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Enforcing `Equal Pay for Equal Work' in the EU: what would it take?

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Abstract

The European Parliament has recently approved new binding pay transparency measures to promote ``Equal Pay for Equal Work'', an EU founding principle which is at the heart of the European Pillar of Social Rights Action Plan towards 2030. Using harmonized microdata for the EU 27 countries and a novel estimation approach -based on blocking with regression adjustments- we provide new comparable estimates of the gap in gross hourly wages between women and men performing similar work. This gap ranges from about 6% in Germany to 18% in Estonia. We also shed new light on the (heterogeneous) distributional consequences of a hypothetical enforcement of equal pay for equal work, simulating an upward shift in women's gross hourly wage. The strongest impact on the distribution of labour earnings would take place in countries with high gender pay gaps for equal work and small gender gaps in employment and hours worked (mainly Central and Eastern European countries), whereas only marginal effects are identified in countries with large gaps in hours worked and gender segregation in the type of work done (Western European countries), and also in countries with large employment gaps (Southern European countries). We also identify income poverty-reducing and inequality-increasing effects. The latter is driven by a composition effect (under-representation of employed women in low-income households), which is only partly offset by the tax-benefit system.

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We want to thank our colleagues from JRC.B2 and DG.JUST for their comments at the internal seminars where this work was presented. We also want to thank Martina Bazzoli (FBK-IRVAPP) and Daniela Piazzalunga (University of Trento) for their help with the adjustment of the Stata command ``psreg'' used in this work. We also want to thank A. Agúndez, A.F. Amores, N. Cattabriga, M. Christl and G. Erreygers for their comments. Special thanks for the insightful feedback received from the reviewers of this Working Paper version: S. Barrios, V. Ivaškaitė-Tamošiūnė, M. Lalanne and D. Villani. Responsibility for the information and views expressed in the article lies entirely with the author(s).

Authors

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Executive summary

— In this study we provide new comparable estimates of the gap in gross hourly wages between women and men performing similar work. This gap ranges from about 6% in Germany to 18% in Estonia.

— Our estimates are based on harmonized microdata for the EU 27 countries from the Statistics and Income Living Conditions surveys (SILC) and a novel estimation approach, based on blocking with regression adjustments.

— We shed new light on the (heterogeneous) distributional consequences of a hypothetical enforcement of equal pay for equal work from a simulated upward shift of women's gross hourly wages. To account for changes in the distribution of household disposable income, we use the EUROMOD tax-benefit microsimulation model.

Background and policy context

— Despite the great gender convergences in labour market participation and human capital of the past decades, women in the EU still face important disadvantages with respect to men in many dimensions of social inclusion. Worryingly, recent studies suggest that there might be new forces increasing women's disadvantages in labour markets, including the green and digital transition and the pandemic shock.

— In this context, the European Parliament has recently approved new binding pay transparency measures to promote ``Equal Pay for Equal Work'', an EU founding principle which is at the heart of the European Pillar of Social Rights Action Plan towards 2030.

Main findings

— The EU is still far from guaranteeing equal pay for equal work between women and men. We estimate that, on average, women earn 11% less per hour (before taxes) than men performing a similar work.

— These “adjusted” gender pay gaps are particularly high in Central Eastern European (CEE) countries, as well as in male-predominant occupations and sectors.

— Unequal pay for equal work is an important driver of the gender pay gap. This is particularly true in CEE and Southern European economies. However, in most Western and Northern European countries (some of which have already implemented different types of Pay Transparency policies), the main driver of the gender pay gap is not unequal-pay phenomenon but the strong gender segregation in the type of work done (women are under-represented in highly paid type of work).

— The simulated impact of the enforcement of equal pay for equal work -through an upward shift of gross hourly wages- on the distribution of labour earnings and household disposable income is very heterogeneous across EU countries, depending, among others, on the gender gap in employment rates and hours worked (i.e. gaps at the extensive and intensive margin of labour market participation).

— The distributional effects tend to be the strongest in countries characterized by high adjusted gender pay gaps (i.e. high incidence of unequal pay for equal work) and low gender gaps at the intensive/extensive margin of labour market participation. By contrast, only marginal effects are simulated in countries with a low prevalence of unequal-pay but large gaps in employment rates

— The expected impact on the distribution of household disposable income suggests poverty-decreasing and inequality-increasing responses across the board. The inequality-increasing effect is mainly driven by a composition effect (the correction of the gender pay gap through an upward shift of women’s gross hourly wages disproportionately benefits middle and high-income households, given the under-representation of employed women at the bottom.) However, we show that this unintended inequality-increasing effects could be easily compensated with the additional government revenues from the increase in the collection of direct taxes and social insurance contributions, as well as from the decrease in mean-tested cash transfers.

Enforcing 'Equal Pay for Equal Work' in the EU: What would it take?*

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Abstract

The European Parliament has recently approved new binding pay transparency measures to promote 'Equal Pay for Equal Work', a European Union (EU) founding principle at the heart of the European Pillar of Social Rights Action Plan for 2030. Using harmonised microdata from the 27 EU countries (EU 27) and a novel estimation approach based on blocking with regression adjustments, we provide new comparable estimates of the gap in gross hourly wages between women and men performing similar work. This gap ranges from about 6% in Germany to 18% in Estonia. We also shed new light on the (heterogeneous) distributional consequences of a hypothetical enforcement of equal pay for equal work, simulating an upward shift in women's gross hourly wage. On the one hand, the strongest impact on the distribution of labour earnings and household disposable income takes place in countries with high gender pay gaps for equal work and small gender gaps in employment and hours worked (mainly in Central Eastern Europe). On the other hand, only marginal effects are simulated in countries with large gaps in hours worked and gender segregation in the type of work (Central Western European countries) as well as in those countries with large gender gaps in employment rates (Southern European countries). Despite this cross-country variation, we identify common poverty-reducing and inequality-increasing effects. The latter is driven by the under-representation of employed women in low-income households, which is only partly offset by the tax-benefit systems.

Keywords: gender pay gap, pay transparency, regression-after-blocking, inequality, European Union
JEL Classification: J01 J24 J38 D63 J78

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1 Introduction

'Equal pay for male and female workers for equal work' (EPEW) is one of the EU's founding principles embraced in the Treaty of Rome of 1957,[1] which is also at the heart of the EU Pillar for Social Rights.[2] Despite the large gender convergences in human capital and employment during the 20th century in advanced economies (Bertrand, 2020; Olivetti and Petrongolo, 2016; Goldin, 2014; Weichselbaumer and Winter-Ebmer, 2005), women in the EU still earn considerably less than men. According to Eurostat's publicly available statistics,[3] in 2019, women's gross hourly wages in the EU were, on average, 14% lower than men's. These persistent sizeable gender pay gaps have inspired vast literature exploring their main drivers, identifying, among others, the key roles played by wage-setting policies and institutions, monopsonies in labour markets, preferences, stereotypes and network formation ability, motherhood and the uneven division of unpaid household production and care work within households.[4]

Worryingly, recent studies suggest that there might be new forces increasing women's disadvantages in labour markets, including robotisation (Aksoy et al., 2021), the COVID-19 shock (Brodeur et al., 2021; Sevilla and Smith, 2020) and the green transition (Bauhardt, 2022). In addition, the emerging and proliferate literature on 'top incomes' has uncovered substantial gaps between women and men at the very top of income distribution (Fortin et al., 2017; Atkinson et al., 2018). The ongoing disadvantages faced by women are of concern, not only from an egalitarian point of view but also for their adverse effects on aggregate welfare through the misallocation of talent (Hsieh et al., 2019; Erosa et al., 2022), disincentives to work and the indirect effects on fertility and human capital decisions (Galor and Weil, 1996; Cavalcanti and Tavares, 2016). In this context, in the spring of 2022, the European Parliament approved a proposal with new binding pay transparency measures,[5] one of the battle horses of the Commission's Gender Equality strategy 2020-2025. The proposal's Impact Assessment points out that these measures could potentially reduce the gender pay gap for equal work by about 3 percentage points (pp).[6] This motivates the questions we address in this paper. How far away are the EU 27 from actually fulfilling the EPEW principle, and how much would it take to enforce it? What could be the distributional consequences of a hypothetical enforcement of

[1] The Treaty, which established the European Economic Community (EEC), included the principle of equal pay between men and women for equal work in Article 119, which was then captured by Article 157 on the Functioning of the EU. Since then, many directives have been adopted against discrimination (for a comprehensive revision of EU gender equality laws, see Timmer et al., 2021).

[2] This Pillar was launched in 2017 and is complemented by a concrete Action Plan, launched in 2011, with targets for 2030 (see https://ec.europa.eu/info/strategy/priorities-2019-2024/economy-works-people/jobs-growth-and-investment/european-pillar-social-rights_en).

[3] See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Gender_pay_gap_statistics.

[4] A comprehensive review can be found in Blau and Kahn (2017), who have conducted several studies on this topic. More recent work on the measurement of the gaps can be found in Meara et al. (2020), which compares estimates from different estimation strategies and specifications for the US, and Blau et al. (2021) who examine the role of selection into employment for the US. In Europe, in particular, there is proliferate literature on 'sticky floors' and 'glass ceilings' (Albrecht et al., 2003; Arulampalam et al., 2007; De la Rica et al., 2008; Christofides et al., 2013). Moreover, while the presence of children and the discontinuity in labour careers have been signalled as two of the main drivers of gender pay gaps throughout working careers, Manning and Swaffield (2008) show that for the UK, these gaps are still positive for women without children, working full time and without any labour career interruption. Social norms and 'sticky' stereotypes on gender skills and roles (Bertrand, 2020) as well as network formation have more recently attracted considerable attention (Beaman et al., 2018; Cullen and Perez-Truglia, 2019; Mengel, 2020). The role of market power and monopsonies in the labour market on disadvantages suffered by women, including the gender pay gap, can be traced back to the original contributions of Joan Robinson (Robinson, 1969), but it has also recently received more attention (Ransom and Lambson, 2011; Manning, 2011; Farmand and Ghilarducci, 2022).

[5] The proposal was launched one year previously by the European Commission. The new measures involve, among others, pay information for job seekers, the right to know pay levels for workers doing the same work and gender pay gap reporting obligations for big companies. In contrast to previous similar initiatives, these new measures are 'binding'. According to Eurofound and EIGE (2021), this 'came only following the failure of the 2014 recommendation on gender pay transparency to nudge all the Member States to introduce pay transparency measures'. A good overview on the partial implementation of pay transparency measures in EU countries is provided by Hofman et al. (2020) (see Table 2).

[6] Available at https://ec.europa.eu/commission/presscorner/detail/en/ip_21_881

EPEW?

To address these questions, we combine two sequential empirical analyses. First, using microdata from harmonised household surveys (the EU and National Statistics on Income and Living Conditions), we estimate the 'raw' or 'unadjusted' gender pay gap (UGPG) and the 'unexplained' or 'adjusted' gender pay gap (AGPG) in all EU 27 countries. While the first simply depends on the difference between the mean hourly gross wage of women and men, the second requires a more careful estimation strategy to compare the hourly gross wages of women and men performing 'equal work'. To do so, we undertake a novel approach using a blocking-with-regression-adjustments strategy based on Imbens and Rubin (2015). With these estimates, we provide a cross-country comparative assessment to evaluate the importance of unequal pay for equal work (i.e. AGPG) in explaining the gender pay gap among employees (i.e. UGPG) as well as the total gender labour earnings gap (GLEG) among the working-age population. The latter depends not only on differences in hourly wages but also on employment rates and hours worked. Second, we simulate a new distribution of gross hourly wages that would narrow the AGPG by either 3 pp (as expected by the European Commission from the recent pay transparency measures) or fully (a scenario of full enforcement of the EPEW principle). We then discuss some of its (overnight)[7] distributional effects, accounting for the interaction of taxes and benefits and for the indirect effect on government budgets and the increase in employers' total labour costs. For this, we use the EU tax-benefit microsimulation model EUROMOD.[8]

We attempt to contribute to the literature in three ways. First, we provide new harmonised estimates on the prevalence of unequal pay for equal work for all 27 EU countries. Although there is rich cross-country literature on the drivers of gender wage gaps for high-income western countries, there is very limited evidence covering the whole of the EU.[9] We explicitly make the effort to cover all 27 EU countries because a wide cross-country perspective sometimes allows researchers to identify patterns that might not be easy to distinguish from a single-country inter-temporal perspective or a smaller cross-country coverage. We also want to explore what happens in the EU, especially in those countries that are not the most frequently covered by the empirical literature.[10] To our knowledge, only Denis Leythienne (2021) has provided cross-country harmonised estimates of the incidence of unequal payment for all EU countries, which are included in Eurostat's experimental statistics website. These estimates are based on a standard Oaxaca-Blinder (O-B) decomposition (Blinder, 1973; Oaxaca, 1973), a strategy that, despite being widely used by the literature, has received strong criticism because of the bias associated with its extrapolation assumption (Ñopo, 2008; Imbens, 2015).[11] This is where our second contribution kicks in. To overcome some of these limitations, we estimate the AGPG with regression adjustments after blocking based on propensity scores, which applies the method proposed by Imbens (2015) and Imbens and Rubin (2015).[12] Third,

[7] We discuss the implications of the implicit assumptions of this simulation in more detail in section 4.

[8] This is the only tax-benefit model that covers all the EU countries using a harmonised approach, and it is updated every year with the latest tax-benefit policy changes (see Sutherland and Figari, 2013; Maier et al., 2022). It is publicly available open-source material (https://euromod-web.jrc.ec.europa.eu/).

[9] Some good cross-country studies of reference are Blau and Kahn (2003), Olivetti and Petrongolo (2008) and Davies and Pierre (2005). Probably the closest studies to our paper in terms of data source and country coverage are from Matteazzi et al. (2018), who analyse the role played by part-time jobs in gender gaps for 11 countries using the EU Statistics on Income and Living Conditions (EU-SILC) 2009; Christofides et al. (2013) identify higher gaps both at the bottom and top (sticky floors and glass ceilings) through quantile regressions using EU-SILC 2007 for 24 EU countries; Schäfer and Gottschall (2015) examine the effect of wage-setting institutions using EU-SILC 2009 for 25 countries.

[10] Shedding light on convergence challenges in EU countries by assessing the potential different responses of policies defined at the EU level by the European Commission (such as the new binding pay transparency measures) is also at the heart of the European Pillar of Social Rights 2021.

[11] Although our estimates are not strictly comparable to Denis Leythienne (2021) because they use different data (the Structure of Earnings Survey (SES)), our estimated AGPG is not far from Denis Leythienne (2021)'s, at least, not for the EU average. Further comparisons and a discussion on the sensitivity of our results to the estimation strategy are provided in our methodological appendix B.

[12] To our knowledge, this is the first attempt to apply this method to the estimation of gender pay gaps. We use the Stata command 'psreg' (Bazzoli et al., 2020), and we thank their authors for extending it to account for sample weights.

we shed new light on the potential effects of enforcing the EPEW on the distribution of household disposable income, firms' costs and government revenues, accounting for the inter-play of taxes and benefits. The literature mainly focuses on gender pay gaps at the level of gross hourly wages and very rarely assesses the role of these gaps in the distribution of labour and household income, which is *a priori* ambiguous.[13] Our microsimulation estimates help us overcome some of the limitations of previous studies and intend to shed new light on the distributional impact of EPEW in the EU.

Our main findings suggest that the EU is still far from guaranteeing EPEW between women and men. We estimate that, on average, women earn 11% less per hour (before taxes) than men performing similar work, ranging from 6% in Germany to 18% in Estonia. In general, underpayment is more pronounced in Central Eastern European (CEE) countries and in male-predominant sectors and occupations. The simulated closure of this gap - through an upward shift of gross hourly wages that would enforce the principle of equal pay - has very different effects on labour earnings and the distribution of household disposable income across countries. The effects are strongest in countries characterised by a high AGPG and low intensive/extensive gaps in labour market participation (mainly CEE economies). In contrast, several countries only experience marginal effects given their low AGPG (especially where pay transparency measures are already in place) and/or high gaps in employment and hours worked. We show that the enforcement of EPEW through an upward shift of women's wages would lead, *ceteris paribus*, to an important increase in household disposable income. This would decrease income poverty, especially for single-adult households with children. However, as this effect is more pronounced towards the middle and top of income distribution, income inequality would slightly increase. Here, the distributional effects vary greatly across countries. We explore the drivers of this heterogeneity and identify the key roles of: i) a size effect (the higher the gaps at the extensive and intensive margins, the lower the effect of enforcing equal pay - defined at the gross hourly wage level - on the distribution of labour earnings and household disposable income); ii) a composition effect (under-representation of employed women at the bottom of household income distribution); iii) a cushioning effect from tax-benefit systems (progressive taxation partly offsets the inequality-increasing composition effect as well as the negative redistributive effect of the decline of means-tested benefits).

The rest of the paper is organised as follows. In section 2, we present the main features of the microdata used as well as the methodology employed to measure gender gaps and conduct the simulation exercise. Then, in section 3, we present the main results of this study. In section 4, we discuss the scope and limitations of our estimates and propose some further lines of research. Finally, section 5 provides some final concluding remarks and policy implications.

