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H. Xavier Jara, Katrin Gasior and Mattia Makovec

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H. Xavier Jara, Katrin Gasior and Mattia Makovec

Institute for Social and Economic Research (ISER), University of Essex

Abstract

Tax and benefit systems play an important role in determining work incentives at both, the extensive and the intensive margin of labour supply. The aim of this research note is to provide a comparative analysis of work incentives in selected EU countries. Our analysis makes use of EUROMOD and representative household microdata from nine EU countries (Belgium, Bulgaria, Germany, Italy, Lithuania, Hungary, Austria, Finland and the UK) to provide a description of the distribution of short- and long-term participation tax rates and marginal effective tax rates in 2015, for people currently in work; and to characterise individuals facing low work incentives. Our results highlight the important variation in the distribution of work incentives across our selected countries. Unemployment insurance schemes play a significant role in short-term participation tax rates, although to different extents across countries. Our analysis further highlights differences across countries in terms of the population subgroups with low incentives to work and discusses the relevance of using a relative or an absolute threshold for such definition.

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Corresponding author:

H. Xavier Jara
hxjara@essex.ac.uk

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1. Introduction

The design of tax-benefit systems plays an important role in the incentive to take up (or give up) a job and to work or earn more (or less). The first type of incentives is known as incentives at the extensive margin of labour supply, while the second is referred to as incentives at the intensive margin. At the extensive margin, the generosity and duration of unemployment insurance or social assistance benefits have often been associated with disincentives to take up work for certain population subgroups. At the intensive margin, high marginal tax rates have been discussed as factors reducing incentives to work or earn more.

For more than a decade, "making work pay" (i.e. ensuring that work is financially more attractive than depending on benefits) has come at the forefront of the policy agenda in European countries (Figari and Matsaganis, 2016). In this sense, providing a description of work incentives embedded in tax-benefit systems at the population level in Europe and identifying those groups with low work incentives is a necessary first step in order to think about potential reforms to make work pay.

Commonly used indicators of work incentives are usually based on synthetic families (see OECD, 2016). Such indicators are particularly useful to analyse the presence of unemployment or poverty traps among specific types of families. However, they do not allow us to provide a representation of the distribution of work incentives in the population, nor do they allow us to characterise which population subgroups are affected by low work incentives. The aim of this research note is to provide a comparative analysis of work incentives at the extensive and intensive margin in selected European countries, based on representative household microdata. In particular, we use EUROMOD, the EU-wide tax-benefit microsimulation model, to compare short- and long-term participation tax rates (PTR) and marginal effective tax rates (METR) in 2015 for individuals currently in work in nine European countries: Belgium, Germany, Austria, Bulgaria, Finland, Italy, Hungary, Lithuania and the UK. Our analysis further provides a description of the characteristics of individuals facing low work incentives. The focus on individuals currently in work allows us to assess, on the one hand, the potential unemployment traps workers might face in case they lose their jobs, and to consider, on the other hand, incentives at the intensive margin, which are important to identify individuals facing poverty traps while in work.

Most recent studies, making use of representative household microdata, have focused on the effect of tax-benefit systems on work incentives in single countries. Pirttillä and Selin (2011) provide a description of METRs and PTRs in Sweden over the period of 2006-2010. Decoster et al. (2015) study the effect of changes in tax-benefit systems on work incentives at the extensive and intensive margin in Belgium over the period of 1992-2012. Bartels and Pestel (2016) compute short-

and long-term PTRs in Germany over the period of 1993-2010 and assess the importance of work incentives in the decision of individuals to take up work. Navicke et al. (2016) study the effect of potential reforms to unemployment and social assistance benefits on financial incentives to work at the extensive margin in Lithuania. Recent cross country studies using microdata are, on the other hand, scarce. Studies by Immervoll et al. (2007, 2009) and O'Donoghue (2011) have, for instance, looked at work incentives across European countries but for tax-benefit rules in place in 1998. More recently, Jara and Tumino (2013) present a comparison of work incentives for the EU27, but focusing only on the intensive margin of labour supply. Finally, Collado et al. (2016) calculate the cost of reducing the poverty gap while maintaining work incentives at the extensive margin but only in three countries: Belgium, Denmark and the UK.

Our research contributes to the literature in three different ways. First, it provides an up-to-date comparative analysis of work incentives at the extensive and intensive margin for nine European countries based on representative household data. Second, we estimate both short- and long-term participation tax rates in order to highlight the extent to which the role of unemployment insurance benefits on work incentives at the extensive margin differs across our selected countries. Third, we provide a portrait of the individuals facing low work incentives at the extensive and intensive margin across countries.

The remainder of this paper is structured as follows. Section 2 discusses the methods to calculate indicators of work incentives at the extensive and intensive margin using EUROMOD based on representative microdata. Section 3 presents the results focusing on the distribution of work incentives across our selected EU countries, the composition of work incentives by income source, the variation of work incentives across different population subgroups, and a description of the characteristics of individuals facing low work incentives in each country. Finally, section 4 concludes by summarising the main findings.

2. Methodology

2.1. EUROMOD and the data

Our analysis makes use of EUROMOD, the tax-benefit microsimulation model for the European Union. EUROMOD simulates direct taxes and social insurance contributions liabilities, as well as cash benefit entitlements for the household population of all 28 EU Member States.[1] The latest microdata available for simulations in EUROMOD is used in our analysis: the 2012 European Union Statistics on Income and Living Condition (EU-SILC) for Belgium, Germany and

[1] See Sutherland and Figari (2013) for further information.

Hungary; the 2014 EU-SILC for Austria, Bulgaria, Finland, Italy and Lithuania; and the 2013/2014 Family Resources Survey (FRS) for the UK. In this study, the tax and benefit rules used are those in place on the 30th of June 2015, which we refer to as 2015 policy systems. Market income and non-simulated income components in the data have been updated to 2015 according to actual changes in prices and incomes over the relevant period. No adjustment is made for changes in population composition between 2012 and 2015.

Our choice of countries is driven by the aim of considering a variety of tax-benefit systems. The selected countries vary widely in the generosity of unemployment and social assistance benefits, which will affect incentives at the extensive margin, but also in the progressivity of income taxes and the design of social insurance contributions, which will be reflected in differences in work incentives at the intensive margin. Belgium, Germany, Finland, Austria and Bulgaria are characterised by generous unemployment insurance with a payment of around 60% of previous earnings and duration of 12 months or more. In Hungary, unemployment insurance also represents 60% of previous earnings but is paid only up to three months. The payment is lower in Lithuania, which is made of a fixed basic part plus a variable part starting at 40% of previous earnings and going down to 20% after three months. Unemployment insurance is the least generous in the UK with a flat payment between £58 and £73 per week for a duration of six months. Unemployment assistance is also available in Germany, Hungary, Austria and Finland, which can act as a top-up or complement unemployment insurance when this is exhausted, or be available for individuals who are not eligible for unemployment insurance. All our selected countries, except Italy, also provide national social assistance benefits in order to guarantee a minimum level of income to low-income households. The generosity of social assistance varies widely across our selected member states. In terms of income tax, the degree of progressivity varies across countries with only Bulgaria and Lithuania characterised by a flat-tax system. Other characteristics of the tax-benefit system will also reflect differences in work incentives across countries, such as the existence of in-work benefits (particularly important in the UK and Hungary). Finally, our selected countries also vary in terms of labour market characteristics (e.g. the share of self-employed or part-time workers), the distribution of earnings and household composition (e.g. presence of secondary earners or children), which together with the design of tax-benefit systems will affect the distribution of work incentives at the extensive and intensive margin.

EUROMOD is used to calculate work incentives at the extensive and intensive margin for individuals currently in work. As previously mentioned, the focus on individuals currently in work allows us to consider incentives at the intensive margin and to provide an insight into potential unemployment traps they might face in case they lose their jobs. At the extensive margin, Participation Tax Rates (PTR) are calculated by means of simulating transitions from work into

unemployment. Our analysis considers participation tax rates rather than net replacement rates because net replacement rates can be significantly influenced by market income of other individuals in the household, while participation tax rates allow us to abstract from such effects. Thus, participation tax rates are a useful indicator of incentives to work at the extensive margin in order to highlight the role played by the tax-benefit system in the formation of incentives to work. Moreover, our analysis provides a description of both short- and long-term PTRs in order to highlight the role played by unemployment insurance schemes in different countries. In our analysis, long-term PTRs are defined based on disposable income out of work when entitlement to unemployment insurance benefits has been exhausted. At the intensive margin, Marginal Effective Tax Rates (METR) are computed assuming a marginal increase in earnings. For both PTR and METR, it is assumed that behaviour of other household members does not change when a person becomes unemployed or when her earnings increase.

We restrict our sample of analysis to individuals with positive earnings, aged 18 to 65, excluding those in full-time education or retirement. For the purpose of our analysis, we further assume full compliance in the sense that adjustments for tax evasion and benefit non take-up are not taken into account for the calculation of work incentives. As such, the results should be interpreted as the "intended effect" of the tax and benefit system on labour market incentives. Table A1a in the appendix presents the characteristics of the samples in each country.

2.2. Calculation of Participation Tax Rates (PTR)

The participation tax rate (PTR) is an indicator of the financial incentives to start or to give up work, embedded in the tax-benefit system. As such, PTRs are an indicator of incentives at the extensive margin of labour supply. In particular, PTR can be defined as the proportion of earnings taken away by increased taxes and social insurance contributions or by reduced benefits when transitions from unemployment to work are simulated. Alternatively, PTR can also be interpreted as the proportion of earnings kept in the form of increased benefits or reduced taxes and social insurance contributions when transitions from work into unemployment are considered.

The approach used in this paper to calculate PTRs consists in moving people currently in work (employment or self-employment) in the data into unemployment and re-calculating their new disposable income by means of the microsimulation model EUROMOD, hence capturing the implications of tax and benefit systems under their new labour market status. As such, we interpret PTR as the proportion of earnings kept in the form of benefits or reduced taxes and social insurance contributions. The reason for our focus on transitions from work into unemployment is twofold. First, simulating transitions from unemployment or inactivity into work requires a number of important assumptions to be imposed in

order to recalculate disposable income in work. For instance, wages need to be imputed for non-workers but also hours of work, and in some cases industry or occupation if tax-benefit rules depend on such information. Second, focusing on those currently in work allows us to consider also incentives to work at the intensive margin for the same sample of people, which are discussed in the next section.

The effects of transitions to unemployment in our analysis are simulated in EUROMOD in the following way. First, disposable income is calculated before transition to unemployment takes place. Then, for each earner in the household in turn, individual earnings are set to zero and all benefits they would become eligible for, including unemployment insurance, are simulated with EUROMOD, as well as their corresponding household disposable income in unemployment.[2] Consider for instance the situation of a dual earner household. First, household disposable income is simulated before any transitions to unemployment take place. Then, we simulate a transition to unemployment for the first earner of the household by setting her earnings to zero, while the earnings of the second earner are held constant, and household disposable income when the first earner is unemployed is simulated. Finally, we simulate a transition to unemployment for the second earner by setting her earnings to zero, while holding the earnings of the first earner constant (i.e. re-setting the earnings of the first earner to their observed value in employment) and the household disposable income when the second earner enters unemployment is calculated.

More formally, the Participation Tax Rate for individual i in household h can be expressed as:

$$PTR_i = 1 - \frac{Y_h^W - Y_h^U}{E_i} \quad , \qquad (1)$$

where E_i represents gross earnings of individual i when she is in work, Y_h^W represents household disposable income when individual i is in work (W), and Y_h^U represent household disposable income when individual i is in unemployment (U). In case of households with multiple earners, PTRs are calculated for each earner in the household separately, assuming that behaviour of other earners and household members does not change when a person becomes unemployed.

Some assumptions are needed in order to calculate PTRs for those currently in work. In particular, the number of months in unemployment needs to be determined. Here, unemployment duration is assumed to be equal to months in work during the year before the simulated transition. This assumption is made in order to compare disposable income in and out of work over the same period of time. Additionally, in order to be able to simulate unemployment insurance

[2] Other relevant labour market variables entering the simulations are adjusted to reflect the corresponding change in their labour market situation e.g. labour market status set to unemployment, hours of work set to zero, etc.

benefits, information about contribution history is needed. Here, we exploit information available in the data and we set the number of months of contribution equal to the number of months in work before the transition, which is recorded over the last 12 months. For instance, in order to be eligible to unemployment insurance in Bulgaria, an individual is required to have contributed 9 out of 15 months, while in Germany it is required to have contributed 12 out of 24 months. In our simulations we would consider a person in the data eligible if she has worked 9 out of 12 months before transition to unemployment in Bulgaria; and 12 out of 12 months in Germany (given that month by month employment information is available for the previous year only).[3]

The role of different income sources on work incentives at the extensive margin can be described by decomposing household disposable income as the arithmetical sum of original incomes (O) (incomes before any tax and transfer), benefits and pensions (B), minus taxes (T) and social insurance contributions (S). Equation (1) can hence be rewritten as:

$$PTR_i = 1 - \frac{Y_h^W - Y_h^U}{E_i} = 1 - \left(\frac{\Delta O_h + \Delta B_h - \Delta T_h - \Delta S_h}{E_i}\right) , \qquad (2)$$

where ΔB_h represents, for instance, the difference between household benefits and pensions when individual i is in work and when individual i is in unemployment. Moreover, since the change in original incomes is equal to the change in earnings, the expression can be further rewritten as:

$$PTR_i = -\left(\frac{\Delta B_{HH} - \Delta T_{HH} - \Delta S_{HH}}{E_i}\right) = PTR_i^B + PTR_i^T + PTR_i^S \ , \qquad (3)$$

where the first component represents the increase in benefits and pensions at the household level when individual i enters unemployment, as a percentage of i's earnings; and the last two components report, respectively, the decrease in taxes and in social insurance contributions at the household level when individual i enters unemployment, as a percentage of earnings. In our analysis of PTRs, we further decompose benefits into three components: (i) unemployment benefits, including both unemployment insurance and unemployment assistance schemes; (ii) social assistance benefits, including minimum income schemes, housing benefits, etc.; and (iii) other benefits and pensions, which include family benefits, in-work benefits (such as the Working Tax Credit in the UK), disability benefits (such as health, disability and invalidity benefits) and public pensions. Decomposing benefits into unemployment, social assistance and other benefits is particularly important in the analysis of short- and long-term PTRs. The role of unemployment insurance benefits would be particularly important for short-term

[3] For those countries where the qualifying period goes beyond 12 months, for instance Lithuania where it is required to contribute 18 out of 36 months, we use information about working history since entering the labour market as an additional control.

