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Department of Economics
SOAS University of London
Thornhaugh Street, Russell Square, London WC1H 0XG, UK
Phone: + 44 (0)20 7898 4730
Fax: 020 7898 4759
E-mail: economics@soas.ac.uk
http://www.soas.ac.uk/economics/

Narrowing women's time and income gaps: an assessment of the synergies between working time reduction and universal income schemes

André Cieplinski[1]

Simone D'Alessandro[2]

Chandni Dwarkasing[3]

Pietro Guarnieri[4]

Abstract: The COVID-19 crisis re-opened a discussion on the gendered nature of time-poverty and income inequality. We compare two policy combinations that assess the synergies between working time reduction and two universal income schemes: basic income and care income programmes. While the former provides every individual with an equal monetary benefit, the latter ties monetary benefits to the amount of unpaid and care work performed by individuals. We assess the impact of these policy combinations applying Eurogreen, a macrosimulation model tailored to Italy. Results suggest that while working time reduction directly improves the distribution of unpaid work and alleviates time-poverty, its impact on income inequality is limited. By contrast, the universal income schemes promote a similar and significant reduction of income inequality but differ in terms of gender equality outcomes. When it comes to improvements in women's employment, labour force participation and real wages, working time reduction in combination with basic income outperforms care income. Meanwhile, care income outperforms basic income in terms of women's income gap. Finally, regarding time-use, the adverse labour market effects of a care income on women's participation rates compromises the redistribution of unpaid work from women to men.

Keywords: inequality; time-use, unpaid work, care work, working time reduction, basic income.

JEL classification: C63, B54, J22, E24.

[1] Department of Economics and Management, University of Pisa. Via Cosimo Ridolfi 10, Pisa 56124, Italy. Email: andre.cieplinski@ec.unipi.it

[2] Department of Economics and Management, University of Pisa. Via Cosimo Ridolfi 10, Pisa 56124, Italy. Email: simone.dalessandro@unipi.it

[3] Department of Economics, SOAS University of London. Russell Square, London WC1H 0XG, UK. Email: cd34@soas.ac.uk

[4] Department of Economics and Management, University of Pisa. Via Cosimo Ridolfi 10, Pisa 56124, Italy. Email: pietro.guarnieri@unipi.it

1. Introduction

Issues related to income inequality between men and women have been extensively considered in economic literature. An overwhelming consensus recognizes disadvantages for women in wages (Weichselaumer and Winter-Ebmer, 2005; Blau and Kahn, 2017), labour force participation (Fortin, 2015), and overall income and wealth (Fortin, 2019, Grabka et al., 2015). Significantly less attention has been devoted to time-use inequality between women and men. The amount of time women spend on care and unpaid work not only results in time-poverty, specially for those balancing care activities with paid work, but acts as a barrier for labour market participation.

One of the crucial findings in the literature on time-poverty is related to the gendered nature of its manifestation. While gender inequality in terms of time varies across countries, regions and household types, its main driver is related to the fact that women spend significantly more time on unpaid work activities (e.g., cooking, cleaning and care) compared to men (Turner and Grieco, 2000; Ghosh, 2001; Bardasi and Wodon, 2010; Chatzitheochari and Arber, 2012; Arora, 2015; Sweet and Kanaroglou, 2016; Yerkes et al., 2020). Across the globe, measures implemented to limit the spread of COVID-19 have pushed care and social reproduction activities deeper into the household sphere, resulting in an overall increase in unpaid work activities where women bore the “lion’s share” of the burden (Azcona et al., 2020; Sarker, 2021; Stevano et al., 2021; Giurge et al., 2021). In addition, ILO data reveals that 4.2% of previously employed women have lost their job between 2019 and 2020 compared to 3.0% of previously employed men (ILO, 2021). Where the difference is related the fact that women are over-represented in the sectors hit hardest by the COVID-19 measures -- e.g., hotel and food services (Kabeer et al., 2021). This recasts light on aspects of gender inequality that have been present long before the pandemic: time-poverty, employment, wage and income inequality.

In this paper, we assess gender inequality across each of the aforementioned dimensions but especially emphasize the issue of time-poverty and unpaid work. Time-poverty is a concept which departs from the idea that economic deprivation is not only related to an individual’s income but also their availability of time (Antonopoulos et al., 2012). Whether an individual is time-poor can be measured using different methodologies (see Harvey & Mukhopadhyay, 2007; Zacharias, 2011; Williams et al., 2016), but it is typically a function of i) the total amount of hours in a given time-frame, ii) time spent on income generation and iii) time spent on personal care and other unpaid activities such as productive, reproductive (care and domestic) and voluntary work (Kes and Swaminathan, 2006). An individual is said to be time-poor if the amount of time left after subtracting each time-consuming activity from the total amount of hours in a time frame falls below a certain threshold.

Ever since the introduction of time-poverty by Vickery (1977), an increasing amount of research has been directed at understanding the relation between time-constraints and physical and mental well-being and the interdependence between income and time-poverty (Krueger et al., 2009; Gershuny, 2011; Kalenkoski et al., 2011; Giurge et al., 2020). When it comes to the latter, William et al. (2016) argue that compared to wealthier individuals, poorer individuals may lack time saving devices (e.g., household appliances) and services (e.g., childcare) which subsequently influences the time which is necessary to escape income-poverty (e.g., not able to work enough hours or dedicate time to formative and social activities).

Since unpaid work or care activities affect women's vulnerability to time-poverty through a direct and uncompensated impact on residual time, it is relevant to highlight that unpaid caregivers are estimated to constitute approximately one to two-fifths of the labour force in 2030 of which women and girls represent four-fifths (King et al., 2021). Hence, addressing the time spent on income generation or paid work bears the potential to prevent the time-poverty impact of future care burdens on women.

To this end, working time reduction (WTR) policies would not only alleviate time-constraints for employed women but also foster the uptake of unpaid work by employed men. Notwithstanding, scholarly literature reveals that the reduction of income as the result of involuntary WTR at constant real wages will affect low-income workers to a larger extent (Coote et al., 2010; Antal, 2018) bearing negative implications for its social acceptance and support. Universal income schemes can potentially overcome this limit through the provision of monetary benefits to disadvantaged workers. This would be the case for a universal basic income (BI) which is funded through a progressive tax on income and therefore results in a larger net-benefit for low-income workers (Widerquist, 2017; Martinelli, 2017).

Given the importance of unpaid work and care, feminist scholars point out that a BI can be seen as an instrument that rewards individuals, particularly women, for their non-market forms of productivity (Robeyns, 2001; Weeks, 2020; Zelleke, 2008). However, a universal income which is tailored to the exact amount of unpaid work performed by individuals would do so to a larger and more equitable extent. This is why we additionally consider an hourly care income (CI) as a universal income scheme which is able to mitigate the negative side-effects of WTR. However, CI changes the incentives for women to join the labour force and may offset the positive impact of WTR on time poverty.

Having discussed WTR in combination with universal schemes as a means to address the gendered nature of time-poverty alongside the absence of compensation for unpaid work brings us to the contribution of this paper. We provide a brief literature review which expands on WTR policies and universal income schemes in relation to redistribution and gender equality. We also discuss how each of the considered policies affectthe time-poverty gap between women and men. Then, in order to estimate the effect of WTR on time-poverty, we run multilevel regressions on 2013 Italian Time-Use Survey microdata and derive the substitution between paid and unpaid work across age, gender and occupational categories. Together with WTR+BI and WTR+CI policy combinations, these coefficients are imputed in an adapted version of Eurogreen, a macrosimulation model tailored to Italy (D'Alessandro et al., 2020, Cieplinski et al., 2021). In contrast to previous versions, this work introduces a new time-use module fully integrated with the rest of the macroeconomic system. To the best of our knowledge, this is the first macrosimulation model which incorporates time-use and allows a deeper understanding of the impact of the two policy combinations on income inequality and multidimensional gender equality outcomes.

2. Literature Review

2.1 Working Time Reduction

Since time-poverty is a function of what's left after engaging in income generating activities or paid work, it seems plausible to assume that WTR policies bear the potential to reduce the incidence of time-poverty. Traditionally, WTR policies have been proposed as a means to combat unemployment through the redistribution of working hours across more people (Bosch and Lehndorff, 2001; Estevão and Sá, 2008; De Spiegelaere and Piasna, 2017; Messenger, 2018) and improve health and well-being through the alleviation of time-constraints (Sparks et al., 2001; Ahn, 2016; Hamermesh et al., 2017). More recently, scholars have recommended WTR policies as a way to limit environmental pressures through the effect of shorter working hours on consumption patterns and/or lower labour incomes which decrease consumption and economic growth as a whole (Pullinger, 2014; Antal, 2018; Gunderson, 2019; Cieplinski et al., 2021; Fremstad et al., 2019). With respect to gender equality, De Spiegelaere and Piasna (2017) highlight how WTR policies would decrease the full-time norm, making it more feasible for women to combine caring and household tasks with a full-time job instead of a part-time job. Not only would this place women on a more equal footing with men on the labour market, but the new employment generated as the result of WTR is likely to result in a relatively higher increase labour force participation for women compared to men.

One of the issues related to WTR policies, however, concerns its impact on income distribution. In absence of a wage-rate increase, a reduction in the amount of paid working hours will result ina decrease of income figures where low-income workers will be hit hardest (Coote et al., 2010, p.26; Antal, 2018, p. 233). The impact of WTR on income distribution can be dampened if the WTR scheme is voluntary since it's likely that participation rates will be higherfor people who can afford salary cuts. While this may ensure a redistribution of working-time hours from high-income earners to low-income earners, the reduction in income equality goeshand in hand with an increase in leisure time inequality (Pullinger, 2014, p. 17; Antal, 2018, p. 233; Persson et al., 2022, p. 84). In other words, under voluntary WTR schemes the alleviation of time-poverty is likely tobe limited to high-income earners.

A regressive redistribution from labour to capital is another outcome if WTR schemes incentivize capitalists to substitute labour for capital; potentially leading to an overall decrease of labour demand which limits the effect of WTR on unemployment reduction (Kallis et al., 2013, p. 1561; Estevão and Sá, 2008, p. 424). Another driver of limited unemployment reduction is the manifestation of bottlenecks as the result of a mismatch between unemployed and employed people in terms of labour skills (Bosch and Lehndorff, 2001, p. 231).