2 Data and empirical strategy

This section begins with a brief description of the data used and a discussion of their main advantages and limitations for the purposes of this study (2.1). Then, we present the methodological steps followed to estimate various gender gaps (2.2). Finally, we explain how the simulation exercise was conducted (2.3) to provide an overnight assessment of the potential distributional consequences of enforcing the EPEW principle.

We provide further details on the implementation of this method in section 2 and in the methodological appendix.

[13] For at least two reasons. First, there is mixed evidence on the prevalence of glass ceilings and sticky floors in Europe (Christofides et al., 2013). This means that underpayment could be higher among medium-top earners (suffering from glass ceilings) but also for lower earners (suffering from sticky floors). Second, it depends on where these underpaid women are located in the ranking of household disposable income and the extent to which changes in gross wages are converted into changes in net or disposable income (i.e. the tax-benefit systems).

2.1 Data

The data on personal, household, income and labour characteristics used in this study comes from harmonised household surveys, mainly the EU-SILC 2019.[14] To estimate the gender pay gaps, we focus on a subsample of individuals aged between 15 and 75 that have reported employment income.[15]

For the purposes of our study, EU-SILC offers some key advantages with respect to other available sources. First, in terms of more detailed surveys conducted by national statistical institutes (e.g. in some countries, microdata contains linked information from household surveys and administrative information from tax records, which among other virtues, better account for gender gaps in top incomes), the EU-SILC is harmonised across countries. Second, with respect to other EU-level harmonised surveys with detailed information on job-related personal characteristics, such as the SES and the EU Labour Force Survey (EU-LFS), EU-SILC contains not only quite detailed information at the individual level (including education, work experience, sector of activity, occupation, among others) but also at the household level (including household composition and incomes from different sources and for the other members of the household). Third, EU-SILC is used by the European Commission and Eurostat to estimate and monitor the official statistics of income inequality and poverty in the EU. This allows us to assess the effects of the simulated enforcement of EPEW on these indicators. Last but not least, SILC is the underlying microdata of EUROMOD, the tax-benefit microsimulation model that we use to estimate the effect of changes in gross wages on household disposable income. These microsimulations allow us to estimate the expected changes in taxes and benefits (and so, the indirect effects on government revenues and the actual increase in labour costs, including employers' social insurance contributions).[16]

In the methodological appendix (section A discusses the sensitivity and robustness of our results), we assess the reliability of our SILC-based estimated hourly wages by comparing our gender pay gap estimates with those reported by Eurostat based on SES (their estimates are included in Denis Leythienne (2021), as well as on their webpage in the 'experimental statistics' section). Moreover, we try to reproduce the sample characteristics of SES by filtering our SILC-based sample (excluding firms with less than 10 employees and workers in the agricultural and public sectors). Using this subsample, we compare our gender pay gap estimates with those published by Eurostat, which is the only source - to our knowledge - to which we can compare our results, given the lack of EU 27 harmonised evidence on the incidence of unequal pay for equal work (or the so-called AGPG, which is defined later).

2.2 Gender gaps: Definition and estimation

Now, we define and explain how we measure the gender gaps in gross hourly wages (2.2.1) and in total labour earnings, employment and hours worked (2.2.2).

[14] In some countries, we use more detailed information from the National SILC, as it provides complementary information that is missing from the EU-SILC, which is important for the tax-benefit microsimulation model. Monetary variables refer to 2018 income, and uprating factors (average growth rates in different components of income) are used to reflect 2019 income.

[15] EU-SILC questionnaires refer to incomes from the previous year (2018) and hours worked in the surveyed year (2019), and a well-known feature of EU-SILC-based hourly wage estimates can find extremely low values (for instance, hourly wages that are far below minimum wages or even close to zero, which are a reflection of a measurement error). Thus, we also filter the sample excluding the bottom 2.5% of the population with the lowest hourly wages. Our results are not affected in any significant way by the exclusion of these extreme low values. Self-employed individuals are excluded from the estimation of the gaps and the simulation exercise because they are, in general, not affected by pay transparency measures or EPEW initiatives, at least, not directly.

[16] The simulated increase in labour costs has to consider employers' and employees' social insurance contributions, something that we can also simulate with the EUROMOD model.

2.2.1 *Unadjusted* and *Adjusted* gender pay gaps: UGPG and AGPG

The UGPG - often called the 'raw' gender pay gap - is defined, following the standard practice in the literature, as the difference in the female and male average gross hourly wages ($\bar{hw}_f$ and $\bar{hw}_m$, respectively) as a percentage of males (see equation 1).

$$UGPG = \frac{(\bar{hw}_m - \bar{hw}_f)}{\bar{hw}_m} = 1 - \frac{\bar{hw}_f}{\bar{hw}_m} \tag{1}$$

These gaps are easy to estimate, as they only depend on the mean of the distribution of two variables. To account for differences in gross hourly wages among women and men performing 'equal work', we use the concept of the AGPG (often called 'unexplained' gender pay gap). The estimation of the AGPG requires more careful and demanding statistical work, as we need to compare wages for women and men with similar characteristics. The most common approach in the literature is to decompose the observed differences in wages into an 'explained part' (EP), differences in wages explained by differences in characteristics between these two groups and an 'unexplained part' (UP), differences in wages that cannot be attributed to differences in these characteristics (see equation 2). This 'unexplained part' is what our AGPG tries to capture and is our proxy for measuring unequal pay for equal work.

$$UGPG = EP + UP \equiv EP + AGPG \tag{2}$$

The most common approaches to measuring the AGPG are based on an O-B type of decomposition, quantile regressions or matching.[17] We estimate the wage differences between women and men performing equal (or very similar) work using the blocking with regression adjustments estimation method proposed by Imbens (2015) and Imbens and Rubin (2015). This methodology, which was primarily designed for causal identification in policy evaluation, uses the nomenclature of 'treatment effects'. The 'treatment' could be, for example, a training course that a particular group of the population has attended. The outcome could be the wage (or other employment-related outcomes) after the course. To evaluate the effect of this 'treatment' on a certain outcome, this methodology tries to find similar 'treated" and 'control' units, similar to matching techniques. We apply this strategy as follows. In our study, the 'treatment' group are women ($W = 1$), the 'control' group are men ($W = 0$) and the outcome of interest (Y_i) is the gross hourly wage. In this setting, we would like to know the wage that a woman would have 'if she were a man' (all things equal). This can be defined, following the standard nomenclature, as $Y_i(0)$, the value of the variable Y for individual i if the worker was a man ($Wi = 0$).

$$Y_i obs = Y_i(W_i) = \{ \begin{array}{l} Y_i(0) \; if \; W_i = 0 \\ Y_i(1) \; if \; W_i = 1 \end{array} \tag{3}$$

The population average treatment effect conditional on the covariates is $\tau(x)$, $\tau(x) = E[Y_i(1) - Y_i(0)/Xi = x]$, but in the sub-population of treated units, it is τ_{tr} ($\tau_{tr} = E[Y_i(1) - Y_i(0)/Wi = 1]$). Estimating the AGPG using this methodology follows three main steps: i) blocking or sub-classification of the estimated propensity score of the surveyed individuals (we identify j number of blocks, i.e. groups of similar women and men based on their characteristics); ii) regressions within the blocks where the outcome Y_{ij} is the logarithm of the gross hourly wage, which is linearly dependent on a matrix of covariates with k characteristics (X_k), together with an indicator for the treated ('women dummy') whose coefficient is τ_j; iii) weighted-averaging the coefficients of interest (τ_j) obtained from each block (see equation 4). In the methodological appendix (A), we provide further details on the

[17] A very interesting study that compares the results of different methodologies and specifications to measure these gaps in the US is by Meara et al. (2020).

steps followed to estimate the AGPG.

$$ATT \equiv \tau_{block,tr}(Y, W, X) = \sum_{j=1}^{J} \frac{N_{tj}}{N_t} \hat{\tau}_j \tag{4}$$

As wages are included in the logarithms, the estimated AGPG is obtained through a small transformation of the weighted treatment effects across blocks as follows:

$$AGPG = (1 - e^{ATT}) * 100 \tag{5}$$

The explanatory variables (x_k) included in both the logit regression behind the propensity score to construct the blocks and the regressions estimated for each block to proxy the 'type of work' as much as possible are classified into four groups: personal variables, geographic characteristics, job characteristics and household characteristics.

- Personal variables: Age and age square; Education (four levels: primary, lower-secondary, upper-secondary, tertiary, based on ISCED-classification); Working experience (years)
- Geographic characteristics: Degree of urbanisation; Region (when the information in EU-SILC is available)
- Job characteristics: Sector of activity (12 groups, NACE 1-digit level); Occupation (8 groups, ISCO 1-digit level); Civil servant (dummy, 1=yes, 0=no); Firm size (number of persons working in the firm); Part-time (dummy, 1=more than 30 hours, 0=less)
- Household characteristics: Number of children (0-2 years old, 3-5, more than 6 years old); Presence of a partner; Citizenship (dummy, 1=National, 0=other)

The selection of variables used to estimate the gap is far from trivial and has an important influence on the estimated AGPG. In this paper, we use the most standard approach and consider all the variables that could drive differences in wages to isolate the effect of gender. However, we discuss the sensitivity of the results to these decisions throughout the paper.

2.2.2 Gender labour earnings gap

Women's total labour earnings (Y_f, $Y_f = \sum_{i=1}^{i=N_f}(h_i hw_i) = \sum_{i=1}^{i=N_f}(yi)$) depend on the number of employed women (N_f), the number of hours worked (h_i) and the hourly wage (hw_i). Analogously, men's total labour earnings is defined as $Y_m = \sum_{i=1}^{i=N_m}(h_i hw_i) = \sum_{i=1}^{i=N_m}(yi)$. Following the standard definition of gender gaps, let us define the GLEG as the difference in the mass of labour earnings between men and women (equation 6).

$$GLEG = \frac{Y_m - Y_f}{Y_m} \tag{6}$$

While the UGPG and AGPG depend only on gross hourly wages, the GLEG also depends on the number of employed women and men (and, therefore, on the gender gap at the extensive margin of labour market participation) and on the number of working hours (the gender gap at the intensive margin). All things equal, a country with higher gaps in hours or employment will have a higher GLEG, even if the UGPG is the same.

Analogously, we define gender gaps in hours worked and employment as in equation 6, by replacing Y with the total hours worked or the number of employed.

2.3 Simulations of the enforcement of equal pay (i.e. closing the AGPG)

We analyse two hypothetical scenarios to simulate the enforcement of EPEW: i) 3 pp reduction (a decline of the AGPG following the projections of the European Commission on the expected effects of the new pay transparency measures); ii) a full reduction scenario (a benchmark where the EPEW principle is fully enforced, i.e. where AGPG=0).

There are, in principle, infinite possible changes in the distribution of gross hourly wages that could close the AGPG by either 3 pp or fully. As we do not know how wages will respond to these new pay transparency measures, to illustrate the potential distributional effect of enforcing EPEW (either by pay transparency or any other policy measure aimed to meet this goal), we simulate the closure of these gaps through an upward adjustment of women's gross hourly wages, leaving the distribution of men's wages untouched. We do not consider behavioural responses. Results, therefore, have to be interpreted as 'overnight effects'. The simulation also assumes that the increase in women's gross hourly wages would be absorbed by firms (who would face an increase in labour costs, driven by the increase in gross hourly wages). We further discuss to what extent these assumptions restrict the scope of our results in section 4, in light of some evidence reported by previous studies.

Therefore, the simulated gross hourly wage under the two scenarios 's' (hw_{is}) - see equation 7 - for each employed woman i is the one that would reduce her individual $AGPG_i$[18] by either 3 pp or fully ($x_s = 0.03$ in the 3 pp reduction scenario and $x_s = 1$ in the full reduction scenario). Here, 'b' refers to the baseline (hw_{ib} is the observed individual gross hourly wage before the simulation). These simulated gross hourly wages are then used to re-calculate the *unadjusted* and *adjusted* gender pay gaps (i.e. the UGPG and AGPG, respectively) as well as the GLEG under these two scenarios.

$$hw_{is} = hw_{ib} + \hat{AGPG}_i * x_s \tag{7}$$

Once we simulate the new distribution of women's gross hourly wages that would narrow the AGPG in the two abovementioned scenarios, we use the microsimulation model EUROMOD to estimate the effect of this 'shock' in gross hourly wages on the distribution of household disposable income and government revenues. This microsimulator combines country-specific coded policy rules with representative household microdata from EU-SILC.[19] The household disposable income of household j (DY_j) is composed of two main elements: i) household market income (MY_j), which is the sum of gross wages, gross incomes from capital, private pensions and private transfers of all household members; ii) the 'net tax-benefit transfer' from governments (TB_j). This net transfer consists of cash benefits (B_j) minus direct taxes (T_j) and social insurance contributions (SIC_j).

$$DY_j = MY_j + TB_j \equiv MY_j + B_j - (T_j + SIC_j) \tag{8}$$

To address the effect of the new distribution of gross hourly wages - following the simulated closure of the AGPG - on the distribution of *equivalised*[20] household disposable income, we decompose the change in household equivalised disposable income for each income decile (defined in the baseline) in the two components of equation 8.

[18] The 'individual' gap is not more than the AGPG within the block where the worker belongs.

[19] The model employs information on countries' tax and benefit policy rules and household characteristics to simulate tax liabilities (direct taxes and social insurance contributions) and cash benefit entitlements (both contributory and non-contributory). The model simulations take into account the role played by each tax-benefit instrument and its possible interactions before generating the disposable household income (i.e. after taxes and cash benefits). Cross-country comparability is enabled by a common framework to code the policy systems of each EU Member State and from the harmonisation of the underlying microdata (SILC). For more information on this model, see Sutherland and Figari (2013) and Maier et al. (2022).

[20] To account for differences in household size and composition, we estimate *equivalised* household disposable income, for which we use the so-called OECD-modified equivalence scales. These assign a value of 1 to the household head, 0.5 to each additional adult member and 0.3 to each child.

We also analyse the expected effects of the simulated distribution of gross hourly wages on aggregate indicators of income poverty and inequality. First, we use the standard at-risk-of-poverty (AROP) rate, the share of people with an equivalised disposable income below 60% of the median. Second, we use concentration indices. To evaluate the overall impact on income inequality, we simply compare the Gini coefficient of equivalised household disposable income in the baseline, $G(DY_b)$, and in the simulated scenarios, $G(DY_s)$. To disentangle the redistributive effect of the changes in market incomes (driven by the new gross hourly wages) from the redistributive effect of changes in taxes and benefits, we use the so-called Reynolds-Smolensky index (RS),[21] which can be defined as $RS_s = G(DY_b) - C(DY_s)$, with $C(DY_s)$ being the concentration index of the simulated disposable income with the baseline ranking. This index measures the redistributive effect without re-ranking the effects (i.e. using the original ranking of households according to their baseline disposable income). To identify the specific role or redistributive effect of changes in market income (MY) *versus* those in the net tax-benefit transfer (TB) under the simulated scenarios, we estimate this index for each component: i) for market incomes: $RS_{my,s} = G(DY_b) - C(DY_{b+my,s})$; ii) for taxes and benefits: $RS_{tb,s} = G(DY_b) - C(DY_{b+tb,s})$.[22]

3 Results

In this section, we present and discuss the results from our analysis in two parts. We start with the estimation of the gender pay gaps - defined at the level of gross hourly wages - for the EU 27 (sub-section 3.1), which allows us to evaluate how far they are from fulfilling the EPEW principle. In the first part, we also discuss how much the AGPG (measuring unequal pay for equal work) matters to explain differences in the mean gross hourly wages between women and men (i.e. the UGPG) and in total labour earnings among the working-age population. In the second part (sub-section 3.2), we present the results from our simulation exercise and discuss the distributional effects of the simulated upward shift of women's gross hourly wages that would narrow or fully close the AGPG.

3.1 Unequal pay for equal work in the EU

Table 1 presents the estimated gender pay gaps for each EU Member State based on gross hourly wages. The first column reports the estimated UGPG, while columns 2-5 display the AGPG, our proxy for unequal payment for equal work, under different specifications. The estimated AGPG in column 2 only accounts for personal characteristics (age, education, work experience); therefore, it represents the mean hourly wage gap between women and men of similar age, education and work experience. The subsequent columns show the AGPG estimated with the sequential and accumulative inclusion of other variables: job characteristics (sector, occupation and firm size)[23] in column 3, a part-time dummy in column 4 and other characteristics (e.g. presence of children, partner, etc.) in column 5. The latter is our baseline specification; therefore, the main results discussed in this section will refer to them. The final row displays the (unweighted) EU average of each column. As we can see from our preferred specification (column 5), the estimated AGPG is, on average, 11.1%.[24] This number suggests that women in the EU earn, on average, about 11% less per hour worked (in gross

[21] Reynolds and Smolensky (1977).

[22] The total redistributive effect can be defined as a weighted average of the redistributive effects of each component depending on their relative size. $RS_s = (1-p1)/(1-p)RS_{my} + (1+p2)(1-p)RS_{tb}$, with $p = p1 + p2$ and $p1$ being the change in the equivalised change in market disposable income and $p2$ the change in equivalised change in taxes and benefits.

[23] We also included geographic characteristics (degree of urbanisation, region).

[24] As we explained in section 2, this value refers to 2019 before the COVID-19 shock. We further compare these estimates with those obtained from SES by Eurostat in the methodological appendix A.

terms) than men performing the same (or very similar) work.