PTR, while social assistance benefits would play a larger role in long-term PTR, after entitlement to unemployment insurance has been exhausted.

In principle, one would expect participation tax rates to range between 0 and 100 percent. While a PTR of 100 indicates a low work incentive as the income would remain the same, a PTR of 0 indicates a high work incentive. However, specific features of tax and benefit systems could result in participation tax rates taking values above 100 percent. For instance, the presence of lower limits of unemployment insurance schemes (minimum payments amounts for those satisfying the minimum required eligibility conditions) could result in disposable income in unemployment being higher than disposable income in work for low earners. Negative PTRs could be, for instance, the result of losing some type of tax credits when entering unemployment. Although participation tax rates outside the range of 0 to 100 percent are plausible, in our analysis we exclude the top percentile of the distribution of participation tax rates if the participation tax rate is above 150 percent and the lowest percentile if the participation tax rate is negative. This restriction is chosen in order to reduce the risk of our calculations being biased by "outliers", especially when we consider participation tax rates by earning quintiles and for different population subgroups.[4]

2.3. Calculation of Marginal Effective Tax Rates (METR)

The marginal effective tax rate (METR) is an indicator of the financial incentives to work more (at a given wage rate) or earn more (i.e. increase effort at a given number of hours of work). As such, METRs are a popular indicator of the incentives faced by workers on the intensive margin of labour supply. In particular, the METR measures the proportion of a marginal increase in earnings that would be taxed away due to social insurance contributions, taxes and loss of benefit entitlement.

The calculations of METRs in EUROMOD are described in detail by Jara and Tumino (2013) and use the following steps. First, household disposable income is calculated. Then, for each earner in the household, separately, individual earnings are increased by 3% and the corresponding household disposable incomes are computed.[5] METRs are therefore specific to each earner in the household. More formally, the marginal effective tax rate of individual i in household h is given by:

$$\mathrm{METR_i} = 1 - \frac{\mathrm{Y_h^1} - \mathrm{Y_h^0}}{\mathrm{E_i^1} - \mathrm{E_i^0}} \ , \qquad (4)$$

[4] A similar procedure is suggested by Jara and Tumino (2013) in their analysis of marginal effective tax rates.

[5] As such, we calculate the incentives to earn more rather than to work more, as we do not increase hours of work. The marginal increase of 3% in earnings roughly corresponds to an extra hour of work for a person working 40 hours per week (Jara and Tumino, 2013).

where the numerator measures the change in household disposable income before (Y_h^0) and after (Y_h^1) the increase in individual earnings (E_i) and the denominator is equal to the increase in earnings itself.

As in the case of PTR, the role of different income components on METR can be calculated by decomposing household disposable income as the sum of original incomes (O), benefits and pensions (B), minus taxes (T) and social insurance contributions (S). Equation (4) can be then rewritten as:

$$METR_i = 1 - \frac{\Delta Y_h}{\Delta E_i} = 1 - \left(\frac{\Delta O_h + \Delta B_h - \Delta T_h - \Delta S_h}{\Delta E_i}\right), \quad (5)$$

where now ΔB_h represents, the difference between household benefits and pensions before and after the increase in individual i's earnings. Since the change in original incomes is equal to the change in earnings, we obtain:

$$METR_i = -\left(\frac{\Delta B_h - \Delta T_h - \Delta S_h}{\Delta E_i}\right) = METR_i^B + METR_i^T + METR_i^S \ , \quad (6)$$

where the first component represents the reduction in benefits and pensions at the household level as a percentage of the earnings increase and the last two components represent the increase in taxes and social insurance contributions as a percentage of the earnings increase.

Marginal effective tax rates would also be expected to take values between 0 and 100 percent. A value of 0 means that individuals keep all of the earnings increase, while 100 means that the total increase is taken away due to higher taxation, additional social insurance contributions or the loss of benefit entitlements. However, certain aspects of tax and benefit rules could result in METRs outside this range. METRs above 100 could, for instance, be related to the loss of some benefit entitlement, which would overcome the marginal increase in earnings. Negative values of METRs could, on the other hand, arise from tax allowances or benefit entitlements paid to people with income above a given threshold. Individuals crossing the threshold after an increase in earnings would experience a larger increase in household disposable income, resulting in negative METR (Immervoll, 2004). In our calculations, we exclude the top percentile of the METR distribution if the METR is above 150% and the lowest percentile if the METR is negative, in order to reduce the risk of our results being biased by "outliers".

3. Results

This section presents results focusing on four aspects drawing from the use of microdata for the analysis of work incentives. First, the distribution of PTR and METR across the population of analysis is discussed in a cross country perspective. Then, work incentives are decomposed by three main income sources: taxes, social insurance contributions and benefits. For PTRs, the contribution of unemployment

insurance benefits is highlighted when comparing short- and long-term indicators. Third, the use of microdata is exploited to present work incentive indicators for different population subgroups and discuss their variation across countries. Finally, a portrait of people facing low work incentives at the extensive and extensive margin in each country is provided.

3.1. Distribution of PTR and METR

The distribution of short-term PTR, long-term PTR and METR are presented in figures 1, 2 and 3, respectively. The solid vertical line represents the mean of each indicator for the whole sample, while the dashed line depicts the median. In addition, tables A2, A3 and A4 in the Appendix provide information on the 25th and 75th percentiles of work incentives for each country. Figures 1, 2 and 3 reveal the advantage of using household representative data. In particular, the graphs illustrate the significant variation in the distributions of short- and long-term PTR and METR across countries.

The first part of this section focuses on short-term PTRs, namely the rates during the first year of unemployment which are presented in Table A2 in the Appendix. It shows the diversity of work incentives with the highest average rates in Belgium (80%), followed by Germany (72%), Finland (71%) as well as Austria (69%) and the lowest rates in the UK and Lithuania. In the latter two countries, the proportion of earnings that is kept in the form of increased benefits or lower taxes when an individual becomes unemployed is less than 50%. Thus, individuals have on average a higher incentive to be employed. On the other hand, rewards to work are relatively small in countries with high PTR. In Belgium for example, reduced taxes and increased benefit entitlement would mean that an employee would receive more than 80% of her earnings in case of unemployment, on average. Among the countries included in the analysis, Italy and Bulgaria comprise of PTRs that are somehow in the middle with 57% and 61%.

However, Figure 1 illustrates the importance of considering the distribution of PTRs rather than focusing on the average value only. Most tax and benefit instruments are implemented to redistribute income in one way or the other and these redistributive mechanisms most likely also influence work incentives. The kernel density functions presented highlight the extent of variation in PTRs. Overall, the national tax and benefit systems contribute to quite different distributions of PTRs. It shows that countries with relatively similar average PTRs might still have very different distributions, compare for example Belgium and Germany.

The dispersion of PTRs is narrower in Germany with substantial shares of people facing high disincentives (high PTRs). The dispersion of PTRs in Belgium is wider, with a block of relatively high PTRs rather than a peak like in other countries. The

figure shows, that half of the Belgium working age population has a PTR of 60% to 80%, and the other half of 80% to about 90%. The group of people with very high disincentives consists mainly of the low to middle income groups, while people with low disincentives (low PTRs) have on average earnings above the highest income tax bracket and the work incentive almost increases linearly with higher employment income. This is further discussed in section 3.3. Germany, on the contrary, shows quite a different distribution of PTRs and drivers of low work incentives. While the highest 5% have a PTR of 91%, the lowest only have a PTR of 37%. The dispersion shows a very high peak around the median. Thus, most working age adults have PTRs in a relatively narrow band. The median is slightly higher than the mean value which indicates a higher concentration of people with high disincentives. Like Belgium and Germany, also Austria and Finland have a Bismarkian tradition characterised by a contribution financed unemployment scheme and a social assistance scheme as the safety net of last resort (Fernandez Salgado et al., 2013). However, the average PTR and the kernel density are quite different from those in Belgium. Not only is the average PTR lower, the very high peak around the median suggests that most adults in Austria and Finland have PTRs in a relatively narrow band. While this is mostly a function of unemployment benefits in Finland, PTRs are also influenced by income tax and social insurance contributions in Austria (see section 3.2).

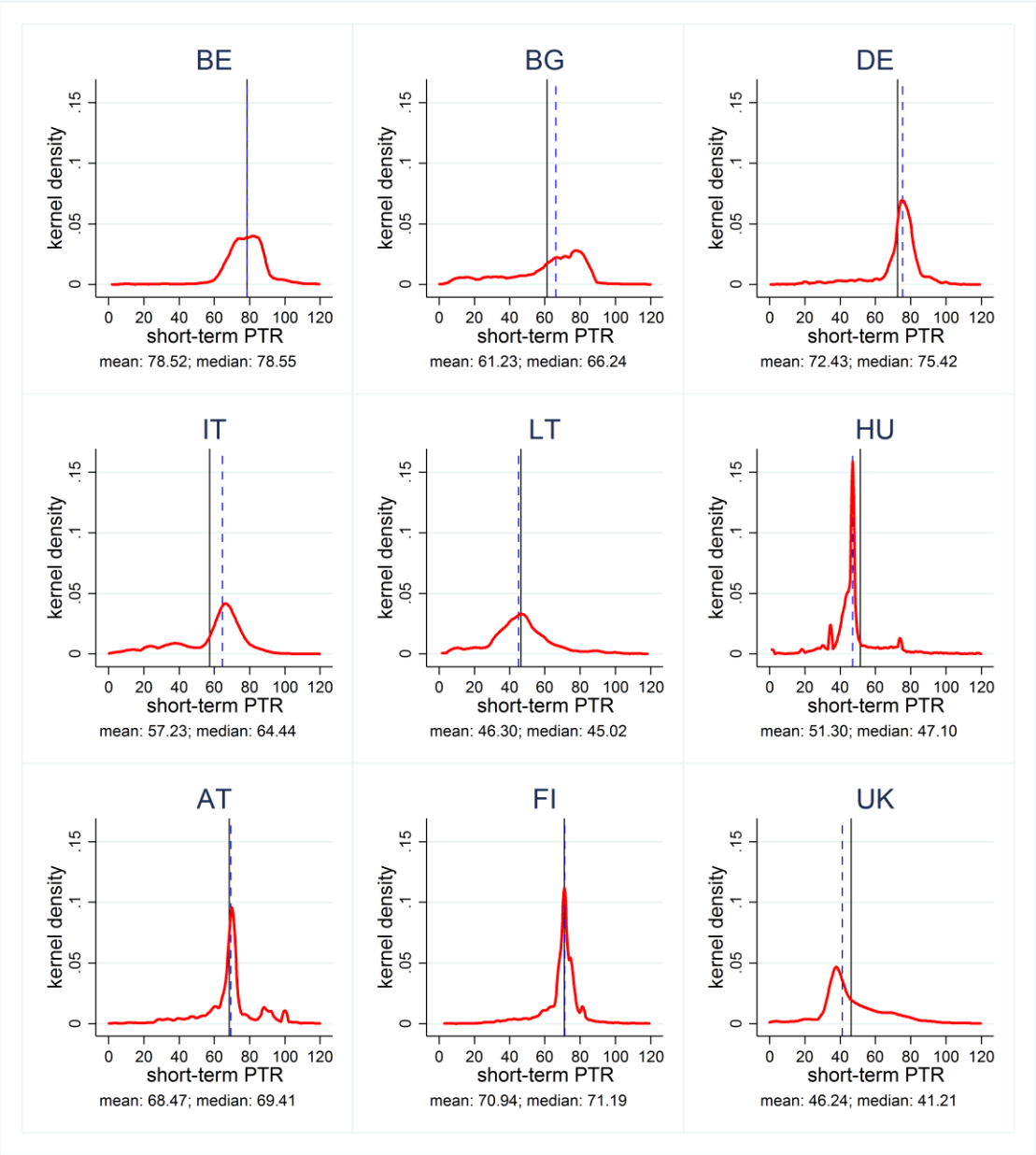
Another country group with similar low average PTRs is Hungary, Lithuania and the United Kingdom. Different from most other countries in focus, the median value is smaller than the mean value in the United Kingdom. This indicates a higher concentration of people with below average incentive to work. The same is true but to a much lesser extent in Lithuania and Hungary. The presented kernel density function of the UK shows a steep increase between 30% and 38% which is mainly due to employees' social insurance contributions and a smoother decrease till 98%. Much of this variation can be accounted by differences in the way the tax and benefit system treats people with and without children, single people and members of couples and, among those in couples, by differences between single and dual-earner households. Thus, the variation is to a lesser extent a result of different levels of employment incomes but the result of the household composition. It shows that individual work incentives depend on one's earnings and on the household context due to the interrelation between own earnings and other household members' earnings. While unemployed people that are living together with an employed household member are assumed to rely on the other member's earnings, unemployed without inter-household support are supported by means-tested benefits and tax credits that provide a basic level of income replacement (Figari et al. 2010).