2.2 Universal income schemes

The negative side-effects of WTR policies mentioned above disclose the necessity to consider additional policies. One option is a basic income (BI) which represents a universal and periodic cash payment which is unconditionally delivered to every individual(BIEN, 2020). The academic literature on BI is extensive and addresses its i) advantages in light of automation and stagnant wages (Martinelli, 2019; Cabrales et al., 2020; Pulkka, 2017), ii) differences compared to other redistributive policies such as negative income taxes and guaranteed minimum income schemes in terms of outcome and funding mechanisms (Van Parijs, 2004; Gentilini et al., 2019; Reed and Lansley, 2016; Harvey, 2006), and iii) impact on climate change (Howard et al., 2019; Van Parijs, 2010; Alexander, 2012; Andersson, 2010).

Since one of the aims of this paper is to assess the interactions between a BI and WTR policies, the present discussion of BI is limited to the assumed implications of a BI for the issues raised by WTR policies as well as gender equality. For starters, the implementation of a BI can fullyor partially compensate the reduction in earned income for WTR schemes where wage-rates re- main constant. Furthermore, if the BI is funded through (an increase of) progressive taxation on income, wealth and capital, comparatively rich households and owners of capital, will essentially fund their own BI as well as a large fraction of comparatively poor households. This counteracts a potential regressive distribution from labour to capital as a result of WTR (Vobruba, 1990; Van Parijs, 2004, pp. 12-13; Straubhaar, 2017, p. 3; Wright, 2004, p. 83). Finally, a BI will also guarantee income to workers who may not benefit from a WTR-induced redistribution of working hours due to their skills not matching with the skills exhibited by freed up working hours.

Scholarly literature reveals both the potential and limitations of a BI when it comes to the advancement of gender equality. Weeks (2020) argues that the feminist case for a BI can be traced back to the 1970s Wages for Housework movement. Activists and theorists demanded an extensionof the traditional wage system to account for the household-based reproductive labour and other unpaid work activities which are disproportionally performed by women (see Federici, 1975; Dalla Costa and James, 1975). A BI is then argued to support this demand since it would reward non-market forms of productivity and render invisible and unpaid work activities more apparent (Robeyns, 2001, p. 91; Weeks, 2020, p. 580; Zelleke, 2008, p. 5). Other advancements of gender equality through a BI are related to the expansion of freedom and autonomy since a BI would grant women i) more bargaining power within the household, ii) income security and iii) a fallback position which would foster the exit from both abusive relationships and badly paid jobs (Elgarte, 2008; Pateman, 2004; Schulz, 2017).

Most academic discussions and policy proposals aimed at a more targeted remuneration of unpaid work regard care allowances or grants. Strong-Boag (1979) recalls the history of Motherhood allowances in the Canadian context while Letablier (2003) evaluates the impact of housewife allowances, which aim to support women's care work at home, on the work and family balance in the French context. Himmelweit et al. (2004) argue for a periodic caregiver allowance where the size of the payment depends on total household income and government intrusion into the personal lives of recipients is minimized. Finally, Robeyns (2001) addresses the benefits of a BI compared to housewives' wages which are conditional upon taking care of small children and withdrawal from the labour market.

To the best of our knowledge, remunerations based on the actual amount of unpaid work activities performed, or an *hourly* CI, is rarely discussed in the literature. Even if it represents a more equitable alternative to a care allowance or BI since individuals who engage more in unpaid work activities will receive a higher remuneration. It is worth mentioning, however, that the measurement of unpaid working hours necessary for the implementation of an hourly CI is likely to be an expensive procedure. An alternative to individual measurements would be to group individuals according to gender, age, ethnicity/race, employment-status, income, etc. and provide remunerations based on the average unpaid working hours found in a surveyed population sample. Regardless of the approach, the actual implementation of an hourly CI will be far more costly compared to a care allowance or BI.

2.3 The time-poverty gap: compensation and closures

The impact of universal income programmes on gender inequality can also be discussed in terms of the time-poverty gap which is defined as the difference in the percentage of women and the percentage of men *likely* to experience time-poverty.[1] As previously mentioned, a BI can be seen as means to reward unpaid work or to

[1] Here it is important to reiterate that the classification of an individual as time-poor depends on an arbitrary thresh- old of time left after engaging in paid and unpaid work. Since we do not specify a threshold but simply consider the differences between women and men when it comes to unpaid work, references to time-poverty refer to a possibility rather than a reality based on a threshold.

compensate for the potential experience of time-poverty. However, since both women and men receive an equal amount of income, a BI fails to embody and compensate for the time-poverty gap. By contrast, an *hourly* CI compensates individuals who perform more unpaid work to a higher extent. Given women's higher engagement in unpaid work and subsequent experience of time-poverty, a CI is likely to benefit women more than men and therefore offers women a compensation for the time-poverty gap.

In addition to compensation, we argue that it is even more important to consider the impact of WTR, BI and CI programmes on time-poverty gap closures. We make a distinction between one- sided and two-sided closures and define the former as the alleviation of women's time-constraints as a result of a reduction in the hours spent on paid work. The idea behind one-sided closures is that a decrease in paid working time allows for an increase in leisure time if the newly available time is not entirely spent on unpaid work. Alternatively, a two-sided closure is achieved when the alleviation of time-constraints (or increase in leisure time) for women is the result of a higher engagement of men in unpaid work activities. In other words, two-sided closures imply a reduction in the time-poverty gap as the result of a redistribution of unpaid working time from women to men.

One can relate time-poverty gap closures to Nancy Fraser's breakdown of contemporary approaches to gender equality and the author's promotion of the *universal caretaker model*. This model stands in contrast to both the *universal breadwinner model*, promotion of women's employment, and the *caregiver parity model*, formalization (remuneration) of unpaid care work(ers). The distinguishing feature of the *universal caretaker model* lies with its demand for a re-orientation of social institutions around care such that unpaid work activities, typically performed by women, become the norm for everyone (Fraser, 1994). With respect to time-poverty gaps, the *universal caretaker model* is thus geared towards the achievement of two-sided time-poverty gap closures.

WTR policies can lead to a one-sided closure of the time-poverty gap if the reduction in women's paid work time is not fully compensated for by an increase in unpaid work. At the same time, the redistribution of working hours under WTR is likely to result in a higher engagement of women in paid work, falling in line with the *universal breadwinner model*. If an increase in paid work decreases unpaid work by an equal amount, time-poverty remains constant, whereas a decrease of unpaid work which is less than the paid work increase would increase time-poverty. Evidently, the relation between paid work and unpaid work varies across women and men which brings us to WTR and a two-sided closure of the time-poverty gap. A redistribution of unpaid work from women to men, or the achievement of the *universal caretaker model* could occur if the increase in men's unpaid work as the result of WTR is greater than that for women. Obviously, such a redistribution not only depends on the coefficient between paid work and unpaid work for women and men, but also on cultural norms and gender roles (Piasna and Spiegelaere, 2021).

When it comes to the BI, the fact that it grants both men and women the opportunity to reduce the time spent on paid work results in closure mechanisms which are similar to that of WTR policies. Zelleke (2008) argues that the introduction of a BI would foster Fraser's *universal caretaker model* whereas care allowances would fall in line with the *caregiver parity model* which maintain the gendered division of unpaid work. Again, this claim depends on the impact of reduced paid work on unpaid work and how this differs across women and men. If women's unpaid work were to increase, then a two-sided closure of the time-poverty gap or the achievement of the *universal caretaker model* can only be attained if men were to engage in role-sharing. Otherwise, the increase in unpaid work could exacerbate time-poverty and restrict women's space for leisure, formative and other types of unpaid work beyond domestic activities (McKay, 2001, p. 107; Robeyns, 2001, p. 101; Elgarte, 2008, p. 5; Gheaus, 2008, p. 4; Bidadanure, 2019, pp. 492-494; Lombardozzi, 2020, p. 320).

In theory, an *hourly* CI provides a monetary and more concrete incentive for individuals who have previously refrained from unpaid work activities, mostly men, to start doing so. As such, it is reasonable to assert that compared to a care allowance and BI, a CI potentially encourages the reconfiguration of the gendered division of unpaid work to a higher extent. This is to say that an unconditional *hourly* CI potentially stretches beyond the *caregiver parity model* and towards the *universal caretaker model* which is characterized by a two-sided closure of the time-poverty gap. Unfortunately, our macro-simulation model does not capture behavioural changes related to the engagement in the unpaid work activities. As such, the assessment of a CI in relation to time-poverty gap closures is limited to what has already been mentioned for WTR policies and the BI. In sum, the impact of policies on closures depends on i) the pre-existing relation/coefficient between paid work and unpaid work for women and men and ii) how WTR policies in combination with a BI or CI affect changes in labour force participation.

Given the assumed impacts of WTR policies and universal income schemes, the analyses provided in the rest of the paper is two-fold. On the one hand, we explore the assumed synergy between WTR policies and universal income schemes when it comes to the negative impact of WTR on income distribution. On the other hand, we examine the impact of each policy mix (WRT+BI vs. WRT+CI) on time-poverty gap closures and compensation. This is done in addition to more common assessments of gender inequality, namely in terms of employment, labour force participation and wage inequalities.

3. Methods

Two main data and methods were applied to evaluate the interaction between working time re- duction and the two universal income programmes. First, microdata from the 2013 Italian Time Use Survey (ISTAT, 2017) was used to estimate the relation between hours of paid and unpaid work, by sex[2] and age groups. Second, the estimated coefficients were applied to our macro-simulation model to understand how the combination between working time reduction (WTR) with both a universal basic (BI) and care income (BI) programme would affect economic and social indicators.

3.1 Data and Estimates

The ITUS records daily activities of the individuals surveyed as well as demographic characteristics. It is also possible to connect observations in the same household, which allows us to nest individuals within households to perform random effects multilevel regressions. Even though data from several waves of the ITUS were collected, microdata is only available for 2013. We impute the obtained econometric results into our macrosimulation model that projects scenarios from 2010[3] to 2040.

Time-use data is presented in a classification of 188 different activities. We aggregate these to five main activity types: physiological overhead, leisure and social, paid work, unpaid work and study. Then we normalise them to a representative day (24 hours) weighting by the number of week and weekend days in the survey. The first activity type includes daily self-care activities such as sleeping, eating and hygiene. The second aggregates all types of leisure including sports, watching TV and movies, meeting friends as well as volunteering, religious and social activities. Paid work and study aggregate all the activities related to paid work and those involving schools and universities, respectively. Finally, unpaid work includes all activities related to care and house maintenance such as caring for children and elderly, cleaning and meal preparation, and shopping. We have opted to split transportation activities according to their final goals. For instance, commuting for work was allocated to paid work, commuting to shop groceries to unpaid work, and travelling to leisure and social.