Table 1: Estimated gender pay gaps in the EU 27 (%)

	Unadjusted	Adjusted			
Country	**UGPG** (1)	Personal (2)	+Job (3)	+Part-time (4)	**AGPG** (5)
AT	14.6	17.9	11.0	13.4	10.8
BE	9.1	9.2	4.2	5.6	7.1
BG	10.7	15.6	13.9	13.3	14.1
CY	17.1	22.4	16.7	15.2	15.7
CZ	21.4	21.8	17.2	17.0	17.4
DE	15.5	14.3	7.9	5.5	5.7
DK	11.6	11.8	7.2	7.5	6.9
EE	11.3	16.1	18.0	18.6	18.0
EL	10.2	11.0	7.9	8.2	8.4
ES	13.7	16.1	8.7	8.6	9.1
FI	14.5	15.2	7.1	7.8	8.1
FR	13.5	12.7	5.3	7.8	7.1
HR	10.9	15.7	11.1	11.5	12.0
HU	18.5	16.3	9.8	11.9	8.2
IE	12.3	10.1	7.6	9.0	8.3
IT	9.8	14.5	10.9	14.1	14.0
LT	5.7	11.1	14.6	15.3	12.3
LU	10.8	8.6	9.9	9.5	11.0
LV	17.3	22.3	16.6	17.3	16.6
MT	5.4	9.6	6.1	9.9	10.2
NL	12.2	10.8	5.6	8.0	8.7
PL	7.9	16.4	10.4	10.8	10.4
PT	11.9	18.7	12.0	12.2	11.4
RO	3.8	9.3	9.5	9.5	8.9
SE	9.1	13.7	10.7	11.0	11.8
SI	5.8	12.6	12.9	13.5	12.6
SK	14.6	16.4	13.5	14.2	13.8
EU27	11.8	14.5	10.6	11.3	11.1

Notes. Columns 2-5 present the estimated AGPG under different specifications. Column 2 controls for work-related personal characteristics (education, work experience, age). Column 3 adds job and geographic characteristics. Column 4 adds a part-time dummy. Column 5 adds other household and personal variables, such as the presence of children, partner, household size and EU citizenship.

The sensitivity of the AGPG estimates to the stepwise inclusion of the covariates used to account for 'equal work' contains useful information to interpret our results, as they capture how segregation in characteristics manifests itself. On average, accounting for personal characteristics alone leads to the highest estimated AGPG for the EU 27 average (14.5%, i.e. 3.4 pp above our baseline estimates), a pattern that is observed in most countries. The AGPG that only accounts for personal characteristics tends to be higher than the UGPG (Germany, Ireland, Luxembourg and the Netherlands are the only exceptions). This suggests that women have, on average, better personal characteristics (driven by higher levels of education). When we add the main job characteristics - sector, occupation, firm size, etc. - in column 3, we observe a sharp decline in the AGPG (from 14.5% to 10.6% on average). This is observed across the board, except for Estonia, Lithuania, Romania and Slovenia. This suggests, in line with what has been extensively documented in the literature for western high-income countries, that an important aspect of wage differences between women and men is explained by labour market segregation effects (i.e. the fact that women are under-represented in highly paid types of work). The inclusion of the part-time dummy leads to smaller effects on the AGPG estimates. This is somehow

expected, as part-time jobs are typically concentrated in certain sectors and occupations, which is already accounted for. After the inclusion of this dummy, the AGPG slightly increases on average in the EU 27 from 10.6% to 11.3%, and this happens in almost all countries (with the exceptions of Bulgaria, Cyprus, Czechia, Germany and Luxembourg).[25] Finally, the inclusion of household characteristics leads to even smaller effects: on average, the AGPG is reduced from 11.3 to 11.1. This downward movement is observed in about two-thirds of the EU countries, but a minor increase is observed in the remaining countries. From our preferred specification (column 5), we can see substantial cross-country variation: the estimated AGPG ranges from about 6% in Germany to its triple (18%) in Estonia. Evidence also seems to suggest there are regional patterns. In general, the highest AGPGs are observed in CEE countries (except for Italy, which also belongs to this group), whereas the lowest AGPGs are observed in Western and Northern European countries (except for Hungary, which belongs to this group). Southern European countries tend to be closer to the EU average. It does not seem to be a coincidence that the lowest AGPGs are, in fact, observed in countries that have already implemented some sort of pay transparency policies (for more details on the features and coverage of these policies, see Hofman et al., 2020; Frey, 2021).

Furthermore, these gaps are not only heterogeneous across countries but also within them, between sectors (NACE-one digit), occupations (ISCO-one digit) and, to a lesser extent, across levels of education (ISCED). In general, male-oriented sectors and occupations (i.e. where the share of men is much higher than women) show higher AGPGs (e.g. construction, craft and trade workers display the highest gaps, while health, social work and services tend to show the lowest).[26] Differences across levels of education are almost negligible at the EU average level, and cross-country dispersion is much lower, without any clear dominant pattern.[27] These patterns are illustrated in Figure B.1 (panels B.1b, B.1b and B.1c, respectively) in Appendix B.

3.1.1 Unequal pay for equal work and the gender pay gap

To what extent does the phenomenon of unequal pay for equal work between women and men explain the gap in their mean gross hourly wages? At the EU average level, the AGPG (11.1%) is only slightly below the UGPG (11.8%).[28] This means that, on average, the bulk of the gender pay gap in the EU (about 94%) can be attributed to unequal payment for equal work, while only a small part (the remaining 6%) seems to be driven by differences in characteristics (i.e. type of work).[29] In principle,

[25] As women are over-represented in part-time jobs, an increase in the AGPG after the inclusion of this dummy suggests that the pay gap between men and women within full-timers and part-timers is higher than when we compare them all without distinction. The impact of the part-time dummy is particularly significant in absolute terms in Austria and the Netherlands (where the AGPG increases by 2.4 pp) and in Germany (where it decreases by a similar amount). The larger influence of this dummy in these countries is not surprising, as they have the highest shares of women in part-time jobs. The difference in the sign is more difficult to interpret. It seems to suggest that, contrary to the pattern observed in almost all countries, in Germany, women who work part-time tend to suffer less from unequal payment when compared to their part-time counterparts.

[26] At the cross-country EU 27 average level, the lowest AGPG (9%-10%) is estimated in workers employed in the health, social work and education sectors, whereas the highest gaps (13%) are observed in construction. Across occupation, the AGPG ranges from 9%-10% in services, sales workers and clerks to 14%-15% in plant and machine operators and craft and trade workers.

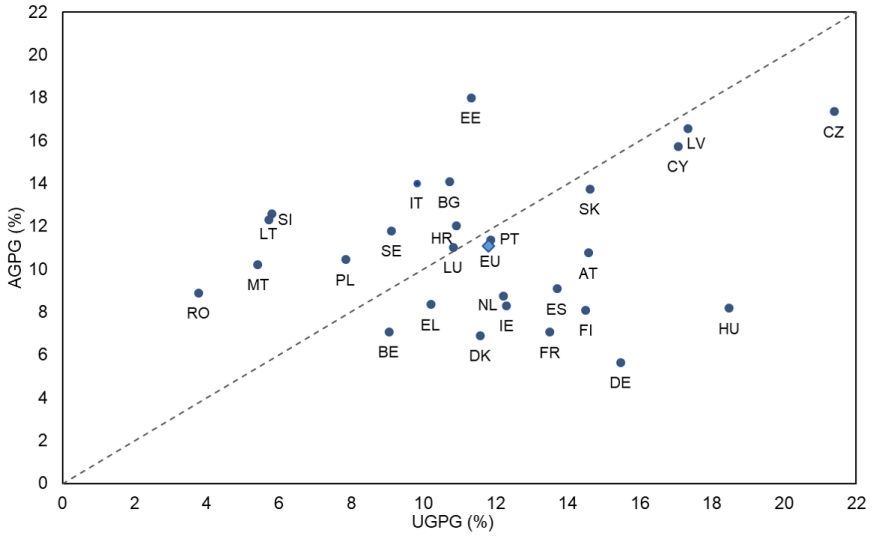
[27] The largest differences in AGPG across levels of education are observed in Denmark, Latvia and Portugal, where the lower the level of education, the higher the AGPG. In particular, employed women with a level of education up to lower-secondary face an AGPG that is about 3 pp higher than their tertiary graduate counterparts. However, an important number of countries have a positive correlation (the higher the education level, the higher the AGPG): Germany, France, Belgium, Austria, Slovenia and Czechia.

[28] These values are not far from the statistics published by Eurostat based on the SES reported by Denis Leythienne (2021). The AGPG - the unexplained component of a standard O-B decomposition - is actually very close (11.4%), while the UGPG is about 2 pp larger (14.4%). In the Appendix, we further discuss the differences between our estimates and SES-based figures.

[29] The difference between the UGPG and AGPG, as discussed in section 2, can be interpreted as the part of the gap that is 'explained' by differences in characteristics. The expression 'explained' should not be associated or interpreted as 'justified', as differences between women and men in the covariates used to approximate the type of work are not exempt from other sources of gender segregation (e.g. the under-representation of women in highly-paid sectors or

a high AGPG/UGPG ratio, such as the one we observe for the EU 27 average, suggests that enforcing EPEW in the EU could, *ceteris paribus*, almost eliminate the gender pay gap. However, while this is true for a group of countries, it is not the case for many others, as shown in Figure 1 (AGPG in the vertical axis, UGPG in the horizontal axis). The closer the countries are located to the 45-degree line, the closer the AGPG/UGPG ratio is to one. From this scatter plot, we can also appreciate that this AGPG/UGPG ratio is not restricted to the unity range [0,1].

Fig. 1. *Adjusted* and *unadjusted* gender pay gaps in the EU countries



Notes. Estimated AGPG and UGPG.

About one-third of the EU countries have a ratio above one (the countries above the 45-degree line). In these countries, women tend to have, on average, 'better' characteristics than men. This means that the enforcement of EPEW (i.e. AGPG=0) could not only entirely cancel the gender pay gap but even reverse it in favour of women (i.e. a negative UGPG). Estonia leads this group with the highest AGPG and AGPG/UGPG ratio. Countries following the Estonian pattern are mostly CEE countries and Italy. At the other extreme, Germany has the lowest AGPG/UGPG ratio, given its quite small AGPG (5.7%) and large UGPG (close to 16%). Countries following the German pattern are a mix of Central, Northern and Southern European countries, where women have 'worse' characteristics. So, which characteristics explain the cross-country dispersion in these ratios? Table 1 shows that the high AGPG/UGPG ratios estimated in most CEE economies are driven by 'better' personal characteristics (which is mainly explained by education). In contrast, the very low AGPG/UGPG ratios identified in most Central Western and Northern European economies seem to be mainly driven by job characteristics (i.e. the under-representation of women in highly paid sectors and occupations).[30]

3.1.2 Unequal pay for equal work and the gender gap in labour earnings

As defined in section 2, the GLEG, which compares the total mass of labour earnings between these two groups, depends not only on the gender gap in hourly wages but also on the gender gap in

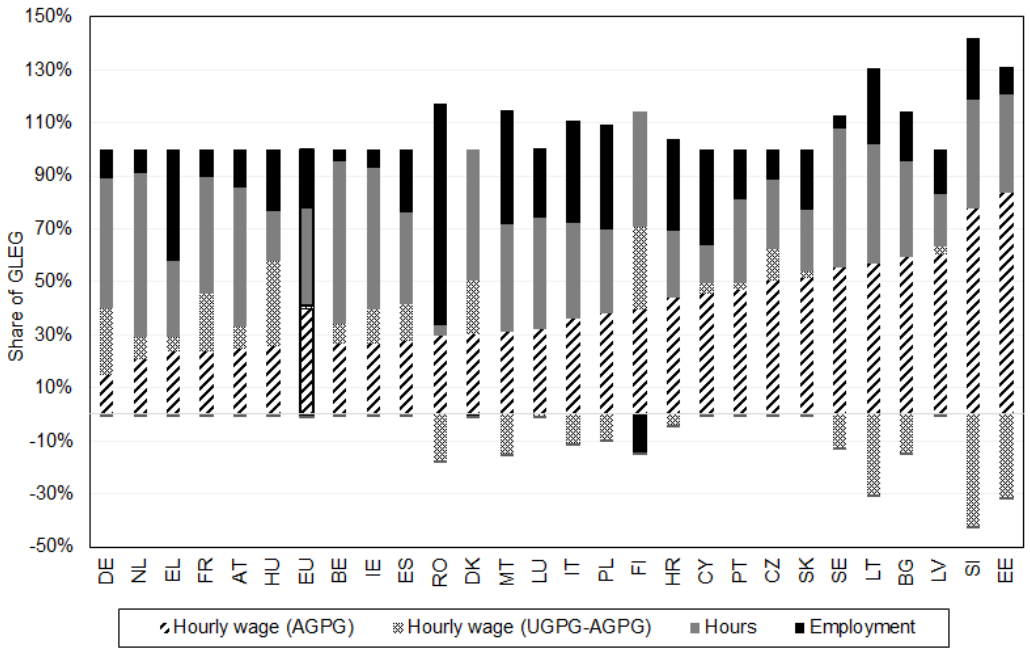
differences in years of experience that could be associated with, for example, an unequal division of unpaid care and housework responsibilities within households).

[30] In CEE countries, we observe a particularly large jump in the AGPG when personal characteristics are accounted for - see differences between specification (1) and (2), Table 1 - whereas the AGPG substantially decreases in countries following the German pattern once these job characteristics are accounted for - see differences between specifications (2) and (3).

employment (extensive margin) and hours worked (intensive margin). According to our SILC-based estimates for 2019, the average GLEG in the EU is 28%, which suggests that women's total mass of yearly gross labour earnings is about three-quarters of men's (for the working-age population).

We now explore the influence of unequal pay for equal work (i.e. AGPG) on the GLEG to obtain some insights on what the potential distributional effect of closing the AGPG could be. In Figure 2, we decompose this gap into three components: i) differences in hourly wages (i.e. the UGPG), which is composed of an unequal-pay-for-equal-work part (the AGPG in diagonal dashed lines) and another part that is explained by differences in characteristics (i.e. UGPG-AGPG with rhombuses);[31] ii) the gender gap at the intensive margin (difference in yearly hours worked, grey bars); iii) the gender gap at the extensive margin (differences in employment, black bars). Countries are ranked from left to right according to the share of the GLEG that is driven by the AGPG (i.e. by unequal pay for equal work).

Fig. 2. Decomposition of the GLEG



Notes. SILC-based estimates for 2019. Employment: the share of GLEG driven by the gap in employment rates. Hours: the share of GLEG driven by the gap in yearly hours worked.

At the EU average level, the main driver of the GLEG is the difference in hourly wages (i.e. the UGPG, which accounts for about 42%), followed by the gap in hours worked (37%) and employment (21%). Although the predominant role of the gender pay gap is observed in most of the EU 27, there are substantial cross-country disparities as well as some clear regional patterns. At one end (on the left of Figure 2), we see countries like Germany and the Netherlands with a relatively low AGPG. In these countries (see the relative size of the grey bar), the bulk of gender differences in yearly labour earnings is explained by differences in hours worked (a large share of part-timers among employed women), followed by differences in hourly wages driven by segregation in characteristics (the over-representation of women in low paid sectors and occupations). At the other extreme (on the right of Figure 2), Estonia, Slovenia and other CEE countries not only have quite a high AGPG but also a high AGPG/UGPG ratio and a smaller influence of gender gaps in employment and hours

[31] The sum of the dashed-filled and rhombuses-filled bars is the UGPG. The negative values of the UGPG-AGPG (observed in countries where the AGPG is higher than the UGPG, i.e. countries above the 45-degree line in Figure 1) represent the differences in characteristics (in these countries, women have better characteristics).

worked. In these countries, the enforcement of EPEW would, *ceteris paribus*, lead to the strongest reduction in the GLEG. In the middle, we observe countries with both high and low AGPGs with a predominant role of gaps at the extensive margin. These are mainly Southern European countries and neighbours, including Portugal, Malta, Italy, Romania, Cyprus and Croatia.

The literature suggests that these gaps may not be independent of each other. For example, countries with low female employment rates may show lower gender pay gaps through a selection-into-employment (downward) bias (see Olivetti and Petrongolo, 2008; Christofides et al., 2013; Matteazzi et al., 2018). Intuitively, when only a small share of women are employed in labour markets, we could think they are hardly representative of the rest of the population (or a random sample).[32] Before we move to the next section, where we present the results from our simulations, we explore whether there are any systematic cross-country correlations between these components of the labour earnings gap. We illustrate this in Figure 3, which has the extensive gap (left-hand panel) and the intensive gap (right-hand panel) in the horizontal axis. In the vertical axis, we plot the gender pay gaps (the black dots represent the UGPG, orange dots the AGPG). In line with what the selection-into-employment bias hypothesis would suggest, we observe at least a weak negative cross-country correlation between the UGPG and the employment gap (the estimated slope is significant at conventional inference levels and of order -0.2). Interestingly, and in line with this hypothesis, the negative slope vanishes when we consider the AGPGs (as reflected by the flatter fitted line linking the orange dots).[33]

Some clear regional patterns emerge here as well. At one end, in the upper-left quadrant, there are mainly CEE countries[34] and a mixed group of Central Western and Northern European countries (including Germany and France) with low employment gaps and high UGPGs. On the other end, in the bottom-right quadrant, there is a group of Southern European countries (Greece, Italy and Malta) with high employment gaps and low UGPGs. The anti-clockwise movement of the fitted line when we move from UGPG to AGPG is mainly driven by Southern European countries, which have large AGPG/UGPG ratios and employment gaps (e.g. Malta, Italy and Greece), as well as by a group of Western and Northern European countries (e.g. Finland, France, Germany, Denmark and Belgium) with low employment gaps and AGPG/UGPG ratios.

