The Gendered Effects of Non-Pharmaceutical Interventions on Labour Market Outcomes During the COVID-19 Pandemic

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Abstract

This thesis examines the gendered impact of the pandemic and non-pharmaceutical interventions (NPIs) on various labour market outcomes. The effects are analysed using a difference-in-difference approach. The method exploits the variation in the strictness of implemented NPIs by European Union countries. EU member states are split into treatment and control countries depending on the strictness of their NPIs. A large number of labour market outcomes are analysed for both men and women separately, including full-time and part-time employment rates, labour market transitions, absence rates, weekly hours worked and shares of temporary workers. The effect of the pandemic on the gender gap is also analysed. The difference-in-difference regression results show that on average, women's part-time employment rate decreased significantly more than men's, narrowing the negative gender gap. The effect was significantly stronger in countries with strict NPIs than in countries with mild NPIs. Hours worked full-time significantly decreased by a similar percentage for men and women in strict NPI countries. This was not the case in mild NPI countries. Women's rates of absenteeism increased more in magnitude than men's in both groups of countries. However, proportionately, men's absences increased more than women's in strict NPI countries. For this reason, the gender gap in absenteeism widened more in mild NPI countries. Meanwhile, men's average full-time employment rate increased less than women's, and both genders rates increased less in strict NPI countries than in mild NPI countries. Meanwhile, the share of temporary workers significantly decreased more for men than for women. This effect was stronger in countries with mild NPIs than in countries with strict NPIs. The NPIs did not cause statistically significant changes in transition rates. An unexpected finding was that countries with stricter NPIs were not hit more severely by labour market shocks than countries with milder NPIs.

Table of Contents

1. Introduction

Non-pharmaceutical interventions (NPIs) were implemented by governments across the world in order to protect the population from the harmful effects of the Coronavirus Disease 2019 (COVID-19). The NPIs have saved lives (Alemán et al., 2020), and decreased the burden of the health care sector, yielding economic benefits (Greenstone & Nigam, 2020). However, NPIs have also brought about enormous economic costs, leading to what is now called the pandemic recession. Non-essential and high-contact sectors were closed, leading to temporary closures of restaurants, retail stores, hotels and hairdressers. As fewer workers were needed, earnings decreased and less money was spent. The rest of the workers were recommended to work from home, if possible. Educational activities were halted or moved online. NPIs also brought about negative consequences to various non-economic factors. As workers, students and school children tried to adapt to their new environments, human capital reportedly decreased (Fuchs-Schündeln et al., 2020). NPIs also impacted population health both in terms of physical (van Giessen et al, 2020) and mental health (Yamamura & Tsutsui, 2021, Banks & Xu, 2020).

The adverse effects of the NPIs and of COVID-19 itself have not been spread equally across populations. The consequences have varied between income groups, ethnicities and gender. More specifically, the NPIs and the pandemic recession may have affected men and women differently in terms of labour market outcomes. To illustrate, the previous recession after the 2007-2008 financial crisis did not affect both genders equally. The impact on the labour market was reported to be stronger for men than for women (Alon et al., 2020b, Hoynes et al., 2012). Arguably this was because of the larger share of men employed in construction, manufacturing and trade (Alon et al. 2020b, Alon et al. 2020a).

The negative labour market shocks are also likely to be greater in magnitude for men in the current pandemic recession. This is due to their higher participation rate on the labour market. In 2019, the European Union (EU) average men's employment rate was 74.8% in comparison to women's rate equal to 65.3% (Eurostat 2022a). Additionally in the past, women's aggregate labour supply has been found to be less volatile than men's (Alon et al. 2020b, Alon et al. 2020a, Doepke & Tertilt, 2016). This was hypothesised to be due to family insurance reasons and due to women working in sectors that are less cyclical, or even countercyclical (Alon et al. 2020a). It is nevertheless possible that this time, the labour market effects are greater for women than for men. While the Great Recession was dubbed a "mancession", this pandemic recession was coined a "she-cession" by economist Armine Yalnizyan (Yalnizyan, 2020). Therefore, the thesis will answer the research question "Did the government non-pharmaceutical interventions against COVID-19 in EU countries have a differing impact on labour market outcomes of females and males?".

The economic shock caused by the temporary shutdowns of the high-contact service sectors may have been asymmetric between the two genders in terms of the demand for labour, but also in terms of labour supply. The two channels will now be described in further detail. Women's labour demand may have been more affected than men's because the hospitality, retail and personal services sectors tend to have a larger share of women workers, or at least the sectors account for a higher proportion of total female employment (EC, 2021, Joyce & Xu, 2020, ILO, 2020a, ILO, 2020b). Out of all sectors, they were the most affected by the NPIs. Due to the nature of the work, working remotely is not a possibility (Lewandowski et al., 2021). This means that workers in these sectors are likely to lose jobs or be furloughed. At the beginning of the pandemic, Alon et al. (2020a) estimated for the US that only 22% of employed women worked in jobs that could be translated to their homes compared to 28% of employed men. However, it must be noted that since then, many studies (Farré et al., 2021, Hupkau & Petrongolo, 2020) have shown that women were more likely to work remotely than men during the first lockdown.

In addition, women are still underrepresented in the fields of science, technology, engineering, and mathematics (STEM) (Kahn & Ginther, 2018, EC, 2021). If these sectors were better able to continue to carry on their activities during the lockdowns, the NPIs may have had gendered effects on labour market outcomes. On top of the gender differences in sectors, women are more likely than men to work part-time, have a temporary job or be self-employed (Oreffice & Quintana-Domeque, 2021). The phenomenon is so prevalent that it has been called the "'one-and-a-half earner model" (Yerkes et al., 2020). These types of workers often do not have access to government labour protection programmes and may be more likely to face income uncertainty during a recession (Bluedorn et al., 2021). Women are also less likely than men to be in a higher rank position, which could imply that their job is on average less protected. In the EU, only 34% of managers were women in Q3 2020 (Eurostat, 2021). In fact, McKinsey has called the corporate pipeline a "leaky pipeline" for women (Ellingrud et al., 2021).

This thesis therefore expects to find that the shutdown of high-contact service sectors led to a higher percentage of women than men losing their jobs or reducing hours worked. The first hypothesis, H1, of the thesis, is that NPIs had gendered effects on full-time and part-time employment, hours worked and share of temporary workers compared.

The thesis also explores a second potential channel of NPIs unequal effects between men and women. The decision to close schools, kindergartens and daycare led to an average increased need of around six to eight hours of the day in the provision of childcare (Heggeness & Suri, 2021). As listed by Heggeness & Suri (2021), the additional care tasks included amongst others helping with online schooling, preparing and serving food, organising and supervising down time, and providing emotional support. Due to social distancing measures and health risks, parents could not rely on informal care from extended family, neighbours or friends. Therefore, parents had to juggle both paid work and unpaid work. Due to interruptions, parents who could work from home possibly worked fewer hours or compromised on productivity (Lyttelton et al., 2020). Meanwhile parents who had less flexibility in work arrangements potentially also had to reduce hours, to switch from full-time to part-time work or to completely leave their job.

The choice of how to distribute the additional housework and child care among different-sex parents has an effect on the parents' labour market outcomes. If a larger share of the child care and home-schooling burden fell on women than men, women were more vulnerable to career scarring. The greater availability of market substitutes for household production is believed to be one of the reasons for the increase in women's labour force participation (Blau & Winkler, 2018). However, there is a persistence of gendered inequalities in domestic tasks within the household. Prior to the pandemic, women, on average, already performed the majority of cooking, cleaning and child care in EU households (EIGE, 2020). This was the case even in dual-earner households. The unpaid work undertaken by working women has been dubbed as "the second shift" by Arlie Hochschild (Blau & Winkler, 2018, Hochschild, 1989).

The unequal contribution is likely to persist during the school closures due to a few reasons. Firstly, although this is certainly changing, traditional gender norms are still pervasive in the EU. Gender norms define what is regarded as desirable behaviour for women and men. According to these gender roles, the man is the breadwinner and the mother is either the home-maker or in a less advantaged labour market position (Sevilla-Sanz et al., 2010, Fortin, 2005, Seiz 2021). More concretely, it has for example been more socially acceptable for working mothers than fathers to take parental leave (Heggeness, 2020).

A second reason, more rooted in economics, may lead to women taking on more housework and childcare than men. One can assume that households try to maximise income subject to a time constraint. Mothers and fathers face different time constraints if women are more likely to be inactive or to work part-time (Biroli et al., 2021). On top of this, women still earn on average less than men and hence have a lower opportunity cost of time. Therefore, the household income maximising choice for a family after the closure of schools could be for the mother to undertake the additional burden while fathers continue to work, potentially even more hours than before (Biroli et al., 2021, Becker, 1965). This specialisation can also be explained in terms of comparative advantages or relative productivity (Graeber et al., 2021). The partner who is hypothesised to be relatively more productive at "home production" should spend more time on housework or childcare. Meanwhile, the partner assumed to be relatively more productive in the marketplace, and can thus earn a higher income for the same hours worked, should spend more time working. However, there is evidence that even in dual-earning households where the mother earns more than the father, the "breadwinner mothers" perform most of the unpaid work at home (Bertrand, 2015). Since this cannot be explained by economics, it perhaps shows the strength of gender norms in determining the distribution of housework and childcare between parents (Sevilla & Smith, 2020).

The effect of the closure of schools on labour market outcomes is naturally even stronger for single parents who are the sole possible providers of the additional child care. In the EU, mothers are more likely to be a single parent than fathers. According to a study, 11% of single women had dependent children, compared to only 3% of single men (Nieuwenhuis, 2020).

Therefore, the second hypothesis of the thesis (H2) is that the increased child care needs prompted by the closure of schools and kindergartens may have been mainly shouldered by women. This in turn potentially led women to report higher absence rates, reduce their working hours, switch to part-time employment or to leave the labour force.

The research question "Did the government non-pharmaceutical interventions against COVID-19 in EU countries have a differing impact on labour market outcomes of females and males?" is answered by conducting a difference-in-difference (DiD) empirical analysis based on country-level time-series data from the European Union Labour Force Survey (EU-LFS). The EU-LFS data set provides quarterly labour market data for all 27 EU countries aggregated by gender, full-time/part-time and economic activity. Therefore, the data set enables the analysis of the gendered effects of the pandemic across all EU countries. It includes information about labour market participants aged 15 and over as well as on people outside of the labour force. The data is collected by the national statistical institutes of EU countries. They select the sample, prepare the questionnaires, conduct the surveys and then forward the results to Eurostat (Eurostat, 2022b). Due to not being able to access the survey microdata, this thesis will use the aggregated statistics for each country that are publicly available on the Eurostat website.

The time period used to answer the research question is from the first quarter of 2015 (2015Q1) until the third quarter of 2021 (2021Q3). The data can thus be cut into two time periods; before and after the pandemic. This allows a comparison of the situation prior to the pandemic with the conditions after the implementations of NPIs. The years 2015-2019 are included in the time period as a means to take into account the trends in labour market outcomes before the pandemic. In order to avoid making a naive before-after comparison, the thesis will use the DiD regression method. The change in labour market outcomes due to the pandemic is compared between "control" and "treatment" EU countries. Although every country was impacted by the pandemic, every country could choose which NPIs to use to combat COVID-19. Therefore, due to cross-national variation in the implementation of NPIs, EU countries can be grouped into two categories. Some countries, such as Italy, implemented very strict NPIs for a long period of time. Other countries, such as Estonia, implemented relatively relaxed policies. The classification into strict and mild NPI countries is based on the stringency index provided by the Oxford COVID-19 Government Response Tracker (OxCGRT) (Hale et al., 2021).

The DiD method compares the differences in labour market outcomes between the strict NPI and less strict NPI countries before and after the pandemic. Therefore, the "first" difference in labour market outcomes is between the pre and post-pandemic situations, and the "second" is the difference between the strict and less strict NPI countries. A simple comparison between countries that adopted strict and mild NPIs would lead to biased results. There may be significant differences in labour market outcomes and gender gaps between the two groups that are not caused by the strictness of the NPIs.

There are three reasons why the research question is important and relevant. Firstly, it is important to quantify the magnitude of the economic and labour market costs of NPIs in order to determine what the appropriate policies should be going forward, especially as there may be future waves and pandemics. For example, governments may need to rethink whether school closures ought to be used to protect the health of the population. Knowing the repercussions of the pandemic is also useful for formulating policies to remedy the adverse effects caused by the NPIs adopted by the government. For example, if women and mothers experienced worse labour market outcomes due to NPIs, public policies could try to target them (Graeber et al., 2021).

Secondly, gender equality is considered an important policy goal in the EU. Women's equality and empowerment is the fifth of the Sustainable Development Goals to be reached by 2030 agreed by the United Nations member states in 2015 (UN, 2015). The European Commission established a gender equality strategy for 2020-2025 (EC, 2020). The majority of developed countries have ensured equalised education opportunities and implemented equal pay legislations (Petrongolo & Ronchi, 2020). Since the 1970s, developed countries have actively tried and succeeded to decrease the gender wage gap and to increase women's labour force participation rates (Kunze, 2018). If the NPIs used to combat the pandemic have gendered effects, they go against the policy goal of reducing gender inequality.

The unequal effects of NPIs could persist beyond the pandemic. For example, the closure of schools and kindergartens prevent outsourcing only temporarily, but may still have long-term consequences. A decrease in productivity and hours worked can induce atrophy of skills and hindeer career progression (Power, 2020, Adda et al., 2017). For instance in many workplaces, workers who are willing to work more hours usually tend to receive a wage premium (Blau & Winkler, 2018, Kato & Kodama, 2018). In this case, if mothers have to take care of their children during school closures, they will be at a disadvantage relative to childless women, men or fathers (Alon et al., 2020a, Craig & Churchill, 2021). Becoming unemployed due to the forced decrease in activity in certains sectors also means that workers lose the benefits of firm-specific training and have less labour market experience in comparison to others (Blau & Winkler, 2018). Alternatively, a switch from full-time work to part-time work has been shown to decrease employment quality in terms of lower pay and a smaller probability of job security, promotion, training, and union membership (Sparreboom, 2014, OECD, 2010, Blazquez Cuesta & Moral Carcedo, 2014, Manning & Petrongolo 2008). An unequal decrease in labour participation at the extensive or intensive margins can thus lead to a widening of the gender pay and employment gaps (EC, 2021, Fuchs-Schundeln et al., 2020). In general, gender gaps in the labour market reduce aggregate productivity and income per capita (Cuberes & Teignier, 2017, EIGE, 2017).