Although, no microdata is available for additional waves of the ITUS, we can use aggregate data available on ITUS main tables for the 1988, 2002 and 2008 waves to trace the trends in unpaid work between men and women of different age groups.[4] These trends are plotted in the two top panels of figure 1. Only minor improvements are observed. The average hours of unpaid work of women, per representative day, decreased from about 6 to slightly less than 5 hours in panel 1a. However, the increase in average unpaid work hours for men (1b), from one hour and a half to about two hours, less than compensates for the women decrease.

[Figure 1 about here]

[2] The 2013 ITUS data only offers an approximation of gender differences since individual participants were asked to specify their sex instead of gender.

[3] First 10 years of the simulations are used to calibrate the model to data.

[4] The tables are available at https://www.istat.it/it/archivio/52079

A more detailed representation of the distribution of unpaid work is presented in panel 1c. It uses the 2013 microdata to plot the mean and median hours of unpaid work by gender, age groups and occupational status: employed (E), unemployed (U), out of labour force (O) and retired (R). Unemployed and out of labour force individuals tend to perform much more unpaid work across all age groups.[5] Among the age groups, whose average is represented by the red lines, women over 65 years and between 45 and 64 dedicate about six hours per day to unpaid work activities, while men of the same age groups limit their unpaid work to about 3 and 4 hours, respectively. The gender differences in unpaid work persist in all groups plotted. Younger women (15-24) also perform more unpaid work than men, although both groups dedicate less time to unpaid work than older ones. The total hours of unpaid work from employed women aged between 25 and 64 years are roughly equivalent, but still higher, than those of unemployed and out of labour force men of similar age.

The availability of a single wave of ITUS microdata limits the methods we can apply to estimate the relation between paid and unpaid work. Standard ordinary least squares regressions implicitly assume that the population of individuals observed is homogeneous. However, ITUS data has a hierarchical structure with individuals nested in households. Ignoring such hierarchy often leads to biased, underestimated standard errors, hence, to properly account for this data structure we apply multilevel regressions (Snijders and Bosker, 2012). Also known as mixed effects, these regressions account for the hierarchical structure of the data, which makes it possible to disentangle effects from covariates defined at different – individual and household – levels.

3.2 Simulation Model

The second step to evaluate the effects of a joint implementation of WTR and universal income programmes is to simulate those in our model. Eurogreen is a system-dynamics macrosimulation model developed at the country level. It has been previously applied to evaluate social and environmental policies for France (D'Alessandro et al., 2020; Cieplinski et al., 2021) and Italy (Cieplinski et al., 2021). The simulations presented in the next section are based on an updated version of the model calibrated for Italy and run from 2010 to 2040. We have added exogenous shocks in the main final demand components – private consumption, investments and exports – for 2020 and 2021 to consider the economic effects of the Covid-19 pandemic.

The current version of the model presents new features tailored to capture the effects of the simulated policies on macroeconomic indicators. First, we have expanded the labour market module to differentiate labour demand and supply not only in three skill

[5] Except for out of labour force men and women in the 15-25 groups.

levels, but also by gender. Thus, our model captures gender differences in wages, employment and labour force participation. The division of total labour demand between skills and genders – which is a function of output, labour productivity and hours worked – follows historical trends extrapolated from the 2010-2020 period using EU-KLEMS data (Jäger, 2017). Moreover, we allow for within-skill substitution between gender as a function of gender and skill specific unemployment rates. That is, if the unemployment rate among low-skill women is greater than that among low-skill men, the demand for low-skill workers will shift towards women.

Variations in labour force participation are defined by skill, sex and age group and then aggregated to obtain total labour force participation. The division between three age groups – 15 to 24, 25 to 44, and 45 to 64 years of age – is important for the interactions between CI and WTR since individuals in different age groups have distinct time-use distributions. The driver of changes in these labour force participation rates is the expected increase in income from joining the labour market. It is calculated as the difference between expected yearly labour market income and the public benefits distributed to individuals out of the labour force (non-labour market income). The former is given by a weighted average of average skill-gender yearly wages and unemployment benefits, while the weights approximate the probability to find employment (the employment rate), and to remain unemployed (the unemployment rate). The latter are, initially, direct transfers towards low-skill individuals only.[6] These features are present in all simulations, including the baseline scenario.

It is important to highlight that modelling labour force participation as a function of expected income has meaningful consequences for the results of the simulated universal care income programme. Since non-employed individuals and women spend more hours in unpaid work activities (see panel 1c), the introduction of a universal care income would thus increase the non-labour market income of these groups and, consequently, reduce their labour force participation rates. Despite the absence of any truly universal basic or care income programme, evidence from pilot programmes and local BI schemes is inconclusive and do not provide evidence that they reduce individual's willingness to join the labour force (de Paz-Báñez et al., 2020). Therefore, in the absence of a clear route we have modelled the worst-case scenario, particularly for the care income programme. This is to say that increasing non-labour market income, especially for unemployed and out of labour force women, curtails the growth of women's labour force participation and can at least partially offset reductions in the income gap from the CI programme transfers.

The second new feature added to the current version of Eurogreen is a simplified time-use module. We use ITUS data to obtain the initial time-use distributions[7] for

[6] We do not include benefits that do not vary according to one's employment status such as family and children benefits or the universal basic income programme.

[7] In the same five categories described above: physiological overhead, leisure and social, paid work, unpaid work and study.

individuals in 60 different groups defined by gender, skill, age and occupational status.[8] The amount of time allocated to unpaid work in each of these groups is then multiplied by the hourly pay of the universal CI programme to determine the total benefit.

The only direct variations of these stocks of time-use activities are tied to the simulation of WTR. As weekly hours are reduced from 40 to 30, the 10 hours freed from paid work are distributed between unpaid work and leisure according to the age and gender specific parameters estimated in section 4.1. However, this increase in unpaid work among those employed would also increase the total unpaid work hours in the economy. Hence, we programmed three different rules to redistribute unpaid work between distinct groups while maintaining the total hours of unpaid work fixed. The first simply detracts the same amount unpaid work hours from every individual not employed to balance the increase in unpaid work by those employed. The second detracts the same unpaid work hours from all the non-employed women groups. In the third rule, the same total hours are detracted only from the groups that perform more unpaid work: low- and middle-skill out of labour force women in the 25-44 and 45-64 age groups as well as retired women from the three skill levels. These three rules vary which explains the large confidence intervals obtained for time-use variables.

3.3 Scenarios and Policies

This section describes in detail the policies and scenarios simulated as well as the assumptions made to guarantee comparability between policies. The figures in section 4.2 plot the means and 95% confidence interval from 200 simulations. These simulations differ in terms of the pace of technological progress,[9] of substitution between men and women in new hires, the sensitivity of labour force participation to expected income, and how unpaid working time is redistributed between different groups of individuals. The simulations run from 2010 to 2040 while policies are gradually implemented after 2023. The two universal income policies are linearly implemented in five years, between 2023 and 2028, while the 10 hours reduction in weekly working hours takes place for 10 years.

The simulation results presented section 4.2 contain two policy scenarios and a baseline. The two policy scenarios combine a reduction in working time with two universal income policies: BI and CI programmes; we termed these two scenarios BIWTR and CIWTR, respectively. The three individual policies, and particularly the two universal income programmes, were designed to ensure comparability between the scenarios.

[8] These groups are low-, middle- and high-skill men and women that are either employed, unemployed or out of the labour force, aged between 15-24, 25-44 and 45-64 for a total of 54 groups. The remaining 6 groups are retired men and women of the three skill levels, all aged 65 or more.

[9] New technologies that increase labour productivity and the technical coefficients of the input-output matrix are extracted randomly at every simulation period.

The total cost of the CI and BI programmes are the same. First, we set the hourly benefit of the CI programme to 5 euros. Then, the total yearly benefit for individuals in each group is obtained multiplying the hourly benefit by the number of yearly unpaid work hours attributed to individuals in each group in the time-use module[10]. For instance, among the groups that perform the most unpaid work out of labour force low-skill women aged between 25 and 44 earn 7.000 € per year for about 1400 hours, and retired middle-skill women earn about 5.000 € for 1,000 yearly hours. The groups that perform the least hours of unpaid work include employed high-skill men aged between 15 and 25 and employed low-skill men aged between 45 and 64 earning 545 and 2,060 € per year, respectively. The total cost of the universal CI programme when fully implemented is of about 180 billion € per year.

For a comparable universal BI programme, we calculate the approximate yearly benefit per capita, for all individuals aged 15 or more, that amounts to the same total cost: 3,500 €. Therefore, the simulated differences between the CI and BI programmes are due to the different distribution of the total benefits among groups of different ages, genders, skills and occupational statuses.

Finally, we add two conditions together with both universal income programmes. First, when introduced they substitute family and children benefits, sickness and disability benefits and direct transfers for lower income, low-skill out of labour force and unemployed, individuals. Second, income tax rates are increased, maintaining the same level of progressiveness, to assure the universal income programmes are budget neutral. Income tax rates are raised from 0.23, 0.27, 0.38, 0.41 and 0.43 to 0.35, 0.4109, 0.5783, 0.6239 and 0.6544 while maintaining the same income brackets of (0, 8000, 15000, 28000, 55000, 75000) which are adjusted over time according to mean wage growth.

A comparison between the baseline and the two policy scenarios in terms of GDP and government deficit is presented in appendix figure B.1. The two policy scenarios only have a small effect on GDP with transitory increases in growth rates after the programmes' introduction. Those results are not unexpected since the increase in aggregate demand from the BI and CI programmes is almost fully compensated by the increase in income taxes. The small positive effects on GDP are due to greater marginal propensities to consume from the low-income groups that benefit the most from the universal income programmes with respect to those whose income taxes increase the most. The deficit-to-GDP ratios grow about 1% above the baseline values, on average, after the universal income policies are introduced. However, the two policy scenarios show a decreasing trend in the public deficit due to WTR for two reasons: an increase in social contribution revenues due to an increased gross wage bill and a reduction in unemployment benefits paid.

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[10] Time-use activities are defined by representative weekday. Thus, to obtain yearly hours by activity we multiply by five workdays, 4 weeks and 11 months.