Hungary is an interesting case because the kernel density function shows a very high concentration around the median. For most people, the incentive to work is quite high mostly driven by social insurance contributions of employees and less

so by the unemployment insurance benefit (see section 3.2). There is only a small group of outliers with PTRs between 72% and 75% which is driven by social insurance contributions of the self-employed. Otherwise, the distribution is relatively similar across household types; while the size of the peak is influenced by the level of earnings (see section 3.3). The shape of the Lithuanian kernel density curve is between that of the United Kingdom and Hungary. The median and the mean are very close together indicating that half of the working age people have a PTR below and the other half above the average PTR with a relatively high concentration around the mean. The proportion of earnings that is kept in the form of increased benefit entitlements and reduced taxes when an individual enters unemployment is between 30-40% in case of high incomes and 50-70% in case of lower incomes. Thus, higher income groups have a higher incentive to be employed while lower income groups have a higher disincentive to be employed.

Bulgaria and Italy are the two countries with an average PTR in between the highest and the lowest country groups. However, they are also the two countries with the highest work incentives among the lowest 5% of the PTR distribution, with 13% and 10%. Although, the dispersion is relatively wide in both countries, the kernel density is quite different. The median is higher than the mean in both countries which indicates a higher concentration of people with above average work incentives. This is mostly driven by the unemployment benefit in Italy. Bulgaria has a flat tax system; thus, income tax has the same effect across distribution although the relative impact differs. Most people with lower PTRs are not eligible for unemployment benefit, thus it is mostly reduced income tax that contributes to PTR. PTRs between 20% and 40% are also driven by social insurance contributions of self-employed. The higher the PTR, the higher the importance of unemployment benefits; the contribution of the social assistance schemes is relatively stable, and family benefits matter to some extent in the case of very high PTRs. All in all, this leads to a relatively similar short-term PTR across income groups in Bulgaria, although driven by different instruments of the tax and benefit system (see section 3.2).

Figure 1: Distribution of short-term PTR in 2015



Source: own calculations using EUROMOD version G3.62

The PTRs presented so far show the financial incentive for working versus not working during the first year of unemployment. However, individuals may base their labour supply decision not only on the short-term change in income but may also take a longer time horizon into account (Bartels and Pestel, 2016). Thus, we present long-term PTRs and discuss their difference to short-term PTRs in the following paragraphs. In our analysis, long-term PTR are defined based on disposable income out of work when entitlement to unemployment insurance benefits has been exhausted.

Table A3 in the Appendix shows that across countries, long-term PTRs are significantly lower than short-term PTRs. While short-term PTRs range between

79% and 46%, long-term PTRs only range between 55% and 23%. Thus, work incentives increase with the duration in unemployment. This can be explained by the nature of the benefits. The newly unemployed are mostly eligible for unemployment insurance which is however limited to a certain period. Once unemployment insurance is exhausted, the unemployed may be eligible for unemployment assistance in some countries (Germany, Hungary, Finland, the United Kingdom and Austria). Additionally, unemployment assistance is very often earnings-related but the replacement rate (less generous) and eligibility criteria differ. Once the unemployed person has exhausted all kinds of unemployment benefit she would need to rely on the social net of last resort, the social assistance benefit. Social assistance is targeted at low income individuals and households to guarantee a minimum level of income. As such, the level of the benefit is independent of previous earnings but often based on the household structure and other income sources of the household.

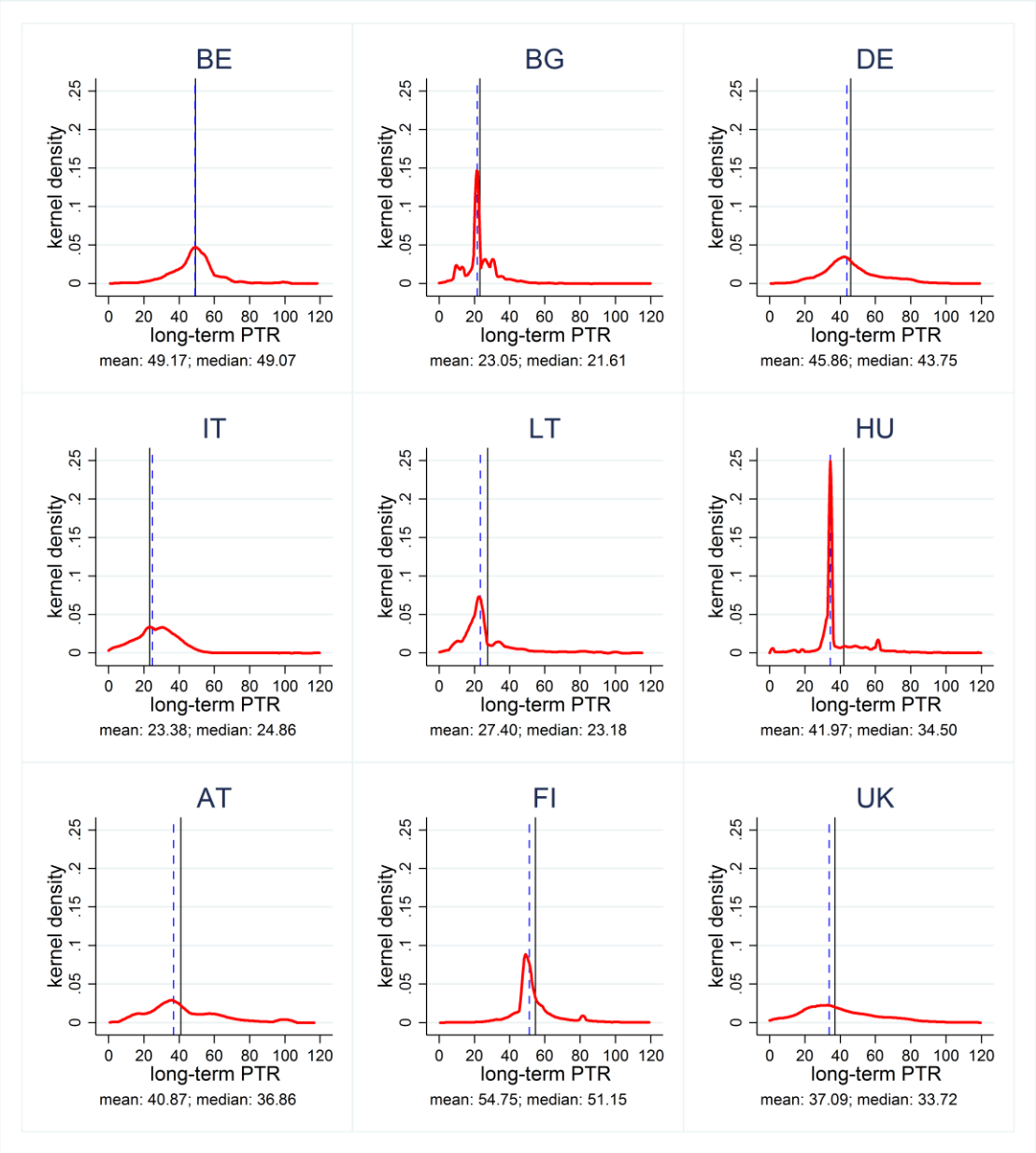
A comparison of long-term and short-term PTRs shows that long-term PTRs particularly decrease for Italy and Bulgaria. One year PTRs are 57% in Italy and 61% in Bulgaria, whereas long-term PTRs are reduced to 23%. The distribution in Bulgaria shifts from a relatively wide dispersion to a relatively narrow with a high peak around the median. Thus, the majority of adults have PTRs in a relatively narrow band. This is mostly driven by income tax and social insurance contributions while most people are not eligible to social assistance due to other incomes in the household (e.g. the partner's earnings). The dispersion is wider in Italy where a substantial share of the new unemployed is left with very low or no incomes due to the absence of a national social assistance benefit.[6]

One year PTRs are the highest in Belgium with 79% and reduced to 49% in the long-term scenario. Most work incentives range between 30% and 60%. While the median work incentives are mainly influenced by the level of the income tax, social assistance decreases the incentive to take up work for higher PTRs. On average, Germany is again relatively similar to Belgium with average long-term PTRs of 46%. The dispersion is relatively wide but the kernel density is less concentrated around the median. The long-term PTR distribution is quite similar in Austria. The proportion of earnings kept in the form of increased benefit entitlements and lower taxes when an individual is out of work is 69% on average in the short-term scenario and 41% on average in the long-term scenario. In Austria, the median is slightly lower than the mean value which indicates a higher concentration of people with below average work incentives. Finland is an interesting case, as long-term PTRs are still very high with 55% on average. Mean and median values are very close and the distribution shows a very high peak around the median. Like

[6] There is no national social assistance scheme in Italy. The (limited) schemes at the local level are not part of the simulations in EUROMOD.

Germany, the role of unemployment assistance is quite important which explains the relatively high disincentive to work (see Figure 5).

Figure 2: Distribution of long-term PTR in 2015



Source: own calculations using EUROMOD version G3.62

Hungary, Lithuania and the United Kingdom are the countries with the lowest average short-term PTRs but their long-term PTRs differ from each other. The average is relatively high in Hungary with 42% and relatively low in Lithuania with 27%. The United Kingdom is somewhere in between with 37%. The dispersion is very high in the United Kingdom with a higher share of people with lower than average PTRs. Together with the United Kingdom, Hungary is the country with the smallest difference in short and long-term PTRs. It comprises of a very high

concentration around the median. Like in Bulgaria, this is mostly driven by income tax and social insurance contributions as most people with PTRs around the median are not eligible for social assistance (see section 3.2). Most people in Lithuania have a long-term PTR between 18% and 32%. The median is smaller than the mean indicating that the share of people with relatively high work incentives is higher than the share of people with relatively low work incentives.

While the previously discussed PTRs focus on the incentive to actually participate in the labour market, the following sections focus on the incentives faced by workers on the intensive margin of labour supply. METRs measure the strength of the incentive for individuals to slightly increase their earnings either through working more hours or bonus payments and promotion from the current employer or by getting a better paid job.

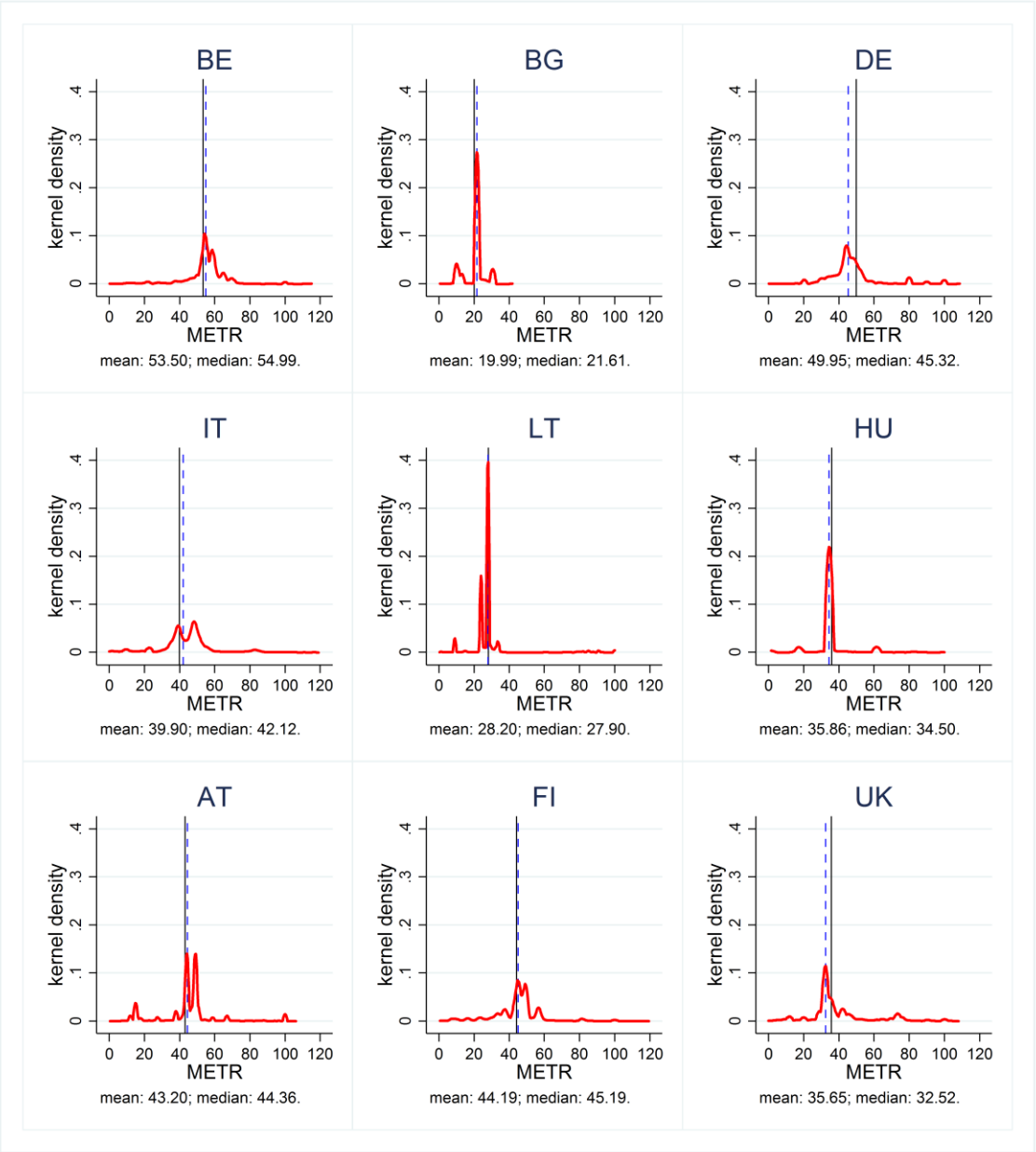
Table A4 in the Appendix shows the average METRs for the selected countries. Bulgaria, followed by Lithuania is the country with the highest incentive to earn more. In Germany and Belgium, individuals keep only about half of the additional earnings with METRs of 50% and 54%. A relatively high amount of the increased earnings is also lost due to tax payments, higher social insurance contributions and forgone tax credit entitlements in Italy, Austria and Finland with between 40% and 44%. The mean METR is 36% in the United Kingdom.