Thirdly, the NPIs may cause gender gaps in non-economic factors. Unemployment during the pandemic recession could increase mortality and decrease life years (von Wachter, 2020). Adda et al. (2009) found that permanent income shocks lead to increases in mortality and risky health behaviour. Similarly parents who try to juggle multiple responsibilities due to school closures may have worse quality of life and life satisfaction as a result. Quality of life can be seen as being composed of leisure time, work-life balance and relationship dynamics (Yerkes et al. 2020). Therefore, not only might an increase in hours on child care and housework reduce working hours, it also reduces hours of leisure (Schoonbroodt, 2018). As Yerkes et al. (2020) argue, employees who experience high stress, high workload and time constraints are less productive and are more likely to suffer from burnout compared to employees who are feeling well. This also translates into economic costs. In addition, it may have intergenerational effects, as parental health has been evidenced to indirectly affect their children (Bratti & Mendola, 2014, Kristiansen, 2021, Le & Nguyen, 2018, Le & Nguyen, 2017, Farahati et al., 2003, Frank & Meara, 2009). It is important to mention that the increased likelihood of women losing their jobs may also increase the pressure felt by their male partners in keeping the household afloat. Even among different-sex couples where a woman earns less than a man, her income can be critical (Heggeness & Suri, 2021). The NPIs also affect couple well-being. The unexpected shifts in division of household tasks due to NPIs or the loss of employment may increase tension within couples, which could have an impact on family stability (Biroli et al., 2021, Ruppaner et al., 2018).

Before continuing any further, four forces that may reduce or counter the disproportionate impacts of the NPIs on women must be acknowledged. Firstly, governments implemented policies to alleviate the effect of the economic shocks caused by the NPIs. Examples of such policies include furloughing schemes, short-time work schemes, additional parental leave, income maintenance schemes, wage subsidies and easing access to unemployment benefits. For example, Germany expanded its short-time work compensation scheme to cover up to 67% of employees' net income (Graeber et al., 2021). The government in the United Kingdom (UK) launched the Coronavirus Job Retention Scheme (CJRS) which allows employers to furlough workers for at least three weeks while the government contributes 80% of the employees' income (Adams-Prassl, 2020b). Spain implemented a job retention scheme similar to furloughing, called ERTEs (Farré et al., 2021).

Secondly, just as on average women spend more time on family care than the average man, they are also more likely to be employed in a sector that involves care for others, such as health care or teaching (Folbre, 2018). In the context of a pandemic, this means that women are potentially more likely than a man to remain in employment due to being an essential worker (Alon et al., 2020b, Lewandowski et al., 2021, ILO, 2020b, Oreffice & Quintana-Domeque, 2021). In addition, many high-contact male-dominated industries such as construction and manufacturing include activities that could not be carried out during the lockdowns. Therefore, it is also possible that the pandemic led to fewer job losses or furloughs among women compared to men. In some European countries, such as the Netherlands (Yerkes et al., 2020), children of key workers were allowed to still attend school and kindergarten. This reduced the adverse effects of school closures on parents' careers.

Thirdly, the pandemic led to a widespread adoption of teleworking and an increased flexibility in work hours (Alon et al., 2020a, Yerkes et al., 2020). The new methods have made it easier to combine the dual demands of paid and unpaid work and thus could reduce gender gaps in employment and earnings (Alon et al., 2020a, Yerkes et al., 2020, Lyttelton et al., 2020). However, it is important to note that if mothers are more likely to choose to work from home than others, it may instead exacerbate the gender gap in both paid and unpaid work (Sevilla & Smith, 2020). This is because it can reduce presence and attachment to the workplace, potentially leading to unfavourable consequences such as reduced earnings as well as fewer career and networking opportunities (Yerkes et al., 2020, Hupkau & Petrongolo, 2020, Lyttelton et al., 2020).

Fourthly, fathers may have increased their contribution to housework and child care. Attitudes towards gender roles have changed over time. Gimenez-Nadal & Sevilla (2012) found that during the period of 1970-2012, men increased the time devoted to unpaid work and child care activities in all of the seven developed countries they studied. Ten years later, the increase is likely to be even larger. Additionally, exogenous shocks such as the pandemic could cause long-term norm change (Biroli et al., 2021, Bicchieri & Mercier, 2014). For example, one can refer to the increase in employed women during WWII due to military mobilisation (Goldin & Olivetti, 2013, Acemoglu et al., 2004). An opposite change could happen if more women are at the so-called "front line" during the pandemic. As hypothesised by Del Boca et al. (2021), it is possible that the short term response to the NPIs is for mothers to take on a larger share of the additional burden, but that in the long-term, fathers also increase their contributions.

The remainder of the thesis is organised as follows. Section 2 is a literature review in which related research is summarised. Section 3 explains the data and the methodology used to perform the analysis. In section 4, the changes in labour market outcomes for men and women are analysed using descriptive evidence and by showing the results of the regression analyses. Section 5 discusses the findings, considers the limitations of the analysis and finally concludes.

2. Literature Review

A fair amount of analysis in the field of economics has been conducted on the gendered effects of the pandemic on labour market outcomes and division of unpaid work at home. Many articles have evidenced that the pandemic affected women more severely than men in terms of a decline in working hours, increased share of child care and housework, increased absences or a decreased labour force participation rate. However, many articles also evidenced a larger shock to men's labour market outcomes. Some articles also reported that men increased their hours spent on child care and/or housework. However, women typically still spent more time overall on domestic activities. The analysis of the most prominent papers are explained in detail below.

Zamarro & Prados (2021) found that during the March-July 2020 school closures in the United States (US), women with school-age children in two-parent households undertook a larger share of child care than men. Zamarro & Prados used longitudinal data from the US Understanding Coronavirus in America tracking survey, which they claim is nationally representative. They estimated coefficients using a multinomial discrete choice logit model with a female dummy. The model included wave fixed effects as well as dummies for regions, age and ethnicity. They found that women were 23 percentage points (pp) more likely than men to claim to be the sole person taking care of their children. Women were also 14 pp less likely to say that their partner was the sole caretaker. Zamarro & Prados (2021) consequently found that the increased child care load led mothers to decrease the hours they worked. They created a dummy that was equal to 1 if the parents still had the same job that they had in March, but had to reduce their working hours. They found that working mothers who had obtained a university degree were around 17 pp more likely to have reduced their working hours compared to working fathers and working women without children. They also estimate a discrete duration model for the probability of leaving employment. However, they do not find a statistically significant gender gap. There was also no significant effect on the probability of transitioning out of employment for mothers. Meanwhile, fathers were 3 pp less likely to leave employment.

Remaining in the US, Fabrizio et al. (2021) analysed the U.S. Current Population Survey (CPS) household microdata. Their time horizon was longer than Zamarro & Prados (2021), as they included data from April until December 2020. They developed monthly linear probability models of the individual likelihood of employment. The variable of interest was a gender dummy. They controlled for industry, occupation, age, race, marital status, education, and state. Women's average probability of being employed was 3 pp lower in their study period. Employment recovery was also stronger for men. Importantly, Fabrizio et al. (2021) noticed that even women without children experienced a larger loss in employment than men with similar characteristics. However, after carrying out a decomposition exercise, they argue that the increased need for child care could explain 45% of the employment gender gap. They further estimate that the additional child care reduced total output by 0.36%. This was calculated by creating a counterfactual scenario using a production model calibrated to the US.

Heggeness (2020) also examined the effects of COVID-19 on parents' labour supply using CPS data in the US. However, unlike Fabrizio et al. (2021), she used a difference-in-difference regression model. She compared the effect of the pandemic between states that had early school closures and stay-in-place orders with states that never imposed the NPIs or did so later on. She analysed labour market outcomes both at the extensive margin, such as attachment, as well as at the intensive margin in terms of hours worked and wages. Her models controlled for other adults in the household, education, and industry. Heggeness (2020) found that mothers in early closure states were 20.2% more likely to take temporary leave than women in late closure states. The results also showed that women in early closure states were 31.8% more likely to have stopped working the week before. Mothers with jobs in early closure states were also 68.8% more likely to not work than mothers in late closure states. She did not find statistically significant differences between the treatment and control states for working fathers or for working women without school age children. She also found no significant differences in weekly earnings between mothers in the different states or between fathers. She suggested that this could be due to parents taking paid leave. Surprisingly, according to the results, women in early closure states who continued working on average increased their hours worked by 1% more compared with women in late closure states. There were no significant differences between mothers. More interestingly, in early closure states, women's hours worked increased by 1.6% more compared to men. Meanwhile, mothers' hours increased by 1.8% more compared to fathers. This can be explained by her finding that men's overall hours decreased by 0.6%. Notably, fathers' hours decreased by 1.3% more in early closure states compared with fathers in late closure states.

Hupkau & Petrongolo (2020) analysed the effects of COVID-19 on the gender division of work in the labour market and in the household for the UK. They used data from the Understanding Society longitudinal study conducted in two waves, April and June 2020. The respondents were also asked to retrospectively explain their labour market situation in January 2020. This allowed Hupkau & Petrongolo to compare the situations before and after the start of the pandemic. The analysis was carried out using linear probability models. They controlled for individual (such as age, region, education, household composition), job characteristics and industry and occupation fixed effects. The coefficient for the gender dummy was not statistically significant when the dependent variable was job loss since the start of the pandemic or furlough. They also did not find statistically significant gender differences in decreases in earnings. However, women were significantly more likely than men to have experienced a decrease in hours worked. The average decrease in hours was nevertheless larger for men. When looking at the changes in the division of work within the household, they restricted the sample to only include respondents who had answered the survey in previous waves in 2017-2019. They also combined the information with 2014-2015 data from the UK Time Use Data. They found a higher absolute and proportional increase in housework for men. This consequently narrowed the gender gap in hours spent on housework. Fathers had also increased their time spent on child care, although women still undertook a larger share.

Sevilla & Smith (2020) also analysed the UK using omnibus survey results from May 2020 (N=4,250). They estimated marginal effects from a multinomial logit regression. The models controlled for individual and job characteristics. Women were 5 pp less likely than men to still be at work. Sevilla & Smith argue that women may have been more likely to stop working in order to meet the increased demand for childcare. However, the gender gap between women and men without children was also significant . When analysing the division of childcare, Sevilla & Smith focused on households with young children aged 12 years or less. They found that similarly to the pre-pandemic period, women undertook most of the child care. Nevertheless, the gender gap did slightly decrease as men increased their time spent on child care. They also find a link between the amount of additional childcare provided and changes in the father's employment status. Men were more likely to undertake a higher share of child care when they had more time, i.e. when they worked from home, had been furloughed or were not working. Meanwhile, on average, women specialised in caring activities regardless of their employment status.

Oreffice & Quintana-Domeque (2021) also analysed UK households using results from a survey (BIDCOFU) that they conducted online in June 2020 (N=1500). Their analysis consisted of a linear regression model with a female dummy as the variable of interest. The model also controlled for the number of children, age, ethnicity, education, income, employment status and location. The estimation was done using ordinary least squares (OLS). Similarly to Hupkau & Petrongolo (2020), they do not find statistically significant gender differences in changes in labour market outcomes at the extensive or intensive margins. They do find that the gender gap in time spent on childcare and home-schooling increased by approximately 3.5–3.9 hours compared to the situation before the pandemic. They also estimated that the gap in time spent on housework increased by 2.2 hours.

Adams-Prassl et al. (2020b) specifically analysed the gender effects of the UK furloughing scheme. They used survey data about workers that was collected in two waves, first in April 2020 (N= 4,931) and later in May 2020 (N= 4,009). In their linear probability model, they included a dummy for gender, region and time fixed effects, occupation and industry fixed effects. The models also controlled for individual and job characteristics. They found that women were 3 pp more likely to have been furloughed compared to men. More interestingly, mothers were 10 pp more likely than men to actually request being furloughed. Adams-Prassl et al. believe this gender gap is explained by childcare responsibilities. This is because no significant gender gap existed in furloughing among childless workers. Additionally, they found that women's wages were 10 pp less likely to have been raised by the employer above the 80% given by the government. However, the coefficient was statistically insignificant when including all control variables. They also found that women were significantly less likely than men to still be working while being on furlough. Women who did work, worked significantly fewer hours than men.

Multiple studies have also evaluated the effect of NPIs in the EU. Huls et al. (2021) analysed the situation for the Netherlands. In their survey sent to workers in April-May 2020 (N=851), respondents were asked to recall their time allocation during two time periods; before the COVID-19 pandemic (retrospectively) and during the first wave of the pandemic. To compare the two time periods, they used paired t-tests and calculated Pearson's correlations. They also ran a linear regression with productivity in paid work as the dependent variable. The results did not show a significant gender difference in the changes in hours worked. However, the largest relative decreases in hours worked were among respondents with young children. Huls et al. also found that productivity was significantly lower if workers had very young children (0-3) and had to work from home. In terms of unpaid work, the number of hours increased significantly more for women compared to men. However, in relative terms, there was no gender difference. According to the data, mothers of children younger than 17 years shouldered the majority of the additional burden of child care and home-schooling in the household. Meanwhile, men undertook most of the additional housework chores and cooking. Interestingly, they found that in households without children, women had spent more additional time than men since the start of the pandemic on housework and cooking.

Yerkes et al. (2020) also studied the Netherlands using the results of a survey carried out in April 2020 (N=852). The respondents needed to have at least one member in the household in paid employment and at least one underage child living at home. Yerkes et al. analysed the data using two types of multivariate models: multinomial logistic regression for paid work dynamics, and a linear probability model (LPM) for the division of childcare and household tasks. They found that mothers were more likely to adjust their work patterns. They worked less during official work days and more on conventional rest days or hours. The LPM analysis results showed that fathers were significantly more likely than mothers to report incurring a relatively higher share of child care and household tasks since the introduction of the NPIs. Nevertheless, by November 2020, Yerkes et al. (2021) found that the percentage of fathers who spent more time on childcare had decreased. The overall division of child care between mothers and fathers stayed unequal.

Seiz (2021) analysed the situation in Spain based on the results of an online survey conducted between April and May 2020. She specifically narrowed the sample to only include heterosexual couples where both parents worked from home. She argues that this removed the effect of work related constraints. When only focusing on families where the mother had higher education and high occupational status (N=265), Seiz found that mothers continued to assume more unpaid work such as housework and child care than fathers. Seiz found these results surprising, as she expected women from a higher socio-economic status to have a greater willingness to deviate from traditional gender roles. She also performed logistic regression models on a wider sample without the restrictions on the mothers' education (N=508). She concluded that time constraints were the most important determinant of whether the division of unpaid work was traditional or not.

Farré et al. (2021) also analysed Spain using household online survey data (N=4,877) collected in May 2020. They asked the 24-50 year old respondents to retrospectively remember their situation before the introduction of NPIs. The regression model included a gender dummy, a time dummy equal to 1 for the period after the start of the lockdown, an interaction variable of the two, individual control variables as well as individual fixed effects. The results showed that women with a university degree were significantly 4 pp less likely to be employed than men since the start of the lockdown. Farré et al. also found that while hours worked significantly fell for both genders, men's hours worked fell by two hours more than women's. This therefore narrowed the gender gap in hours worked. In order to analyse the division of the added child care burden, Farré et al. further restricted the sample to only include respondents in opposite-sex couples who had children younger than 17 years old (N=1,774). The time spent on housework and child care significantly increased for both genders. While hours spent on housework and child care increased more for men than women, women still carried out a larger share in both tasks.

