, R., Thin, T. (1948). "Income Tax Progression, 1929-48", *Journal of Political Economy*, 56(6), pp. 498-514
- Paturot, D., Mellbye, K., Brys, B. (2013). "Average Personal Income Tax Rate and Tax Wedge Progression in OECD Countries", *OECD Taxation Working Papers*, No. 15, OECD Publishing
- Pfingsten, A. (1988). "Progressive taxation and redistributive taxation: Different labels for the same product?", *Social Choice and Welfare*, 5(2-3), pp. 235-246
- Sabirianova Peter, K., Buttrick, S., Duncan, D. (2010). "Global Reform of Personal Income Taxation, 1981-2005: Evidence from 189 Countries", *National Tax Journal*, 63(3), pp. 447-478
- Verbist, G., Figari, F. (2013). "The redistributive effect and progressivity of taxes revisited: An International Comparison"
- European Commission (2010). "Europe 2020 – A strategy for smart, sustainable and inclusive growth"
- OECD (2013). *Taxing Wages, 2011-2012*, OECD Publishing