The right-side panel of Figure 3 is analogous, but it has the gender gap in hours worked in the horizontal axis (intensive margin). Interestingly, the slopes of the fitted lines are symmetrically the opposite, i.e. a slightly positive - albeit quite flat - slope for the UGPG (black) and a marked negative slope for the AGPG (orange). Although we still find most of the Eastern European countries in the upper-left part (high pay gaps, especially AGPGs, and low gaps in hours worked), the anti-clockwise movement of the UGPG and the clockwise movement of the AGPG emerge from the change in the ranking of countries with a large incidence of part-time work among women: Austria, the Netherlands, Germany, Belgium and Ireland. This seems to be in line with previous findings in the literature, suggesting that part-time workers suffer from wage penalties and there is a larger concentration of part-time work in lower-paid sectors and occupations (Matteazzi et al., 2014; Goldin, 2014; Goldin and Katz, 2016; Matteazzi et al., 2018; Meara et al., 2020).[35]

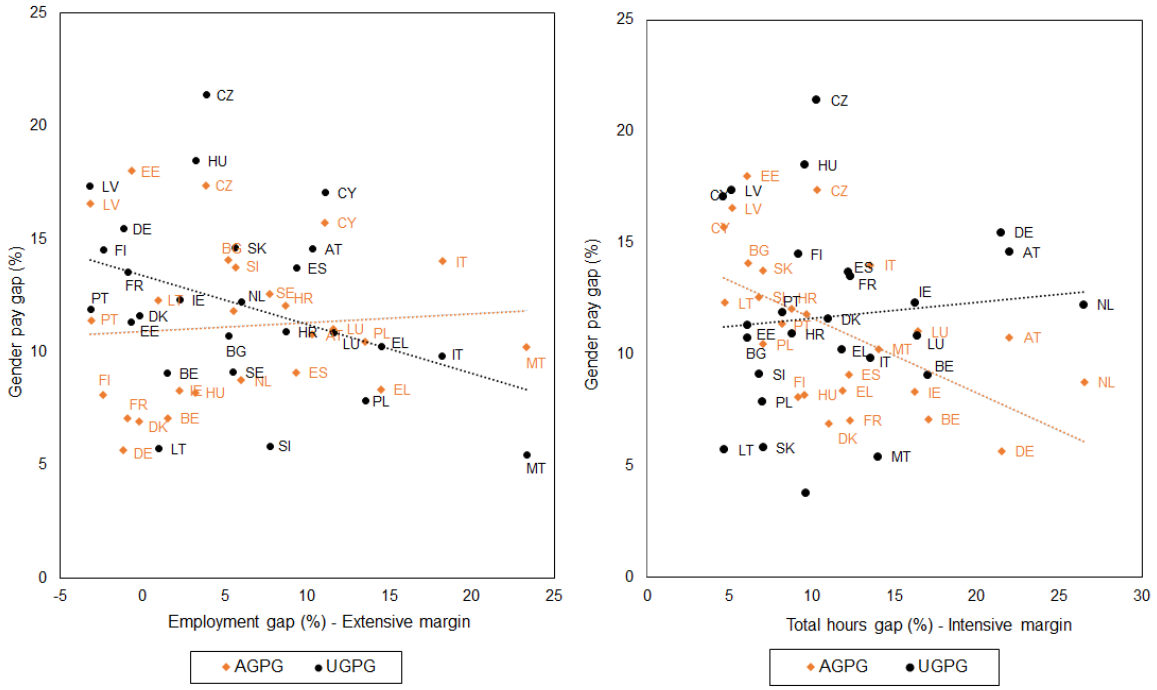
[32] This sample-selection downward bias in the estimate of gender pay gaps can also explain movements in the gender pay gap over time in one country. For example, in an economic downturn, where often a non-random group of workers lose their jobs (as illustrated by the recent COVID-19 shock), there could be a decline (increase) in gender gaps if those who keep their jobs are worse (better) paid because of the changing features of the population employed at each point in time (recent estimates that account for this selection into employment over time can be found in Blau et al. (2021)).

[33] As our AGPG is not affected - or at least much less affected - by the differences in the distribution of covariates between women and men (as we are comparing wages across similar men and women), this flatter line could actually be interpreted as additional supporting evidence for the presence of selection-bias in the estimate of the UGPG.

[34] While the high female labour force participation in these countries has been systematically related to the socialist inheritance from the USSR, it is interesting to see how the enforcement of EPEW (which is also stronger in these countries than in most of the European countries, Atkinson et al. (1992)) has been very much weakened.

[35] At this point, an attentive reader would wonder about the effect of including the part-time dummy in our AGPG estimates presented in Table 1. If part-time workers suffer a penalty and if women are over-represented in this group,

Fig. 3. Gaps in hourly wages, employment and hours worked



Notes. The employment gap refers to the total number of employed, while the total hours gap captures the difference in total hours worked in a year. Therefore, it captures both the differences in weekly hours and the number of months worked. The AGPG and UGPG refer to gross hourly wages.

Overall, there are at least three takeouts from this cross-country comparative assessment. One is that it is *a priori* difficult to predict, only from the value of the AGPG, in which countries the distribution of labour earnings will be more affected by the enforcement of EPEW. Although we identify a negative cross-country correlation between the AGPG and the gender gaps in hours worked, no significant correlation is observed with the gender gaps in employment.[36] Second, the negative cross-country correlation between the UGPG and the gender gaps in employment, which is not observed for the AGPG, seems to support the selection-into-employment hypothesis identified by previous studies for the EU and some Central Western European countries (see, Blau and Kahn, 2003; Blau et al., 2021). This hypothesis suggests that the UGPG tends to be underestimated in countries with high gender employment gaps (i.e. where only a small share of the female population is employed). Third, while the AGPG does not show any significant correlation with the gender gaps at the extensive margin (employment), it is clearly negatively correlated to the gender gaps at the intensive margin (hours worked). This seems to reflect a further level of sorting - similar to occupational sorting - driven by the large shares of part-timers among women, given the under-representation of part-time

the estimated AGPG should decrease once we account for this characteristic. However, this is not what happens in most countries, including those with the highest incidence of part-time female workers (with the exception of Germany, where the AGPG increases after the introduction of this dummy variable). Our microdata shows, and the literature also extensively documents, that some population groups, including women, students and the elderly, are often over-represented in part-time jobs (see Matteazzi et al., 2018). Moreover, the literature also suggests that part-time jobs are concentrated in lower-wage sectors and occupations. This is why the addition of the part-time dummy in our specification (4) does not tend to decrease the AGPG because it could have been expected, as the 'segmentation effects' of part-time jobs were already absorbed by the introduction of job and personal characteristics. Moreover, the general increase in the AGPG observed after the introduction of this dummy is likely because of unobservables related to household characteristics, as the jumps tend to correct downwards after these characteristics are included.

[36] To illustrate this ex-ante ambiguity, Italy and Estonia have a high prevalence of unequal-pay-for-equal-work (i.e. a high AGPG); therefore, the enforcement of the EPEW principle will probably have a much larger distributional effect on labour earnings in Estonia, given the smaller employment gaps faced by women in this country (with respect to Italy).

positions in the pool of high-wage jobs.

3.2 Simulation results: Imagine there is no gap

We now move to an 'imaginary world' to assess, with microsimulations, some of the distributional consequences from hypothetical reductions of the AGPG driven by the enforcement of EPEW. In section 1, we analysed two scenarios: i) a *3 pp reduction scenario*, which implies a uniform shock across the board (a 3 pp decline in the AGPG) based on the preliminary estimations of the European Commission on the expected effect of the recent pay transparency initiatives; ii) a *full reduction scenario*, a benchmark where the EPEW principle is enforced (AGPG=0). We assume these adjustments occur via an upward shift of women's gross hourly wages and look at the overnight effects (i.e. what the distribution of labour earnings and household disposable income would look like immediately after without considering behavioural responses). We further discuss the implications of these assumptions in section 4.

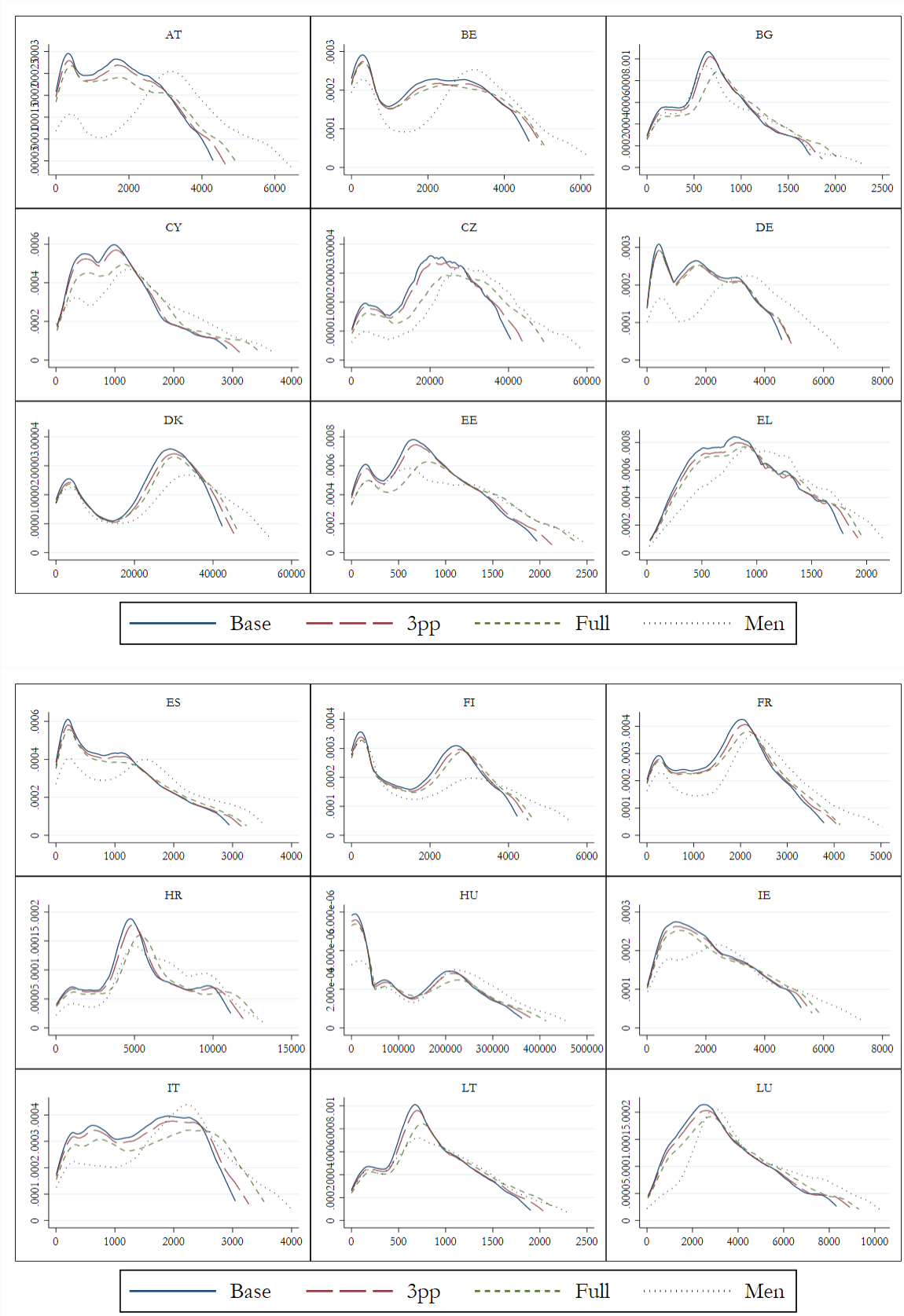
3.2.1 Simulated women's gross hourly wages and the impact on total labour earnings

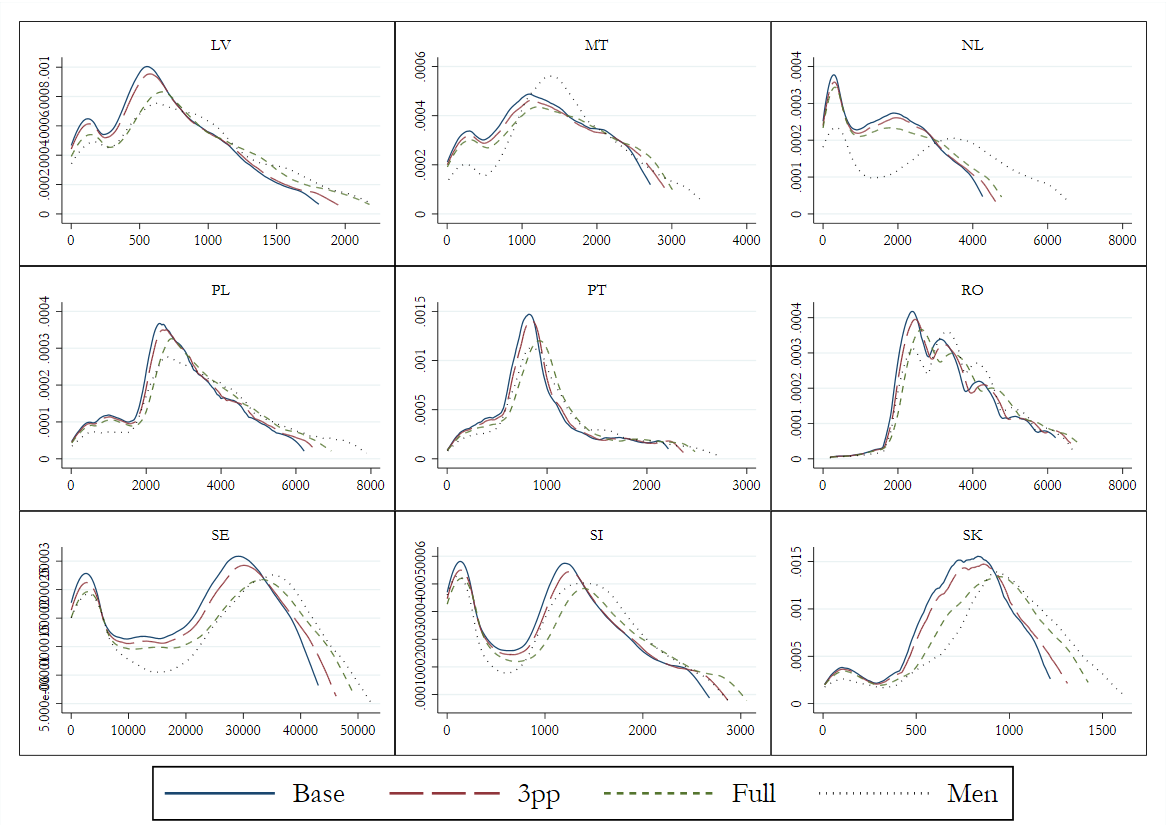
The baseline and simulated distribution of gross wages for women and men for each country and scenario are presented in Figure 4. From these figures, we can observe that the simulated distribution of women's gross wages under the two scenarios moves much closer to men's distribution of wages in some countries rather than others. The straight line represents women's baseline gross wages, while the long-dashed and short-dashed lines show the distribution under the 3 pp and full reduction scenarios, respectively. The distribution of men's wages (which remains unchanged in baseline and simulated scenarios) is represented with dotted lines. In some countries, we can still observe substantial differences in the wage distribution between women and men, even in the scenario of full enforcement of the EPEW principle. This is particularly true in countries that present (as we showed in the previous section) a high UGPG and gender gaps in hours worked. This is the case in Austria, the Netherlands, Germany, France and Finland. In contrast, in CEE countries, the distribution of gross hourly wages of women and men gets closer under the full reduction scenario, as their AGPG is higher and their gender gaps in hours worked are lower.

As we have shown in Figure 2, the GLEG depends not only on AGPG and UGPG but also on the hours worked and employment gap. Thus, the expected effect of the simulated reduction of the AGPG on the GLEG varies greatly across countries. This can be appreciated in Figure 5, which shows the baseline and simulated GLEG under each scenario. Countries are ranked from left to right according to the baseline value of this gap.

The horizontal lines in Figure 5 represent the EU average values in the baseline and the two simulated scenarios. If we look at the rankings in this figure, we can see that countries with the largest gap in total labour earnings are below the EU average share of AGPG on the labour earnings gap in Figure 2. These are countries where the major part of labour earnings differences between women and men come from either the gaps in hours worked (Austria, the Netherlands and Germany) or employment (Italy and Malta). Symmetrically, countries with the lowest gaps in total labour earnings (i.e. those placed on the right of Figure 5) were those with the strongest influence of AGPG (Estonia, Lithuania, Slovenia, Latvia and Bulgaria).