Mangiavacchi et al. (2021) analysed Italy using online survey data (n=3352) collected in April-May 2020. It is important to note that they caution that their sample may not be nationally representative. They focused on households with children younger than 16. Their first difference regression model included explanatory variables such as changes in employment status, hours worked and a switch to working from home. It controlled for other time-varying characteristics such as household income, age, education, household composition. It also included a time trend and province fixed effects. They found that fathers were more involved in childcare if the mother earned up to 50% of the family income. In addition, the share of households in which the father carried out at least 50% of child care had increased by 6.6 pp since the start of the pandemic. The regressions estimated that the lockdown reduced the mothers' share of housework by 4.3 pp and their share of child care by 2.1 pp. All coefficients were significant at 1% level. Mangiavacchi et al. also found that when the father becomes unemployed, the share of housework and child care undertaken by the mother decreases. They argue that the decreased hours worked can be seen as an exogenous increase in the time available for men to increase their hours spent on unpaid work. They also found that families who were more gender unequal at the beginning of the pandemic experienced a stronger equalising effect in terms of the division of tasks.

Adams-Prassl et al. (2020a) undertook an analysis of the survey results from the April 2020 COVID Inequality Project conducted in the US, the UK and Germany. They regressed job loss on a female dummy using a linear probability model. They controlled for whether the respondent had to change their work patterns to care for others as well as the number of children in the household. The models also included an interaction variable for the number of children and gender. Additionally, they controlled for individual and job characteristics. Adams-Prassl et al. found that women were significantly more likely to have lost their job than men in the US and in the UK, although not in Germany. The probability was 6.5 pp higher in the US and 4.5 pp higher in the UK. In Germany, women were more likely than men to be put on short-term work. The effects remained significant even after controlling for occupation fixed effects as well as the ability to work from home in a specific sector. Adams-Prassl et al. therefore concluded that the gender gap is due to differences in care responsibilities. Furthermore, additional analysis showed that amongst the population working from home, women spent significantly more time home-schooling and caring for children than fathers.

Economic analysis on the research question has also been carried out in Asian countries. Fukai et al. (2021) analysed the Japanese labour market. They used individual-level data from the Labour Force Survey from January 2013 to June 2020. Fukai et al. employed a causal machine learning method to investigate the difference between the employment probability in a post-pandemic month and the same month in the previous year. In their model, they controlled for the respondents' background characteristics and working status in the previous month. The regression results showed that overall, there were no significant differences between men and women. An exception was in April 2020, when the negative effect of the pandemic on the employment probability was approximately 1.8 pp larger for women than for men.

Ham (2021) investigated gender differences in labour market outcomes in South Korea. Using the results from the Economically Active Population Survey (EAPS) from February to April 2020, she looked at the employed population (N=90,248). She ran logistic regressions which controlled for workers' demographic and job characteristics. She studied two dependent variables; whether workers were on leave of absence and whether they became unemployed. She found that 5.5% of women were on leave of absence. This was more than double the percentage of men, 2.5%. More specifically, she found that women aged 30–45 took more leave of absence than men in that age category. This is the age bracket assumed to be of childbearing and caring age. The Oaxaca–Blinder decomposition method showed that 21.3% of the gender difference in leave of absence was explained by the concentration of women in the "care" industries. Women being more likely to have a part-time job also explained 16.8% of the total gender gap in leave of absence. However, 60.8% of gender differences in leave of absence were unexplained, which hints at the persistence of traditional gender norms. With respect to unemployment, Ham found that the gender gap was around 1.6 pp. While 4.6% of women workers lost their jobs, only 2.9% of men did. Workers who lost their jobs were more concentrated in service and sales occupations, the care or hospitality sectors. They were also likely to be in an unstable employment status or part-time job.

Kim (2021) also analysed the gender differences in labour market outcomes in South Korea using the EAPS data. However, she looked at a longer time period, between January 2013 and December 2020. The regression model included a female dummy as the variable of interest, time dummies for the months during the pandemic, as well as an interaction variable of the two. The models also controlled for job characteristics and included fixed effects for occupation, industry, and work arrangements. With the transition from employment to non-employment as the dependent variable, the regression results showed that the transition was 0.9 pp higher (at 1% significance) for married women than for married men in March 2020. The gender difference was not significant in September or December 2020. There were also no differences when running the regression on unmarried workers. When analysing the situation in more detail, Kim found that the gender gap in the transition from employment to non-participation was more than twice as large as the gap in the transition from employment to unemployment. Job characteristics explained a larger share of the difference in the employment to unemployment transition than in the employment to non-participation transition. Kim hypothesised that the unexplained gender difference could be due to added childcare responsibilities. This is because she found that the largest gender gap in the employment to non-participation transition was observed for those aged 39-44. In March 2020, married women in that age group were 1.4 pp more likely to leave the labour force than men. This difference did not exist for single women and men in the same age bracket. In the other age groups, gender disparities did not exist or were mostly explained by gender differences in the job characteristics. Similarly to Ham (2021), she reasons that workers in the age category of 39-44 years are most likely to have children going to primary school. The results also showed that 38% of employed women were working in the education, accommodation and food, human health or social work industries. These three industries experienced the largest decreases in employment rates. In addition, part-time workers accounted for approximately 30% of the average employment losses. Women were more likely to work part-time. 19% of women were working part-time before March 2020, whereas the rate was only 9% for men.

Many other articles have also analysed the gendered effects of the pandemic, but are beyond the scope of the literature review of the thesis. Craig & Churchill (2021) found that women in Australia were significantly more likely to report a larger number of daily hours spent on housework during the pandemic. Kalenkoski & Pabilonia (2021) and Graeber et al. (2021) analysed the situation specifically for the self-employed in the US and Germany. The results showed that women were more likely to have lost their job than men. Meanwhile, Casarico & Lattanzio (2020) did not find a significant impact of gender on unemployment in the extensive margin at the beginning of the pandemic in Italy. Campa et al. (2021) also concluded that COVID-19 did not increase gender inequalities in employment in the short-term in Sweden.

Articles undertaking cross-country analysis have also been published. An IMF working paper by Bluedorn et al. (2021) informs that over half of the 38 countries analysed experienced a "she-cession" at the beginning of the pandemic. A report by EIGE (2021) covering Europe found that women accounted for more than 50% of the job losses in the food service activities, retail trade and the accommodation sectors. An ILO 2020 report also found adverse employment effects for women in the majority of the G20 countries (ILO, 2020a).

Several studies have also looked at the asymmetric effects of NPIs on the productivity of female and male academics and scientists (Deryugina et al. 2021, Amano-Patĩno, 2020, Barber et al., 2021). In addition, many working papers that have not yet been published in a journal have researched similar topics to this thesis, such as papers by Pouliakas & Branka, 2020, Montenovo et al., 2021, Cajner et al. 2020, Lee et al. 2021, Beauregard et al., 2021, Lofton et al. 2021, Couch et al., 2020, Meekes et al. 2020, Albanesi & Kim, 2021, Cowan, 2020, Beland et al. 2021, Del Boca et al., 2021, Moehring et al. 2021, Doorley et al., 2021 and Alon et al. 2021.

Contribution to the literature

The contribution of this thesis to the literature on the pandemic recession and gender inequality are manifold. Firstly, the thesis will try to analyse the impact of the NPIs using data used from an objective data set, the European Union Labour Force Survey (EU-LFS) available on Eurostat. The EU-LFS includes country-level data about labour market outcomes dating from long before the start of the pandemic. The majority of the papers mentioned in the literature review only used data from real-time surveys carried out during the pandemic. For example, Zamarro & Prados only looked at the situation during the pandemic and did not compare to time periods before the pandemic. Due to the unexpectedness of the pandemic, the NPIs can be considered a sort of random event. However, simply comparing gender gaps in labour market outcomes before and after the pandemic requires the assumption that the only change in labour market conditions is due to the NPIs. This is unlikely to hold. Firstly, there may be a time trend. Including time trends is important, as the gender gap was likely to be decreasing or stagnating before 2020. This thesis analyses the labour market outcomes for the time period 2015-2021. Secondly, COVID-19 has affected the labour market through other ways than NPIs as the behaviour of businesses and workers has changed. Some of the articles that did compare to the pre-pandemic period asked respondents to retrospectively remember their situation before. This causes concerns of recall bias. The Labour Force Surveys does not ask questions retrospectively. Therefore, the data used in the thesis provides a more accurate baseline for labour market outcomes.

Secondly, the thesis analyses the impact of NPIs in all EU countries. Instead of focusing on the impact of NPIs on gender equality in a specific EU country, analysing all EU countries gives a more comprehensive picture of the effects of the pandemic. This is of interest because as Adams-Prassl et al. (2020a) showed, the labour market outcomes during the pandemic significantly differed between countries. The focus will thus be on developed countries and not on developing countries (as covered in the articles by example Desai et al., 2021, Deshpande, 2021, İlkkaracan & Memiş, 2021, Seck et al., 2021, Ma et al., 2020). On top of this, the analysis in the thesis also splits the EU countries into strict and mild NPI countries, which has not been done in the context of analysing the gendered effects of the pandemic in economics.

Thirdly, the thesis uses the latest available quarterly data from Eurostat which currently is the third quarter of 2021. Longitudinal data allows the identification of long term changes to labour market outcomes on top of short-term changes. This is an improvement over various international studies that used data from the first two or three quarters of 2020. These studies (for example Alon et al., 2021, Bluedorn et al. 2021) can only paint a picture of the initial stages of the pandemic.

Fourthly, the thesis comprehensively analyses the consequences of the pandemic on labour market outcomes by looking at both the extensive (employment rate) and intensive (working hours) margins as well as movements in and out of the labour force. This is done separately for part-time and full-time employment rates and hours worked. Only looking at total employment may omit some important findings since a higher share of women than men work part-time (EIGE, 2020). For example, it could be the case that mothers working part-time are more likely to change their hours than full-time working mothers (Yerkes et al., 2020).

3. Regression Methods

The ideal regression method for answering the research question is the DiD method. The average change in the gender gap before and after the pandemic in strict NPI countries is compared to the average change in control countries. This way, the probability that the coefficients in the regression results reflect the true effect of the NPIs is maximised. The models are estimated using OLS and robust standard errors.

The difference-in-difference regression equation, estimated by OLS, is in its simplest form shown in equation 1:

$$Labour\ Market\ Outcome = \beta_1 + \beta_2 T_t + \beta_3 D_i + \delta(T_t \times D_i) + \varepsilon_{it}$$

(Equation 1)

The subscript *t* represents the quarter, *i* the country. β_1 represents the baseline average gender gap in the labour market outcome of interest. ε_{it} is the error term. The time dummy variable T_t represents the implementation of NPIs in mid-March 2020. The dummy has been set to equal 1 for all time periods after 2019Q4, and 0 for time periods before and up to 2019Q4. The coefficient β_2 of the dummy T captures the impact of the pandemic recession on gender differences for control countries ever since the pandemic started. The dummy D_i equals 1 for the countries considered to have strict NPIs and 0 for countries with less strict NPIs. β_3 represents the difference in the gender gap between treatment and control countries before the pandemic.

$T_t \times D_i$ is the interaction variable of the two dummies T_t and D_i. δ is the coefficient of interest and captures the average difference in labour market outcomes between men and women before and after the introduction of NPIs for EU countries with strict NPIs relative to EU countries with less strict NPIs. A positive coefficient will mean that differences between men and women increased more in treatment countries than in control countries. The null hypothesis is that the difference is equal to 0. If the p-values of the coefficients are smaller than 10%, it is possible to reject that there is no differing impact at the 10% level.

$Labour\ Market\ Outcome$ is the dependent variable. The average labour market outcomes for each country in every quarter was available for both genders on the Eurostat website. Therefore, regressions are run for the labour market outcomes for each gender separately as a dependent variable. Since the main focus of the thesis is to analyse the changes in gender gaps, the difference between the average men and women was also calculated for each time period in every EU country. The gender gap $y_{men} - y_{women}$ in the labour market outcomes was then the dependent variable.

The thesis looks at multiple labour market outcomes, with the nine dependent variables listed below:
1. the share of full-time employed workers (LFSQ_EPGAN2),
2. the share of part-time employed workers (LFSQ_EPGAN2),
3. the share of workers transitioning from employment to unemployment (LFSI_LONG_Q),
4. the rate of transition from unemployment to employment (LFSI_LONG_Q),
5. the rate of transition from employment to inactivity (LFSI_LONG_Q),
6. the quarterly average number of actual weekly hours of work in full-time main job (LFSQ_EWHAN2 in Eurostat),

7. the quarterly average number of actual weekly hours of work in part-time main job (LFSQ_EWHAN2),
8. the rate of absences from work (LFSI_ABT_Q),
9. the share of temporary workers (LFSQ_ETGAN2).

Reasons for using multiple labour market outcomes as dependent variables are manifold. Firstly, since data on the employed does not exclude people on sick or maternity leave, most of the effects of increased childcare are not grasped when only using the percentage of the population employed as the dependent variable. For this reason, absences from work are also analysed. Similarly, work hours are analysed on top of employment rates in order to see whether many workers are still employed but working fewer hours than before. Therefore, certain dependent variables look at the effect of the NPIs at the intensive margin, while others provide a general measure of the impact of school closures and stay-at-home orders on the extensive margin of labour.

Secondly, the differences in transitions provide more information than rates of unemployment or inactivity. This avoids accidentally analysing workers who were already unemployed or inactive at the onset of the pandemic. Thirdly, transitions to inactivity are important in order to see whether there are any effects of NPIs on the labour supply, as non-participation rates may have increased among women during the pandemic (Del Boca et al., 2021). Additionally, the transitions from employment to unemployment can be seen as representing labour demand conditions, while the employment to inactivity transitions can represent labour supply decisions.

A DiD estimation differences out time invariant factors. However, any time variant characteristics that differ between the treatment and control groups or pre- and post-pandemic may bias the true effect of the pandemic on the labour market outcome variables. To ensure that the DiD coefficient measures the true effect of NPIs on labour market outcomes, the regressions will include dummies for each country as well as year and quarter fixed effects. Labour market outcomes of interest in each country may be affected by changes in the labour market institution and employment protection legislations as well as by changes in workforce compositions themselves. The country fixed effects Φi will control for all time-invariant, country-level factors. For instance, female employment rates tend to be higher in the Nordic countries compared to the Mediterranean countries (Kunze, 2018). The model includes quarter $\boldsymbol{\alpha}$t and year $\boldsymbol{\phi}$t fixed effects in order to take into account any seasonal trends or other time trends.
The final regression equation is therefore equation 2 below:

$$Labour\ market\ outcome = \beta_1 + \beta_2 T_t + \beta_3 D_i + \delta(T_t \times D_i) + \Phi_i + \phi_t + \alpha_t + \varepsilon_{it}$$

(equation 2)

Regressions will be run with and without the controls to see whether the coefficient of interest δ changes with the model specification. The six different models are summarised in table 2 below. The first two models will only include the T_t and the treatment dummy D_i, respectively.