4. Results

4.1 Econometric analysis

The regressions confirm the partial substitution between paid and unpaid work. The results are summarized in the five models presented in table 1.[11] Column one presents an ordinary least square regression for the full sample of 12,582 observations while column two estimates a multilevel model for the same sample with the same 12,582 nested in 6,338 households. Columns three to five are also multilevel regressions for the three sub-samples of the working age population: 15-24, 25-44 and 45-64 years of age.

Data for the dependent variable, unpaid work, and our main covariate, paid work, are in minutes per day. Thus, in column one an additional minute of paid work reduces unpaid work by 0.249 minute or about 15 seconds on average. Alternatively put, an extra hour of paid work substitutes 15 minutes of unpaid work. The coefficient remains relatively unchanged in the multilevel regression of column two (-0.251) but varies among the three age groups. The reduction in unpaid work for an extra minute of paid work is much smaller (-0.075) for the younger group (15-24), roughly the same for the middle one (-0.266) and larger for the older group in column five (- 0.346).

We also consider the interaction between paid work and gender. With the single exception of the 15-24 age group, the substitution between paid and unpaid work is larger for women. In the full sample multilevel regression, column two, an extra hour of paid work reduces unpaid workfor women by 0.398 or about 24 minutes. The same reduction of women aged between 24-44 and 45-64 are of 30 and 31 minutes, respectively.

The categorical variable for females in models two and three also confirms that they perform, on average, about 83 more minutes of unpaid work per day compared to men. The last three variables of table 1 are also categorical and indicate the presence of domestic workers, babysitters and elder care workers in the household, respectively. While domestic workers are associated with a reduction of unpaid working time, on average, babysitters tend to increase it. Elder care workers are associated with meaningful reduction of unpaid work, but only in the first two models. Hence, we interpret this as an indication that elder care workers reduce unpaid work among individuals aged 65 or more. These variables suggest an important relation between income and time inequality.[12] Higher income households can reduce time poverty accessing market services to substitute activities commonly performed as unpaid work in most of the households.

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[11] The complete regressions results are available in appendix table A.1 We also repeat the regressions for a sub-sample of employed individuals in table A.2 with small variations in the coefficients.

[12] ITUS data does not provide any information on the income of individuals or households surveyed.

[Table 1 about here]

The regression results summarized in table 1 also point to an interaction between working time reduction (WTR) and unpaid work. The reduction of working time of employed individuals would increase their participation in care and house activities. Simultaneously, an increase in the number of individuals employed, previously unemployed and out of the labour force, would also substantially reduce the time spent in unpaid work activities of individuals in the groups that more intensely engage in care and housework. Thus, improving the distribution of working hours among different groups of individuals may also improve the distribution of unpaid work. Even though, WTR may reduce time poverty among women, the regressions results also alert us for a limited possibility for a two-sided closure of time gaps since the reduction of unpaid work by women is not met by an equivalent increase by men.

For the simulation results in the following section, we plug-in the estimated values of the paid work coefficients for men and women to the time-use model of Eurogreen. Therefore, the simulated reduction of working time from about 40 to 30 weekly hours results in the same variations of unpaid working time presented in table 1 . For instance, an employed man aged between 25-44 will increase weekly hours of unpaid work by about 2 hours and 40 minutes[13] for a 10-hour decrease in paid working time. Meanwhile, an employed women aged between 45-64 will increased unpaid working hours by 5 hours and 13 minutes for a similar reduction of paid working time.[14] The difference between reductions in paid work and increases in unpaid work are allocated to leisure activities.[15]

4.2 Simulation results

The simulation results represent plots of the means and 95% confidence intervals of 200 simulations for the baseline (black), BIWTR (orange) and CIWTR (blue) scenarios described in section 3.3. The substitution between paid and unpaid work, as a function of WTR, is based on the coefficients of models (3), (4) and (5) in table 1, for men and women in the three age groups of the working age population.[16]

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[13] This is equivalent to −10 hours multiplied by the coefficient −0, 266 or 2.66 hours or 2 hours and 40 minutes.

[14] This is equivalent to −10 hours multiplied by the sum of the paid work coefficient and its interaction with variable female −0.346 − 0.175 or 5.21 hours or 5 hours and 13 minutes.

[15] The allocation of total unpaid working hours in the economy from individuals in other groups (unemployed, out of labour force and retired) to employed ones is explained in section 3.2.

[16] Since one less hour of paid work results in less than an hour increases of unpaid work, the remaining minutes are allocated to leisure.

Figure 2 summarizes the main labour market results for women (top row) and men (bottom column). The two left panels plot unemployment rates, the two centre panels employment rates and the two right panels plot labour force participation rates.

In both policy scenarios WTR results in a long-term reduction of unemployment rates, increase in number of individuals employed, and an increase of labour force participation rates. Hence, WTR can better distribute total working hours among the working age population.

Still, we observe distinct dynamics between the two policy scenarios, particularly in the years after the introduction of the universal income policies. Section 3.2 makes it clear that we model the effect of the care income (CI) programme on labour force participation as a worst-case scenario in which increasing benefits for out-of-labour-force individuals reduces, ceteris paribus, labour force participation rates. Moreover, we do not assume that the basic income (BI) programme has any effect on labour force participation since the same amount is paid to all individuals whether they are employed, unemployed or out of the labour force.

[Figure 2 about here]

Therefore, the sharp decrease in women unemployment rates (2a) in CIWTR right after the introduction of the policies is almost fully explained by the decrease in women's labour force participation rates (2c). In contrast, the initial decrease in men's unemployment rates (2d) in CIWTR with respect to BIWTR can be attributed to an increased employment rate. In other words, while both CIWTR and BIWTR exhibit improving long-term trends of increasing employment and labour force participation, due to WTR, they differ in the short-term because of the differences between the universal CI and BI programmes. The increase in transfers for those who perform more hours of unpaid work, such as out-of-labour force and unemployed women seems to initially direct most of the newly created employment positions to men. Even though these trends do not persist, women's employment rates are lower under CIWTR when compared to BIWTR (2b), while men's employment rates are higher (2e). Still, when compared to the baseline scenario, CIWTR reaches much higher employment rates with similar labour force participation for women.

These gendered differences in labour market outcomes have further consequences for the gender wage gap. Although the CI programme in CIWTR redistributes income towards women that perform more hours of unpaid work, it also tightens labour markets in such a way that favour higher men's hourly wages. In Eurogreen, hourly wages are defined by gender, skill and industry. Their variation depends on labour productivity and employment rates. Therefore, by jointly decreasing women labour force participation and increasing men's employment, CIWTR results in a higher increase of men's wages with respect to BIWTR. Figure B.3 plots the accumulated growth of average hourly wages by gender and skill during all the simulation period

(2010-2040). Hourly wages for middle- and high-skill men grow more in CIWTR than BIWTR whereas only high-skill women also reach higher hourly wages in CIWTR. However, when compared to the baseline, hourly wages always increase more in the two policy scenarios. Such increase is more pronounced in categories that traditionally face tighter labour markets such as high-skill workers, while hourly wages of low-skill men and women grow only slightly above the baseline. In particular, low-skill women's hourly wages in CIWTR grow slightly less than in the Baseline due to the adverse effects on women's labour force participation.

If labour market results provide a warning on unintended consequences of a CI, the dynamics of the gender distributions of total gross non-financial income favour CIWTR instead of BIWTR. The top row of figure 3 plots the evolution of the women's share of total gross non-financial income (3a), the percentage of all unpaid work performed by women (3b). The bottom-row shows two Gini coefficients. The first for income distribution (3c) and the second for unpaid working time (3d).[17]

The introduction of the CI programme promotes a meaningful and lasting increase in women's share of total earnings (3a), while the universal BI results in a women's share of income only slightly higher, on average, than in the baseline simulations. This reduction of the gender income gap, however, partially dissipates throughout the simulation period, particularly after 2025, due to the adverse labour market effects mentioned above.

The accumulated growth rates (2010-2040) of gross non-financial income by gender, skill and occupational status is available in appendix figure B.4. The total yearly income of employed men and women of all skills grows much less in the two policy scenarios with respect to the baseline due to the reduction in total labour income after the reduction of working time. On the other hand, the two policy scenarios result in higher income growth for almost all retired and out of labour force individuals. Nonetheless, some groups of individuals experience income growth similar or below the baseline values in the two policy scenarios, particularly those whose direct social transfers were substituted by the BI or the CI such as low-skill out-of-labour-force and unemployed individuals.[18]

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[17] The two Gini coefficients are calculated over different groups. The first (3c) is calculated based on the net income of the 13 different groups of individuals in the model categorized by the three skill levels and four occupational status (employed, unemployed, out-of-labour force and retired) and capitalists which constitute a small, fixed portion of the population. It does not consider gender because we are not able to disaggregate financial income and asset ownership by gender. The Gini coefficient for unpaid working time (3d) instead is calculated based on 60 different groups defined by gender, skill, occupational status, and age groups.

[18] Notice that here we refer to the growth rate, not the level, of income. The BI and CI programmes result in high income growth for middle- and high-skill out of labour force individuals because in the baseline these group only receive small benefits that are split between all the groups such as family and children benefits and sickness and disability benefits. Low-skill men and women out of the labour force, in contrast, receive specific direct transfers in the baseline that are substituted by CI and BI and.

If the CI programme favours the reduction of gender income gaps, the two policy scenarios have a similar performance in terms of the Gini coefficient for overall income distribution (3c). A sharp reduction in income inequality is observed after the introduction of the two universal income programmes. At first, the CI programme outpaces BI as it directs a largest share of its transfer towards lower income groups such as out-of-labour force men and women. However, adverse labour market trends offset these initial gains and the combination of BI and WTR results in the lowest Gini coefficient, on average, by the end of the simulation period. Still, both policy scenarios sustain significant reductions in income inequality throughout the simulations when compared to the baseline.

The fraction of total unpaid work performed by women decreases in the three simulated scenarios (3b). Even though this reduction is stronger in BITWTR and CIWTR due to WTR, improvements in the gender distribution of unpaid work are limited. The fraction performed by women falls from about 69% in 2010 to around 66.5%, on average, in 2040 in the BIWTR and CIWTR scenarios. The larger confidence intervals of the two policy scenarios plotted in figure 3b are due to the three different rules to redistribute unpaid work (see section 3.3) which vary randomly in the 200 simulations that compose every scenario. Nevertheless, even at the lower bound of the confidence intervals, the fraction of unpaid work performed by women is higher than 64%.