The table also shows that the distance between the 25th and 75th percentile of METRs distribution is quite narrow in Bulgaria and Lithuania, which is due to the flat-tax system in these two countries. In both countries, the distribution is highly concentrated around the mean, with three-quarters of workers having MTRs in this range (see Figure 3). However, there is a significant minority of workers in Lithuania with higher incentives to increase their relatively low income because it would only slightly increase their social insurance contribution. In Bulgaria, there is also a small but significant group of workers with higher incentives to increase their income as it would only increase their income tax but not the social insurance contributions. Also Hungary is in the group of "flat-tax countries", though with slightly higher disincentives to increase earnings.

In all other countries, the distribution is less concentrated with a wider dispersion due to the progressivity in the income tax system. The distribution in Italy shows for example a peak left and a peak right from the average METR. The distribution in Austria is quite similar, although with a higher concentration of workers at the two peaks and a higher concentration around the mean. Most workers with METRs around the mean have incomes that are just below the threshold for the 3rd income bracket. Thus, an increase in earnings might imply a higher marginal income tax rate. The second peak consists of workers with higher incomes and self-employed. In Germany, METRs are concentrated between 40% and 55% mostly due to the income tax. However, the median is slightly lower than the mean which indicates a higher number of workers with relatively high work incentives. The distribution in

the United Kingdom has a relatively large spike at tax rates of between 30% and 34%, although the average METR is 39%. The smaller kink at around 12% includes workers with high incentives to increase their income as it would only increase social insurance contributions but not the income tax.

Figure 3: Distribution of METR in 2015



Source: own calculations using EUROMOD version G3.62

The role of the means-tested benefits is mostly visualised in the small kinks at the end of the distribution. See for example METRs at 80%, 90% and 100% in Germany or METRs at 100% in Belgium. Also the kink at 100% in Austria is due to the loss of means-tested benefits. Means-tested benefits play at least some role across the distribution in Finland, with the only exception of workers with METRs

just above the median (the 2nd peak). These are mostly workers with high incomes (8th to 10th decile) and thus, are not eligible to means-tested benefits. Also in Italy, means-tested benefits play a marginal role across the distribution, however, without kinks with higher importance like in other countries. In the UK, means-tested benefits do not only play a role at the high margin of the distribution but also for workers with METRs just above the mean. The role of means-tested benefits is very small in Lithuania and not important at all in Hungary and Bulgaria.

3.2. Decomposition of PTR and METR

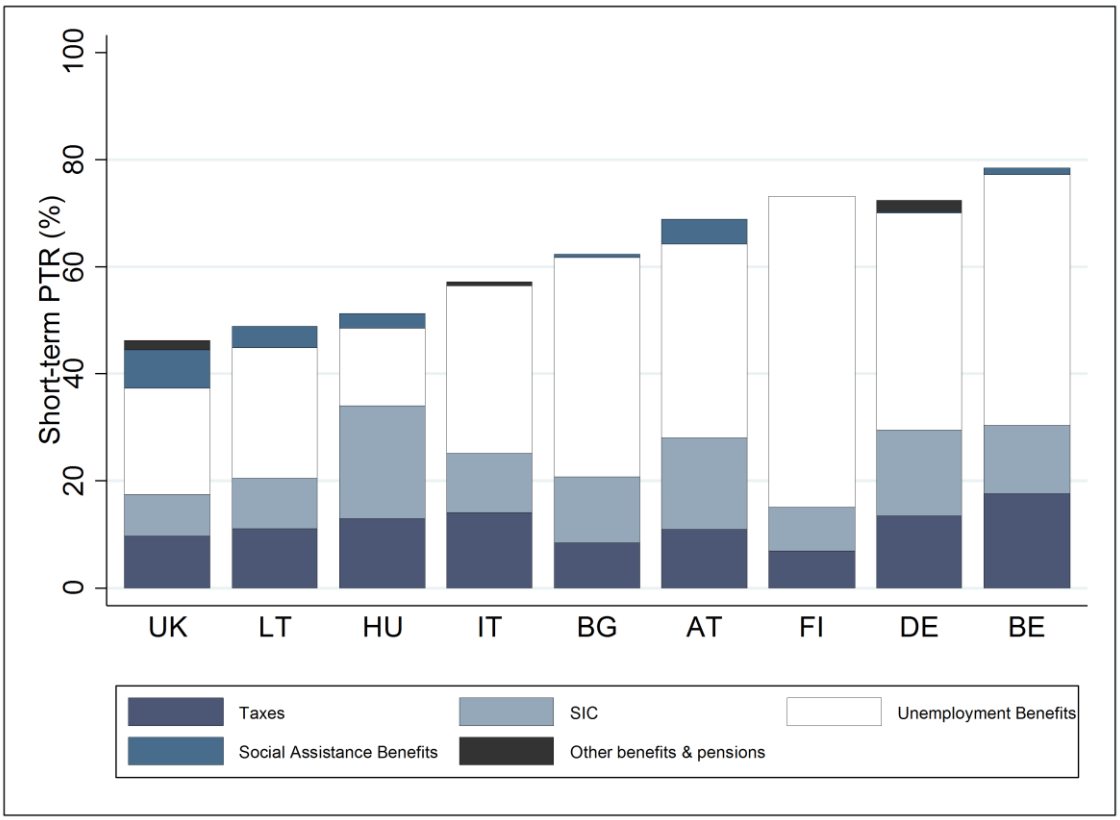
The decomposition of mean PTR (short- and long-term) and METR by income sources is presented in figures 4, 5 and 6, respectively.

Figure 4 shows the ranking of mean short-term PTR among the countries subject of this study, and the decomposition of mean short-term PTR by different income sources. Countries characterised by generous unemployment insurance systems, such as Belgium, Germany, and Finland, show PTR above 70%. Unemployment benefits represent in almost all countries the most important component driving short-term PTRs, with the exception of Hungary. In Finland, unemployment benefits account for more than 80% of the short-term PTR, while in Hungary their contribution is only 28%. Most Finnish employees are covered by the unemployment insurance and thus, would receive unemployment benefit (Jara et al. 2016). Hungary's results can be explained by the short duration of unemployment insurance benefits (only 3 months), and by the age limitations to the access to job-seekers' allowances, which is available to unemployed individuals who received unemployment insurance benefits for at least 45 days, and are within five years under old-age pension age. Further, low levels of both unemployment insurance benefits and job seekers' allowance can also explain the small contribution of unemployment benefits to PTR: unemployment insurance benefits are in fact capped at the minimum wage, and job seekers' allowance consist of a fixed amount equal to 40% of the minimum wage. On the other hand, in Hungary, the most important component explaining PTR consists of reduced social insurance contributions (SIC), which accounts for 41% of PTR, and together with reduced taxes, sum up to 66% of mean PTR. The other countries in which reduced taxes are relatively important are Italy, Lithuania, Belgium and the UK. As far as social insurance contributions are concerned, the most relevant reductions (when a person becomes unemployed) occur in Austria, Germany, Lithuania and Belgium. Simultaneously, it is the contribution-financed Bismarkian unemployment scheme in countries like Belgium, Austria and Germany that provides a relatively stable safety net in case of unemployment (Figari et al. 2011). The UK is the only country

among those considered, where social assistance benefits have a significant role, accounting for 16% of total PTR.[7]

Finally, the contribution of family benefits and pensions to short-term PTR is minor, and it is mainly driven by family benefits. Pensions and other benefits show in general a marginal negative contribution because sickness benefits are set to zero when a person becomes unemployed, as these benefits cannot usually be received jointly with unemployment benefits. In the UK and Germany, family benefits account for around 3% and 2% of PTR, respectively, but in other countries their contribution falls below 1 percent.

Figure 4: Decomposition of mean short-term PTR by income source in 2015



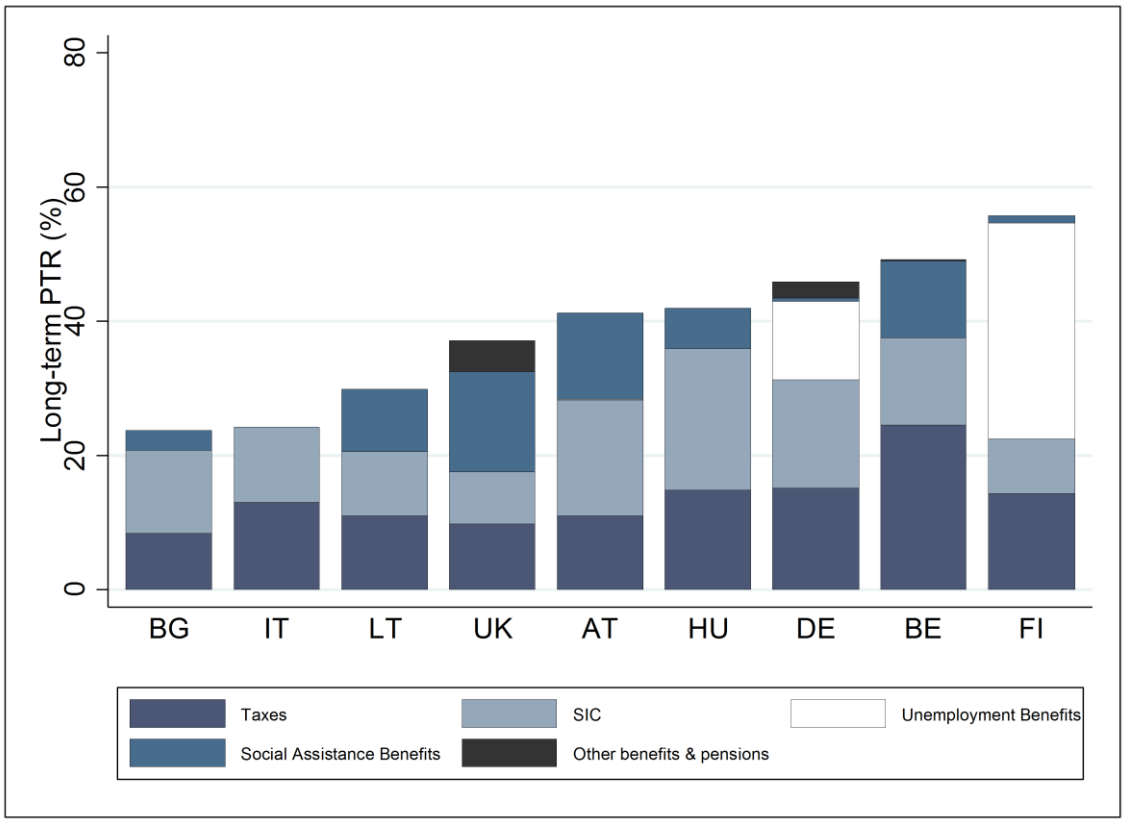
Note: countries ranked by mean short-term PTR
Source: own calculations using EUROMOD version G3.62

The ranking of countries is almost preserved in the case of long-term PTR, where we assume that entitlement to unemployment insurance has been exhausted. As shown in Figure 5, Finland exhibits the highest long-term PTR (almost 55%), followed by Belgium (49%) and Germany (46%). Finland maintains relatively generous unemployment assistance benefits also in the long-run, once the entitlement to the main unemployment insurance benefits is exhausted; as a result, unemployment benefits still account for almost 60% of long-term PTR. The other

[7] Here, income-tested Job Seeker's Allowance is treated as part of social assistance in the UK.

country in which unemployment (assistance) benefits still play a role in explaining long-term PTR is Germany, while in the remaining countries they do not matter. In most countries, social assistance plays a more significant role in long-term PTRs compared to the short-term scenario. This is particularly the case in the UK, where the contribution of social assistance benefits to long-term PTR jumps to 40%, and in Austria and Lithuania, where it accounts to over 30% of mean PTR. Reduced taxes and social insurance contributions, represent now the most important component of long-term PTR, especially in Italy and Belgium, where reduced taxes account for around 50% of long-term PTR. In Bulgaria and Hungary, reduced SIC represent 54% and 50% of long-term PTR, respectively. Bulgaria and Italy show the lowest long-term PTR. In the case of Bulgaria, this relates to the very low level of social assistance benefits available to people exhausting entitlements to unemployment insurance. The main contribution to long-term PTR in Bulgaria, comes therefore from reduced taxes and social insurance contributions, in a way which is also relatively stable across the PTR distribution as pointed out in section 3.1. As previously mentioned, the case of Italy is particular as long-term PTRs are made of changes in taxes and SICs only, due to the absence of unemployment assistance and of a national social assistance scheme. A comparison of short-term PTR and long-term PTR highlights the importance of taking the social protection system as whole into account. Fernandez Salgado et al. (2013) highlight the role of a developed social assistance scheme and the danger to fall below the poverty threshold if such a system does not exist. As in the case of short-term PTR, family benefits and pensions impact only marginally on mean long-term PTR. In the UK, Germany, and Belgium family benefits account for around 4%, 2.3%, and 1.3% of PTR, respectively, but in other countries their contribution falls below 1 percent.