Table 2 - Model specifications

	1	**2**	**3**	**4**	**5**	**6**

Time	x	x	x	x	x	x
Treated		x	x	x	x	x
Time, treated & DiD			x	x	x	x
Year fixed effects				x	x	x
Quarter fixed effects					x	x
Country fixed effects						x

In the special case for absences, the regression will also additionally include a model which controls for COVID-19 quarterly deaths and cases. This is because absenteeism is also directly affected by virus. By controlling for the quarterly average number of COVID-19 cases and deaths in the EU countries, perhaps the effect of the closure of schools and kindergartens on absenteeism can be highlighted. In this special case, the regression model is therefore:

$$Labour\ market\ outcome = \beta_1 + \beta_2 T_t + \beta_3 D_i + \delta(T_t \times D_i) + \Phi_i + \phi_t + \alpha_t + \beta_4 Cases + \beta_5 Deaths + \varepsilon_{it}$$

The control and treatment groups

The classification of EU countries into treatment and control groups can be found in table 1 below. The Oxford COVID-19 Government Response Tracker (OxCGRT) index is specifically made for the purpose of cross-country comparisons (Hale et al., 2021). Every country is assigned a stringency level for each NPI ranging from 0 to 3. The eight NPIs included in their index are the closure of schools and universities, the closure of workplaces, the cancellation of public events, restrictions on gathering, closure of public transport, stay at home requirements, restrictions of movement and international travel. The data provided by OxCGRT is weekly, but for the purpose of this thesis was transformed into quarterly. This was done by assigning the average stringency level of all the weeks during each quarter.

Table 1 - Classification of EU countries into treatment and control groups

Treatment = Strict NPIs	**Control = Mild NPIs**
Belgium	Poland
Germany	Bulgaria
Ireland	Czech republic

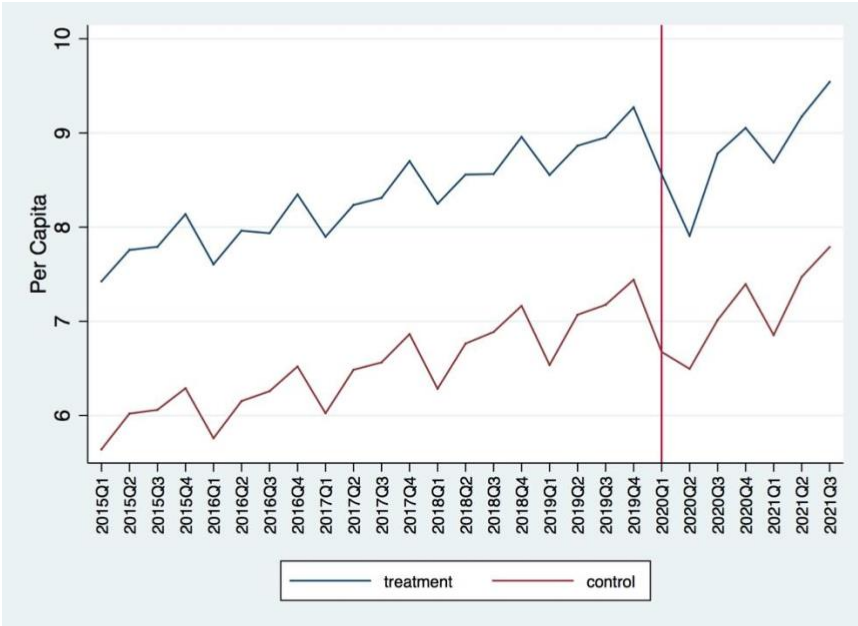
Greece	Denmark
Spain	Estonia
France	Croatia
Italy	Latvia
Cyprus	Lithuania
Netherlands	Luxemburg
Austria	Malta
Sweden	Slovenia
Portugal	Slovakia
Romania	Finland
	Hungary

This sub-section will graphically analyse differences between the treatment and control groups before and after the pandemic in terms of relevant factors such as GDP, the severity of the pandemic, and policy instruments used to combat the negative labour market outcomes. The DiD regression does not require the treatment and control groups to be similar in these characteristics. This is because the regression method removes the effect of the differences between the groups on the results. What it does assume is the parallel trend assumption: that had the pandemic not occurred, the differences in labour market outcomes between the two groups would have remained the same over time. This assumption cannot be formally tested. However, it can be analysed with the use of graphs, especially by looking at the slopes of the lines. This analysis will be done in the next section.

GDP per capita

Quarterly GDP per capita for the treatment and control countries was calculated from data (NAMQ_10_GDP) available on Eurostat. GDP per capita is clearly higher in treatment countries than in control countries. Both groups seem to have been following an upward trend prior to the pandemic. There is also clear seasonality as GDP per capita peaks in the fourth quarter and consequently drops in the first one. The effect of the pandemic is clear. Both groups took an economic hit after the pandemic began. Countries with strict NPIs took a larger hit than countries with less strict NPIs. It is possible that countries with a higher GDP per capita were more likely to implement stricter NPIs, as they would have been in a better financial position to provide economic support to counteract the economic losses caused by the NPIs. If this is the case, this may cause bias in the results of the analysis.

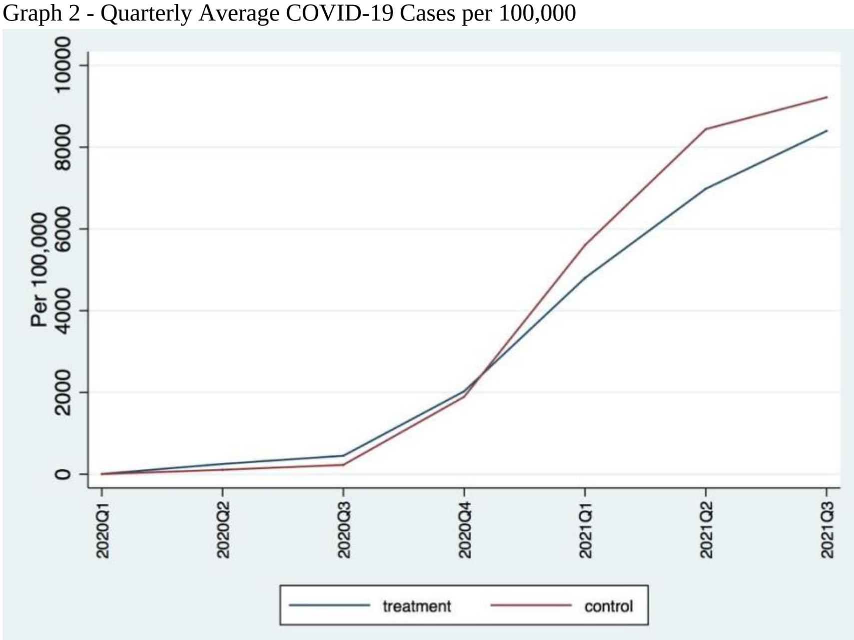
Graph 1 - Quarterly Average GDP Per Capita



COVID-19 cases

Data on the quarterly average of weekly new COVID-19 cases for each EU country was available in the OxCGRT database. Up until 2020Q4, the differences in COVID-19 cases per 100,000 between the treatment and control groups seemed to on average be quite small. Since 2020Q4, the number of cases has increased to higher levels in control countries than in treatment countries. This is in line with what is expected, as control countries adopted less strict NPIs than treatment countries.

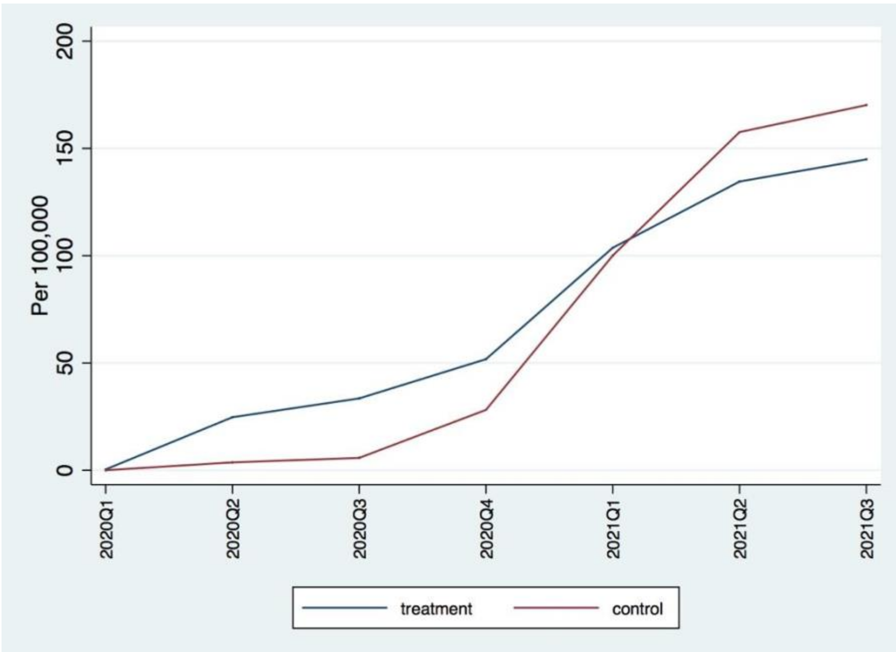
Graph 2 - Quarterly Average COVID-19 Cases per 100,000



COVID-19 *deaths*

Data on the quarterly average of weekly new COVID-19 deaths was also available in the OxCGRT database. When it comes to COVID-19 deaths, it seems that initially, the deaths per 100,000 were on average higher in treatment countries than in control countries. However, the gap started narrowing after 2020Q4, and later on in 2021 the number of deaths became higher in control countries.

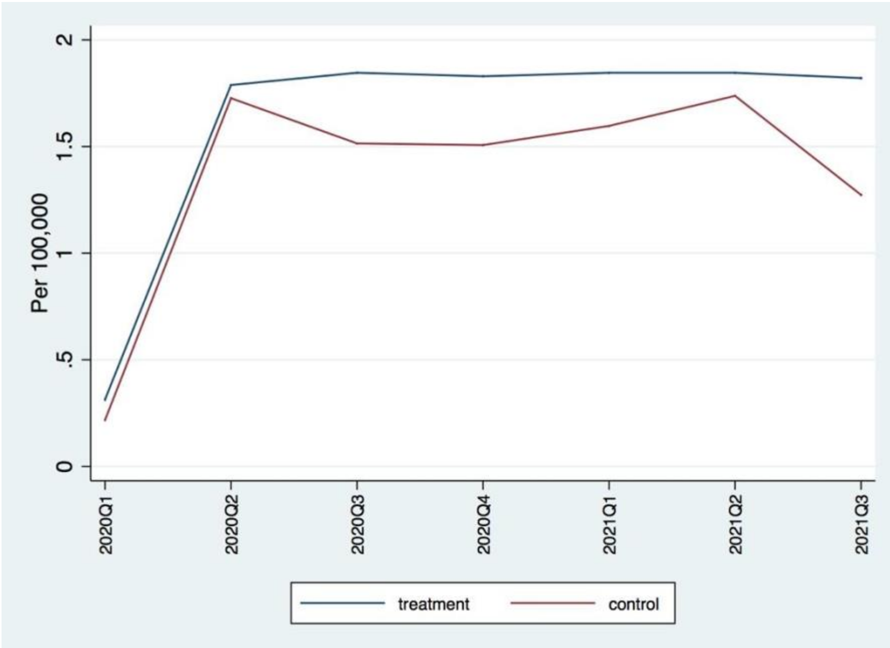
Graph 3 - Quarterly Average COVID-19 Deaths per 100,000



Income support schemes

Data on policy instruments such as income support was also available on the OxCGRT website. The OxCGRT assigned each EU country a value from 0 to 2 for their income support policies (Hale et al., 2021). 0 means no support was given. A value of 1 indicates that the government replaced less than 50% of lost income, and a 2 means that the government replaced 50% or more. While in the initial stages of the pandemic, the income support schemes were similar in both groups, the support schemes have been more extensive in treatment countries than in control countries. This is expected, since treatment countries have imposed stricter NPIs. One reason for this could be that the stricter NPIs damaged the economy more than in countries that adopted less strict NPIs. However, this is not supported by graph 1, as despite the drop in GDP per capita being sharper for treatment countries, GDP per capita was consistently higher in treatment countries than in control countries. An alternative reason is that treatment countries might have been more likely to afford to provide income support than control countries. This could potentially also explain why they adopted stricter NPIs. As mentioned above, this might be a problem for the validity of the results. What is also interesting is that on average, the level of support received in treatment countries has remained the same throughout the pandemic, whereas the level has slightly fluctuated over time in control countries.

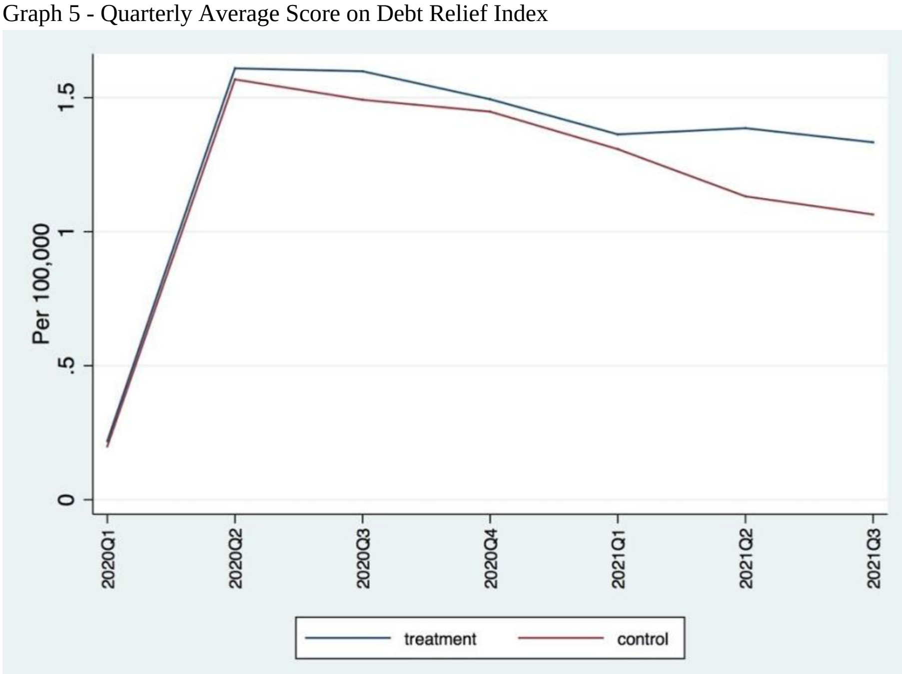
Graph 4 - Quarterly Average Score on Income Support Index



Debt relief schemes

The OxCGRT also assigned each EU country a value from 0 to 2 for their debt relief policies (Hale et al., 2021). A score of 0 means no relief, 1 represents narrow relief, and 2 means broad relief. In the first quarter, the levels of debt relief were similar in treatment and control countries. However, since 2020Q2, treatment countries have consistently provided slightly higher levels of debt support, although the level of support has fluctuated in both treatment and control countries, unlike in the case of income support.