Fig. 4. Simulated distribution of men's and women's gross wages in baseline and simulated scenarios



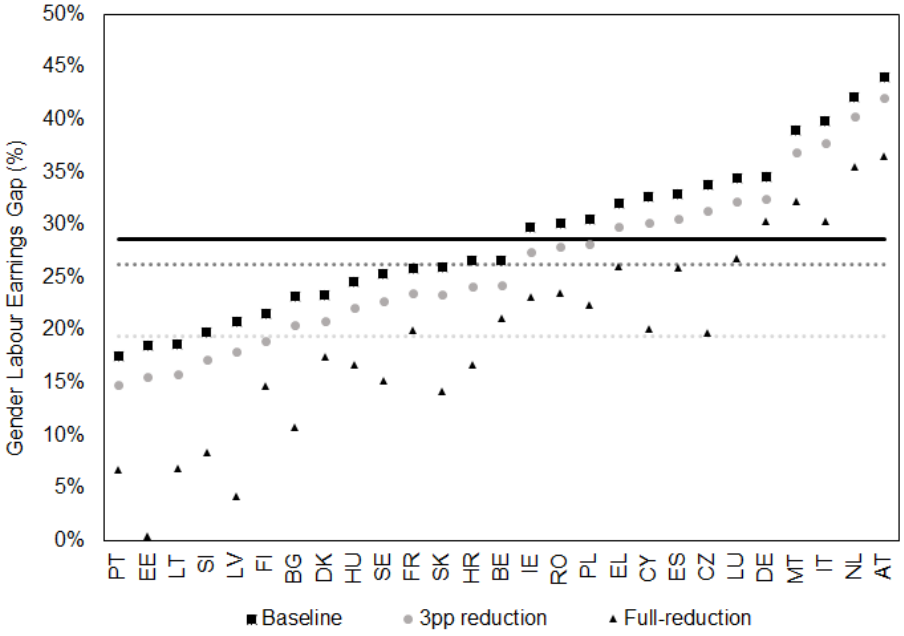


Notes. Gross wages in national currency up to the 90th percentile. 'Base' represents the distribution of women's gross wages in the baseline; '3 pp' and 'full' represent the simulated distribution of women's gross wages to narrow the AGPG under these two scenarios. 'Men' represents the men's gross wages distribution in the baseline (remains unchanged).

Under the 3 pp reduction scenario, the average total GLEG is reduced from 28% (baseline - black horizontal line) to 26% (dotted grey horizontal line). Cross-country differences are not substantial, but we can still observe that countries where the AGPG is one of the most important drivers of the GLEG have a slightly stronger reduction. Results are more interesting in the full reduction scenario, as the complete enforcement of EPEW would reduce the EU average GLEG from 28% to 19.5%. This suggests that even in an 'imaginary world' where the EPEW principle is finally enforced, women in EU countries would still earn, on average, 20% less than men per year. This remaining gap is driven by the gender pay gap explained by gender segregation in the characteristics as well as by the gap in hours worked and the employment rate, as we have shown in the previous section.

The largest reduction in the GLEG takes place in CEE countries, given both the weight of the AGPG on the labour earnings gap as well as the high baseline AGPG levels. In the Baltic countries, some Balkan countries and also in Portugal, the simulated enforcement of the equal pay principle would significantly narrow the GLEG, placing it below 10%. In contrast, in a few countries, the GLEG would remain above the baseline EU average level (i.e. above 30%) even under this hypothetical scenario of the full reduction of the AGPG. This is the case in countries with a low baseline AGPG and high gaps at the intensive margin (Germany, the Netherlands and Austria) and also in countries with a high AGPG in the baseline and large gaps at the extensive margin (Italy and Malta).

Fig. 5. GLEG: Baseline and simulated scenarios



Notes. The GLEG is the difference in the total mass of wages between women and men expressed as a percentage of the total mass of men's wages. Countries are ranked from left to right according to their baseline GLEG.

In summary, and to some extent paradoxically, the enforcement of EPEW would lead to a stronger reduction of the labour earnings gap in countries where the gaps are actually low, from a cross-country perspective, in the baseline. This is particularly the case in CEE countries and especially in the Baltic countries. In contrast, the enforcement of equal pay would only slightly reduce the gap in labour earnings between women and men in countries where these are very large (in cross-country comparative terms). This is, in particular, the case of Germany, Austria and the Netherlands (low AGPG and high gaps in hours worked) and Italy (high AGPG and gender gaps in employment rates).

3.2.2 Simulated impact on the distribution of household disposable income

So far, we have addressed the potential implications of narrowing the AGPG on the distribution of gross hourly wages and total labour earnings between women and men. Now, we move from the individual gross labour earnings perspective to the level of household disposable income. Starting from the new distribution of gross hourly wages, we simulate the change in household disposable income, taking into account the interaction of taxes and benefits with the EUROMOD model.

In Table B.2 (Appendix B), we report the expected effects on income poverty and inequality for each EU Member State under both simulated scenarios.[37]

This simulated upward shift of women's gross hourly wages would decrease poverty in both scenarios and in all EU Member States. This means that there are employed women suffering from underpayment (i.e. with an AGPG>0) living in 'poor households' (i.e. households with an equivalised disposable income below the poverty line). On average, poverty would decline about 0.2 pp in the 3 pp scenario (up to 0.5 pp in Spain) and 0.6 pp in the full reduction scenario (up to 1.5 pp in Estonia). This reduction of income poverty is particularly pronounced in single-adult with children

[37]Income poverty is measured using the standard AROP rate, with a poverty line defined at 60% of the median, whereas income inequality is measured with the Gini coefficient. We find very similar patterns when alternative income inequality indicators are used, such as the top 20 to bottom 20 ratio of income shares. For a comparative analysis of poverty rates, we keep the poverty line fixed in the baseline.

households, which are mainly women. For this group, in the full reduction scenario, the expected decrease in poverty is 2.5 pp at the EU average level (reaching 9 pp in Bulgaria, while almost no change would be observed in countries like Austria and Malta). Remarkably, the enforcement of the EPEW principle would also, *ceteris paribus*, reduce in-work poverty by 0.6 pp at the EU level (ranging from about -1.5 pp in Estonia, Latvia and Cyprus to 0.12 pp in Belgium).

In contrast, the simulated enforcement of EPEW would increase the concentration of household disposable income. This is observed in all EU countries, with the exception of Portugal, which would not experience any significant change in inequality under the full reduction scenario. On average, the Gini coefficient increases by 0.001 and 0.004 in the 3 pp and full reduction scenarios, respectively (see columns 3-4 of Table B.2, Appendix B); however, the magnitude of these effects is rather small. The largest increase in the Gini coefficient is observed in CEE economies in the full reduction scenario (of about 0.007). However, not all countries with a relatively high AGPG in the baseline show the largest increases in inequality, and we also observe countries with relatively low levels of AGPG experiencing an above-average increase in the concentration of household disposable income.

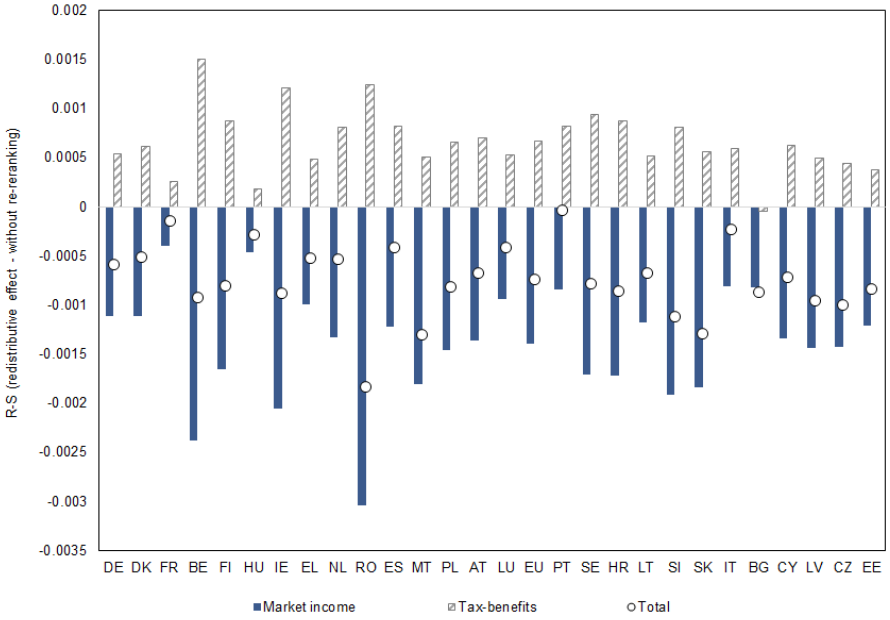
To what extent are these heterogeneous effects on income distribution driven by the unequal magnitude of the simulated upward shift in wages, and what role do taxes and benefits play in partly offsetting the increase in inequality? Figure 6 shows the redistributive effect of the simulated changes in market income *vs* the redistributive effect of the simulated changes in taxes and benefits (panel 6a for the 3 pp reduction scenario; panel 6b for the full reduction scenario). The circles represent the total redistributive effect (measured with the Reynold-Smolensky index as defined in section 2.3). A negative value means that the concentration of income increases, while a positive value represents the opposite. The dark-filled bars represent the redistributive effect driven by the change in household market income (the increase in gross wages before taxes and transfers), and the dashed bars represent the (counterbalancing) effect of the tax-benefit system. Countries are ranked from left to right with respect to their baseline AGPG and once again, Estonia and Germany are at opposite ends.

From this figure, we can clearly appreciate that the driver of the increase in income inequality is the shock in market incomes. The tax-benefit systems offset about half of this effect, albeit with important cross-country heterogeneity. In the 3 pp scenario, the strongest increase in the concentration of household disposable income is observed in Romania, Malta and Slovakia due to a relatively high impact on the concentration of market incomes, which is only timidly cushioned by the tax- benefit system. In contrast, Belgium, Ireland and Finland also suffer a relatively strong negative redistributive effect from the changes in market income, but these are largely offset by the tax-benefit system.

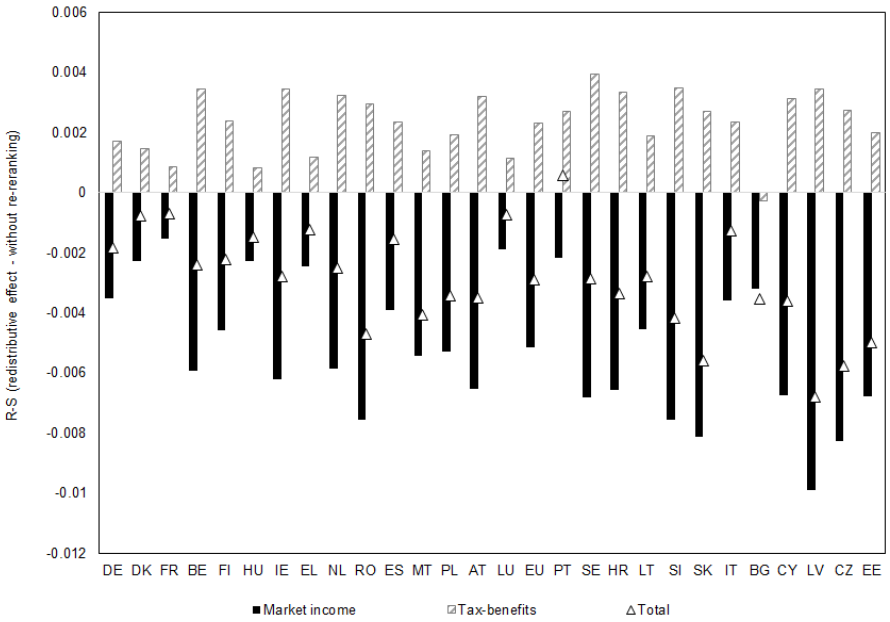
In the full reduction scenario, the shock in market income also dominates. In this case, the baseline AGPG plays an even more important role in explaining the cross-country variation (see how the black bars tend to increase in magnitude when we move from left to right), but not without some exceptions. For instance, despite having quite a high baseline AGPG, Italy would not experience a large increase in market income inequality because the shock in market income is small, as the upward shift in wages only affects a small minority of the population (given the low female employment rates). In contrast, in countries with low levels of AGPG but with high female employment rates, such as Belgium, Ireland and Finland, the redistributive impact of the increase in gross hourly wages is much more significative.

To further disentangle the role of the tax-benefit system in cushioning the negative redistributive effect of the simulated increase in women's gross hourly wages, we look at the simulated change in disposable income across income deciles and decompose the effect of the most important aggregate tax-benefit components in driving these decile-specific changes. We illustrate the main patterns with the EU average in Figure 7 (the left panel shows the 3 pp reduction scenario, and the right shows the

Fig. 6. Redistributive effect of market incomes and taxes and benefits



(a) 3 pp reduction scenario



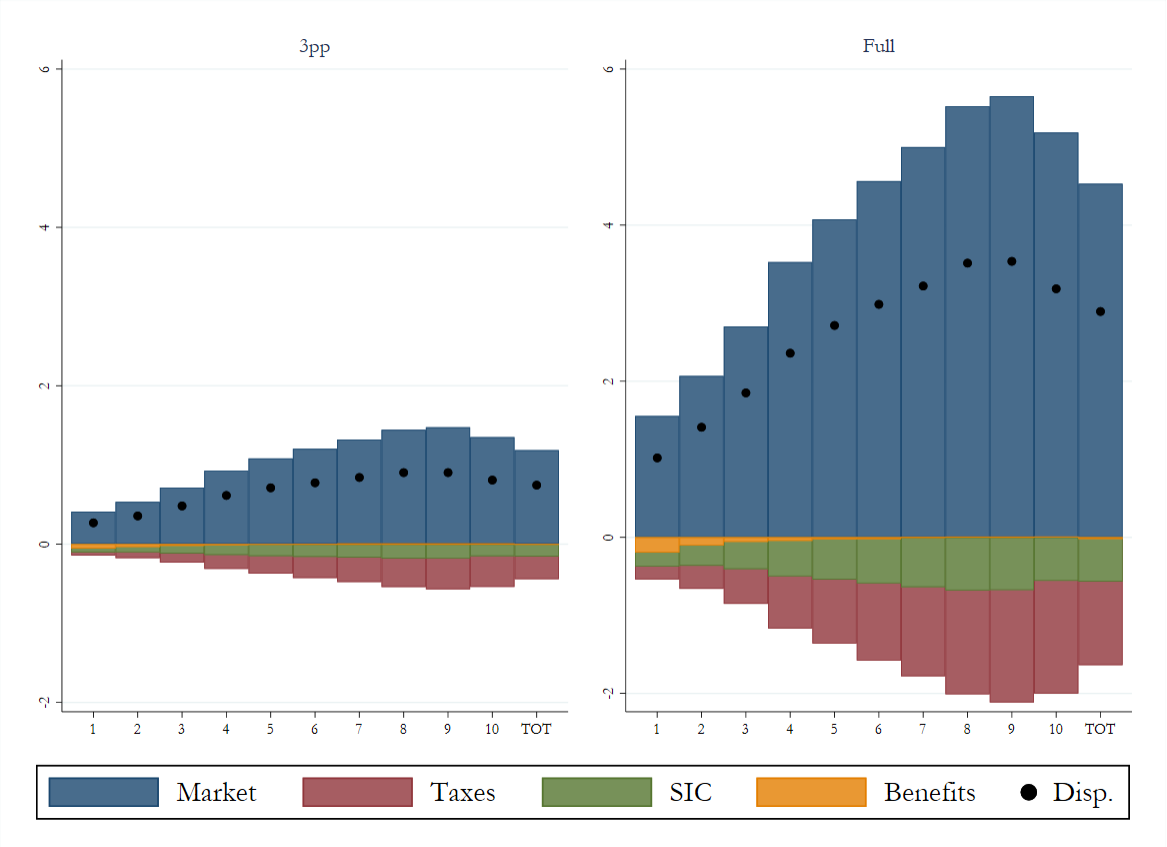
(b) Full reduction scenario

Notes. The redistributive effect is measured as the difference between the Gini coefficient of baseline household disposable income and the concentration index of the simulated household disposable income after the change in the distribution of gross wages (Reynolds-Smolensky index).

full-reduction scenario). The same figures for each country can be found in Appendix B (Figure B.3 and B.4). The bars represent the relative change in disposable income driven by the change in gross wages that affects market incomes (blue bar) against the changes coming from the main tax-benefit components, aggregated in direct taxes (Taxes), employee's social insurance contributions (SIC) and cash benefits (Benefits). The black dots represent the total expected increase in household disposable

income resulting from these two forces.

Fig. 7. Decomposition of change in household disposable income by deciles: EU average



Notes. Market: household market income; Taxes: direct taxes; SIC: employee's social insurance contributions; Benefits: cash benefits (excl. pensions); Disp: disposable income.