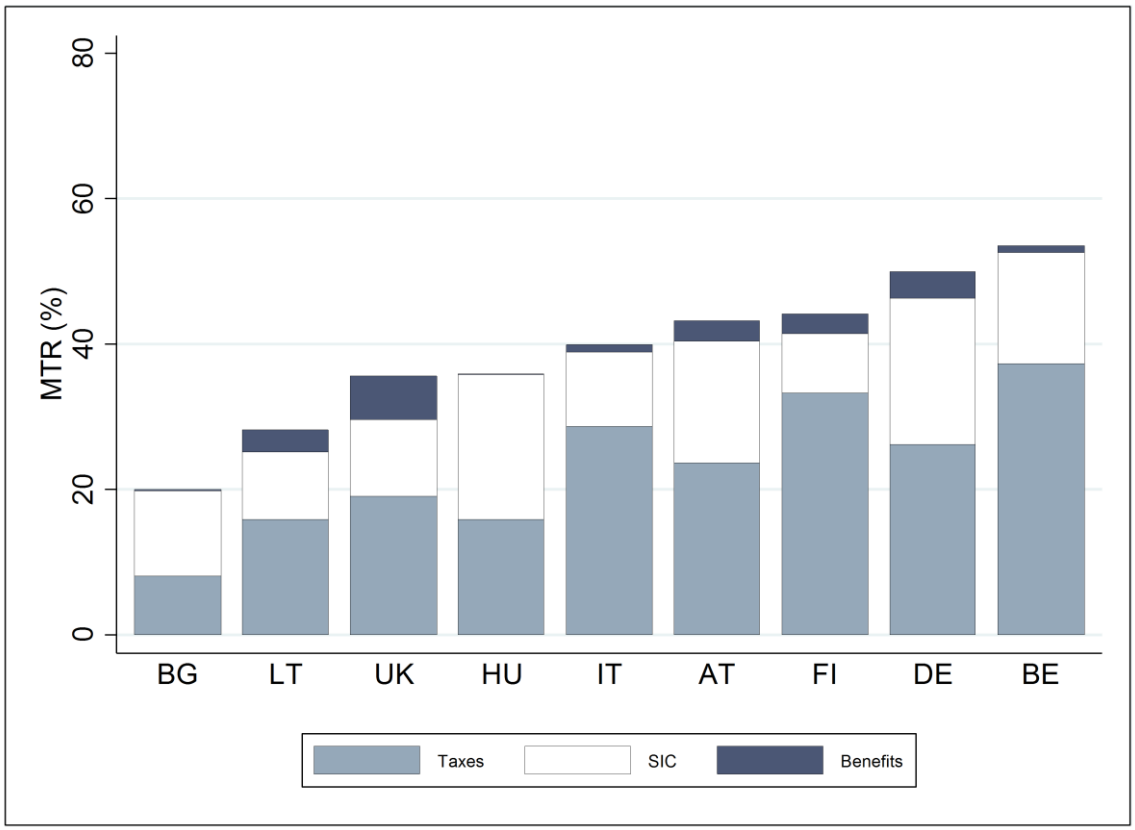
Figure 5: Decomposition of mean long-term PTR by income source in 2015



Note: countries ranked by mean long-term PTR
Source: own calculations using EUROMOD version G3.62

Differently from PTRs, METRs represent the change in taxes, social insurance contributions, and social benefits associated to an increase of 3% in earnings, for people who are currently at work. Countries with higher mean METRs are Belgium, Germany, Austria and Finland (Figure 6), characterized by highly progressive tax systems. On the contrary, the lowest mean METRs are registered in Bulgaria and Lithuania, where the tax structure is relatively flatter. Our decomposition exercise shows the relative incidence of taxes, social insurance contributions and (loss of) benefits to the mean METR. Higher taxes associated to higher earnings represent the most important component (around 70%) of mean METRs in Finland, Italy and Belgium. On the contrary, in countries characterized by lower progressivity, such as Hungary and Bulgaria, the contribution of taxes to the mean METR remains below 50%. In Bulgaria and Hungary, on the other hand, increase in social insurance contributions due to higher earnings explain over 55% of mean METR. Finally, loss of benefits associated with higher earnings seems to matter only in the UK and, to a minor extent, in Lithuania, but explain only 17% and 10% of mean METR, respectively. In the UK, the loss in benefits is associated with reduction in means-tested benefits (in-work benefits and housing benefits).

Figure 6: Decomposition of mean METR by income source in 2015



Note: countries ranked by mean METR
Source: own calculations using EUROMOD version G3.62

3.3. Heterogeneity across population subgroups

Another advantage of using representative data for the analysis of work incentives is that it allows us to compare indicators across different population subgroups. Tables 1, 2 and 3 compare mean PTR (short- and long-term) and MTR by gender, age and skill groups, employment and self-employment status, for main and secondary earners in the household, by earnings quintiles, part-time employment status and work intensity status.

Table 1 shows that the most important differences in short-term PTRs can be found between earnings quintiles, by employment status (employee vs. self-employed), and, to a minor extent, by type of earners (main vs. secondary). In Lithuania, Hungary and Belgium, individuals in the bottom part of the earnings distribution face higher disincentives than high-earners in the top quintile, of the order of 21, 20, and 16 percentage points, respectively. This can be explained by the existence of lower limits in unemployment insurance schemes (minimum payments amount for people satisfying eligibility conditions) and by the fact that in these countries low-earners are still entitled to means-tested benefits, such as minimum income schemes and other social assistance benefits.

While protecting low-paid individuals against the risk of poverty, overly high PTRs at the bottom of the earnings distribution can discourage labour market participation among the poor, creating benefits dependence and unemployment traps. On the contrary, in Italy and Germany, low earners face a higher incentive to work than top earners, probably because of the importance of tax allowances and family benefits in the upper part of the earnings distribution in these countries. In the case of the UK, the variation in PTRs depends not only on the distribution of individual earnings, but also, and to a similar extent, on the number of earners in the household and on their employment status (employee vs. self-employed).

Table 1: Mean short-term PTR by population subgroups in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
all	78.52	61.23	72.43	57.23	46.30	51.30	68.47	70.94	46.24
male	76.41	60.47	74.01	54.91	46.49	51.51	67.49	70.48	45.68
female	80.97	62.05	70.75	60.31	46.09	51.05	69.66	71.40	46.86
age (<30)	79.57	48.88	70.84	53.51	46.12	57.38	68.58	70.81	42.88
age (30-50)	78.21	65.29	73.17	56.75	45.46	48.00	69.83	71.15	49.03
age (50+)	78.43	60.48	71.88	60.11	48.09	54.24	65.12	70.65	43.33
low-skilled	80.89	63.85	71.83	55.85	52.76	52.89	73.44	73.16	48.17
medium-skilled	80.15	62.20	72.48	58.11	49.34	51.88	69.16	70.84	45.08
high-skilled	76.28	58.08	72.46	57.16	41.29	48.96	65.45	70.53	44.08
employee	77.73	62.96	74.13	65.64	46.88	48.42	70.21	70.81	47.47
self-employed	87.91	35.26	43.69	33.88	36.04	77.95	50.70	73.22	37.40
main earner	76.72	62.28	73.65	57.55	46.56	48.94	69.49	71.26	49.78
secondary earner	81.84	59.74	70.05	56.57	45.89	54.85	66.81	70.32	40.29
earnings Q1	84.91	59.93	60.00	41.71	56.70	64.64	71.06	72.58	54.61
earnings Q2	83.09	60.20	73.09	55.83	50.58	51.34	71.64	70.40	45.56
earnings Q3	81.03	62.22	74.80	61.68	48.47	50.08	67.84	71.52	44.83
earnings Q4	75.41	62.48	76.07	63.72	43.18	48.48	68.80	71.61	43.71
earnings Q5	68.85	60.77	76.15	58.14	35.62	44.69	63.54	68.95	42.88
part time	88.00	62.90	63.56	47.69	54.39	65.83	74.72	73.47	52.51
low work intensity	67.76	59.95	66.87	47.65	58.51	57.95	73.90	70.82	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Employees face in general higher PTRs than the self-employed, since the latter are not always eligible for unemployment insurance benefits. However, in a number of countries, the reverse is true: for example, in Hungary, PTR for self-employed exceeds employees' by almost 34 percentage points, mostly due to the high social insurance contributions paid by the self-employed. Further, in countries where the

self-employed have also access to unemployment benefits, such as Belgium and Finland, work disincentives are higher for the self-employed by 10 and 3 percentage points respectively.

In general, PTRs do not show large variation between main earner and secondary earners. One exception is the UK, where PTR for the main earner is 9 percentage points higher than for secondary earner. In particular, single parents, single-earner households and households with 3 or more children (due to family benefits), face higher disincentives to work in the UK. On the contrary, secondary earners face higher PTRs in Belgium and Hungary. Finally, we cannot find important differences in short-term PTR by gender or age groups. The only exception is Bulgaria, where younger individuals aged below 30, face significantly lower PTR than the average. Differences in PTR by skill level are likely to be confounded with differences associated with earnings, and in any case exhibit less variation than the latter.

As far as part-time workers are concerned, the evidence is mixed. In most countries PTR is higher for part-time workers than for the total population, especially in Hungary, Belgium, and Lithuania, but also, to a minor extent, in Austria, UK and Finland. In Germany and Italy on the contrary part-time workers seem to face lower disincentives to work than the total population, while in Bulgaria no substantial difference can be appreciated. High PTRs for part-timers can be associated to eligibility to social assistance benefits given probably the low level of earnings received. Finally, we analyse the short-term PTR for people characterised by low-work intensity. These are defined as individuals living in households where earners' months in employment add up to a maximum of 50% of the total potential duration in employment in a year, corresponding to 12 months for each earner.[8] Consistently with the methodology used in the calculation of MTRs and PTRs, we calculate work intensity considering all earners in the household. Somehow similarly to part-timers, individuals in low-work intensity households face higher short-term PTRs than the total population in Lithuania, Hungary and Austria, while in Italy, Germany and Belgium the opposite holds. No significant difference can be found in Bulgaria and Finland.

As far as long-term PTR is concerned (Table 2), the differences between bottom and top earners in some cases narrow, in others widen, compared to short-term PTR. Hungary and Finland are characterized by the highest long-term PTR for bottom earners compared to top earners (with a difference of 17 and 13 percentage points, respectively). In Finland, the role of unemployment assistance is quite important and constitutes a relatively high disincentive to work for lower income groups. The same is true in Belgium and Germany. In Germany, the work incentive for lower income is high in the short-term and on the other hand relatively small in the long-term scenario. In Italy and Austria, on the contrary,

[8] Note that information on low work intensity is not available for the UK as the Family Resources Survey does not contain information on months in work during the past year.

long-term PTR for top earners exceeds the one for bottom earners by 23 and 10 percentage points, respectively. In Italy, this depends mostly on the income tax and social insurance contribution one would pay in employment: therefore, the higher the taxable income, the lower the long-term incentive to work. In Austria, most earners in the bottom quintile are no longer eligible for unemployment assistance in the long-run scenario; therefore the role of benefits is by far less important in this case compared to the role of taxes and social insurance contributions for high-earners. In the UK, the composition of the household is also an important factor for higher long-term PTRs, with family benefits reducing the incentive to work. However, the support for families has been shown to be an important safety net in times of crisis (Figari et al. 2011).

Table 2: Mean long-term PTR by population subgroups in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
all	49.17	23.05	45.86	23.38	27.40	41.97	40.87	54.75	37.09
male	49.74	23.87	47.86	23.75	28.43	42.96	45.43	54.19	40.18
female	48.50	22.15	43.74	22.89	26.33	40.81	35.32	55.31	33.63
age (<30)	51.81	21.74	48.37	18.62	30.38	54.81	36.48	57.73	36.86
age (30-50)	48.33	24.46	45.72	22.79	28.02	38.74	41.78	54.00	38.93
age (50+)	49.15	20.88	44.53	27.03	23.96	40.24	42.73	54.11	33.33
low-skilled	49.30	29.98	53.09	19.48	34.93	43.61	40.89	58.84	38.21
medium-skilled	48.69	22.43	46.74	22.97	28.40	41.90	39.57	55.77	35.95
high-skilled	49.51	20.90	43.47	29.17	25.15	41.35	43.06	52.78	36.26
employee	48.81	22.23	45.98	22.03	26.91	39.40	39.91	53.77	37.05
self-employed	53.45	35.26	43.69	33.88	36.04	65.75	50.70	72.49	37.40
main earner	50.56	24.69	48.59	23.46	31.27	39.44	50.69	55.31	44.78
secondary earner	46.61	20.73	40.55	23.23	21.28	45.78	24.99	53.68	24.20
earnings Q1	50.27	30.36	40.80	13.35	34.49	55.94	35.55	64.99	36.80
earnings Q2	47.75	22.25	51.44	14.97	26.66	41.84	36.11	55.11	35.55
earnings Q3	48.77	22.16	46.94	20.40	25.88	38.98	42.05	52.94	37.00
earnings Q4	48.68	21.23	44.65	27.50	26.58	37.81	43.64	51.53	37.33
earnings Q5	50.49	22.13	44.72	36.64	25.46	38.15	45.91	51.52	38.77
part time	48.26	31.94	38.28	13.77	36.44	53.65	32.94	63.40	52.51
low work intensity	58.18	27.04	49.49	15.91	47.31	48.97	52.91	59.10	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

The self-employed show in general higher long-term PTR than employees, most likely because employees lose eligibility for unemployment insurance benefits in

the long-run scenario, while the self-employed remain still eligible for instance to social assistance benefits. In Hungary, this difference is still the largest, and amounts to over 26%. The difference between main vs. secondary earner PTRs instead increases, when considering long-term PTR, compared to short-term PTR: in the case of the UK and Austria, this difference reaches 25 percentage points. This can result from taxes and SIC having a stronger incidence on long-term PTR compared to benefits. Without the effect of unemployment insurance, the effect of taxes and SIC might be larger for main earners than secondary earners because the reduction of taxes and SICs paid by main earners might be much larger than that of secondary earners.