Graph 5 - Quarterly Average Score on Debt Relief Index



4. Analysis of labour market outcomes

This section will analyse the changes in the labour market outcomes of interest in the treatment and control groups. Each labour market outcome will be analysed in turn. Firstly, a descriptive analysis of the situation before the pandemic will be undertaken mainly with the use of graphs. The parallel trend assumption will also be assessed. Secondly, the results of the regression analyses will be shown. DiD regressions are undertaken for men and women separately. On top of this, regressions are run with the gender gap in the labour market outcome as the dependent variable. The tables will show the results for all six (seven in the case of absence rates) model specifications shown in table 2. Due to lack of space, the coefficients for the year, quarter and country fixed effects are not included in the table. The coefficients for *treated* and *time* are omitted from the results when the model specifications include fixed effects due to multicollinearity. This means that the distinct effects of time and treatment alone cannot be analysed in the more complete models.

Full-time employment rate

Graph 6 below exhibits the quarterly average full-time employment rate for both genders separately in treatment and control countries. The rate is calculated for each country and quarter by dividing the number of full-time workers by the population aged 15-65 years. The graph visibly showcases that prior to the pandemic, there was an increasing trend over time in the full-time employment rate. The rate also fluctuates seasonally. The rates consistently peak in the third quarter and dip in the first quarter. Due to the existence of the time and seasonal trends, it is very important to include time trends in the regressions.

Full-time employment is persistently higher for men than for women. The average full-time employment rate for women in the time period before the pandemic was 54.6% in control countries, compared to 41.2% in treatment countries. This means that in treatment countries, 58.8% of working age women were either working part-time, unemployed or out of the labour force. For men, the average rate was 69% in control countries and 64.2% in treatment countries. Graph 7 shows the gender gap in the full-time employment rate. It is the difference in the employment rate between men and women, calculated by subtracting the average full-time employment rate of women from the rate for men. Because the men's rate is consistently higher, the gap is positive. The gender gap seems to have increased over the years. The difference is also usually the largest in the third quarter. Prior to the pandemic, the average gap was 14.4 pp in control countries and approximately 23 pp in treatment countries.

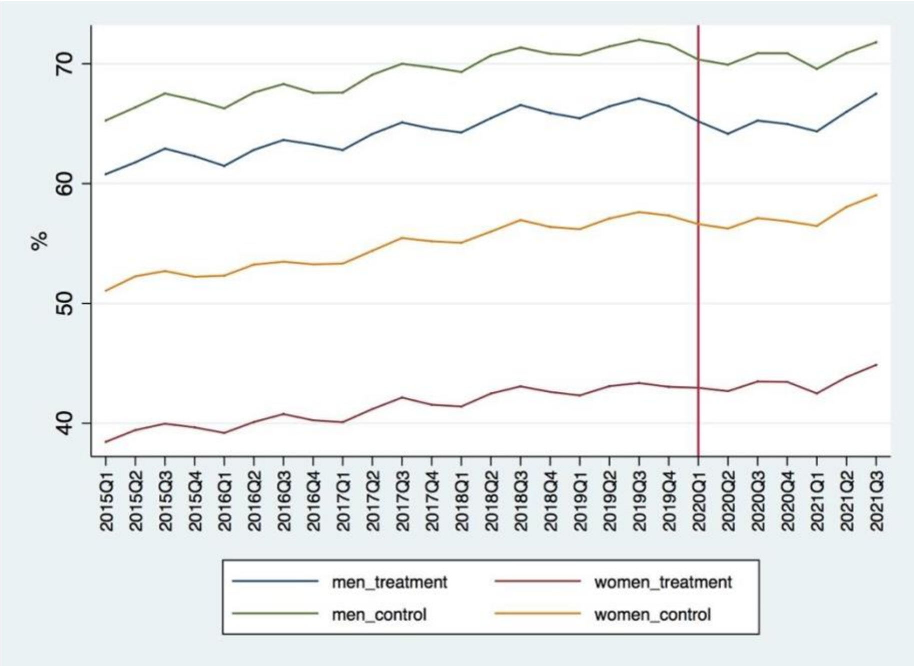
The full-time employment rates differ between treatment and control countries. The rates are higher in the control countries compared to treatment countries for both genders. The results of the DiD regressions with men, women and the gender gap as dependent variables confirm this in tables 3, 4 and 5 below. The number of observations included in the regressions are equal to 725. The four missing observations are due to Germany's missing data for the year 2020. The coefficient for *treated* in the fifth model specification (the model with the most variables included where the coefficient is not omitted) in tables 3 and 4 show that the two groups of countries had a statistically significant difference at 1% significance in men's and women's full-time employment rates before the pandemic. The rate for men was on average 4.85 pp higher in control countries compared to treatment countries and 13.37 pp higher for women. Table 5 shows the DiD regression results for the gender gap. The pre-pandemic average gender gap was 8.52 pp larger in treatment countries than in control countries. This difference is also statistically significant at 1%. There does not appear to be a difference in the trend over time in the employment rates between treatment and control countries (graph 6). With respect to the gender gap shown in graph 7, the trend slightly differs between the two groups for the year 2019. This might be a cause of concern for the validity of the parallel trends assumption.

The start of the pandemic and the introduction of NPIs is demonstrated by the red vertical line in graphs 6 and 7. The effect on the full-time employment rate is noticeable from the graph. For men, there was an immediate decrease in the rate. This occurred in both strict and mild NPI countries. The average rates for men remained lower than before the pandemic until 2021Q2. After this, the men's rate started to increase in both groups of countries. However, the coefficient for *time* in the first model of table 3 shows that the men's full-time employment rate in the EU increased with 1% statistical significance by 1.47 pp. More specifically, the coefficient of *time* in the third model shows that in mild NPI countries, the rate increased by 1.6 pp. This represents a 2.3% increase from the pre-pandemic average. In strict NPI countries, the post-pandemic average rate increased by 1.2 pp. This was a 1.9% change. Due to the larger increase in mild NPI countries than in strict countries, the *DiD* coefficient is negative and approximately equal to 0.4 pp in the baseline model. Including country fixed effects considerably reduces the coefficient to 0.08 pp. However, the effect is not statistically significant at any of the conventional levels.

For women, the effect of COVID-19 is less flagrant. In graph 6, the average rate in the strict NPI countries even appears to stay constant. As can be seen from the regression results in table 4, the average full-time employment rate in the EU for the time period after the start of the pandemic is 2.57 pp higher than the average before the pandemic. This increase was statistically significant at 1%. In mild NPI countries, the rate significantly increased by 2.62 pp. The increase was 2.2 pp in strict NPI countries. This change was smaller in magnitude, but is actually larger in proportion. The rate increased by 5.3% in strict countries in comparison to 4.8% in the mild group. However, since the increase was larger in magnitude in mild countries, the DiD coefficient is negative and equal to 0.42 pp in the baseline model. When including country fixed effects in the model, it increases to approximately 0.6 pp. The coefficient also only becomes statistically significant at 10% after including country fixed effects. This was not the case for men.

Graph 7 shows that after the pandemic, the gender gaps followed opposite patterns in the two groups. The average full-time employment for men increased by a smaller percentage compared to women in both groups of countries. Therefore, the average gender gap decreased in the time period after the introduction of the NPIs in comparison to before. The coefficient for *time* in the first model specification of table 5 shows that the average gap narrowed by 1.1 pp in the EU. However, the coefficient is not statistically significant. In countries with mild NPI, the decrease was 1.02 pp, which was a 7.1% change. However, the coefficient is also not statistically significant. In strict NPI countries, the gap decreased by 0.99 pp, representing a 4.3% change. The gender difference thus decreased more in mild NPI countries, which is why the *DiD* coefficient is positive and equal to 0.03 pp. It is statistically insignificant until the inclusion of country fixed effects. Controlling for time invariant country characteristics also considerably increases the magnitude of the DiD to 0.5 pp.

Graph 6 - Quarterly Average Full-Time Employment Rate



Graph 7 - Gender Gap in Quarterly Average Full-Time Employment Rate

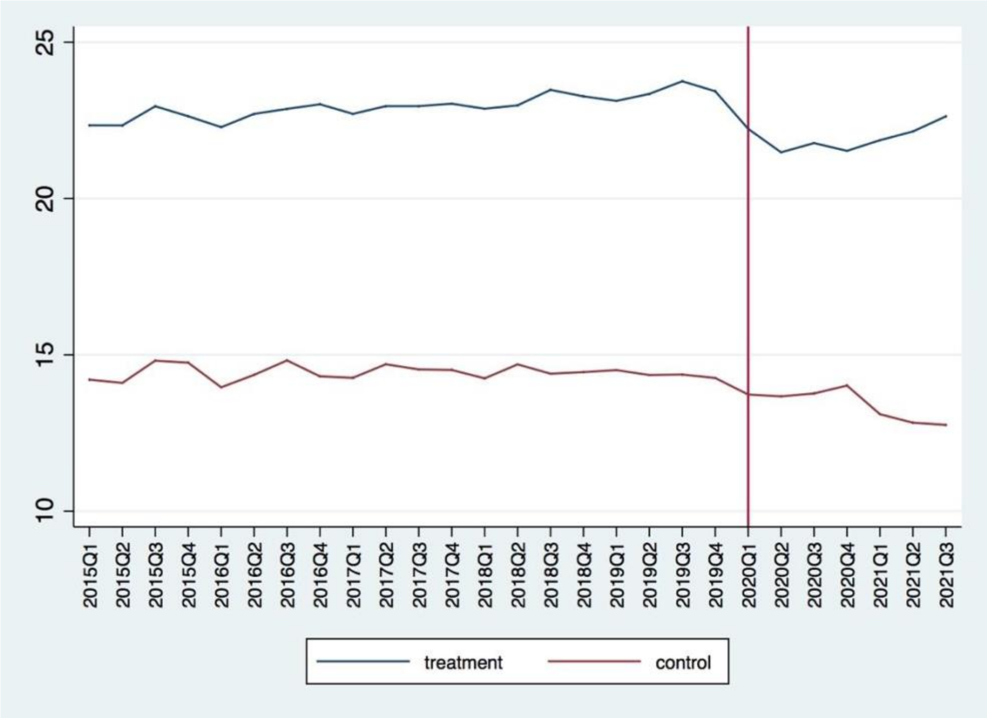


Table 3 - Full-time Employment Rate for Men

Model specification	1	2	3	4	5	6
Time	1.469*** (3.43)		1.601*** (2.96)	.	.	.

Treated		-4.960*** (-14.61)	-4.848*** (-12.09)	-4.848*** (-13.00)	-4.848*** (-13.17)	.
DiD			-0.396 (-0.54)	-0.408 (-0.57)	-0.408 (-0.57)	-0.0772 (-0.28)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 4 - Full-Time Employment Rate for Women

Model specification	1	2	3	4	5	6
Time	2.572*** (2.80)		2.621*** (3.63)	.	.	.
Treated		-13.50*** (-20.78)	-13.37*** (-17.73)	-13.37*** (-17.97)	-13.37*** (-17.98)	.
DiD			-0.422 (-0.29)	-0.439 (-0.30)	-0.439 (-0.30)	-0.599* (-1.94)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 5 – Gender Gap in Full-Time Employment Rate

Model specification	1	2	3	4	5	6
Time	-1.104 (-1.51)		-1.020 (-1.35)	.	.	.

Treated		8.536*** (14.41)	8.521*** (12.12)	8.521*** (12.08)	8.521*** (12.06)	.
DiD			0.0261 (0.02)	0.0311 (0.02)	0.0311 (0.02)	0.522** (2.13)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Part-time employment rate

Graph 8 shows the average share of the working age population in part-time employment. The increasing trend that was visible for the full-time rate is not reflected in graph 8. For men, the average rate has stayed relatively constant throughout the years. For women, the rate seems to have slightly increased over time. There is also mild seasonality for women, as the rate consistently dips in the third quarter, especially in treatment countries. This is possibly due to (school) summer holidays.

As opposed to the full-time rate, the average part-time employment rate is consistently higher for women than for men in both groups of countries. The pre-pandemic average rate for women was 20.3% in treatment countries and 9.4% in control countries. For men, 7.5% of the working age population in treatment countries were employed part-time, compared to 4.1% in control countries. Therefore, as shown in graph 9, the gender gap in part-time employment rate is negative. The gap seems to have widened over the years before the pandemic. Every year it was at its widest in the second quarter, and its most narrow in the third. The gender gap before the pandemic was -12.79 pp in treatment countries and -5.25 pp in control countries.