[Figure 3 about here]

Figure 4 illustrates the separate development of total women (4a) and total men (4b) unpaid work. In relation to time-poverty gaps, the limited reduction of women's unpaid work does not necessarily indicate a one-sided closure. This is because the reduction is the result of an increase in paid work and is therefore not accompanied by an increase in leisure time for women. Since the uptake of paid work by women is stronger under BIWTR compared to CIWTR, one can argue that the likeliness of time-poverty for women is higher in presence of a BI compared to a CI. At the same time, figure 4b indicates an increase in the amount of unpaid work performed by men which represents a limited presence of a two-sided closure of the time-poverty gap. In this case, the uptake in unpaid work performed by men is stronger under BIWTR than CIWTR since the latter creates more employment opportunities for men which negatively effects their engagement in unpaid work.

However, variations in which groups of individuals perform unpaid work are not limited to differences by gender. A different picture on the overall distribution of unpaid work

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Despite the lower growth rate, the level of women low-skill out of labour force income remains above that of middle- and high-skill women, while men experience a decrease in their income with the CI programme.

is presented by its Gini coefficient (3d). The significant increase in the share of individuals employed due to WTR also redistributes unpaid working time within men and women. When compared to the baseline, by the end of the simulation period, a lower fraction of unpaid work is performed by out-of-labour force and unemployed men and women, and a greater fraction by employed and retired individuals. This larger contribution of employed men and, mostly, women is a combination of more unpaid working hours per capita after WTR (intensive margin) and a larger number of individuals employed (extensive margin), Thus, the distribution of paid work hours within men and women improves. The increase in unpaid work performed by retired individuals is due to the demographic trends and the relative increase of individuals aged 65 or older in the population.

[Figure 4 about here]

5. Discussion

This work explored the potential synergies between a reduction in working time and universal income schemes for the reduction of income and time inequalities. Overall, the econometric and simulation results suggest a meaningful complementarity between the policies. The introduction of either a basic (BI) or care income (CI) scheme allows for a reduction of working time, with fixed hourly wages, which does not hurt low-wage workers and improves the distribution of total paid work time.

The universal income programmes, coupled with the increase in progressive income taxes to finance them, stand out in the reduction of income inequality presented by the Gini coefficient. Working time reduction (WTR), on the other hand, alleviates time-poverty. It increases the amount of unpaid work performed by employed individuals and reduce that of out of labour force, retired and unemployed individuals, especially of those who transit into new jobs created. Hence, WTR contributes to the reduction of unpaid work time inequality whilst universal income programmes improve income distribution and create the conditions for low-wage workers to reduce their work weeks without substantial losses of income.

Nonetheless, there are major differences between the two universal programmes. Particularly regarding the distribution of income and unpaid work between men and women. The CI programme, attaching monetary payments to unpaid work time, improves the women to men income ratio far more than the flat payment of the BI programme. Not only does a CI directs larger proportion of the transfers to women, it also benefits all individuals out of labour force or unemployed since they perform more hours of unpaid work, on average.

Still, the simulation results also indicate important drawbacks of a potential CI scheme. The increase in income for those outside the labour market reduces women's labour force participation and directs most new jobs created by WTR towards men. The combination of increased men's employment and reduced participation by women tightens labour markets and increases wage inequality, favouring the growth of hourly wages for middle- and high-skill men as well as high-skill women. This adverse labour market effects partially offset the improvement in women's share of total income promoted by the CI scheme and provide valuable arguments in favour of the BI.

The statistical and simulations analyses conducted are not without flaws and significant uncertainties remain. The lack of longitudinal data does not allow us to estimate the variation of unpaid work, as a function of paid work, within individuals. However, the estimated models are consistent across different estimators and samples suggesting the elasticity of unpaid to paid work time is substantial and higher for women, despite remaining below unit.

The modelling of labour force participation and redistribution of unpaid work time, explained in section 3.3, also carries a high degree of uncertainty. Rendering labour force participation a function of the difference between labour and non-labour market incomes, despite the lack of consistent evidence either for or against this hypothesis related to universal income programmes, seriously tilts our results against the CI scheme. Hence, the adverse labour market effects on wage inequality and women's participation rate might as well be exaggerated in our results. It is also hard to model the redistribution of unpaid work, which is why we opted to vary between three redistribution rules, and may also explain the small decrease in the share of women on total unpaid work in figures 3b and 4. In a real setting a monetary benefit coupled with proper framing and communication strategies could significantly increase men's willingness to increase unpaid work and contribute to the two-sided closure of time-poverty gaps or the achievement of the *universal caretaker model*.

Taking stock of the considerations above, the modelling choices that underpin our results are fairly conservative and should not be far from a worst-case scenario for the policy mixes simulated, and for the CI programme in particular. Yet the joint implementation of lower working time and universal income schemes financed by progressive taxes is promising and has a substantial potential to address time and income inequality contemporaneously while narrowing women's income and unpaid work time gaps.

Whether these large and ambitious policies are feasible or if important barriers for their implementation were overlooked in the present analysis is beyond the scope of this work. Anyhow, it highlights policy options that, together, have the potential to tackle two of today's most pressing social issues. We see the development simulated scenarios, despite its limitations, as a valuable tool to explore policy strategies of form and size without precedent and to anticipate their benefits and unexpected drawbacks. We hope this work can shine a light on the significant challenges presented by income and time-use inequalities as well as their interconnections, and that the policy combinations put forth may foster further debate on ways to tackle these twin-problems.

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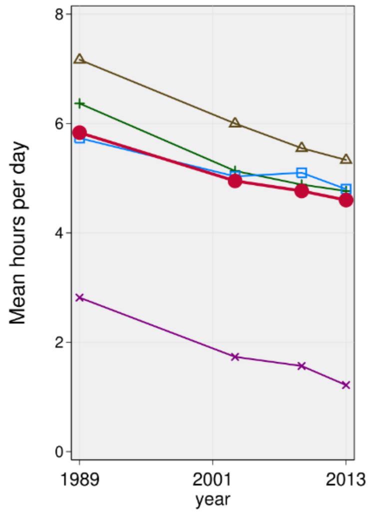
Table 1: OLS and multilevel regressions of unpaid work (uw) on paid working time, full sample (1-2) and by age group (3-5)

	OLS (1)		MLM (2-5)		
	(1)	(2)	(3)	(4)	(5)
	All	All	15-24	25-44	45-64
	uw	uw	uw	uw	uw
Paid Work	-0.249***	-0.251***	-0.0748***	-0.266***	-0.346***
	(0.005)	(0.005)	(0.012)	(0.013)	(0.011)
Female	82.61***	82.60***	46.88***	117.3***	146.5***
	(4.578)	(4.597)	(5.60)	(10.23)	(10.47)
Paid Work*Female	-0.148***	-0.147***	-0.0204	-0.238***	-0.175***
	(0.009)	(0.008)	(0.022)	(0.017)	(0.014)
Domestic Worker	-29.92***	-29.84***	-25.18*	-9.769	-28.71***
	(5.434)	(5.419)	(11.01)	(10.68)	(8.523)
Babysitter	64.30***	64.58***	-21.56**	40.88*	57.04**
	(14.07)	(16.29)	(7.166)	(18.29)	(19.69)
Elder Care Worker	-118.4***	-121.4***	14.05	-7.259	-28.10
	(11.76)	(11.60)	(21.69)	(22.71)	(24.07)
Controls	C	C	C	C	C
Random Effects					
level 2: $\sigma^2_{household}$		820.9	2,009	2,430	2,316
		(249.5)	(924.8)	(531.3)	(549.1)
level 1: σ^2_e		18,551	7,783	12,051	13,865
		(395.8)	(956.4)	(615.5)	(648)
N	12,582	12,582	1,417	3,605	4,334
Groups		6,338	1,100	2,605	3,006
R^2	0.524				
Intraclass correlation coefficient		.042	.205	.168	.143

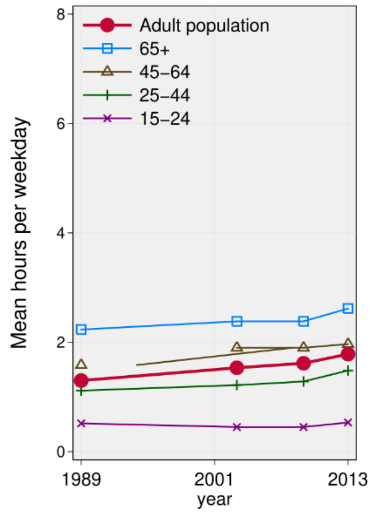
Robust standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

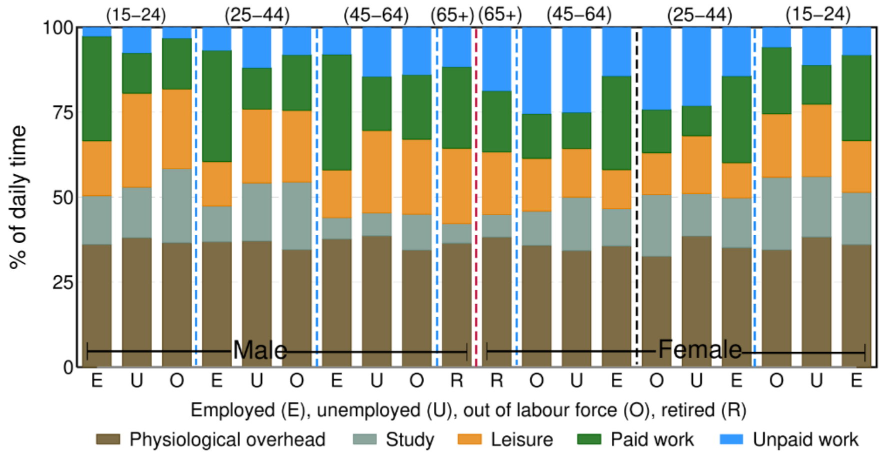
Additional controls include the household position of the respondent (head, spouse or child), region and period in which the survey was answered. The full table is reported in the appendix