The simulated increase in women's gross wages would lead, *ceteris paribus*, to an increase in household disposable income that ranges from about 0.3% (1.5%) in the first decile to 0.9% (4%) in the ninth decile in the 3 pp and full reduction scenarios, respectively. We can see that, on average, the 8th to 9th deciles are the most favoured from this change in gross hourly wages, and this is mainly driven by the change in market incomes, in line with the results reported in Figure 6. The tax-benefit systems partly offset this inequality-increasing effect, especially through the increase in taxes - and to a lesser extent, through social insurance contributions - which more than compensates for the regressivity patterns of the simulated decrease in cash benefits (as this affects the bottom of income distribution) related to the presence of means-tested benefits. When we look at these patterns country-by-country, we can observe that the simulated reduction of the AGPG tends to favour the middle and top of the income distribution in both scenarios (the only exception seems to be France, for which the middle income is mostly favoured). This is driven by the increase in market income. The tax-benefit system only partly compensates for this regressive pattern, even in countries with the most progressive taxation systems.

Overall, from this exploration, we show that the role of taxes and benefits is key to understanding the uneven expected effects on the distribution of household income of a potential closure of the AGPG via an upward shift in women's wages. Countries whose tax-benefit systems have the highest cushioning role, such as Belgium, Denmark, Spain, France, Finland, Sweden and the Netherlands, have a more generous welfare state and stronger progressive taxation where about 50% of the negative redistributive effect of market income increase is smoothed by the tax-benefit system in both scenarios.

However, other countries, especially Eastern European countries, such as Bulgaria, Estonia, Malta and Hungary, are characterised by a less progressive tax-benefit system, so the redistributive effect (and the inequality-reducing effect) of the tax-benefit system is only minor. Their weak progressive tax systems and high baseline AGPGs explain why the expected increase in the inequality of household disposable income under the full reduction scenario is the largest in Eastern European countries.

We have seen that the distributional effect largely depends on the size of the unequal pay phenomenon and its influence on earnings (which, as we showed in the previous sections, also depends on female employment rates and hours worked), as well as on the tax-benefit system. However, we have also shown that the main driver of the increase in the concentration of income is driven by the shock in market incomes from the new distribution of gross hourly wages, which is observed across the board. So the final open question is: What drives this inequality-increasing effect at the level of household market incomes? A priori, there are two candidates to explain this phenomenon: the AGPG increases along the income distribution (and so the reduction of this gap favours higher-income households) and/or the share of employed women decreases towards the bottom. A quick overview of these values across income deciles - see Appendix B, Tables B.4 and B.3 - clearly shows that the second phenomenon dominates. Surprisingly, we do not identify any clear AGPG patterns across income deciles at the EU average level or in the majority of countries.

Countries showing the largest differences in female employment rates between the poorest and richest households are Romania, Latvia, Lithuania, Malta and Slovakia, where the share of employed women at the top is about 30% more than at the bottom. At the other extreme, Denmark, France, Greece, the Netherlands and Luxembourg show a difference that is about half (15% between the maximum and minimum).

These cross-country differences help to explain some cross-country variation that could not be observed from countries' average gaps in hourly wages, employment or hours worked. For instance, Belgium has a low AGPG and high gaps in hours worked as well as quite a progressive tax system. From this, we would expect the enforcement of EPEW to have a very small impact on the distribution of household disposable income. However, in Belgium, the overall rise in inequality is relatively large (compared to other countries with similar features) because both the share of employed women and the average AGPG significantly increase across the income distribution.

3.2.3 Simulated impact on government revenues and firms' labour costs

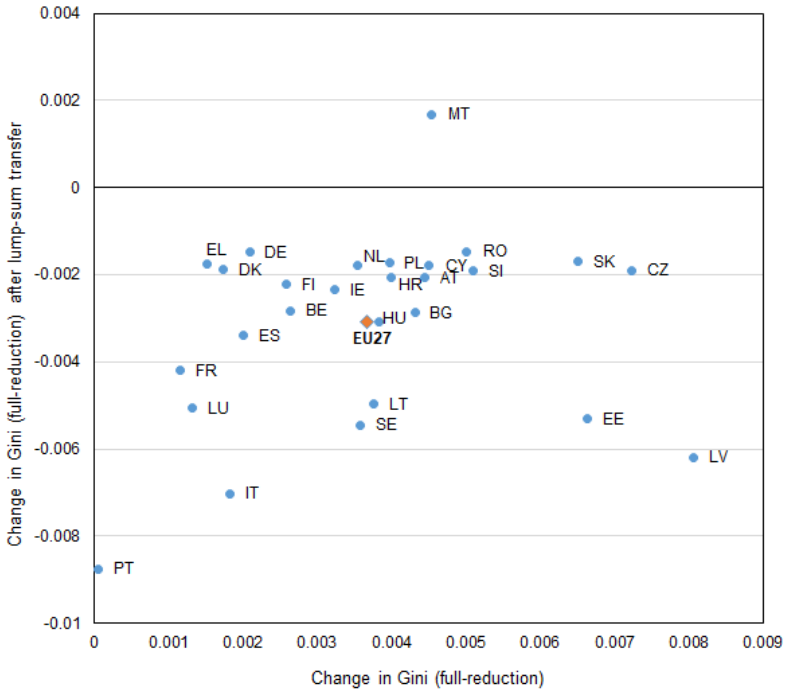
What is the implicit increase in labour costs in these simulated scenarios? What effect would the expected changes in taxes and benefits described above have on government revenues?

The simulated reduction of the AGPG would increase employers' labour costs (i.e. gross wages plus employer social insurance contributions) by 1.4% and 5.3% at the EU average level in the 3 pp and full reduction scenarios, respectively. The estimated effect on labour costs expressed as a percentage of the baseline total wage bill and as a share of GDP are reported in Table B.5 (in Appendix B).[38] As expected, the dispersion is much larger in the full reduction scenario. Labour costs would increase by about 3.3% in Denmark and up to nearly 10% in Estonia and Latvia.

At the same time, governments' revenues would substantially increase from the higher collection of taxes and social insurance contributions and the decrease of expenditures in means-tested cash benefits. At the EU level, the simulated shift in women's gross hourly wages would increase government revenues by 4.5% or 16.6%, depending on the scenario (see Table B.5). These additional revenues could be used to either finance the implementation of policies aimed at reducing the AGPG or tackle the GLEG via policies that aim to reduce the differences in employment and hours worked.

[38] In GDP terms, this simulated increase in firms' labour costs in the 3 pp scenario ranges from about 1.2% to 1.6%.

Fig. 8. Simulated effect on income inequality (full reduction scenario)



Notes. The change in the Gini coefficient of equivalised household disposable income before and after the upward shift in gross hourly wages in the full reduction scenario without compensatory measures (horizontal axis) and with a budget-neutral lump-sum transfer (vertical axis).

These additional revenues could also be used to compensate for these unintended negative effects on the concentration of household disposable income. In fact, a simple budget-neutral lump-sum transfer would already do this job in the broad majority of EU countries. We illustrate this in Figure 8, where we plot the change in the Gini coefficient from the simulated enforcement of EPEW (horizontal axis) against the change in the Gini coefficient after the lump-sum compensatory transfer (vertical axis). Here we can see that except for Malta,[39] all EU countries would manage to achieve a more equal distribution of household disposable income under the two simulated scenarios with a simple lump-sum transfer. Income inequality would decrease mainly in countries that would experience the strongest increase in government revenues (see the last column of Table B.5), such as Estonia and Latvia, while the effect would be milder in countries with lower budgetary effects and characterised by a lower AGPG such as Greece, Germany, Denmark and Malta.

4 Discussion on scope and limitations

Before moving to the conclusions, we would like to reflect on the scope of our results in light of some key explicit and implicit assumptions and methodological decisions that we have made. We focus on four main methodological aspects: i) data; ii) estimation strategy; iii) behavioural assumptions; iv) distributional analysis.

The first reflection we want to make relates to the microdata used, i.e. the EU-SILC. Although our study is not the first to use these surveys to measure gender pay gaps in EU countries (see Christofides et al., 2013; Schäfer and Gottschall, 2015), SILC has some clear disadvantages that could influence our

[39] In Malta, a lump sum would not be enough because the change in market income inequality is quite large (and driven by the extremely skewed distribution of employed women across the income distribution, as it can be appreciated in Table B.3 in Appendix B, and because, at the same time, government revenues would not increase that much (as Table B.5 in Appendix B shows).

results and should be taken into account when interpreting them (we have already briefly commented on these in section 2). One is that SILC contains quite aggregated data on some key variables that are used to approximate the 'type of work', such as the sector of activity (NACE at the one-digit level), occupation (ISCO - one digit) and education (ISCED - one digit).[40] Another is that hourly wages in SILC are not directly reported by surveyed individuals but are constructed based on reported information on labour status and hours worked (which refer to the current year) and yearly labour incomes (which refer to the previous year). This is the cost we face to be able to conduct a cross-country analysis covering the EU 27, which accounts for household characteristics and which enables us to simulate the distributional effects of changes in the gender pay gap (as the EU-wide tax-benefit microsimulation model EUROMOD is based on the EU-SILC). In the methodological appendix, we compare our SILC-based estimates of the UGPG and AGPG with those published by Eurostat under its experimental statistics section (and reported by Denis Leythienne, 2021), which, to our knowledge, are the only cross-country harmonised estimates of these gaps covering the whole of the EU. Their estimates are based on the SES, which has better quality hourly wage information and more disaggregated data on sectors and occupations, as well as on the type of contracts, but it does not include information at the household level.[41] In general, from this comparison, we observe that our AGPG tends to be slightly lower than theirs (even when we estimate the AGPG with a SILC-based O-B decomposition), for most countries. In contrast, our estimated UGPG is smaller, which is driven by the different survey characteristics.

Our second comment relates to the estimation strategy followed to measure the magnitude of unequal pay for equal work. Most empirical studies on gender pay gaps have used matching or O-B types of decomposition analysis to account for differences in earnings not attributed to characteristics. We know that this can make an important difference (see Meara et al., 2020 for an interesting discussion and sensitivity analysis in this regard). To our knowledge, our strategy, based on blocking with regression adjustments (inspired by Imbens and Rubin, 2015), has not yet been used to estimate the gender pay gap for women and men performing equal or very similar work. In principle, as suggested by Imbens and Rubin (2015), this methodology should not suffer as much as O-B types of analysis from the (upward) bias coming from the extrapolation assumption that underlines regression-based analysis on the full sample when the two groups that are compared - i.e. women and men in this case - show very different characteristics (Ñopo, 2008; Imbens, 2015). Indeed, in the comparison we make with SES-based estimates (methodological appendix B), we find that our AGPG estimates lie below O-B, and this could also explain why we obtain slightly lower AGPGs with respect to those published by Denis Leythienne (2021) based on SES 2018. We could, therefore, interpret our results as more conservative and our estimates as lower bounds.

Third, there are three implicit assumptions in the simulation to estimate the distributional effects of closing the AGPG following the hypothetical enforcement of EPEW. One is that we do so by an upward shift of women's gross hourly wages, leaving men's distribution of wages untouched. Whether this is a reliable assumption to account for the potential effects of pay transparency measures is *a priori* unclear. The (limited) existing literature on the actual effect of the (limited) pay transparency initiatives[42] that have been implemented has mixed responses (a good review can be found in Frey,

[40] Accounting only for aggregate levels of education (e.g. primary, secondary, tertiary) is quite limited to proxy human capital differences between women and men. Some studies with access to more detailed information have shown that the horizontal differences in the level of education (i.e. field of study) typically lead to higher-than-average returns in the labour market (Eurofound and EIGE, 2021). Moreover, it would also be good to account for the actual tasks workers perform and obtain more detailed information on their skills, as this can significantly influence the estimate of the unequal-pay-for-equal-work phenomenon (see Christl and Köppl-Turyna (2020) for Austria, Fana et al. (2021) for France). But this is not possible with SILC or SES.

[41] These SES-based statistics are also used by the European Institute for Gender Equality (EIGE) to measure and monitor gender inequalities in the EU (see https://eige.europa.eu/gender-equality-index/2021).

[42] We should also say that among the limited pay transparency initiatives, there is a substantial degree of heterogeneity

2021). Some studies found that women's wages increased after pay transparency policies, while others have identified a slow down in the growth of men's wages.[43] The second implicit assumption is that there are no behavioural responses (i.e. we look into the overnight distributional consequences as if there was no impact on labour supply or demand; therefore, we do not account for potential changes in employment and labour transitions). From any standard neoclassical labour market model, an upward shift in wages would reduce labour demand and increase labour supply, and this could lead to a new equilibrium with lower employment. But this does not necessarily have to be the case, especially in imperfect labour markets (e.g. monopsonies). In fact, Manning (2013) suggests that this probably explains why the 1970 UK Equal Pay Act resulted in a large increase in female-relative wages with no impact on relative employment. The third implicit assumption in our simulations is that firms face the full cost of this upward shift in gross hourly wages. This is a very convenient assumption for the illustration of the effects on households, firms and governments, but at the same time, it relies on the features of labour markets. Again, this could hold under some specific labour market features, such as firms' strong monopsony power where the presence of mark-ups would allow employers to absorb the rise in wages without decreasing labour demand.

Finally, we have addressed some of the *ceteris paribus* distributional effects of the enforcement of the EPEW principle. When we move from individual gross hourly wages to household disposable income, we show that the simulated upward shift of women's wages would reduce income poverty and slightly increase income inequality (driven mainly by a composition effect: the under-representation of employed women at the bottom of the income distribution). Although we are interested in evaluating the broader effect of these gaps in the distribution of household income, the gender dimension is actually lost when we move to the household disposable income perspective, as this actually hides the intra-household dimension.[44] However, we show that if governments would like to offset this unintended effect on the concentration of income, a simple lump-sum transfer (recycling the additional government revenues that this shift in wages would generate) would suffice for most countries. In this sense, the lump-sum is just an illustration of one of the many revenue-recycling policies that could be implemented. Of course, more targeted transfers to low-income households could lead to even stronger positive redistributive effects, while policies aimed at reducing the higher burden faced by women in unpaid household production and care activities could also generate secondary positive effects in employment and hours worked. There are also two potentially important redistributive aspects that we have not accounted for because they are out of the scope of this analysis but which can make the enforcement of the EPEW even more inclusive. One is, from a life-cycle perspective, the effect that the increase in gross wages has on social insurance contributions (which, in most countries, tend to be proportional), which could lead to more equitable access to contributory benefits such as unemployment benefits and pensions. Another is related to the omission of the potential changes that these policies could have on the functional distribution of income.[45]

in the type of measures implemented, as comprehensively reviewed by Hofman et al. (2020).

[43] Moreover, Cullen and Pakzad-Hurson (2021) suggest that pay transparency initiatives can also lead to unintended indirect negative effects on wages, especially in countries with weak collective bargaining power (as this increases the monopsonic behaviour of firms).

[44] These rely on the assumption of resource-pooling. In this sense and with solid arguments, the literature on gender inequality has systematically accused these measures of gender blindness, as the unequal distribution of resources (e.g. income and time) and outcomes (e.g. consumption or broader definitions of welfare) remains hidden. The same happens with the distribution of government transfers (e.g. child benefits) and even with joint taxation, where it is very difficult to identify how much goes to whom (notable exceptions are Avram and Popova, 2020 and Sauer et al., 2020, but which are not exempt from the need for strong assumptions).

[45] If the enforcement of equal pay would involve a transfer from capital to labour (e.g. through a reduction of mark-ups that are transformed in higher wages), this could lead to a positive redistributive effect - the reduction of income inequality - which we are not accounting for. However, this analysis falls beyond the scope of our study and would also require different databases (capital income is strongly under-covered in SILC, as in general in household surveys, which are mostly used to assess the distribution of personal income -and, in particular, labour income- rather than the functional distribution of income).

5 Conclusions

The EU countries have been committed to the principle of 'Equal pay for male and female workers for equal work' since the 1957 Treaty of Rome. This is also at the heart of the EU Gender Equality Strategy 2020-2025 and the European Pillar for Social Rights Action Plan for 2030. In this context, and given the persistent disadvantages faced by women in labour markets, the European Parliament has recently approved the Commission's proposal for a new Directive on Pay Transparency that includes new binding pay transparency measures.[46] The Impact Assessment that accompanied this new proposal suggests that these binding measures could potentially reduce the gender pay gap between women and men performing 'equal work' by about 3 pp. But how far are the EU countries from accomplishing equal pay for equal work between women and men? A weak consensus exists on how to actually measure these differences in payment for 'equal work' between women and men, and evidence covering the EU 27 countries is very limited. Even less research has studied the role played by these gaps - which are commonly defined at the level of gross hourly wages - on the broader distribution of household disposable income. This is where our study contributes to the literature.

We provide new harmonised estimates of the UGPG and AGPG in the EU, based on microdata for the EU 27 and a novel estimation strategy based on Imbens and Rubin (2015) and Imbens (2015). By doing so, we are able to evaluate how far the EU countries are from accomplishing the EPEW principle. Through the simulation of an upward shift of women's gross hourly wages to reduce the AGPG by 3 pp (as suggested by the Impact Assessment) or fully (a benchmark scenario where the EPEW principle is enforced), we address the distributional effects of reducing these gaps on labour earnings as well as on household disposable income.