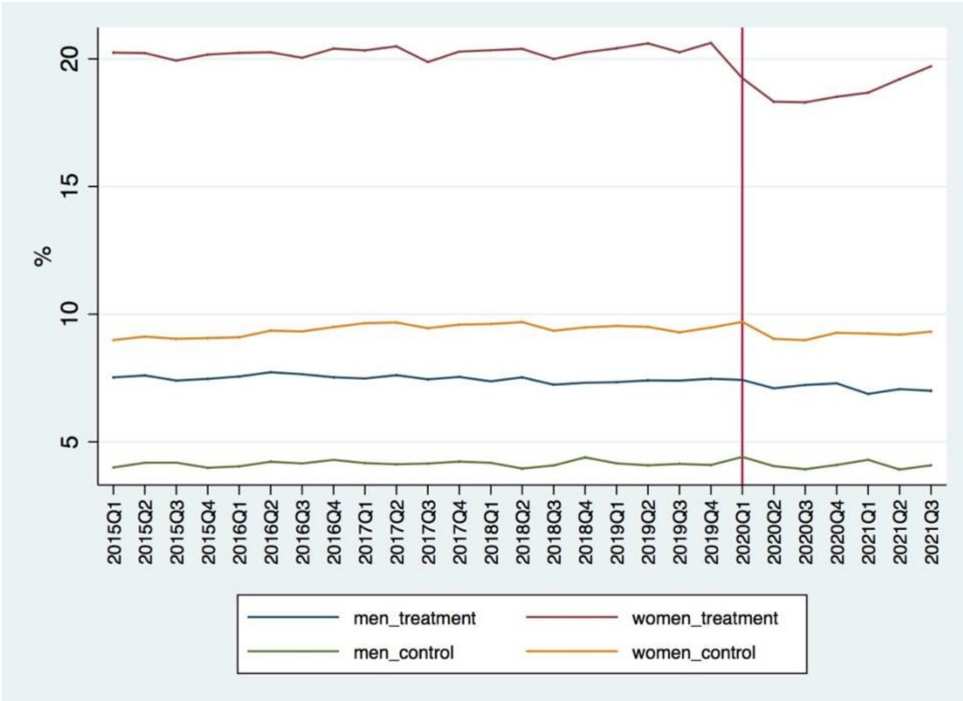
Another difference to the full-time rate is that the rates are consistently higher in treatment countries. The average employment rate is 3.34 pp higher for men in treatment countries and 10.88 pp higher for women. The difference is especially large for women. The coefficients for *treated* in the fifth model specification in tables 6 and 7 below confirm that the pre-pandemic differences between the treatment and control countries for both women's and men's rates were statistically significant at 1%. As with the full-time employment rate, there is a large difference in terms of the gender gap between countries with strict and mild NPIs. According to the regression results in table 8, the gap is 7.54 pp larger in magnitude in treatment countries than in control countries. The difference is statistically significant at 1%. According to the graphs, there does not seem to be a striking difference in the trends of control and treatment groups. The trend in the gender gap is also broadly similar between the two groups. The required assumption of parallel trends appears to be met.

The effect of the pandemic is more visible for women than for men in graph 8. The sharpest drop occurs in the employment rate for women in countries that implemented strict NPIs. In the baseline model in table 7, the coefficient for *time* shows that the employment rate for women decreased by 0.86 pp in the EU. The change is however not statistically significant. In mild NPI countries, the rate diminished by 0.14 pp. However, the decline was not statistically or economically significant as the change compared to the pre-pandemic average was only 1.5%. In strict NPI countries, the rate decreased by 1.4 pp. The percentage change was therefore 6.9%. Because the decrease was larger in magnitude in strict countries, the DiD coefficient is negative and equal to -1.27 in the baseline model. As for the full-time rate, it only becomes statistically significant at 1% after the inclusion of country fixed effects. Worthy of note is that the coefficient in the full model is only a third of the magnitude of the coefficient in the baseline model.

The coefficient for *time* in table 6 shows that the employment rate for men in the EU decreased by 0.22 pp. This change was not statistically significant. In mild NPI countries, it diminished by 0.03 pp. The change in the average was smaller than 1% and was not statistically significant. In treatment countries, the rate fell by 0.35 pp, which was a 4.6% change. The rates therefore fell more in countries with strict NPIs than in mild NPI countries. The DiD coefficient equals 0.32 pp in the baseline model. As for women, it becomes statistically significant at 5% after the inclusion of country fixed effects. The coefficient simultaneously also decreases to 0.3 pp.

Graph 9 shows that the gender gap visibly narrowed in treatment countries after the introduction of NPIs. The coefficient for *time* in the baseline model in table 8 is positive, meaning that the EU average gap slightly narrowed by 0.64 pp. This change was also not statistically significant. In countries that implemented mild NPIs, the gap narrowed by 0.11 pp. The effect is not statistically significant and only represents a 2.1% decrease. In strict NPI countries, the difference decreased by 1.06 pp, which was a 8.3% change. Since the average gender gap narrowed more in countries with strict NPIs, the DiD coefficient in table 8 is positive and equals 0.95 pp in the baseline model. However, after the inclusion of country fixed effects, it decreases considerably to 0.35 pp and becomes statistically significant at 5%.

Graph 8 - Quarterly Average Part-Time Employment Rate



Graph 9 - Gender Gap in Quarterly Average Part-Time Employment Rate

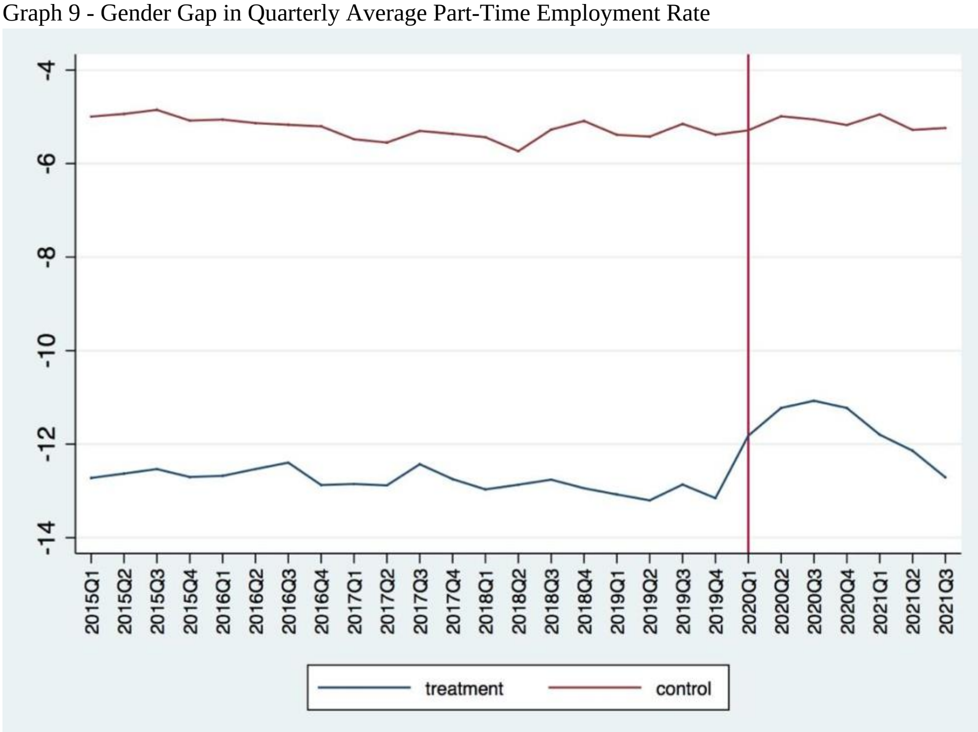


Table 6 - Part-Time Employment Rate for Men

Model specification	1	2	3	4	5	6

Time	-0.215 (-0.62)		-0.0289 (-0.09)	.	.	.
Treated		3.261*** (11.67)	3.340*** (10.48)	3.340*** (10.45)	3.340*** (10.42)	.
DiD			-0.316 (-0.48)	-0.313 (-0.47)	-0.313 (-0.47)	-0.302** (-2.50)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 7 - Part-Time Employment Rate for Women

Model specification	1	2	3	4	5	6
Time	-0.857 (-0.87)		-0.140 (-0.18)	.	.	.
Treated		10.56*** (13.27)	10.88*** (11.83)	10.88*** (11.79)	10.88*** (11.77)	.
DiD			-1.265 (-0.69)	-1.271 (-0.69)	-1.271 (-0.69)	-0.653*** (-3.48)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 8 – Gender Gap in Part-Time Employment Rate

Model specification	1	2	3	4	5	6

Time	0.642 (0.94)		0.111 (0.22)	.	.	.
Treated		-7.303*** (-12.79)	-7.540*** (-11.30)	-7.540*** (-11.26)	-7.540*** (-11.24)	.
DiD			0.949 (0.74)	0.958 (0.74)	0.958 (0.74)	0.350** (2.47)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Rate of Transition from Employment to Unemployment

Unfortunately, data on labour market transitions did not exist for every EU country in the Eurostat database. Data is missing for the whole time period for Germany and Malta. Data is incomplete for Belgium, Luxembourg, Bulgaria, Latvia, Estonia, Romania and Croatia. For this reason, the number of observations is lower compared to the other labour market outcome studied. Graph 10 shows the quarterly average share of the working age population transitioning from employment to unemployment. The transition rate has decreased over time during the time period 2015-2019. Seasonal fluctuation is also visible from the graph. For men, the rates were the highest in the fourth and first quarters. Whereas for women, the rates peak in the third and fourth quarters.

On average, the transition rates from employment to unemployment are higher for men than for women. For the pre-pandemic period, the average rate in control countries was 0.87% for men and 0.74% for women. In treatment countries, it was 1.1% for men and 0.97% for women. However, there were also time periods where the transition rate was higher for women. As can be seen in graph 11, the gender gap is positive but is on average close to 0 in both groups of countries. The pre-pandemic gender gap in average rates was equal to 0.13 pp in control countries and 0.14 pp in treatment countries. Prior to the pandemic, there appears to have been a decreasing trend in the gender gap. The difference is usually largest in the first quarter and the most narrow in the third.

Graph 10 evidences a disparity between control and treatment countries. The average transition rates for control countries are lower than in treatment countries. The rates for both men and women are on average 0.23 pp higher in treatment than in control countries (tables 9 and 10). Both differences are statistically significant at 1%. The women's average transition rate in treatment countries is in fact higher than the rate for men in control countries. As can clearly be seen in graph 11, the difference in the gender gap between the two groups is minimal at 0.02 pp. It is in fact not statistically significant in table 11. The mild and strict

NPI countries follow roughly similar trends in the transition rates over the pre-pandemic time period. This means that it is unlikely for the parallel trends assumption not to hold.

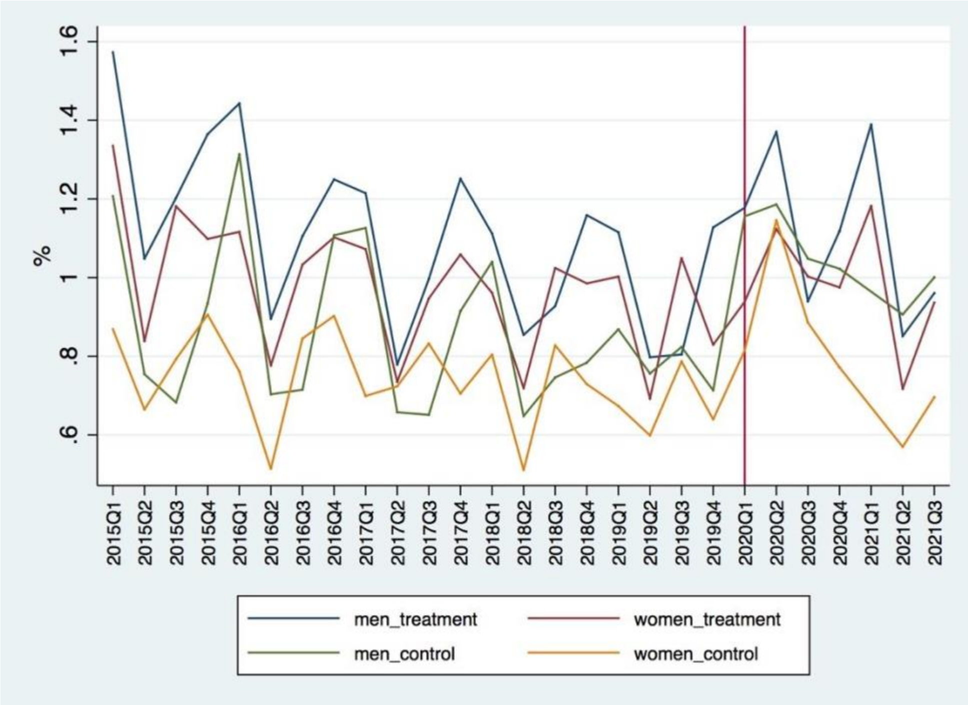
The pandemic caused a large increase in the rates of transition from employment to unemployment, disrupting the downward trend. This occurred for both men and women. Interestingly, the peak for strict NPI countries in the first quarters of 2020 is lower than the peak in 2021. In 2021Q1, the rate is at 1.4% for men, reaching similar levels to the time period 2015-2016. However, by 2021Q2, the rate sharply fell again. Women reached low levels in line with before the pandemic. Meanwhile, for mild NPI countries, the transition rate increased immediately. It also quickly started falling after 2020Q2. This was especially the case for women, whose transition rate was at its highest level ever at 1.15%. The average rates did not peak in 2021Q1 as they did for strict NPI countries.

In table 9, the coefficient for *time* is positive and shows that the men's average transition rate from employment to unemployment in the EU increased by 0.09 pp. The effect is statistically significant at 10%. In mild NPI countries, the rate increased over time by 0.19 pp. This represents a 22.2% change and is statistically significant at 5%. The average transition rate for men in strict countries for the post-pandemic period stayed virtually the same, as it slightly decreased by 0.01 pp. This 1.35% change does not seem economically significant. The DiD coefficient is thus negative, equal to -0.21 pp in the baseline model. It is also statistically significant under all model specifications. Controlling for time invariant country characteristics decreases the magnitude of the coefficient to -0.16 pp.

For women, the average transition rate from employment to unemployment in the EU increased by 0.04 pp (table 10). This change was not statistically significant. In mild NPI countries, the rate rose by 0.08 pp. Although the transition rate changed by 11.2% in comparison to before the pandemic, it is not statistically significant. In the strict NPI group, the average decreased by 0.02 pp, which is only a 1.6% change. The DiD coefficient is equal to -0.1 pp in the baseline model, and is not statistically significant in any of the model specifications. The coefficient even diminishes to -0.05 pp after including country fixed effects.

When looking at graph 11, it appears that the pandemic increased the gender gap, especially in control countries. The regression results confirm this. The coefficient for *time* in table 11 shows that the average gap in the EU widened by 0.05 pp. However, this change was not statistically significant. However, in the mild NPI countries, the difference grew by 0.12 pp. The change is statistically significant at 5% and was a 92% increase in the gap in comparison to the pre-pandemic situation. In strict NPI countries, the average gender difference did not actually change, and remained at 0.12 pp. As a result of this, the DiD coefficient for the gender gap in the transition rate from employment to unemployment is negative and statistically significant at 5% in all model specifications. In the baseline model, the coefficient is equal to 0.13 pp, but increases to 0.15 pp when including quarter fixed effects. After including country fixed effects, it diminishes to 0.12 pp.