(a) Women

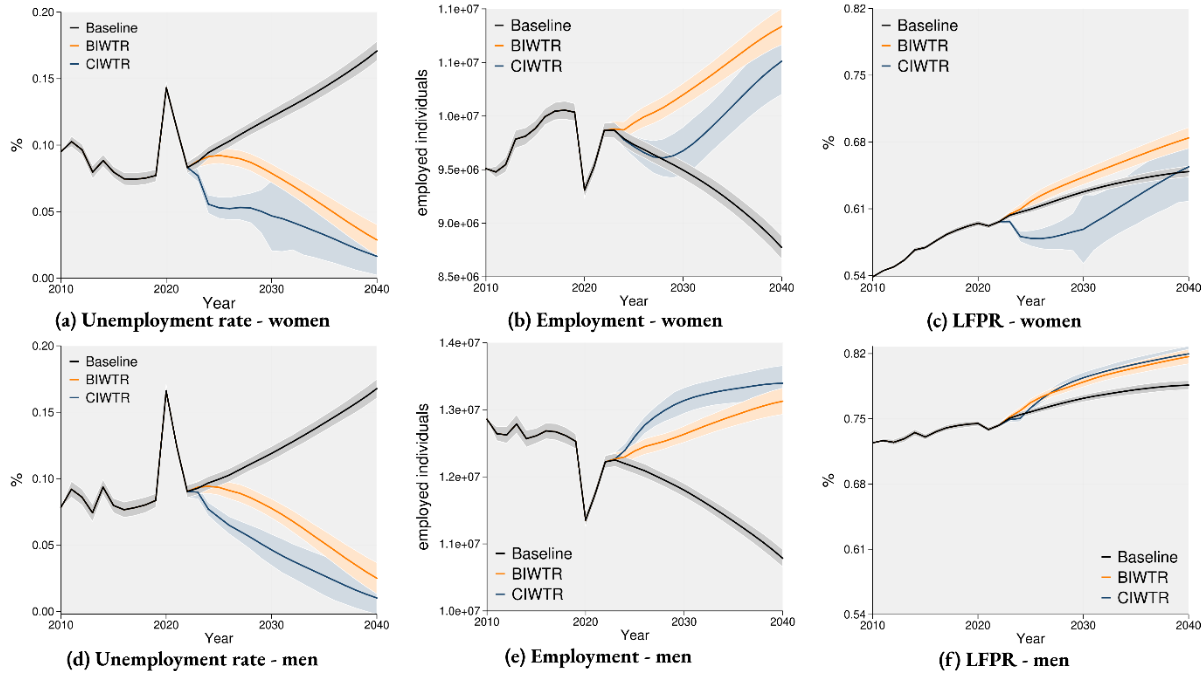


(b) Men



(c) Time-use distribution

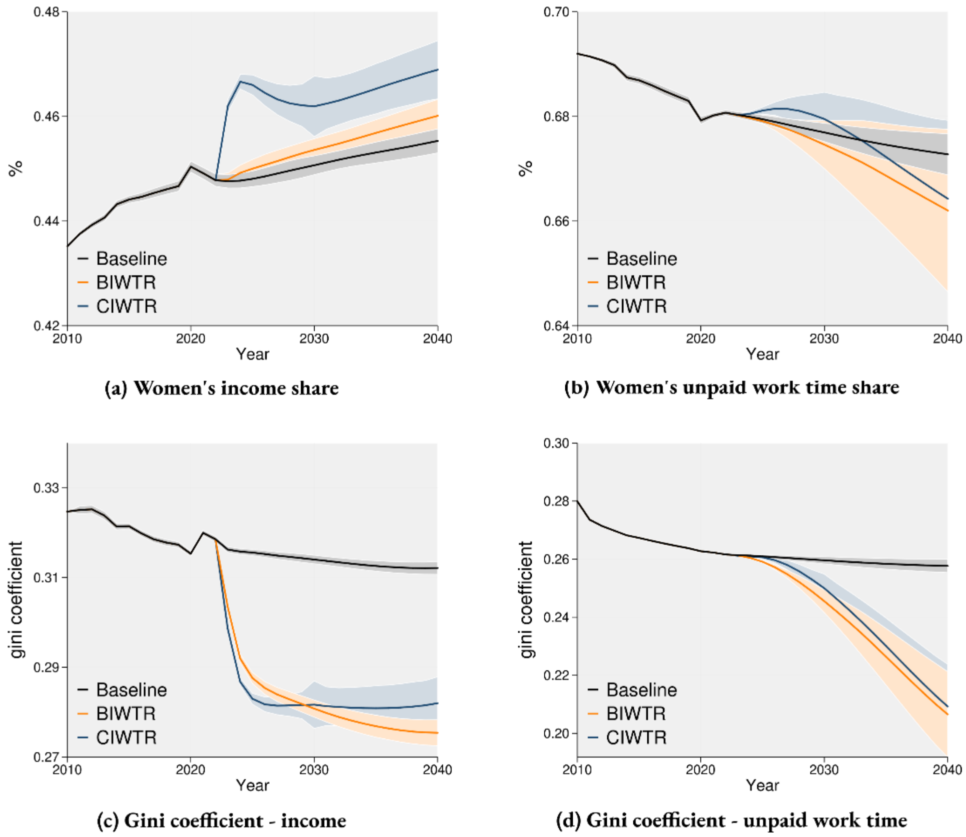
Figure 1: Time-use distribution: (a) long-term trends in unpaid working time for females and **(b)** males, **(c)** time-use distribution by activity, gender, age groups and occupational status. Panels (a) and (b) are build using aggregate tables from four waves of the ITUS. The *x-axis* labels in Panel (c) represent individuals that are employed (E), unemployed (U), out of the labour force (O) and retired (R), their respective age-groups are indicated in the top of the graph. Panel (c) is based on detailed microdata for the 2013 wave of the ITUS.



(a) Unemployment rate - women (b) Employment - women (c) LFPR - women

(d) Unemployment rate - men (e) Employment - men (f) LFPR - men

Figure 2: **Main labour market indicators for women (top-row) and men (bottom-row).** The panels plot unemployment rates **(a)** and **(d)**, total employment in number of individuals **(b)** and **(e)**, and labour force participation rates **(c)** and **(f)**. The lines plot the means from 200 simulations for each scenario and the shaded areas around them their respective 95% confidence intervals.

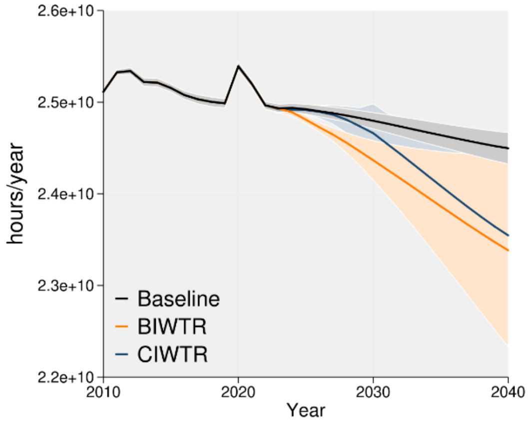


(a) Women's income share (b) Women's unpaid work time share

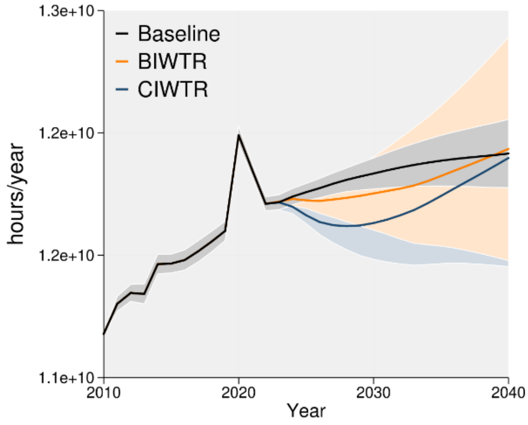
(c) Gini coefficient - income (d) Gini coefficient - unpaid work time

Figure 3: **Income and time inequality. (a)** Women share of gross non-financial income and **(b)** unpaid work hours, **(c)** Gini coefficient for net income and **(d)** unpaid work time. Panel (a) considers all non-financial sources of income for working age and retired individuals, namely wages, unemployment

benefits, old age pensions, family and children benefits, sickness and disability pensions, as well as basic and care income according to the scenarios. The lines plot the means from 200 simulations foreach scenario and the shaded areas around them their respective 95% confidence intervals.



(a) Women's total unpaid work



(b) Men's total unpaid work

Figure 4: **Unpaid work trends for (a) women and (b) men.** The panels consider trends in the total amount of unpaid work projected in each scenario calculated as the yearly amount of unpaid work performed by each individual according to age–group, sex, skill and occupational status multiplied by the number of individuals from that group in the adult population. The lines plot the means from 200 simulations for each scenario and the shaded areas around them their respective 95% confidence intervals.

Appendix A. Full regression table and employed sub-sample

Table A.1: OLS and multilevel regressions of unpaid work (uw) on paid working time, full table