Part-time workers' long-term PTRs exhibit a similar pattern across countries than short-term PTRs. In some countries, such as Finland and Hungary, disincentives to work for part-timers still appear very high compared to the total population, most likely given the availability of social assistance benefits in the long-term as well. At the other side of the spectrum, Italy shows the lowest disincentives for part-timers also for long-term PTRs. In general, workers in households with poor labour market attachment (low work intensity) suffer from higher disincentives compared to the total population. This is true especially in Lithuania, where the difference exceeds 20 percentage points, but also in Austria (11 percentage points), and Belgium (10 percentage points), followed by the remaining countries. The only exception remains Italy, which is not surprising, given the absence of guaranteed minimum income schemes at the national level in this case.

Table 3 shows the differences in mean METRs between different population subgroups. In the case of METRs, some slight gender differences seem to emerge in some countries. For instance, women seem to face higher METRs than men in Germany, but lower METRs than men in Austria, the UK and Finland. In general, younger age groups exhibit lower METRs than older age groups, with the exception of Lithuania. Also in the case of METRs, the largest differences can be observed between earnings quintiles. Bottom earners seem to face MTRs particularly higher than top earners in Germany and Lithuania, by 19 and 10 percentage points respectively. On the contrary, in Italy, METR in the top quintile exceeds the one at the bottom by over 34 percentage points. Also in the remaining countries, MTR for high-earners is higher than for low-earners, especially in the UK (21 percentage points), Belgium (19), Austria (18) and Finland (16).

Table 3: Mean METR by population subgroups in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
all	53.50	19.99	49.95	39.90	28.20	35.86	43.20	44.19	35.65
male	53.98	19.67	46.85	41.55	28.49	36.55	45.63	45.58	37.65
female	52.94	20.35	53.23	37.70	27.91	35.05	40.25	42.79	33.40
age (<30)	49.97	20.18	48.53	31.76	31.43	34.40	40.43	41.48	31.68
age (30-50)	54.18	20.28	49.85	40.46	27.71	35.73	43.41	44.69	38.47
age (50+)	54.69	19.26	51.06	42.50	26.79	37.11	45.26	45.07	33.26
low-skilled	52.39	19.28	58.41	36.66	35.29	32.79	39.70	42.98	35.07
medium-skilled	52.66	20.38	51.49	40.15	28.90	36.01	43.11	42.51	34.34
high-skilled	54.61	19.59	46.49	43.49	26.43	36.96	44.65	46.15	37.78
employee	53.90	19.26	50.26	41.95	28.51	34.06	42.67	44.08	36.29
self-employed	48.76	30.91	44.62	40.48	22.81	52.54	48.61	46.12	31.04
main earner	54.79	19.94	48.80	42.51	29.00	36.29	47.81	46.63	39.90
secondary earner	51.13	20.07	52.17	34.68	26.94	35.21	35.75	39.56	28.52
earnings Q1	39.09	19.82	64.53	15.28	34.28	31.41	28.60	34.67	21.16
earnings Q2	60.20	19.55	49.06	32.44	29.29	34.86	43.99	40.89	38.04
earnings Q3	54.75	20.25	45.69	41.56	27.91	37.06	45.15	44.96	39.02
earnings Q4	54.27	20.02	47.40	52.01	27.42	36.91	49.09	47.25	36.67
earnings Q5	57.65	20.23	45.42	49.62	23.89	38.13	46.29	50.97	42.66
part time	49.84	19.15	62.51	21.52	34.87	30.77	34.25	39.03	28.37
low work intensity	42.11	18.95	50.24	31.57	40.50	32.91	44.90	40.56	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table 3 also shows that there is not a large variation in METRs between employees and self-employed, with the exception of Hungary and Bulgaria. In Hungary, METR for the self-employed exceeds METR for employees by over 18 percentage points, while in Bulgaria the difference amounts to 12 percentage points. Again, these differences can be explained mostly by high social insurance contributions for the self-employed in these countries. Finally, we do not find substantial differences in METRs between main and secondary earners, with the exception of Austria and the UK, where main earner's METRs exceed secondary earner's by 12 and 11 percentage points respectively. METRs for part-time workers are in general lower than in the total population, with the exception of Germany, probably due to the relatively higher increase in taxes associated to an increase in wages. Individuals with poor labour market attachment also face lower METRs compared to the total population in almost all countries (with the exception of Lithuania), since they probably fall in relatively lower tax breaks.

3.4. Low work incentives at the extensive and intensive margin

High levels of PTR and METR are an indicator of low incentives to work or to increase labour supply. At the extensive margin, high PTRs reflect that a high proportion of earnings would be kept in the form of increased benefits or reduced taxes and social insurance contributions in case of unemployment, reducing therefore the incentives to (r)enter employment. At the intensive margin, high METRs reflect that a high proportion of the additional earnings would be taxed away because of extra taxes and social insurance contribution or due to benefit withdrawal, reducing therefore the incentives to work more.

There is no consensus as for which level of PTR or METR should be considered high enough to identify people as facing low work incentives. Two different approaches could be considered. On the one hand, an absolute threshold could be fixed in order to identify those facing low work incentives. Jara and Tumino (2013) define, for instance, METR above 50% to represent low incentives to work at the intensive margin. Although an absolute threshold could be considered appealing for cross country comparisons, our analysis also shows that there is substantial variation in the dispersion of work incentives across countries. An absolute threshold could therefore result in very large groups identified as facing low work incentives in some countries and very small groups, in others. Moreover, a different absolute threshold would need to be defined for short- and long-term PTR, and METR, given the different levels and distributions of these indicators. On the other hand, a relative threshold could be defined for each country based, for instance, on the median value of each indicator in each country. This would allow taking into account the very different distributions of work incentive indicators across countries. However, in countries characterised by very low median values, the thresholds might still be considered low (in absolute terms) for cross country comparisons. It could be the case for instance that in one country, the tax-benefit system, simply does not result in low incentives to work or it does for a very small sample of the population.

In this section, we provide a cross country comparison of the portrait of individuals facing low work incentives at the extensive and intensive margin, where low work incentives are defined using an absolute threshold across countries. The difference made by the use of relative thresholds is presented in tables A5 to A7 in the appendix and discussed at the end of this section. In our analysis, the absolute threshold for each indicator is defined as the average plus one standard deviation of the mean PTR or METR across countries. In the case of short-term PTR, the absolute threshold corresponds to a value of PTR equal to 75%. For long-term PTR and METR, the value of the threshold is 50%.[9]

[9] Note that in the case of METRs, the threshold corresponds to the value used in Jara and Tumino (2013).

Table 4 presents the characteristics of individuals facing short-term PTRs above 75%. The percentage of our sample facing high disincentives to work varies widely across countries. In Hungary, Lithuania and the UK less than 10% of our sample faces a high short-term PTR, while the share is as high as 52% in Germany and 63% in Belgium. In most countries except Germany, Lithuania and Hungary, there is a larger share of women among those facing high short-term PTRs, and particularly so in Italy and Austria. In all countries, the share of young workers (below 30 years old) among those facing high disincentives is the lowest compared to the main age group (30 to 50 years old). This might be related to age restrictions for the entitlement of certain benefits or to the fact that young workers may not fulfil eligibility conditions based on work history, for instance, for unemployment insurance benefits. The pattern is less clear for the oldest age group (50+). In most countries the share of workers aged 50 or more is lower than the share of those aged 30 to 50 (except in Italy and Hungary). The share is also lower compared to the youngest age group (below 30), except in Belgium, Lithuania, Austria and Finland.

In terms of skill groups, the majority of individuals facing high short-term PTRs are medium skilled, except in the UK where the low-skilled represent the largest share. Household composition, in particular, the presence of secondary earners in the household plays a role on work incentives.

In most countries, the largest share of individuals facing high short-term PTR are main earners, except in Italy and especially in Hungary, where 60% of those facing low work incentives are secondary earners.

Finally, in terms of earning quintile groups, among those with high short-term PTR, the largest share is made of individuals with low earnings in most countries, which might be related to the existence of lower limits for unemployment insurance benefits or social assistance (e.g. minimum payments amounts in both cases for those satisfying minimum requirements). In Lithuania, Hungary, Austria and the UK around 80% or more of those facing high work disincentives belong to the first and second quintiles of earnings. A similar pattern is also observed in Italy, where 66% of those with low work incentives come from the first and second earning quintiles. The picture is rather different in Germany, where individuals at the top of the earnings distribution are more likely to be among those with high short-term PTRs; and in Belgium and Bulgaria, where the highest proportion of individuals facing low work incentives is concentrated in the middle of the earnings distribution.

The share of part-time workers facing high short-term PTRs is particularly high in the UK, where it reaches almost 50%, Austria, Hungary and Lithuania. At the other side of the ranking, in Bulgaria, which presents a distribution of PTRs much more concentrated around a lower median value (20%), less than 8% of part-time workers face high PTRs.

Finally, the highest concentration of workers with low-work intensity facing higher PTRs can be found by far in Lithuania, 37%, followed by Hungary, 21%. This share falls substantially in the other countries, and less than 4% of workers living in poor work intensity households exhibit high PTRs in Germany and Belgium.

Table 4: Characteristics of the population facing short-term PTR above 75% in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	3,338	1,545	6,353	2,035	309	715	1,128	2,564	1,488
% sample	63.01	30.10	52.71	12.13	7.91	7.25	20.69	22.03	8.61
% male	46.08	47.54	58.54	33.00	53.62	55.90	39.68	44.43	46.52
% female	53.92	52.46	41.46	67.00	46.38	44.10	60.32	55.57	53.48
% age (<30)	22.78	2.17	10.88	13.19	35.37	29.81	22.44	20.79	21.46
% age (30-50)	57.61	53.96	62.99	42.54	44.37	31.64	65.08	58.84	56.72
% age (50+)	19.61	43.88	26.13	44.27	20.26	38.55	12.49	20.37	21.83
% low-skilled	20.72	14.58	6.07	37.80	12.26	20.11	21.99	13.14	56.94
% medium-skilled	42.97	64.60	49.72	47.44	72.15	61.95	54.81	51.02	25.79
% high-skilled	36.31	20.82	44.20	14.76	15.59	17.93	23.20	35.84	17.26
% employee	92.24	99.54	99.14	98.79	94.49	56.49	92.19	92.45	82.42
% self-employed	7.76	0.46	0.86	0.85	5.51	43.51	7.81	7.55	17.58
% main earner	56.30	58.84	70.87	42.21	61.33	39.37	51.72	59.71	74.69
% secondary earner	43.70	41.16	29.13	57.79	38.67	60.63	48.28	40.29	25.31
% earnings Q1	20.63	14.26	7.65	30.17	73.14	59.34	40.96	33.96	59.80
% earnings Q2	28.59	20.85	16.99	35.63	19.47	25.37	43.55	26.64	19.23
% earnings Q3	29.33	25.67	18.74	22.16	6.29	3.71	10.36	19.28	12.42
% earnings Q4	20.69	21.11	24.95	11.23	1.11	5.34	4.57	15.06	7.03
% earnings Q5	0.76	18.11	31.67	0.81	0.00	6.24	0.56	5.06	1.52
% part time	19.83	7.89	11.64	29.16	37.66	39.28	44.45	24.80	47.83
% low work intensity	3.18	11.72	3.98	8.30	36.80	21.46	11.86	15.44	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.

Source: own calculations using EUROMOD version G3.62

Table 5 replicates the analysis presented above but now describing the characteristics of individuals facing long-term PTRs above 50%.