Graph 10 - Quarterly Average Rate of Transition from Employment to Unemployment



Graph 11 – Gender Gap in Quarterly Average Rate of Transition from Employment to Unemployment

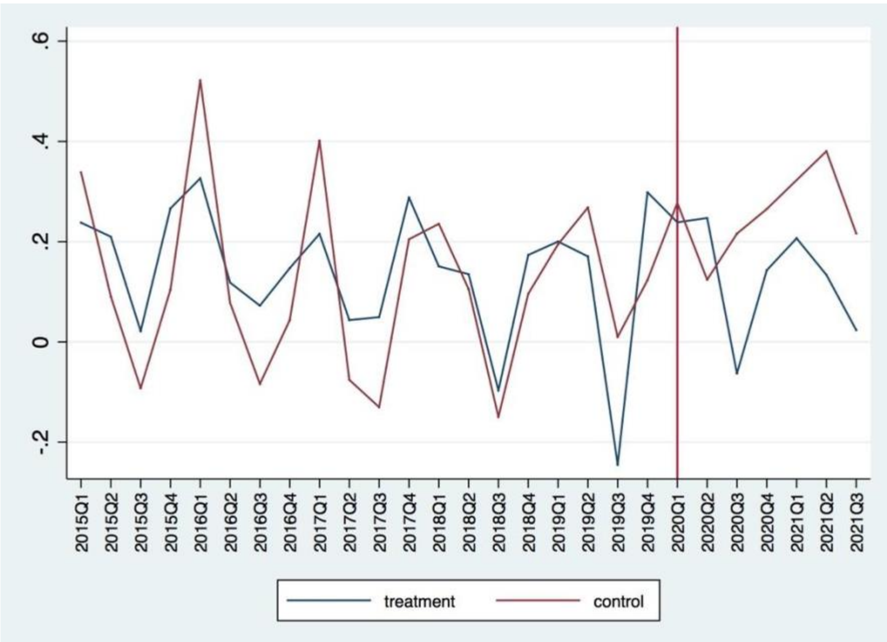


Table 9 – Rate of Transition from Employment to Unemployment for Men

Model specification	1	2	3	4	5	6
Time	0.0869* (1.69)		0.193** (2.52)	.	.	.

Treated		0.177*** (3.86)	0.225*** (4.23)	0.230*** (4.35)	0.238*** (4.68)	.
DiD			-0.208** (-2.02)	-0.200* (-1.94)	-0.220** (-2.12)	-0.156** (-2.51)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	581	581	581	581	581	581

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 10 – Rate of Transition from Employment to Unemployment for Women

Model specification	1	2	3	4	5	6
Time	0.0347 (0.73)		0.0828 (1.26)	.	.	.
Treated		0.207*** (5.16)	0.231*** (4.98)	0.233*** (5.05)	0.237*** (5.22)	.
DiD			-0.0983 (-1.05)	-0.0857 (-0.93)	-0.0938 (-1.00)	-0.0460 (-0.84)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	561	561	561	561	561	561

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 11 – Gender Gap in Rate of Transition from Employment to Unemployment

Model specification	1	2	3	4	5	6
Time	0.0419 (1.41)		0.116** (2.25)	.	.	.

Treated		-0.0185 (-0.67)	0.0120 (0.38)	0.0125 (0.39)	0.0221 (0.76)	.
DiD			-0.131** (-2.13)	-0.131** (-2.10)	-0.147** (-2.42)	-0.121** (-2.41)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	549	549	549	549	549	549

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Rate of Transition from Unemployment to Employment

Graph 12 shows the quarterly average share of the working age population transitioning from unemployment to employment. What is immediately noticeable is the downward trend in the rates over time. The rate also fluctuates seasonally, with the rates being the highest in the second quarter. It is also apparent from the graph that there are gender differences. For both groups of countries, the transition rates are higher for men than for women. However, during the time period 2015-2018 the rates for women in the treatment group and men in the control group are relatively similar. In control countries, the average transition rate is 1.2% for men and 1.1% for women. In treatment countries, the rate is around 1.5% for men and 1.3% for women. Therefore, as can be seen in graph 13, the pre-pandemic average gender gap is positive but very close to 0 in both groups. However, in the fourth and first quarters, the gap even turns negative, especially in control countries. Over the years, the difference seems to have decreased. The gap is the widest in the second quarter, and most narrow in the fourth.

The transition rates are constantly higher in treatment countries compared to control countries. Table 12 shows that the 0.3 pp difference in men's rates between the treatment and control is statistically significant at 1%. The 0.23 pp difference for women is also statistically significant at 1% in table 13. As can be seen in graph 13, the difference in the gender gap of 0.07 pp between the two groups is also very small yet statistically significant at 5%. The trends in the men's and women's rates are similar between the treatment and control countries. This gives reassurance to the parallel trends assumption.

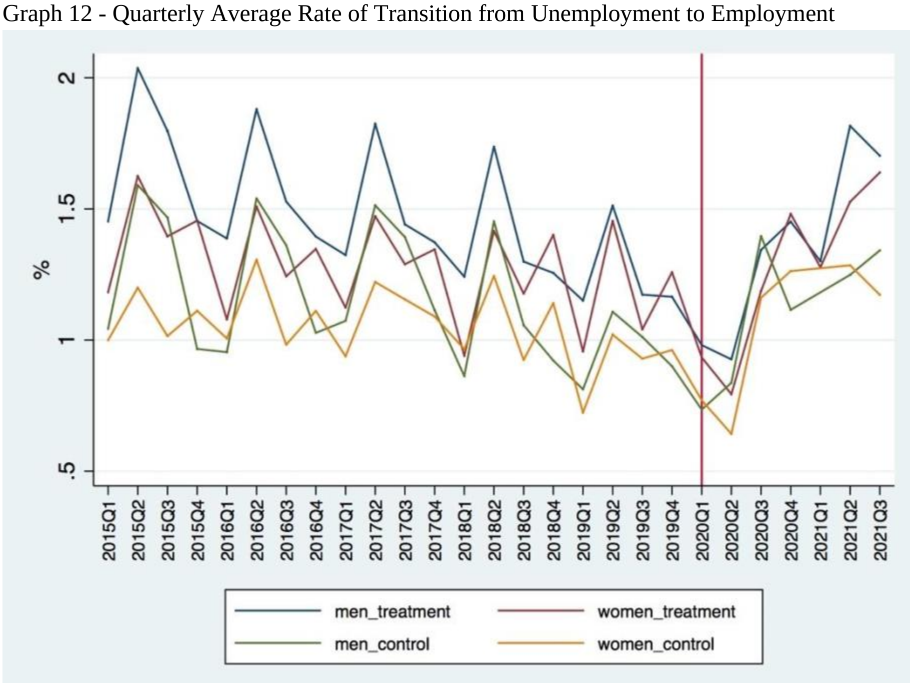
The pandemic clearly disrupts the decreasing trend in graph 12. After an initial dip in the rates, the transition from unemployment to employment starts increasing from 2020Q2 onwards. The rates continue to be higher in strict NPI countries than in mild countries. Important to note is that men's transition to employment in mild NPI countries is exceptionally larger than women's transition in strict NPI countries for the time period 2020Q2-2020Q3.

The results for men in Table 12 show that while the transition rate in mild NPI countries decreased by 0.06 pp, the change was not statistically significant. The percentage change compared to the average before was 4.9%. Meanwhile, the post-pandemic average rate for men in strict NPI countries decreased by 0.09 pp. This was a 6% change. Therefore, since the rate on average decreased slightly more in strict NPI countries, the DiD coefficient is negative and equal to 0.03 pp in the baseline model. The DiD slightly increases in magnitude to 0.05 pp with the inclusion of year and quarter fixed effects. It decreases slightly when adding country fixed effects to the model. However, the coefficient is not statistically significant in any of the model specifications.

For women in mild NPI countries, the average transition rate to employment slightly increased by 0.01 pp (table 13). As for men, the change is not statistically significant. In strict NPI countries, the rate instead decreased by 0.01 pp. The DiD coefficient is equal to 0.03 pp in the baseline model and is also not statistically significant. Similarly to men, the coefficient becomes more negative with the inclusion of time trends, but decreases when including country fixed effects.

The effect of the pandemic on the gender gap is not clear from graph 13. It appears as though the downward trend is disrupted. However, the results in table 14 indicate that the average gender gap in the EU actually significantly (at 5%) decreased by 0.07 pp compared to the pre-pandemic period. The 0.07 pp decrease in mild NPI countries is however not statistically significant. It nevertheless was a 61.7% change. In strict NPI countries, the gap also decreased by 0.07 pp. However, since the gap was larger in magnitude, this represented only a 41.1% change. Since the magnitude of the change is the same between the two groups, the DiD coefficient is very close to 0 and is not statistically significant.

Graph 12 - Quarterly Average Rate of Transition from Unemployment to Employment



Graph 13 - Gender Gap in Quarterly Average Rate of Transition from Unemployment to Employment

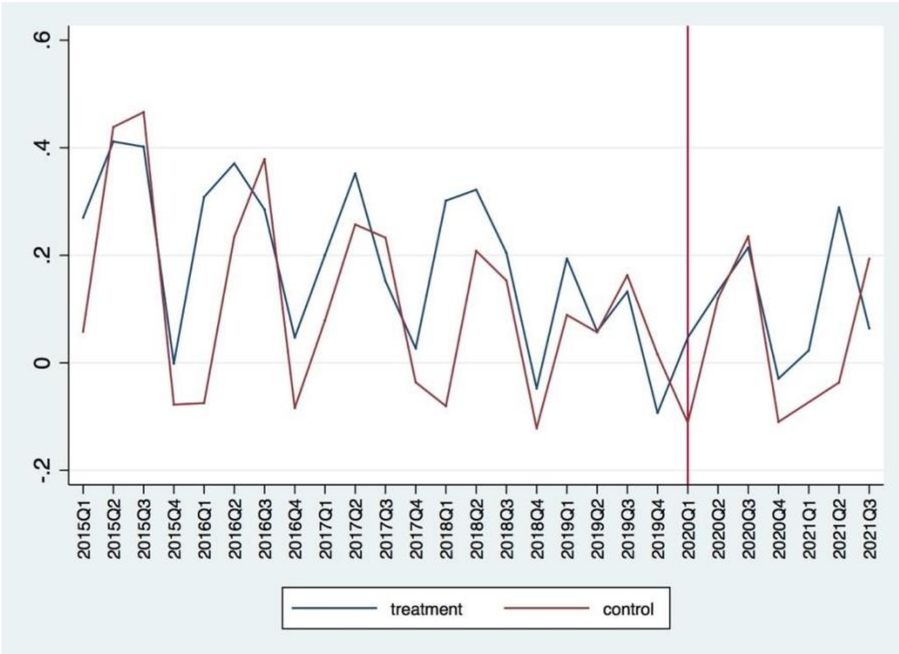


Table 12 –Rate of Transition from Unemployment to Employment For Men

Model specification	1	2	3	4	5	6
Time	-0.0643 (-1.04)		-0.0570 (-0.70)	.	.	.
Treated		0.287*** (5.47)	0.297*** (4.88)	0.306*** (5.09)	0.310*** (5.37)	.
DiD			-0.0311 (-0.26)	-0.0567 (-0.48)	-0.0531 (-0.45)	-0.0464 (-0.60)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	613	613	613	613	613	613

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 13 – Rate of Transition from Unemployment to Employment For Women

Model specification	1	2	3	4	5	6

Time	0.00756 (0.12)		0.0132 (0.16)	.	.	.
Treated		0.222*** (4.48)	0.228*** (4.09)	0.233*** (4.16)	0.234*** (4.26)	.
DiD			-0.0266 (-0.22)	-0.0340 (-0.28)	-0.0302 (-0.25)	-0.00451 (-0.06)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	600	600	600	600	600	600

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 14 – Gender Gap in the Rate of Transition from Unemployment to Employment

Model specification	1	2	3	4	5	6
Time	-0.0731** (-2.12)		-0.0746 (-1.36)	.	.	.
Treated		0.0659** (2.23)	0.0683** (2.02)	0.0727** (2.18)	0.0751** (2.40)	.
DiD			-0.00168 (-0.02)	-0.00686 (-0.10)	-0.00513 (-0.08)	-0.0273 (-0.43)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	590	590	590	590	590	590

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Rate of Transition from Employment to Inactivity

Graph 14 shows the quarterly average share of the working age population transitioning from employment to inactivity. There appears to have been an upward shift in the rates in 2017-2018 in comparison to 2015-2016. In 2019, the average rates decreased for the third and fourth quarters. There is clearly some seasonality, with the transition rates peaking in the fourth quarter and dipping in the second. The rates of transition from employment to inactivity are consistently higher for women than for men in both groups of countries. The rate was the highest for women in the control group until 2019. The pre-pandemic average rate for women was 1.8% in control countries and 1.7% in treatment countries. For men, the rate was approximately 1.5% in both groups. Therefore, as shown in graph 15 the gender gap is negative. During the pre-pandemic period, it was equal to -0.33 pp in control countries and -0.19 pp in treatment countries. The gap appears to have widened over the years. Over the year, the difference is its narrowest in the first quarter, and widest in the third.

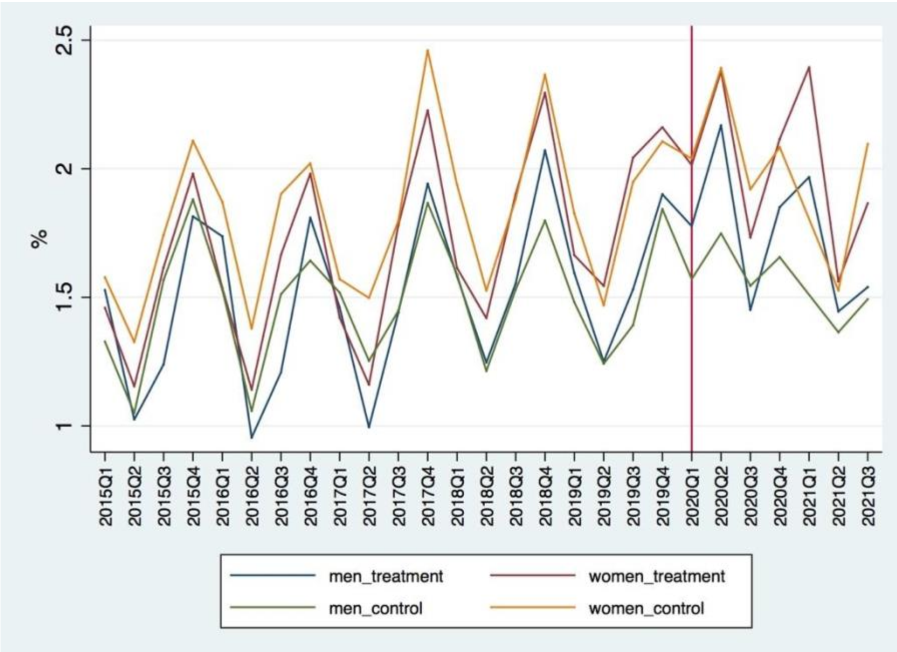
The difference between control and treatment countries is small compared to previous labour market outcomes analysed. Since there are hardly any differences for the men's rate, the coefficient for *treated* in table 15 is very close to 0 and not statistically significant. For women in table 16, the coefficient of -0.13 pp is negative and becomes statistically significant when including year and quarter fixed effects in the model. The gender gap is slightly larger in control countries. The difference of 0.15 pp is statistically significant at 1% (table 17). The trends for the rates visible in graph 14 are very similar in the two groups of countries. In terms of the trend in the gender gap (graph 15), there may be some concerns about whether the parallel trend assumption holds. The gap in the control countries seems to consistently lag behind that of the treatment countries. In the treatment group, the gap followed a decreasing trend. This is not as evident from the graph for the control group.