	OLS (1)		MLM (2-4)		
	(1)	(2)	(3)	(4)	(5)
	All	All	15-24	25-44	45-64
	uw	uw	uw	uw	uw
Paid Work	-0.249***	-0.251***	-0.0748***	-0.266***	-0.346***
	(0.00543)	(0.00535)	(0.0122)	(0.0132)	(0.0107)
Female	82.61***	82.60***	46.88***	117.3***	146.5***
	(4.578)	(4.597)	(5.600)	(10.23)	(10.47)
Paid Work*Female	-0.148***	-0.147***	-0.0204	-0.238***	-0.175***
	(0.00862)	(0.00816)	(0.0225)	(0.0175)	(0.0144)
Foreign	-0.843	-0.0970	16.80	-3.941	-19.12*
	(4.909)	(4.931)	(12.99)	(6.816)	(7.445)
Household level variables					
Domestic Worker	-29.92***	-29.84***	-25.18*	-9.769	-28.71***
	(5.434)	(5.419)	(11.01)	(10.68)	(8.523)
Babysitter	64.30***	64.58***	-21.56**	40.88*	57.04**
	(14.07)	(16.29)	(7.166)	(18.29)	(19.69)
Elder Care Worker	-118.4***	-121.4***	14.05	-7.259	-28.10
	(11.76)	(11.60)	(21.69)	(22.71)	(24.07)
Household Position					
Head	135.2***	135.2***	228.1***	166.0***	71.20***
	(4.212)	(4.250)	(31.77)	(7.554)	(7.114)
Spouse	2.347	2.654	81.17	28.19***	11.14
	(4.180)	(4.182)	(69.37)	(6.064)	(7.211)
Child	-128.7***	-128.5***	-37.38*	-72.29***	-21.64*
	(4.101)	(4.290)	(16.44)	(6.053)	(10.87)
Region					
North-East	3.470	3.418	4.149	0.720	0.0222
	(3.772)	(3.913)	(9.371)	(6.376)	(6.133)
Center	0.261	0.208	-7.832	2.729	9.723
	(3.935)	(4.022)	(8.912)	(6.410)	(6.547)
South	0.0385	-0.282	-0.285	2.465	2.942
	(3.539)	(3.661)	(7.753)	(6.049)	(5.778)
Islands	8.767+	8.810+	6.749	-5.140	8.702
	(4.797)	(4.922)	(11.42)	(8.433)	(7.722)
Survey Date					
Feb-Apr	-6.548+	-6.640+	-7.887	-1.793	-6.372
	(3.430)	(3.399)	(7.608)	(5.661)	(5.443)
May-Jul	-5.455	-5.686	-0.0130	-9.145+	-13.86*
	(3.417)	(3.541)	(7.349)	(5.484)	(5.655)
Aug-Oct	-8.147*	-8.432*	1.782	-9.759	-19.86***
	(3.580)	(3.666)	(7.773)	(6.230)	(5.786)
Constant	230.9***	231.3***	82.44***	224.2***	264.9***
	(5.285)	(5.337)	(17.49)	(10.05)	(10.04)
Random Effects					
level 2: σ^2		820.9	2,009	2,430	2,316
		(249.5)	(924.8)	(531.3)	(549.1)
level 1: σ^2		18,551	7,783	12,051	13,865
		(395.8)	(956.4)	(615.5)	(648)
N	1,2582	1,2582	1,417	3,605	4,334
Groups		6,338	1,100	2,605	3,006
R^2	0.524				
Intraclass correlation coefficient		.042	.205	.168	.143

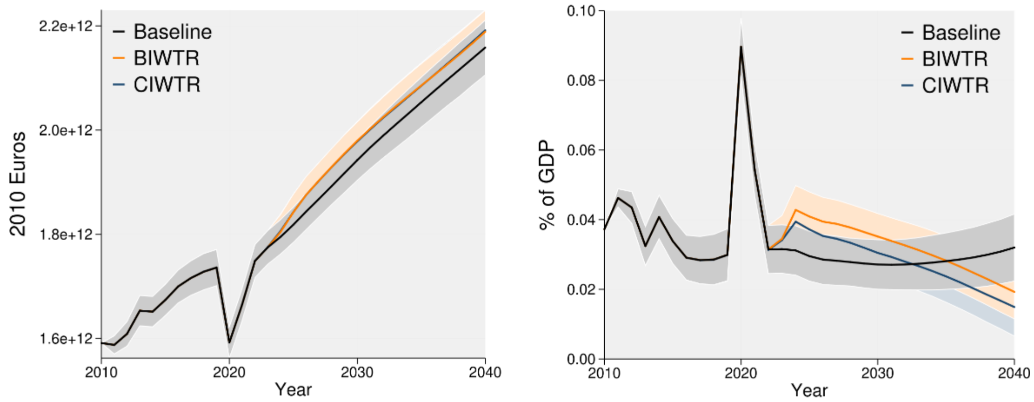
Robust standard errors in parentheses

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.2: OLS an multilevel regressions of unpaid work (uw) on paid working time, employed individuals,full sample (1-2) and by age group (3-5)

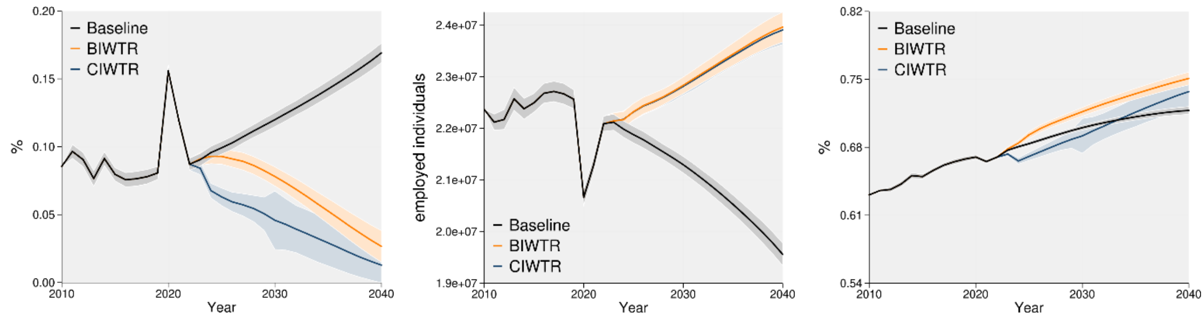
	OLS (1)	MLM (2-4)			
	(1)	(2)	(3)	(4)	(5)
	All	All	15-24	25-44	45-64
	uw	uw	uw	uw	uw
Paid Work	-0.291***	-0.299***	-0.0449**	-0.233***	-0.325***
	(0.0125)	(0.0124)	(0.0141)	(0.0147)	(0.0145)
Female	119.9***	116.6***	148.1***	117.0***	168.6***
	(10.57)	(10.04)	(23.22)	(11.25)	(12.33)
Paid Work*Femalec.pw	-0.163***	-0.156***	-0.199***	-0.220***	-0.215***
	(0.0187)	(0.0173)	(0.0496)	(0.0203)	(0.0190)
Foreign	-5.486	-5.029	19.87	-4.262	-18.08*
	(5.038)	(5.104)	(21.00)	(7.066)	(7.389)
Household level variables					
Domestic Worker	-12.43*	-11.75+	30.82	-10.78	-31.38***
	(6.134)	(6.357)	(27.66)	(10.11)	(9.001)
Babysitter	64.32***	64.00***		53.54**	59.13**
	(13.60)	(15.87)		(19.76)	(19.72)
Eler Care Worker	42.52*	44.47*	-16.97	21.25	-0.961
	(17.52)	(17.44)	(27.96)	(19.77)	(27.11)
Household Position					
Head	91.26***	89.89***	139.0***	152.1***	66.17***
	(4.962)	(4.962)	(37.92)	(7.530)	(7.609)
Spouse	9.333*	8.967*	-4.983	22.99***	7.471
	(4.143)	(4.198)	(28.14)	(5.888)	(6.625)
Child	-59.13***	-58.25***	-12.80	-70.56***	-24.73*
	(4.441)	(4.576)	(17.61)	(5.867)	(10.53)
Region					
North-East	3.407	3.153	16.58	0.875	2.463
	(4.114)	(4.386)	(15.74)	(6.388)	(6.255)
Center	5.575	5.826	-8.194	-3.802	11.77+
	(4.303)	(4.514)	(15.66)	(6.442)	(6.767)
South	-2.457	-2.692	2.641	-5.493	4.570
	(3.945)	(4.188)	(13.25)	(6.072)	(6.098)
Islands	0.0426	-0.250	-4.366	-9.624	11.06
	(5.402)	(5.810)	(20.73)	(8.584)	(8.294)
Survey Date					
Feb-Apr	-2.051	-1.690	-13.74	-3.701	-1.331
	(3.720)	(3.868)	(16.58)	(5.756)	(5.637)
May-Jul	-7.948*	-8.707*	-25.25+	-9.398+	-13.93*
	(3.720)	(3.945)	(13.90)	(5.482)	(5.988)
Aug-Oct	-5.730	-6.595	-25.33*	-8.659	-14.68*
	(4.001)	(4.232)	(12.32)	(6.246)	(6.033)
constant	237.2***	241.6***	58.53*	211.0***	252.0***
	(8.727)	(8.819)	(24.41)	(10.91)	(11.17)
Random Effects					
level 2: $\sigma^2_{household}$		1,958	2,831	1,985	2,111
		(269.1)	(921.1)	(527.0)	(590.5)
level 1: σ^2_{ε}		8,671	2,670	10,513	11,631
		(316.4)	(638.1)	(647.6)	(673.9)
N	5,750	5,750	237	3,094	3,391
Groups		3,931	219	2,338	2,473
R^2	.572				
Intraclass correlation coefficient		.184	.515	.159	.154

Appendix B. Additional Results



(a) real GDP (b) Deficit-to-GDP ratio

Figure B.1: Macroeconomic indicators. The lines plot the means from 200 simulations for each scenario and the shaded areas around them their respective 95% confidence intervals.



(a) unemployment rates (b) total employment (c) labour force participation rates

Figure B.2: Aggregate Labour market indicators. The lines plot the means from 200 simulations foreach scenario and the shaded areas around them their respective 95% confidence intervals.

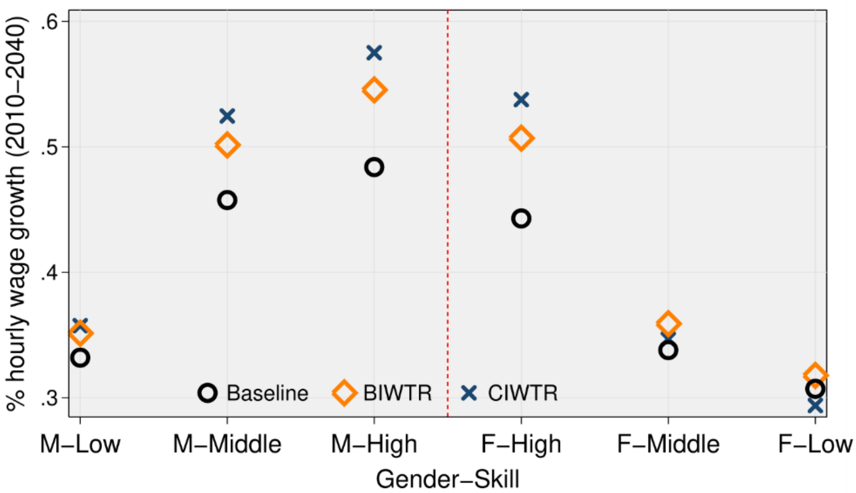
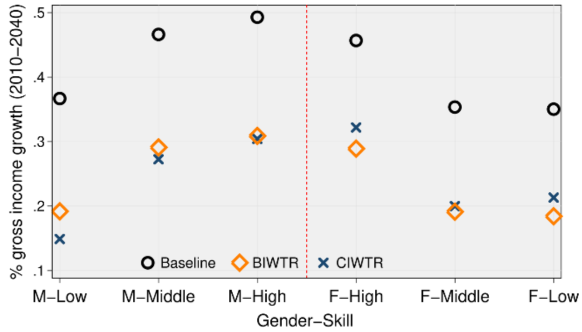
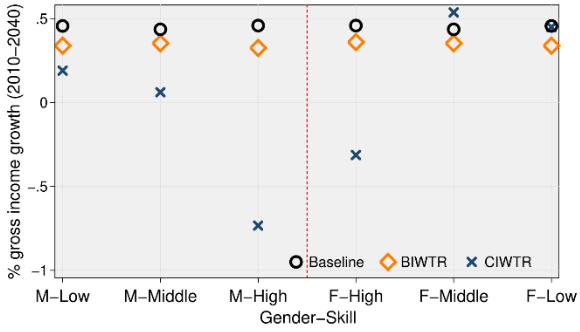