Our results suggest that, on average, women's gross hourly wages are about 11% less than men who perform similar work in the EU 27. In most countries, the AGPG is higher in sectors of activity and occupations that are mainly dominated by men, while differences across education are less significant. Paradoxically, countries showing the highest (lowest) AGPGs would experience the smallest (largest) distributional effects of potential enforcement of EPEW. Countries with a low AGPG and high gaps in total labour earnings (e.g. Germany, Austria and the Netherlands) typically feature very high gaps in hours worked (large shares of part-time workers among employed women) and a much stronger effect of segregation into characteristics (i.e. the fact that women tend to work in worse-paid types of jobs) than unequal pay to explain the gap in hourly gross wages. In contrast, countries with a high AGPG and low GLEGs (mainly CEE countries) tend to suffer much less from these other gaps and segregation effects. Unsurprisingly, the estimated effect on the distribution of household disposable income, income inequality and poverty shows a wide cross-country variation. Still, we identify at least two common patterns across the board. One is that income poverty decreases, and this is particularly pronounced in single-adult households with children (these adults are mostly women). Another, and perhaps less intuitive pattern, is that income inequality slightly increases. The simulated upward shift of women's gross hourly wages tends to disproportionately favour households at the middle and top of the income distribution. This is not due to a higher AGPG profile of workers at the top of income distribution but to another type of composition effect: employed women are strongly under-represented at the bottom. However, the magnitude of this unintended negative redistributive effect is very small, especially at the level of disposable income, given the counterbalancing role of the tax-benefit systems (which tend, on average, to offset about half of the negative redistributive effect from the simulated change in the distribution of gross hourly wages).

The main policy message of our paper is that new binding pay transparency measures, or any

[46] This proposal aims to reinforce and expand the measures that were already covered by the Directive 2006/54/EC (the 'Recast Directive') and the 2014 Commission Recommendation on this subject.

policy aimed at enforcing EPEW between women and men in the EU, will likely have very different effects on the gender pay gap and on the distribution of labour earnings. This depends on a size effect (the extension of the phenomenon of unequal pay,[47] and the importance of unequal-pay-for-equal-work as a driver of the total GLEG). It will also have very different effects on the distribution of household disposable income, depending on, a composition effect (where are underpaid women located in the distribution of household disposable income) and the interplay of taxes and benefits. Therefore, we provide suggestive evidence that these policies would be very effective in almost virtually eliminating the gender pay gap in hourly wages and the total GLEG in some countries (mainly CEE countries), but it would only have marginal effects in others, especially where the bulk of differences in labour earnings between women and men is mainly driven by gender gaps in employment (e.g. Italy and Malta) or by segregation in the type of work and gaps in hours worked (e.g. Germany and Austria). Paradoxically, it is precisely in countries where the expected gains in terms of gender inequality are the lowest that the total GLEG is the largest. In these countries, different policies would be needed to complement the enforcement of EPEW to tackle these gaps in total labour earnings, which are particularly influenced by the disadvantages women face in accessing work and highly paid jobs. These could be, among others, measures designed to re-balance the uneven distribution of unpaid work activities between women and men (related to household production and care activities), the introduction or expansion of the public provision of care activities as well as policies aimed at reducing gender segregation in the type of work done (the under-representation of women in highly paid jobs, which is very much related to occupational/sector sorting).

[47] Which matters less in countries that have already implemented some pay transparency policies. A good review of the already implemented pay transparency measures is provided by Hofman et al. (2020) and Frey (2021).

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A Methodological appendix

A.1 Regression adjustments after blocking

As described in section 2, we estimated the AGPG following three steps. Here, we provide more detailed information on the strategy followed in each of them.

The first step involved estimating the propensity score based on a logistic regression model estimated by maximum likelihood. Given a vector of functions $h : X \to R^M$, the propensity score is specified in equation 9, where γ is estimated by maximum likelihood. The propensity score balances the covariates in a mechanical way without structural or causal interpretation (Imbens, 2015). A property of the propensity score is that women and men, comparable for the propensity score, will also be similar with respect to the whole set of covariates. We include the full set of variables that will be used in the next stage.

$$e(x) = \frac{exp(h(x)'\gamma)}{(1 + exp(h(x)'\gamma)'} \tag{9}$$

In the second step, we estimated equation 10 with an ordinary squares estimator, where the outcome variable Y_i is the log of gross hourly wages of individual i, W_i is the treatment indicator (women dummy) and X_i are the covariates that are used to measure the type of work that individuals perform, given their personal characteristics and the job's features. These covariates are the same we used to estimate the propensity scores.

$$(\hat{\alpha}_j, \hat{\tau}_j, \hat{\beta}_j) = argmin_{\alpha,\tau,\beta} \sum_{i=1}^{N} B_i(j)(Y_i - \alpha - \tau W_i - \beta' X_i)^2 \tag{10}$$

$B_i(j) \in 0, 1$ is the binary indicator for the event that the estimated propensity score for unit i, $\hat{e}(X_i)$, satisfies $b_{j-1} < \hat{e}(x_i) < b_j$.

Conceptually, as argued by Imbens and Rubin (2015), there are a couple of advantages of this estimator over simple weighting estimators. First, the sub-classification approximately averages the propensity score within the sub-classes and smooths over the extreme values of the propensity score. The regression does not rely heavily on extrapolation as it might do if applied to the full sample. Second, the regression within the sub-classes adds a lot of flexibility compared to a single weighted regression.

In the third step, the within-blocks estimates $\hat{\tau}_j$ were averaged over the J blocks using the proportion of treated units in each block (see equation 11). Given that the outcome variable (Y_i: gross hourly wage) is defined in the logs, our AGPG estimates were obtained after the transformation shown in the second line of 11.

$$ATT \equiv \tau_{block,treat}(Y, W, X) = \sum_{j=1}^{J} \frac{N_{tj}}{N_t} \hat{\tau}_j \tag{11}$$

$$\to AGPG = 1 - exp(ATT) * 100$$

To define the number of blocks, we used a data-dependent algorithm developed by Imbens and Rubin (2015), which consisted of comparing the average values of the log odds ratios by treatment status, starting with a single block and checking the adequacy of the stratification. The adequacy was tested as follows. In each block, a T-statistic test of the null hypothesis that the average value for the estimated propensity score for the treated (women in our case) was the same as the average value for the estimated propensity score for the control (men). The block was considered 'adequate'

if the value of the t-statistic was sufficiently small or if splitting the block further would lead to too few observations in the new blocks. If a block was not considered adequate, it would be split at the median value of the propensity score of treated within the block.[48] The same tests were applied to the new blocks until all blocks were considered adequate. The number of blocks defined by the algorithm depended on the country, and in our analysis, the minimum number of blocks was 11 and the maximum was 23.[49]

A.2 Sensitiveness and robustness

A.2.1 Comparisons with SES-based gender pay gaps

We now compare our SILC 2019-based estimates[50] with those produced by Eurostat based on the SES (2018). These estimates are reported in Denis Leythienne (2021) and published on Eurostat's website in the 'experimental statistics' section. The difference in the estimated UGPG is only related to sample differences (as this gap is simply measured as the difference between mean gross hourly wages of women and men), while the difference in the AGPG estimates involve the methodological strategy. Our estimates were obtained using a hybrid matching-regression technique called regression-after-blocking, based on Imbens (2015), while Denis Leythienne (2021) uses a standard O-B decomposition. We also estimated the AGPG with an O-B decomposition based on our sample (SILC) and compared it with Denis Leythienne (2021)'s and our AGPG based on regressions after blocking.

To compare our estimates with SES-based Eurostat figures, we filtered the EU-SILC survey to replicate the same sample covered by the SES as much as possible, and we used the most similar sets of variables and methodology. In particular, we restricted our sample, excluding i) employees working in firms with less than 10 employees; ii) employees working in occupations classified as ISCO 0 and ISCO 6; iii) those employed in firms whose economic activity is classified as NACE A and O.[51] Similar to Eurostat, we controlled for age, work experience, level of occupation, working time, sector of activity, enterprise size, enterprise control (public vs private) and region. However, different from Eurostat, we did not have information on the type of contract (permanent vs temporary). The level of occupation and sector of activity was less disaggregated, and the data on region were only available in a few countries.

The UGPG based on SES 2018 is, on average, slightly larger than our UGPG based on SILC 2019 (see Figure A.9). The largest discrepancy in this sense was observed in Estonia, Austria and Slovakia (where SES-based gaps were somewhat larger than our estimates from SILC with the filtered sample). Alternatively, we also observed a few countries where our gaps were slightly higher (mainly in Luxembourg and Belgium). Moreover, in this figure, we could also see the effect of filtering the SILC sample to replicate SES characteristics. The UGPG estimates based on SILC without any filter 'SILC 2019 (no filter)' were very similar to the estimates we obtained after filtering, on average, although with some cross-country variation. In some countries, such as Italy, Cyprus, Hungary and Romania, we observed higher UGPGs in the unfiltered SILC sample (which could be driven by higher gaps in small firms or in sectors that are in the SILC and not the SES, such as agriculture), whereas the opposite pattern - but still with relatively small differences - was found in Malta, Lithuania, Sweden and Bulgaria.

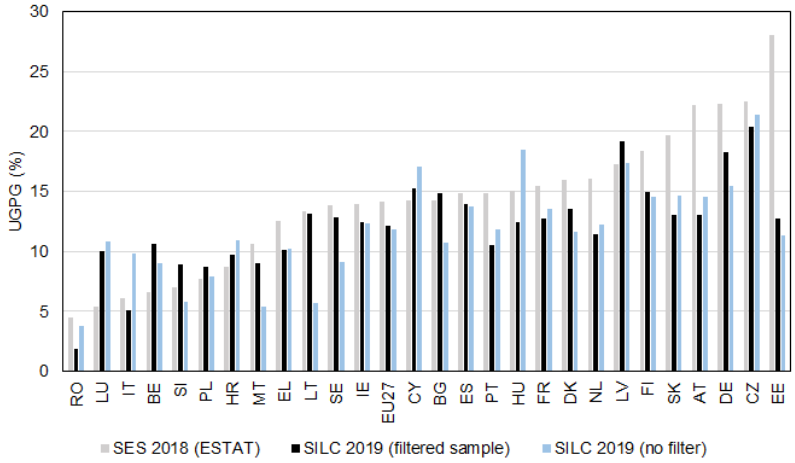
[48] For more details on the procedure and tests, please see Imbens and Rubin (2015).

[49] A higher number of blocks is expected in countries with a larger number of observations and where the characteristics of employed women are very different from those of men.

[50] Which refer to 2018 incomes.

[51] Eurostat also excludes employees working in firms with NACE T and U. However, in SILC data, we do not have this level of disaggregation.

Fig. A.9. Unadjusted gender pay gap: Compared point estimates



Notes. SES 2018 estimates obtained from EUROSTAT's website (and also reported in Eurofound and EIGE (2021)). SILC 2019 (filtered sample) are our estimates, filtering the sample to 'mimic' SES features in terms of sector and firm size coverage.

Fig. A.10. Adjusted gender pay gap: Compared point estimates

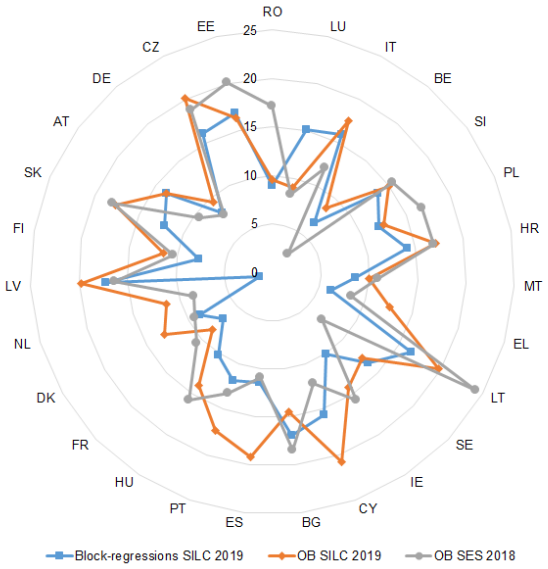
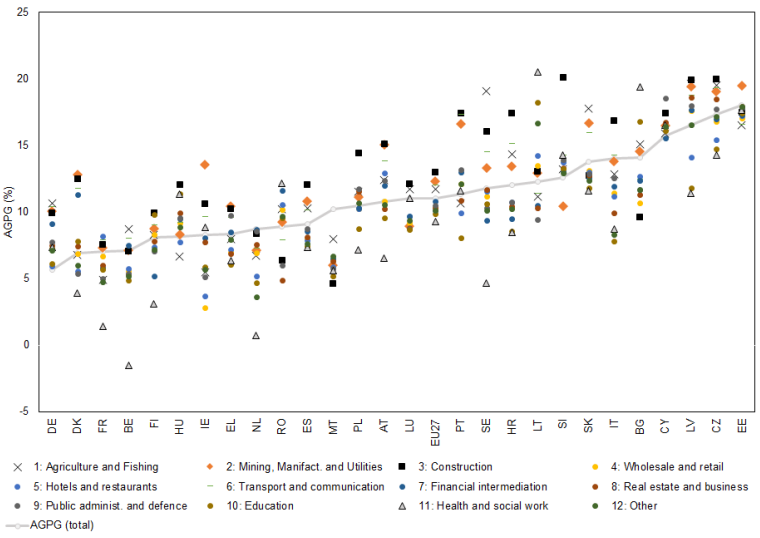


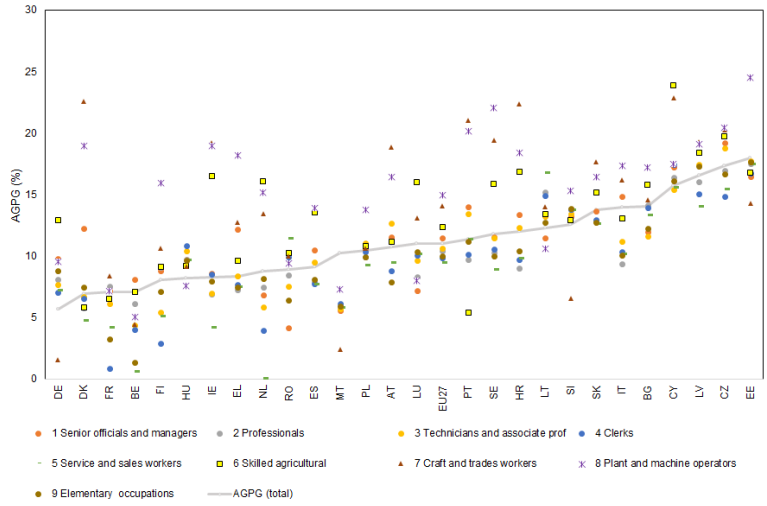
Figure A.10 shows the AGPG estimates obtained with an O-B decomposition: 'OB SES 2018' refers to the estimates obtained by Eurostat, and 'OB SILC 2019' refers to our estimates based on a filtered SILC survey that tries to replicate SES characteristics as well as the AGPG we obtained with our blocking with regression adjustments strategy ('Block-regressions SILC 2019'). We can see that for some countries, the AGPG estimates are pretty similar, but in general, our estimates are lower than those obtained with O-B both in SILC and SES (in line with the upward bias that is associated with estimates that rely on the extrapolation assumption suggested by Imbens and Rubin, 2015). The only countries for which we obtained higher AGPG are Belgium and Sweden. For Belgium, using SILC, we observed higher estimates when using O-B than blocking-regressions (in line with the upward bias suspicious pattern of O-B), while for Sweden, the results are higher with SILC than SES, but they do not significantly depend on the estimation strategy.