Table 5: Characteristics of the population facing long-term PTR above 50% in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	2,401	117	3,884	326	389	2,027	1,610	7,225	5,858
% sample	45.26	2.42	35.19	1.74	9.88	20.82	28.20	59.58	24.54
% male	58.50	61.60	56.37	60.11	50.46	61.56	66.26	48.88	58.62
% female	41.50	38.40	43.63	39.89	49.54	38.44	33.74	51.12	41.38
% age (<30)	23.18	11.42	23.31	7.32	33.40	35.68	18.78	18.37	21.19
% age (30-50)	53.74	69.51	52.66	46.50	55.74	42.56	57.56	56.28	60.50
% age (50+)	23.08	19.07	24.03	46.17	10.86	21.76	23.66	25.35	18.31
% low-skilled	16.67	48.86	10.77	31.71	13.63	12.61	14.02	10.66	52.96
% medium-skilled	33.92	40.96	58.37	39.99	66.97	66.47	51.45	46.52	24.26
% high-skilled	49.41	10.18	30.86	28.30	19.40	20.92	34.53	42.82	22.78
% employee	90.20	80.08	95.03	33.95	92.24	56.46	88.17	92.17	85.84
% self-employed	9.80	19.92	4.97	62.19	7.76	43.54	11.83	7.83	14.16
% main earner	72.58	77.48	74.20	65.03	76.97	44.23	95.86	69.65	89.18
% secondary earner	27.42	22.52	25.80	34.97	23.03	55.77	4.14	30.35	10.82
% earnings Q1	16.23	73.86	18.82	20.24	51.88	27.84	16.58	17.56	27.91
% earnings Q2	18.25	21.90	27.56	13.68	26.46	31.86	17.11	23.27	21.42
% earnings Q3	19.23	3.60	22.48	11.00	14.07	19.38	21.76	20.11	20.29
% earnings Q4	18.44	0.64	17.12	7.34	6.47	10.29	22.49	18.76	17.78
% earnings Q5	27.85	0.00	14.02	47.74	1.12	10.63	22.06	20.30	12.59
% part time	11.06	35.09	14.42	15.50	30.68	17.65	13.33	14.18	29.83
% low work intensity	5.18	36.24	6.18	7.17	32.77	9.50	10.57	10.27	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

In this case, there is also significant variation in the share of the sample affected by high long-term PTRs. In Bulgaria and Italy only around 2% of the sample face long-term PTRs above 50%. At the other end of the spectrum we find Belgium and Finland, where the share is as high as 45% and 60%, respectively. Contrary to the case of short-term PTRs, the largest share of people facing high long-term PTRs is made of men, Finland being the only exception. In all countries, the youngest and oldest age groups are less likely to face high long-term PTRs compared to the main age group (30 to 50 years old). In terms of skill level, the highest proportion of those with low work incentives is made of medium-skilled workers, except in

Bulgaria and the UK, where the low skilled represent the largest group; and in Belgium where the share of high-skilled workers is the largest among those facing low work incentives. In all countries, except Hungary, main earners are more likely to face high long-term PTRs, and particularly so in Austria, where only 4% of those with low work incentives are secondary earners. Finally, the pattern across earning quintiles is somewhat different from that observed in the case of short-term PTRs. In Lithuania, Hungary and the UK around the largest share of those facing high PTRs belong to the first and second quintile of earnings; and this pattern is also observed now in Germany and particularly in Bulgaria, where now more than 70% of those with low work incentives belong to the bottom earnings quintile. In Belgium and Italy, the largest group belongs to the top earnings quintile; while there is no clear pattern in Austria and Finland. The highest incidence of part-time workers with long-term PTR above 50% can be observed in Bulgaria, Lithuania and the UK (35%, 31% and 30% of part-timers respectively). In the other countries, the share of part-time workers facing high participation disincentives in the long run is much smaller, between 11% and 17%. Interestingly, a very similar pattern can be found for workers with poor labour market attachment.

Finally, the portrait of people facing high METRs (above 50%) is presented in Table 6 below. The share of people facing low work incentives at the intensive margin varies substantially and even more than that of incentives at the extensive margin. The share of people with METRs above 50% is as low as 0.18% of the sample in Bulgaria and as high as 81.9% in Belgium. The small share of individuals facing high METRs in Bulgaria is consistent with previous findings by Jara and Tumino (2013) and is related to the fact that the distribution of METR for Bulgaria is highly concentrated around a much lower median value (21%), which is likely due to the presence of a flat income tax system and a relatively flat distribution of earnings. Characteristics of individuals facing high METR in Bulgaria are omitted from Table 6 as only 9 observations in our sample face METR above the 50% threshold. As such, our cross-country comparison points out to the presence of only a very small share of individuals facing low work incentives at the intensive margin in Bulgaria, under our absolute threshold of 50%. Sensitivity checks using lower absolute thresholds (METR above 40% or 35%) show that the sample of people facing high METR in Bulgaria remains small. This result highlights the importance of providing, in addition, a description of low work incentives based on relative thresholds, which takes into account the specific distribution of METRs within each country, presented in the Appendix.

Table 6: Characteristics of the population facing METR above 50% in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	4,381	9	2,983	3,449	134	690	744	2,022	2,469
% sample	81.91	0.18	26.70	20.14	4.01	8.31	13.59	11.27	13.09
% male	55.42	-	42.43	69.40	55.67	68.16	53.83	63.87	59.95
% female	44.58	-	57.57	30.60	44.33	31.84	46.17	36.13	40.05
% age (<30)	16.84	-	15.69	4.88	48.99	4.83	16.84	19.67	15.57
% age (30-50)	60.25	-	57.17	67.88	43.21	60.19	55.22	48.02	67.80
% age (50+)	22.92	-	27.14	27.24	7.80	34.97	27.94	32.31	16.64
% low-skilled	15.53	-	8.44	25.82	18.69	6.07	14.28	11.21	48.86
% medium-skilled	35.51	-	53.38	46.17	68.95	64.90	49.83	34.70	25.49
% high-skilled	48.97	-	38.17	28.01	12.36	29.03	35.90	54.10	25.65
% employee	93.74	-	95.90	81.78	99.91	14.08	63.03	82.41	84.20
% self-employed	6.26	-	4.10	17.82	0.09	85.92	36.97	17.59	15.80
% main earner	67.41	-	63.69	85.01	71.30	67.01	68.79	81.85	85.95
% secondary earner	32.59	-	36.31	14.99	28.70	32.99	31.21	18.15	14.05
% earnings Q1	7.17	-	27.71	1.55	81.27	4.31	22.55	25.55	25.21
% earnings Q2	21.76	-	16.74	3.67	17.29	19.08	35.90	10.11	23.05
% earnings Q3	22.94	-	7.94	11.43	1.44	24.83	12.58	5.12	21.91
% earnings Q4	23.73	-	28.87	39.46	0.00	22.03	14.24	7.50	12.06
% earnings Q5	24.40	-	18.74	43.89	0.00	29.76	14.73	51.72	17.76
% part time	11.20	-	26.41	4.06	51.18	4.16	21.99	19.56	26.27
% low work intensity	2.30	-	5.85	6.51	51.51	6.81	8.54	14.59	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). Results for Bulgaria omitted due to small sample size. N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table 6 further shows that in most countries, men are more likely to belong to those facing low work incentives at the intensive margin, the exception being Germany. In terms of age groups, among those with high METRs the largest group is, in general, that of workers aged 30 to 50, followed those aged 50 or more, and the youngest age group. The only exception is Lithuania, where younger workers are more likely to face high METRs. In most countries, the largest share of those with high METRs is made of medium-skilled workers. The pattern is different in Belgium and Finland, where higher-skilled individuals are more likely to face high METRs; and the UK, where the largest share is made of low-skilled workers. The proportion of main earners is higher in all countries. Finally, no clear pattern is observed across countries for the composition of those with high METRs across earning quintiles. In Lithuania and the UK, individuals facing high METRs belong

mainly to the bottom earning quintile. In Belgium, Italy and Hungary, individuals with low work incentives at the intensive margin are concentrated in the upper quintiles of the earnings distribution. The pattern is much less clear in Belgium and Finland. In Lithuania, over 50% of part-time workers face METR above 50%, while in the rest of the countries, this percentage is much smaller, and particularly low (around 4%) in Italy and Hungary. A very similar pattern can be found for individuals living in low work intensity households: in Lithuania over 50% of them face METR above 50%, while for all other countries the percentage falls below 10% (except Finland, 14%).

Tables A5 to A7 in the appendix provide a similar description of individuals facing low work incentives at the extensive and intensive margin. However, the thresholds are now defined relative to the median value of work incentive indicators in each country. We specify the relative threshold as 120% of the median PTR or METR in each country. The last rows of tables A2 and A4 present the value of the thresholds in each country. Table A5 show that in the case of short-term PTRs, the relative threshold to identify low work incentives is higher than the absolute threshold (75%) in all countries, except Lithuania (54.02%), Hungary (56.52%) and the UK (49.45%). The largest relative threshold is found in Belgium, reflecting the fact that on average short-term PTRs are higher in Belgium compared to other countries. In terms of long-term PTRs, we observe the opposite pattern (see Table A6). The relative threshold is higher than the absolute threshold (50%) only in three countries: Belgium (58.88%), Germany (52.5%) and Finland (61.38%). The lowest threshold equals 25.93% in Bulgaria. In the case of METRs (Table A7), four countries present relative thresholds below 50% (our absolute threshold). The threshold is particularly low in Bulgaria and equals 25.93%.

As expected the share of individuals facing low work incentives increases (decreases) when the relative threshold is smaller (larger) than the absolute threshold. The characterisation of individuals facing low work incentives broadly holds whether an absolute or relative threshold is used. The main differences are observed in countries where the share of the population facing low work incentives varies significantly when a relative threshold is used instead of an absolute threshold. For short-term PTRs, for instance, with the use of a relative threshold now most individuals facing work incentives in Belgium and Germany belong to the bottom quintile of earnings. A similar pattern is observed in Belgium and Finland, when a relative threshold is used to define high long-term PTRs. In the case of METRs, the use of a relative threshold also influences the composition of the groups facing low work incentives in some countries. In Belgium and Germany, the largest share belongs to the first and second earning quintiles. In Bulgaria, now the largest share of those facing high METRs come from the top earnings quintile, followed by those in the bottom quintile. The rather different pattern observed in Bulgaria when an absolute threshold is used reflects the fact

that under the use of such threshold only a very small share of the population (0.18%) is considered as facing low work incentives at the intensive margin.

The differences between the definition of low work incentives in terms of an absolute or a relative threshold and the portrait of individuals facing low wok incentives in each case highlight the extent to which the distribution of work incentives differs across countries. The use of relative thresholds appears to be more relevant when the aim is to represent the population with the lowest work incentives in each country. However, from a cross country comparative perspective, the relative thresholds in certain countries might be too low to characterise some individuals as facing low work incentives. In this sense, the definition of an absolute threshold might seem more appropriate for a general characterisation of groups facing low incentives to work.

4. Concluding remarks

This research note presents a cross country comparison of work incentives at the extensive and intensive margin of labour supply in selected EU countries. Our analysis makes use of the EU tax-benefit model EUROMOD and representative household microdata to estimate short- and long-term participation tax rates (PTR), and marginal effective tax rates (METR) in 2015 for individuals currently in work in Belgium, Germany, Austria, Bulgaria, Finland, Italy, Hungary, Lithuania and the UK. The use of microdata allows us to characterise the mean level and distribution of work incentives at the population level and to provide a portrait of the individuals facing low work incentives in each country.

Our findings illustrate the important variation in the mean level and the distribution of work incentives, at the population level, across our selected countries, highlighting the importance of using representative microdata in the analysis. Countries with relatively similar average PTR or METR can be characterised by very different distributions of work incentives. The distribution of short-term PTR is for example highly concentrated around the median in Hungary, Finland and Austria and rather flat in Lithuania and Bulgaria. In most countries, the composition of the distribution by income group differs. While higher income groups tend to be concentrated left from the mean in Belgium, they are concentrated towards above-average disincentives in Germany. The interplay of unemployment insurance benefit and the potential contributions to the system have very diverse effects on the distribution. However, drivers are not only different from country to country but also between short-term and long-term scenarios. Across countries, average long-term PTR are smaller than the short-term PTR and the shape of the distribution changes quite substantially. This is partly due to the exhaustion of unemployment insurance benefits and thus, highlights the role of unemployment benefits on work incentives in the countries.

The distribution of long-term PTR is shaped by the role of unemployment assistance and eligibility criteria for social assistance in the countries. It is often less concentrated than the distribution of short-term PTR with the exception of Bulgaria and Hungary. The distribution of the METR highlights the role of the income tax system. While, flat-tax countries such as Hungary, Lithuania and Bulgaria show a high concentration around the median, progressive income tax systems contribute to a wider dispersion of the distribution. In most countries, means-tested benefits influence the small kinks at the end of the distribution rather than the distribution of METR as such.

Thus, numerous factors contribute to the differences in the distribution of work incentives across countries, reflecting for instance the underlying differences in the design of tax-benefit systems and in labour market conditions. Our comparison between short-and long-term PTRs highlights the importance of unemployment insurance benefits on work incentives at the extensive margin. In most countries, unemployment insurance schemes represent the most important component driving short-term PTR but to different extents depending on the generosity or the duration of the benefit in each country. Countries such as Belgium, Germany and Finland, characterised by generous unemployment insurance schemes, present high short-term disincentives on average, between 70% and 80% of previous earnings. In the long-term, the existence of unemployment assistance and the generosity of social assistance benefits characterises countries ranking high in terms of mean PTR. However, the role of reduced taxes and social insurance contributions increases compared to short-term PTR and particularly so in countries such as Italy, Bulgaria and Belgium. At the intensive margin, in most countries, reduced income taxes contribute the most to METR followed by social insurance contributions.

Additionally, our analysis exploits the advantages of microdata and compares work incentives across different population subgroups. In all countries, the largest differences in work incentives can be observed between earning quintiles, however the patterns differ across countries. In some countries, individuals at the bottom of the earnings distribution face lower work incentives (e.g. Lithuania, Belgium and Hungary, when short-term PTR are considered), while the opposite is observed in other countries (e.g. Italy and Germany for short-term PTR). Some differences are observed in terms of employment status. In particular, employees face on average higher short-term PTR as the self-employed are not eligible to unemployment insurance in some countries. Employment status also plays a role in METR do to different regimes in social insurance contributions for employees and the self-employed.