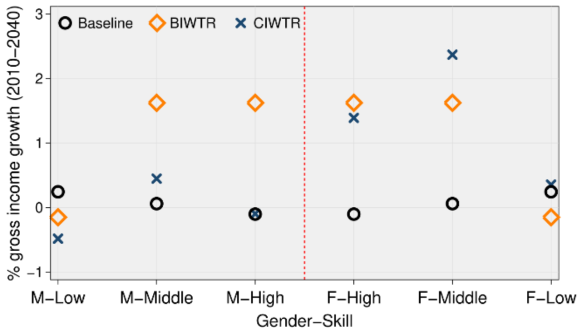
Figure B.3: Accumulated real hourly wage growth by gender and skill (2010-2040). The graphs plotthe mean real hourly wage growth rates from 200 simulations for each scenario.



(a) Employed



(b) Unemployed



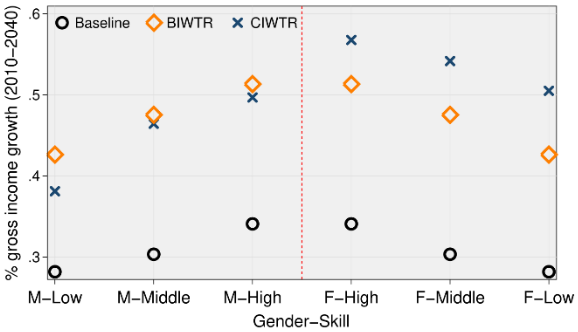


Figure B.4: Accumulated nominal non–financial income growth rate by gender and skill (2010-2040). The graphs plot the mean gross non-financial income growth rate from 200 simulations for each scenario.

Appendix C. Single Policy Results

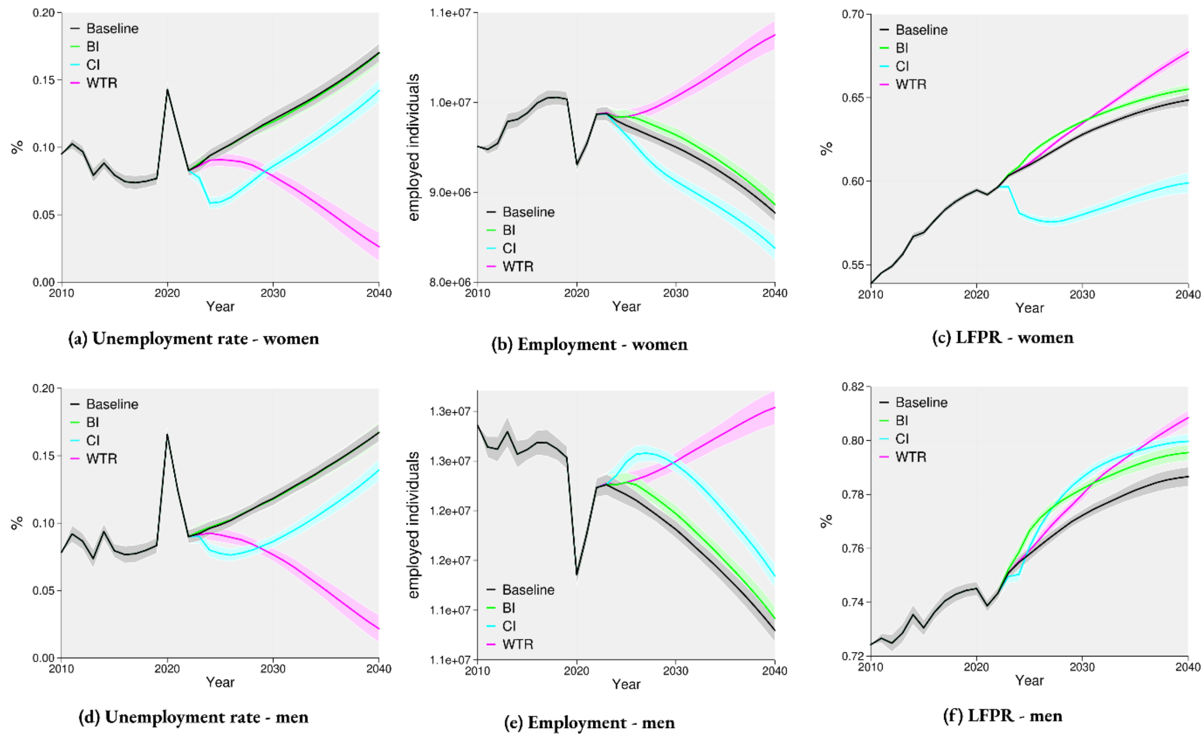


Figure C.1: Main labour market indicators by sex for single policies. The lines plot the means from 50 simulations for each scenario and the shaded areas around them their respective 95% confidence intervals.

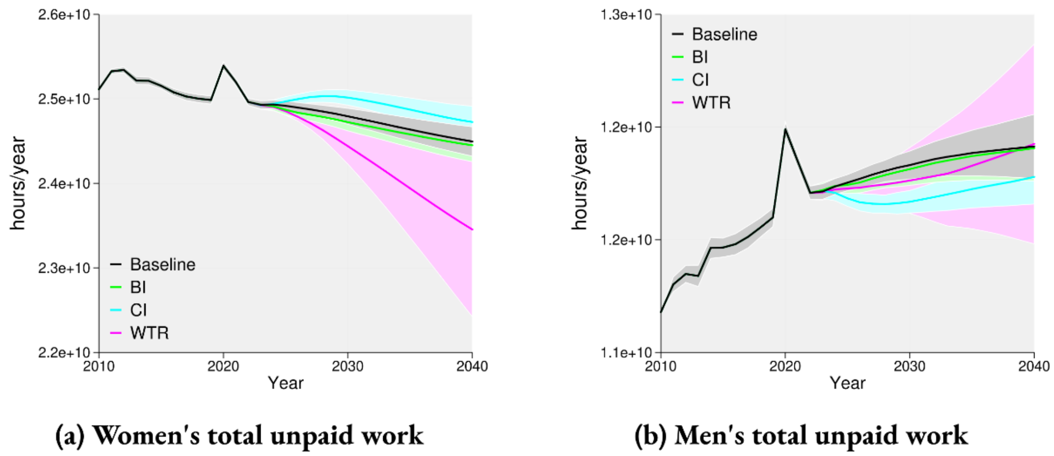
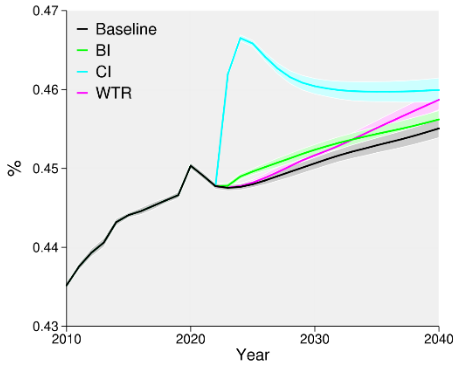
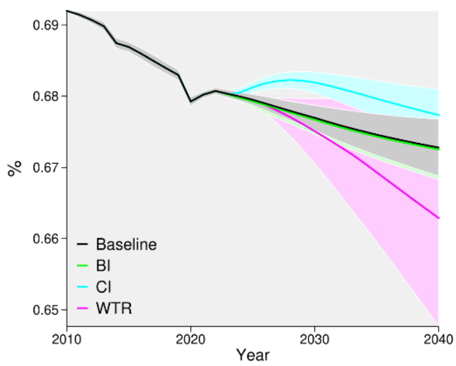


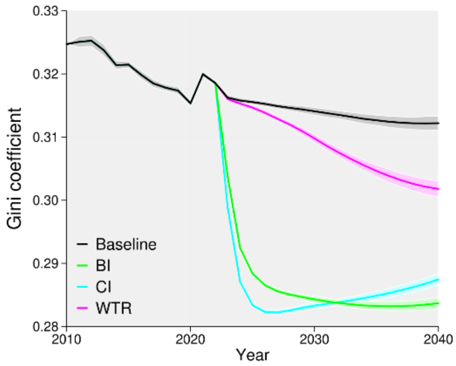
Figure C.2: Unpaid work trends for single policies. The graphs consider trends in the total amount of unpaid work projected in each scenario calculated as the yearly amount of unpaid work performed by each individual according to age-group, sex, skill and occupational status multiplied by the number of individuals from that group in the adult population. The lines plot the means from 50 simulations for each scenario.



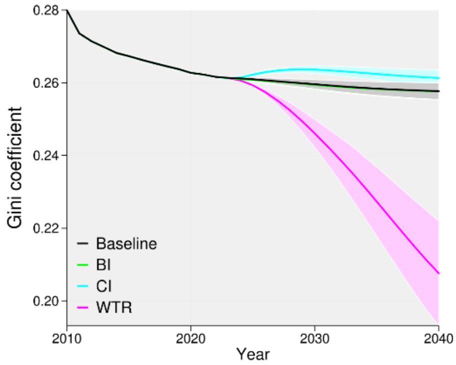
(a) Women's income share



(b) Women's unpaid work time share



(c) Gini coefficient - income



(d) Gini coefficient - unpaid work time

Figure C.3: Income and time inequality for single policies. (a) Women's share of gross non-financial income and **(b)** unpaid work hours, **(c)** Gini coefficient for net income and **(d)** unpaid work time. Graph (a) consider all non-financial sources of income for working age and retired individuals, namely wages, unemployment benefits, old age pensions, family and children benefits, sickness anddisability pensions, as well as basic and care income according to the scenarios. The lines plot the means from 50 simulations for each scenario and the shaded areas around them their respective 95% confidence intervals.