B Additional tables and figures

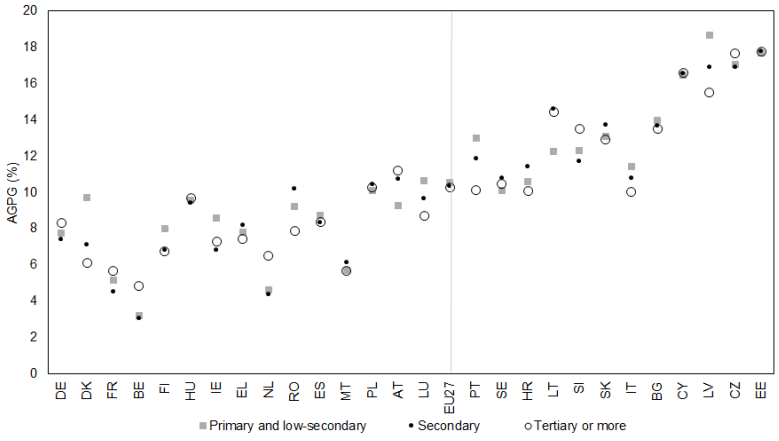
Fig. B.2. AGPG by sector of activity, occupation and education in the EU 27



(a) AGPG by country and sector of activity



(b) AGPG by country and occupation



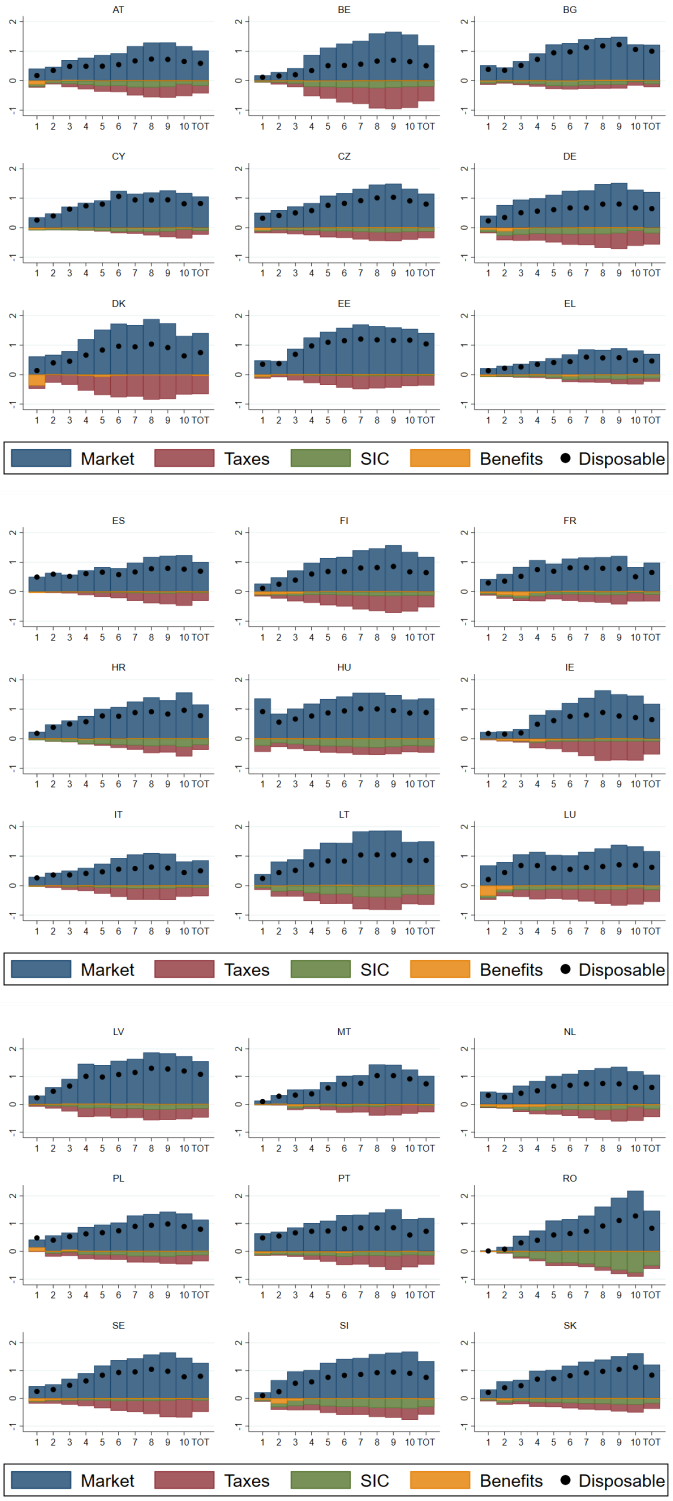
(c) AGPG by level of education

Table B.2: Change in the AROP and Gini in the 3 pp and full scenario

	AROP		GINI	
	(1) 3pp	(2) Full	(3) 3pp	(4) Full
AT	-0.233	-0.327	0.001	0.004
BE	-0.077	-0.225	0.001	0.003
BG	-0.195	-0.740	0.001	0.004
CY	-0.133	-1.317	0.001	0.005
CZ	-0.103	-0.646	0.001	0.007
DE	-0.186	-0.332	0.001	0.002
DK	-0.179	-0.286	0.001	0.002
EE	-0.171	-1.465	0.001	0.007
EL	-0.071	-0.244	0.001	0.002
ES	-0.460	-0.847	0.000	0.002
FI	-0.083	-0.277	0.001	0.003
FR	-0.230	-0.639	0.000	0.001
HR	-0.335	-0.641	0.001	0.004
HU	-0.075	-0.185	0.000	0.004
IE	-0.334	-0.421	0.001	0.003
IT	-0.217	-0.642	0.000	0.002
LT	-0.132	-0.720	0.001	0.004
LU	-0.327	-0.803	0.000	0.001
LV	-0.260	-1.321	0.001	0.008
MT	-0.051	-0.292	0.001	0.005
NL	-0.097	-0.407	0.001	0.004
PL	-0.148	-0.310	0.001	0.004
PT	-0.273	-1.259	0.000	0.000
RO	-0.236	-0.405	0.002	0.005
SE	-0.062	-0.652	0.001	0.004
SI	-0.057	-0.387	0.001	0.005
SK	-0.124	-0.330	0.001	0.007
EU27	-0.180	-0.597	0.001	0.004

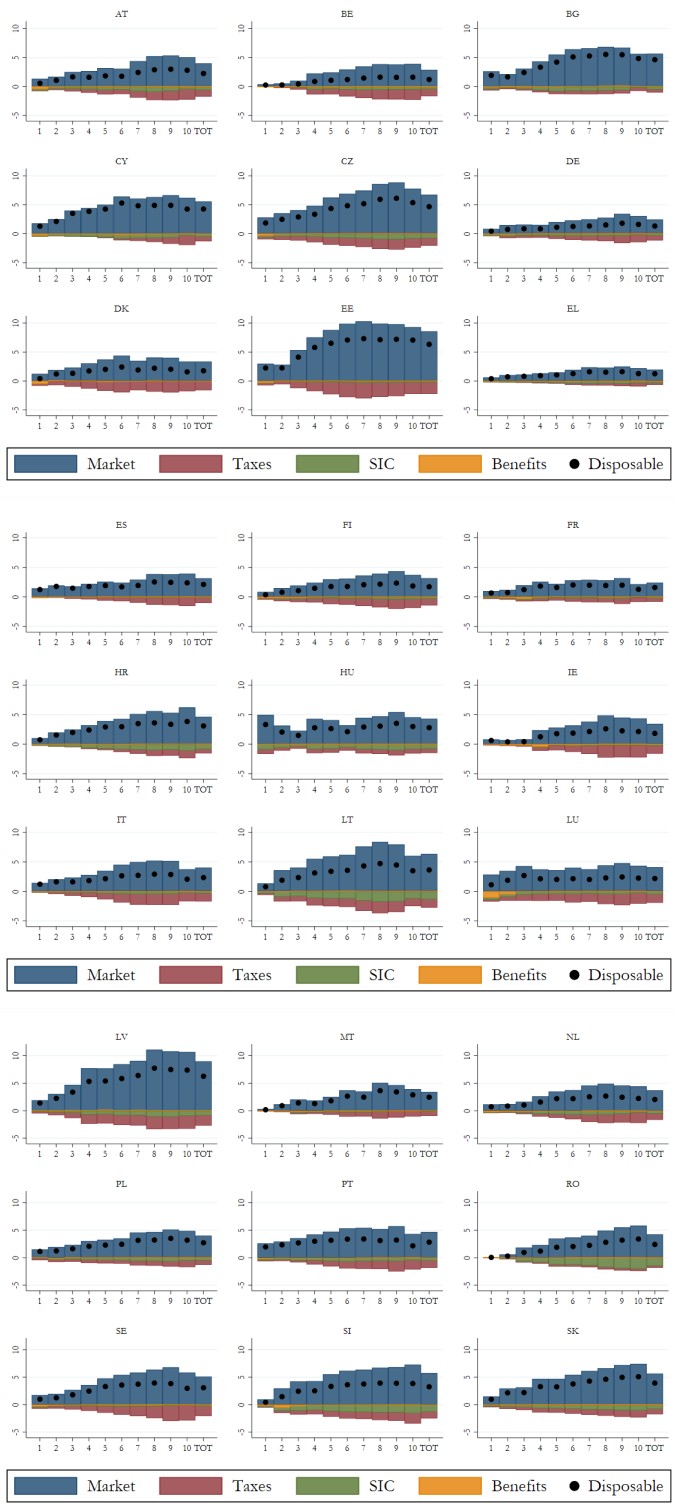
Notes. Percentage points.

Fig. B.3. Decomposition of the change in household disposable income by deciles: 3 pp scenario



Notes. Market: household market income; Taxes: direct taxes; SIC: employee's social insurance contributions; Benefits: cash benefits (excl. pensions); Disp: disposable income.

Fig. B.4. Decomposition of the change in household disposable income by deciles: full scenario



Notes. Market: household market income; Taxes: direct taxes; SIC: employee's social insurance contributions; Benefits: cash benefits (excl. pensions); Disp: disposable income.

Table B.3: Share of women in employment over total population by household income deciles

Country	1	2	3	4	5	6	7	8	9	10
AT	14.4	16.4	18.9	21.7	22.9	23.8	27.9	30.6	30.5	29.7
BE	9.2	10.7	14.5	20.9	24.3	26.1	27.2	30.3	30.7	31.4
BG	8.4	10.0	15.1	19.8	24.4	28.0	31.4	32.5	36.2	32.1
CY	10.5	13.9	18.8	22.0	23.5	29.0	25.6	27.1	27.4	28.0
CZ	10.1	12.3	14.9	17.2	21.4	23.3	26.4	28.6	30.7	30.6
DE	15.1	19.7	21.4	24.3	24.6	27.4	27.7	31.6	32.0	32.5
DK	22.8	20.0	18.5	22.4	27.2	29.9	30.5	33.9	33.9	32.9
EE	14.3	14.1	20.4	29.0	31.5	34.7	36.5	36.6	35.9	35.3
EL	4.2	5.2	6.9	9.1	11.0	13.4	16.7	16.8	18.8	20.4
ES	14.3	17.3	17.1	19.4	21.7	20.8	23.5	26.5	28.9	30.7
FI	14.3	17.5	18.9	23.5	25.5	26.1	30.8	32.2	35.3	34.6
FR	13.4	16.2	20.9	25.4	23.9	26.1	27.0	27.9	27.8	26.8
HR	3.6	7.8	11.4	14.8	19.0	20.8	23.3	25.4	25.5	30.0
HU	21.3	18.7	24.0	26.2	27.6	28.0	29.2	30.8	29.9	30.3
IE	7.4	8.4	9.5	18.6	22.0	25.6	27.0	30.1	29.5	33.1
IT	6.7	10.2	10.7	14.0	15.7	18.1	21.0	22.8	24.3	21.7
LT	6.6	13.1	16.0	21.8	26.7	27.5	32.7	34.6	35.0	33.6
LU	15.0	18.6	19.7	22.0	19.7	20.5	22.7	24.0	25.5	27.7
LV	7.9	14.6	19.6	28.0	28.9	31.0	33.1	34.9	35.8	36.9
MT	4.2	8.7	11.8	14.5	18.7	22.5	25.1	30.7	33.2	32.9
NL	17.6	15.8	19.7	22.0	25.1	27.2	27.3	30.2	30.4	29.8
PL	6.3	10.0	11.8	15.5	17.1	18.6	23.6	25.2	27.6	29.5
PT	10.2	13.6	17.1	19.8	21.7	25.3	26.5	27.7	28.4	23.6
RO	0.3	1.4	5.2	8.4	13.7	15.8	17.8	22.9	27.9	31.3
SE	15.2	15.3	18.6	22.3	26.5	28.7	32.3	34.7	37.8	38.0
SI	8.8	15.5	19.4	20.5	24.6	26.8	27.8	30.2	29.7	32.3
SK	5.1	10.7	12.2	18.1	18.7	23.0	25.9	28.9	31.3	36.4
EU27	10.6	13.2	16.0	20.1	22.5	24.8	26.9	29.2	30.4	30.8

Table B.4: AGPG by deciles of equivalised household disposable income

Country	1	2	3	4	5	6	7	8	9	10
AT	11.0	9.6	9.2	9.5	10.2	9.9	10.4	11.4	11.1	11.1
BE	2.7	3.7	2.7	2.7	3.5	3.4	3.7	3.8	4.8	5.4
BG	13.0	13.1	12.5	13.8	12.9	14.4	13.1	13.7	12.9	13.1
CY	16.6	17.2	16.0	16.4	16.8	17.4	16.4	15.7	16.5	16.3
CZ	16.6	17.0	16.4	17.2	16.7	17.0	16.9	17.4	17.6	17.7
DE	7.4	7.6	7.4	7.5	7.8	7.7	7.9	7.8	8.2	8.0
DK	7.4	7.4	7.8	6.0	7.1	6.3	7.0	6.8	6.8	7.2
EE	19.4	18.3	17.8	17.7	17.5	17.8	17.7	17.7	17.7	16.9
EL	8.0	7.6	7.2	7.7	7.6	7.6	7.9	7.8	7.9	8.1
ES	8.7	8.6	8.0	8.7	8.5	8.3	8.9	8.9	8.4	8.6
FI	8.1	7.5	6.9	6.9	6.8	6.1	6.2	6.7	7.0	7.3
FR	4.2	4.7	4.6	5.0	4.7	4.9	5.0	5.6	5.7	5.4
HR	11.2	11.5	10.8	11.0	11.0	11.2	10.7	10.6	10.8	10.8
HU	10.0	9.0	9.9	10.3	9.0	8.8	9.0	9.8	9.5	8.9
IE	7.0	7.2	7.0	7.1	7.9	7.0	7.1	7.1	6.9	6.0
IT	10.6	11.4	11.1	11.3	10.6	10.9	11.0	10.9	10.8	10.8
LT	13.1	14.6	13.8	14.2	14.2	14.7	14.7	13.9	14.5	13.7
LU	11.0	10.5	8.7	8.7	9.5	10.2	9.6	10.1	9.7	7.6
LV	17.0	15.3	17.2	16.2	16.2	16.6	16.5	17.0	16.8	17.5
MT	3.5	7.1	6.5	7.4	5.0	6.4	5.1	5.5	6.6	5.8
NL	5.8	4.8	4.5	4.3	4.8	5.0	5.2	5.9	5.8	6.6
PL	10.2	10.1	10.3	10.3	10.3	10.1	10.4	10.2	10.5	10.3
PT	12.7	12.7	12.8	13.3	13.2	12.7	12.7	11.7	11.7	10.6
RO	11.6	6.2	9.8	9.0	9.5	9.6	10.0	10.1	9.6	7.9
SE	10.1	10.2	9.9	10.6	10.8	10.3	10.0	10.9	10.5	11.2
SI	13.0	11.8	12.5	12.6	13.3	12.8	13.2	12.4	12.6	13.4
SK	13.2	13.6	14.0	13.5	13.1	13.3	13.7	13.7	13.7	13.4
EU27	10.5	10.3	10.2	10.3	10.3	10.4	10.4	10.5	10.5	10.4

Table B.5: Budgetary effect on government revenues and firms' labour payments as % change and % of GDP

	% Change				Amount as % of GDP			
	Wage bills		Gov. budget		Wage bills		Gov. budget	
Country	3 pp	Full	3 pp	Full	3 pp	Full	3 pp	Full
AT	1.2	4.7	5.0	19.6	0.5	2.1	0.3	1.1
BE	1.4	3.3	4.5	10.7	0.6	1.5	0.4	1.0
BG	1.5	7.0	5.9	27.8	0.7	3.0	0.2	0.9
CY	1.4	7.4	-10.1(*)	-54.1(*)	0.6	3.1	0.2	1.0
CZ	1.4	8.4	3.7	21.3	0.5	3.2	0.3	1.5
DE	1.2	2.4	3.5	6.7	0.6	1.2	0.3	0.6
DK	1.4	3.3	2.6	6.2	0.6	1.5	0.3	0.7
EE	1.6	9.9	4.2	25.6	0.8	4.9	0.4	2.2
EL	1.3	3.6	-4.9(*)	-13.9(*)	0.3	0.9	0.2	0.4
ES	1.2	3.9	5.1	17.2	0.5	1.6	0.2	0.7
FI	1.4	3.8	5.7	15.5	0.6	1.7	0.4	1.0
FR	1.4	3.5	5.1	12.7	0.7	1.7	0.4	0.9
HR	1.4	5.7	11.2	45.4	0.5	2.1	0.2	0.9
HU	1.4	4.5	3.1	9.8	0.5	1.4	0.2	0.6
IE	1.4	3.9	4.5	13.4	0.3	1.0	0.2	0.5
IT	1.2	5.8	8.1	38.1	0.5	2.2	0.3	1.2
LT	1.5	6.5	4.8	20.3	0.6	2.5	0.3	1.1
LU	1.3	4.6	10.4	36.3	0.4	1.4	0.2	0.7
LV	1.6	9.2	3.2	18.5	0.8	4.6	0.3	2.0
MT	1.2	4.0	11.4	38.0	0.4	1.5	0.1	0.5
NL	1.2	4.1	2.4	8.5	0.5	1.7	0.2	0.9
PL	1.4	4.8	4.4	15.9	0.5	1.8	0.2	0.8
PT	1.5	6.0	8.2	32.0	0.6	2.3	0.3	1.2
RO	1.3	3.9	3.6	10.3	0.4	1.2	0.2	0.5
SE	1.4	5.8	3.3	13.7	0.7	2.7	0.4	1.5
SI	1.5	6.4	7.9	33.9	0.6	2.7	0.3	1.4
SK	1.5	6.8	3.9	18.1	0.5	2.5	0.3	1.2
EU27	1.4	5.3	4.5	16.6	0.6	2.2	0.3	1.0

Note: The cost for the firm includes social insurance contributions for employers and the additional cost for higher wages. The change in government budget is due to higher taxes, social insurance contributions and lower benefits. (*) In Cyprus and Greece, the government budget is negative (higher benefits than taxes and social insurance contributions, which are accounted for in EUROMOD), so the result should be interpreted as a reduction of this deficit.

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