Finally, our analysis provides a description of the characteristics of individuals facing low work incentives at the extensive and intensive margin. Two different approaches are considered to define low work incentives. On the one hand, an

absolute threshold is defined. Such approach seems particularly relevant when the aim is to provide a cross-country comparative analysis. On the other hand, a relative threshold is defined based on the median value of PTR or METR in each country (120% of the median in our analysis). The latter approach seems more appropriate when the aim is to describe the population with low work incentives in each country. Our results show that the relative thresholds differ significantly across countries, reflecting differences in the distribution of work incentives. In countries such as Bulgaria, the relative threshold to define high long-term PTR or high METR can be as low as 26%, compared to an absolute threshold at 50%. In the UK the threshold to define high short-term PTR would be 50%, compared to an absolute threshold at 75%. In general, the portrait of those facing low work incentives does not vary substantially whether an absolute or a relative threshold is used, and where it does, it is due to the gap between the relative and the absolute threshold (capturing different subsamples of the population).

Providing a comparative analysis of work incentives in selected EU countries based on representative household data is a useful exercise, as it highlights the important differences in the distribution of work incentives associated to differences in tax-benefit systems. The characterisation of population subgroups facing low work incentives, provided in our analysis, can be considered a useful first step to discuss potential reforms to make work pay. From a technical point of view, a comparative analysis further provides a starting point to discuss what the most appropriate definition of low work incentive would be (i.e. setting a threshold, whether relative or absolute).

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Appendix

Table A1a: Sample characteristics

	BE	BG	DE	IT	LT	HU	AT	FI	UK
N. of observations	5,375	4,649	11,964	16,941	4,699	11,300	5,673	12,241	17,068
Population (1,000)	4,371	3,023	35,916	21,668	1,256	4,017	3,788	2,312	25,411
% female	46.20	47.74	48.57	42.89	49.17	46.10	45.13	49.89	47.17
% age (<30)	18.76	16.97	17.06	12.64	20.00	17.62	21.38	19.15	22.80
% age (30-50)	58.65	56.42	56.22	60.98	53.01	56.01	55.42	51.74	52.74
% age (50+)	22.58	26.60	26.71	26.39	26.98	26.37	23.20	29.11	24.46
% low-skilled	17.21	14.13	6.84	29.33	4.41	11.76	12.15	10.22	46.56
% medium-skilled	37.28	56.61	52.79	47.52	55.93	64.31	55.13	45.00	25.31
% high-skilled	45.51	29.26	40.37	23.15	39.65	23.94	32.72	44.78	28.13
% employee	92.30	93.74	94.41	77.61	94.66	90.25	91.09	94.80	87.71
% self-employed	7.70	6.26	5.59	17.34	5.34	9.75	8.91	5.20	12.29
% main earner	64.85	58.54	66.01	66.68	61.27	60.11	61.80	65.43	62.63
% secondary earner	35.15	41.46	33.99	33.32	38.73	39.89	38.20	34.57	37.37
% part time	14.64	6.33	19.03	15.87	9.83	11.18	18.94	11.55	19.45
% low work intensity	4.04	11.52	4.88	8.01	8.47	8.46	6.40	9.37	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table A1b: Sample size

	BE	BG	DE	IT	LT	HU	AT	FI	UK
N. of observations	5,375	4,649	11,964	16,941	4,699	11,300	5,673	12,241	17,068
male	2,796	2,414	6,060	9,398	2,301	5,802	3,019	6,242	8,688
female	2,579	2,235	5,904	7,543	2,398	5,498	2,654	5,999	8,380
age (<30)	934	622	1,489	1,883	579	1,954	1,037	1,787	3,058
age (30-50)	3,204	2,597	6,622	10,199	2,294	6,399	3,281	6,179	9,364
age (50+)	1,237	1,430	3,853	4,859	1,826	2,947	1,355	4,275	4,646
low-skilled	920	715	735	4,433	161	1,451	586	1,259	8,308
medium-skilled	1,962	2,696	6,387	8,591	2,788	7,108	3,103	5,466	4,144
high-skilled	2,493	1,238	4,842	3,917	1,750	2,741	1,984	5,516	4,616
employee	4,936	4,312	11,279	12,784	4,427	10,544	5,156	10,800	14,989
self-employed	439	337	685	3,315	272	756	517	1,441	2,079
main earner	3,452	2,780	7,799	10,928	2,864	6,951	3,614	7,404	11,101
secondary earner	1,923	1,869	4,165	6,013	1,835	4,349	2,059	4,837	5,967
part time	813	321	2,417	2,716	484	1,212	1,084	1,397	3,548
low work intensity	200	547	519	1,368	377	984	355	1,136	N/A

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table A2: Distribution of short-term PTR in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
mean	78.52	61.23	72.43	57.23	46.30	51.30	68.47	70.94	46.24
median	78.55	66.24	75.42	64.44	45.02	47.10	69.41	71.19	41.21
p25	71.71	49.70	71.00	47.53	35.95	43.00	64.09	68.80	35.86
p75	84.88	76.61	79.47	70.20	53.78	50.16	72.43	74.28	55.20

Source: own calculations using EUROMOD version G3.62

A3: Distribution of long-term PTR in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
mean	49.17	23.05	45.86	23.38	27.40	41.97	40.87	54.75	37.09
median	49.07	21.61	43.75	24.86	23.18	34.50	36.86	51.15	33.72
p25	41.80	19.89	35.32	15.02	18.39	34.21	27.13	48.20	22.62
p75	55.22	26.88	56.15	33.62	32.65	44.83	53.62	57.30	49.54

Source: own calculations using EUROMOD version G3.62

Table A4: Distribution of METR in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
mean	53.50	19.99	49.95	39.90	28.20	35.86	43.20	44.19	35.65
median	54.99	21.61	45.32	42.12	27.90	34.50	44.36	45.19	32.52
p25	52.67	21.61	40.89	35.71	24.00	34.50	42.67	39.89	32.00
p75	59.36	21.61	50.39	48.91	27.90	34.50	48.99	48.90	42.00

Source: own calculations using EUROMOD version G3.62

Table A5: Characteristics of the population facing short-term PTR above 120% of the median in each country in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	395	1,042	511	1,451	1,258	1,985	857	467	6,003
% sample	7.25	19.99	5.01	8.78	24.69	20.32	15.91	3.58	32.83
% male	33.95	48.40	55.11	30.92	47.56	60.14	34.73	43.27	52.61
% female	66.05	51.60	44.89	69.08	52.44	39.86	65.27	56.73	47.39
% age (<30)	23.97	2.94	32.20	14.50	19.11	19.96	22.88	28.62	18.59
% age (30-50)	51.37	43.65	50.58	42.67	40.77	39.82	65.97	39.40	62.05
% age (50+)	24.67	53.41	17.22	42.83	40.13	40.22	11.14	31.98	19.36
% low-skilled	25.47	15.01	18.41	39.64	6.92	14.44	24.45	17.76	52.95
% medium-skilled	44.19	64.88	50.49	45.68	73.41	65.74	54.41	51.29	24.68
% high-skilled	30.34	20.11	31.10	14.68	19.68	19.83	21.14	30.96	22.37
% employee	75.26	99.31	98.42	98.40	97.01	54.74	92.57	69.94	89.32
% self-employed	24.74	0.69	1.58	1.10	2.99	45.26	7.43	30.06	10.68
% main earner	42.47	58.40	48.16	39.51	59.35	51.49	46.13	55.69	78.25
% secondary earner	57.53	41.60	51.84	60.49	40.65	48.51	53.87	44.31	21.75
% earnings Q1	93.12	17.74	37.84	38.73	31.93	36.71	49.63	74.03	33.58
% earnings Q2	6.62	19.50	18.81	37.84	35.85	20.32	46.01	17.15	19.77
% earnings Q3	0.00	25.56	14.14	15.66	23.93	16.43	3.54	4.38	18.41
% earnings Q4	0.26	20.67	18.19	6.95	7.82	15.94	0.73	2.95	16.31
% earnings Q5	0.00	16.53	11.02	0.82	0.47	10.59	0.10	1.48	11.94
% part time	47.80	9.02	15.96	34.50	18.26	24.71	52.65	34.84	29.43
% low work intensity	13.17	11.96	7.20	9.82	17.55	13.83	12.51	20.92	n/a
threshold	94.26	79.49	90.50	77.33	54.02	56.52	83.29	85.43	49.45

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table A6: Characteristics of the population facing long-term PTR above 120% of the median in each country in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	791	1,343	3,244	6,548	1,262	2,843	1,986	2,071	6,003
% sample	15.58	27.82	29.81	36.23	30.19	27.70	34.11	18.59	36.58
% male	55.33	57.73	54.33	61.11	53.33	60.15	67.80	44.97	59.93
% female	44.67	42.27	45.67	38.89	46.67	39.85	32.20	55.03	40.07
% age (<30)	25.58	10.54	23.46	6.70	27.52	33.93	16.65	31.08	20.00
% age (30-50)	52.01	68.31	52.43	59.11	53.13	44.47	58.68	42.16	60.36
% age (50+)	22.41	21.16	24.12	34.18	19.35	21.61	24.67	26.76	19.64
% low-skilled	24.33	23.39	12.16	20.99	7.29	11.26	12.70	14.71	49.93
% medium-skilled	39.89	53.00	59.80	44.61	59.53	64.77	49.08	55.41	24.48
% high-skilled	35.78	23.62	28.04	34.40	33.18	23.97	38.22	29.89	25.58
% employee	88.91	78.57	94.70	66.49	86.83	65.65	86.11	83.41	86.85
% self-employed	11.09	21.43	5.30	31.52	13.17	34.35	13.89	16.59	13.15
% main earner	85.57	74.63	74.96	69.41	78.33	48.58	94.73	72.00	87.26
% secondary earner	14.43	25.37	25.04	30.59	21.67	51.42	5.27	28.00	12.74
% earnings Q1	34.60	18.28	21.39	6.52	22.15	22.45	14.26	44.55	23.28
% earnings Q2	23.19	21.49	31.39	9.42	21.07	25.55	15.33	26.58	18.63
% earnings Q3	19.29	21.12	21.46	9.57	19.60	20.43	20.28	14.14	19.17
% earnings Q4	14.60	17.53	15.62	22.61	20.33	16.53	21.84	9.16	18.76
% earnings Q5	8.31	21.59	10.14	51.88	16.85	15.04	28.28	5.57	20.16
% part time	18.35	8.90	15.89	7.22	14.69	14.33	12.33	28.85	29.43
% low work intensity	10.65	13.71	6.73	5.80	16.31	8.32	10.18	16.98	n/a
threshold	58.88	25.93	52.50	29.83	27.82	41.40	44.23	61.38	40.46

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62

Table A7: Characteristics of the population facing METR above 120% of the median in each country in 2015

	BE	BG	DE	IT	LT	HU	AT	FI	UK
Sample size	377	451	1,519	3,091	275	824	469	1,676	4,931
% sample	7.11	8.82	13.75	18.13	6.61	9.77	8.82	9.48	27.63
% male	49.85	67.56	38.20	68.46	53.75	67.88	46.82	64.98	63.14
% female	50.15	32.44	61.80	31.54	46.25	32.12	53.18	35.02	36.86
% age (<30)	30.25	8.93	20.28	5.14	35.43	5.41	23.03	21.41	12.19
% age (30-50)	53.33	59.90	52.75	68.30	44.74	58.78	52.45	48.01	65.94
% age (50+)	16.42	31.17	26.98	26.56	19.83	35.81	24.53	30.58	21.86
% low-skilled	25.10	22.33	14.24	26.48	12.75	5.90	18.34	10.46	40.96
% medium-skilled	47.24	47.77	57.21	46.54	63.37	63.73	52.34	34.31	22.64
% high-skilled	27.66	29.90	28.55	26.98	23.89	30.37	29.32	55.22	36.40
% employee	93.76	30.76	93.09	81.33	65.17	21.53	75.01	83.25	86.00
% self-employed	6.24	69.24	6.91	18.25	34.83	78.47	24.99	16.75	14.00
% main earner	62.71	63.11	62.07	84.30	66.96	66.54	67.28	82.18	83.94
% secondary earner	37.29	36.89	37.93	15.70	33.04	33.46	32.72	17.82	16.06
% earnings Q1	22.50	22.92	47.43	1.71	65.13	6.10	33.85	28.31	15.92
% earnings Q2	70.58	15.16	25.83	3.95	14.94	19.04	43.71	6.53	11.91
% earnings Q3	5.76	13.13	8.05	11.73	6.80	23.13	3.07	4.02	11.49
% earnings Q4	0.72	16.29	7.49	41.11	9.52	21.58	9.15	6.02	8.12
% earnings Q5	0.44	32.50	11.20	41.50	3.60	30.16	10.21	55.12	52.57
% part time	17.41	8.33	39.53	4.11	39.32	4.85	31.15	19.35	17.19
% low work intensity	8.27	8.30	8.93	6.55	36.56	7.28	10.91	14.65	n/a
threshold	65.99	25.93	54.38	50.54	33.48	41.40	53.23	54.23	39.02

Note: In this table "self-employed" are defined as those with self-employment income, who do not have employment income. "Part time" indicates workers working less than 30 hours per week. "Low work intensity" indicates individuals living in households where earners' months in employment in a year add up to a maximum of 50% of the full potential employment duration (12 months in employment in a year for each earner). N/A – not available.
Source: own calculations using EUROMOD version G3.62.