The effect of the pandemic on the rate of transition to inactivity is very visible in graph 14. The usual dip that occurs in the first and second quarters does not take place in 2020. Instead, the average rates remain relatively high in comparison to previous years, except for the men's rate in the mild NPI countries. Table 15 shows that the average rate for men in the EU significantly (at 5%) increased by 0.14 pp. However, in mild NPI countries, the rate only slightly increased by 0.07 pp. The 4.6% change is not statistically significant. Meanwhile, in strict NPI countries, the rates increased by 0.21 pp. This implies a 14% change. Since the rates increased more in strict NPI countries, the DiD is positive and equal to 0.14 pp in the baseline model. However, the coefficient is not statistically significant and decreases in magnitude to 0.1 pp after the inclusion of all the control variables.

The average rate of transition to inactivity for women in the EU increased significantly by 0.22 pp (table 16). In mild NPI countries, the rate rose by 0.19 pp. The 10.43% change is however not statistically significant. Meanwhile, in strict NPI countries, the rate increased by 0.26 pp, which was a percentage change of 15.5%. Therefore, as for men, the DiD coefficient is positive. It is however smaller in magnitude at 0.07 pp in the baseline model. It is also not statistically significant and decreases in size in the full model.

Women thus experienced a larger increase in transition rates to inactivity. This means that the negative gender gap further widened in both groups. In graph 15, it appears that the gender gap remained relatively constant in the treatment group, while the gender gap immediately widened in the control group. Indeed, the average gender gap in the mild NPI group increased by 0.11 pp in comparison to pre-pandemic levels. This was a 37.37% change. However, the change is not statistically significant in table 17. The increase was much smaller in strict NPI countries at 0.05 pp, which was a 27.1% change. Since the gender gap widened more in the mild group, the DiD coefficient is positive and equal to 0.07 pp in the baseline model. It is however also not statistically significant.

Graph 14 - Quarterly Average Rate of Transition from Employment to Inactivity



Graph 15 - Gender Gap in Quarterly Average Rate of Transition from Employment to Inactivity

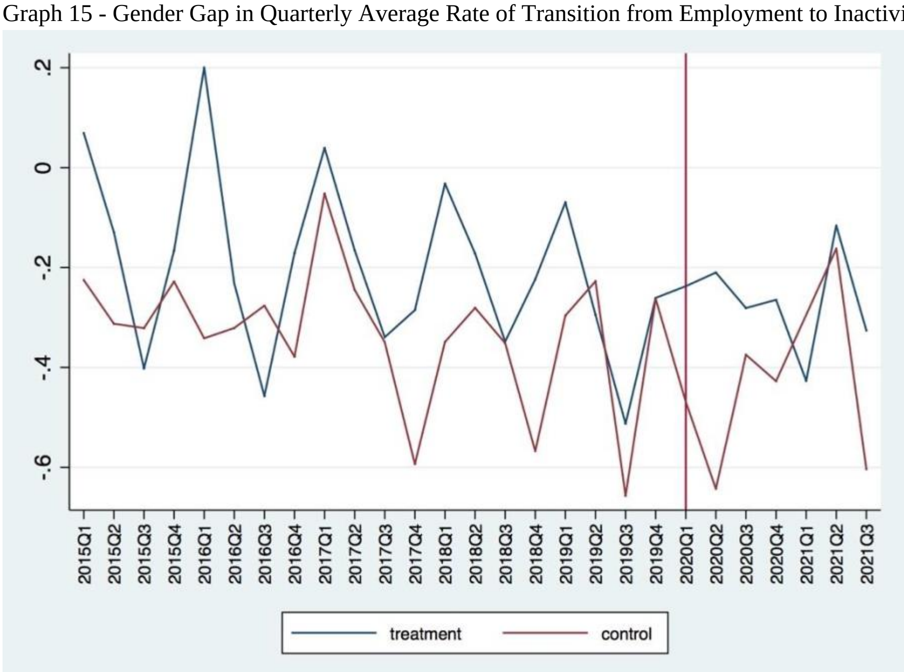


Table 15 - Transition Rate from Employment to Inactivity for Men

Model specification	1	2	3	4	5	6
Time	0.139* (1.69)		0.0683 (0.56)	.	.	.

Treated		0.0428 (0.63)	0.00604 (0.08)	0.00403 (0.05)	0.00864 (0.12)	.
DiD			0.141 (0.86)	0.153 (0.93)	0.141 (0.85)	0.105 (0.98)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	631	631	631	631	631	631

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 16 - Transition Rate from Employment to Inactivity for Women

Model specification	1	2	3	4	5	6
Time	0.223** (2.45)		0.190 (1.36)	.	.	.
Treated		-0.104 (-1.43)	-0.125 (-1.57)	-0.129 (-1.61)	-0.126* (-1.68)	.
DiD			0.0720 (0.40)	0.0877 (0.49)	0.0836 (0.46)	0.00971 (0.08)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	640	640	640	640	640	640

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 17 - Gender Gap in Transition Rate from Employment to Inactivity

Model specification	1	2	3	4	5	6
Time	-0.0779 (-1.62)		-0.114 (-1.42)	.	.	.

Treated		0.149*** (3.83)	0.133*** (3.04)	0.134*** (3.06)	0.134*** (3.13)	.
DiD			0.0673 (0.72)	0.0640 (0.68)	0.0581 (0.61)	0.0787 (0.93)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	630	630	630	630	630	630

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Actual weekly hours worked - full time

Graph 16 shows the average actual weekly hours worked in full-time employment. The number of hours worked appears to have slightly decreased over time. The hours worked fluctuate with the seasons, as hours consistently peak in the third quarter. This is against expectations, since the third quarter includes the summer months. The graph displays that on average, men work more hours than women. Prior to the pandemic, men on average worked 41 hours 27 minutes per week in treatment countries and 40 hours 39 minutes in control countries. Meanwhile, women worked on average 38 hours 53 minutes in control countries and 38 hours 54 minutes in treatment countries. The average gender gap in hours worked demonstrated in graph 17 is thus positive. The gap seems to have slightly narrowed over time in both groups. It is at its widest in the second quarter, and most narrow in the first. Before the pandemic, the gender gap was 1 hour 49 minutes in control countries and 2 hours 36 minutes in treatment countries.

Men worked on average 49 minutes more in treatment countries compared to control countries. The difference is statistically significant at 1% as shown in table 18. Meanwhile, the difference in women's weekly hours of work between the treatment and control groups is very small and is not statistically significant (table 19). The gender gap is 47 minutes wider in the treatment group than in the control group. The coefficient in table 20 is statistically significant at 1%. The trend in hours worked over time are strikingly similar for both groups, at least until 2018. The trends in the gap are also very similar between the two groups. This means that the parallel trends assumption is likely to hold.

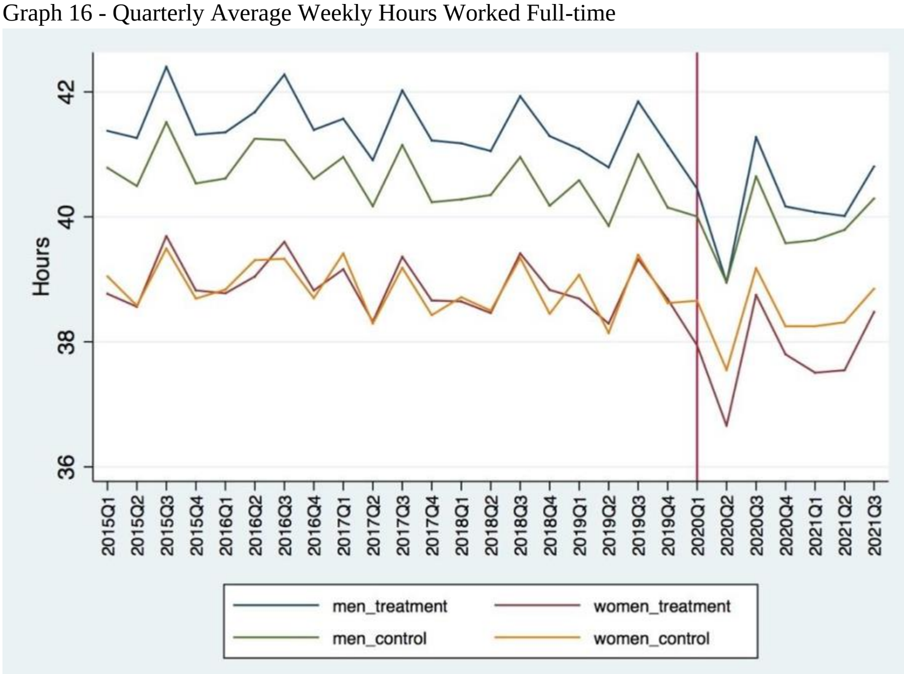
The impact of the pandemic is noticeable from graph 16. The average number of hours worked dropped abruptly after the introduction of the NPIs. By 2020Q3, the lost hours were recovered in control countries. Meanwhile, in treatment countries, hours worked remained well below the pre-pandemic level. The hours declined again after 2020Q3. While a drop in the fourth quarter is part of the seasonal pattern, the hours remained at a lower level than they usually would have. Since 2021Q1, hours worked have been increasing again.

Women worked on average 45 minutes (0.74 hours) less per week in the EU. Table 19 shows that the change was statistically significant at 1%. More specifically, women's hours worked in mild NPI countries decreased on average by 26 minutes (0.44 hours). This 1.1% change was statistically significant at 1%. In strict countries, the average decreased by 1 hour 6 minutes, which was a 2.8% change. Because hours worked decreased more in strict countries, the DiD coefficient is negative and equal to 38 minutes (0.64 hours) in the baseline model. The DiD is statistically significant at 1% in all of the model specifications. The DiD decreases slightly when including country fixed effects.

On average, men worked one hour less in the EU compared to before the pandemic. As demonstrated in table 18, the change was statistically significant at 1%. For men in mild NPI countries, weekly hours worked significantly (at 1%) decreased by 48 minutes. This was a 2% change. In strict NPI countries, hours worked decreased by 1 hour 12 minutes, which is equal to a 2.9% change. Therefore, the DiD is negative and equal to 24 minutes. It is also statistically significant at 1% even when including all controls, and remains approximately the same size as in the baseline.

The effect of the NPIs on hours worked was thus larger for men than for women in both strict and mild NPI countries. This means that the average gender gap decreased. The control group experienced a 22 minute narrowing of the gender gap. The change was statistically significant at 1% and represents a 20.4% decrease. In the treatment group, the gender gap narrowed by 7 minutes, which is only a 4.7% decrease. The effect was smaller in the treatment group because the decrease in hours worked between men and women in the treatment group was more similar in magnitude. However, the gender gap still remains larger in magnitude in treatment countries. The DiD coefficient in table 20 is positive and equal to 14 minutes. It is not statistically significant until the inclusion of country fixed effects, after which the coefficient decreases to 13 minutes.

Graph 16 - Quarterly Average Weekly Hours Worked Full-time



Graph 17 – Gender Gap in Quarterly Average Weekly Hours Worked Full-time

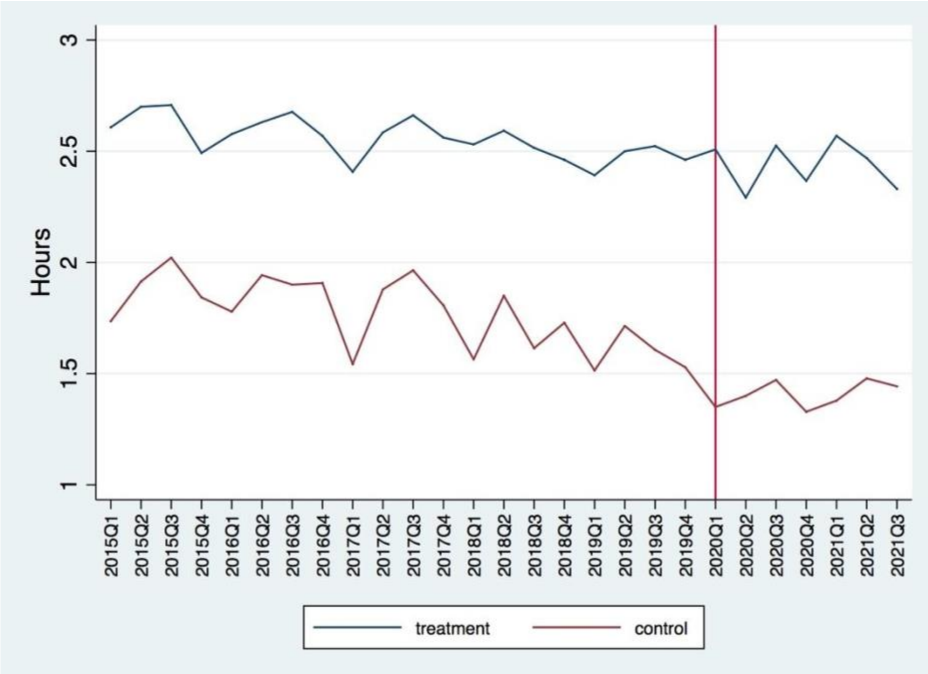


Table 18 - Weekly Hours Worked Full-Time for Men

Model specification	1	2	3	4	5	6
Time	-1.000*** (-10.11)		-0.802*** (-7.65)	.	.	.
Treated		0.716*** (8.02)	0.810*** (8.60)	0.810*** (8.69)	0.810*** (9.15)	.
DiD			-0.402** (-2.04)	-0.404** (-2.05)	-0.404** (-2.22)	-0.398*** (-3.36)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 19 - Weekly Hours Worked Full-Time for Women

Model specification	1	2	3	4	5	6

Time	-0.744*** (-7.16)		-0.441*** (-3.42)	.	.	.
Treated		-0.137 (-1.55)	0.0202 (0.21)	0.0202 (0.21)	0.0202 (0.22)	.
DiD			-0.643*** (-3.14)	-0.644*** (-3.14)	-0.644*** (-3.37)	-0.616*** (-4.56)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 20 – Gender Gap in Weekly Hours Worked Full-Time

Model specification	1	2	3	4	5	6
Time	-0.256*** (-2.96)		-0.361*** (-3.82)	.	.	.
Treated		0.853*** (12.38)	0.790*** (9.85)	0.790*** (9.86)	0.790*** (9.86)	.
DiD			0.241 (1.56)	0.240 (1.55)	0.240 (1.55)	0.218*** (3.32)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Actual weekly hours worked - part time

Graph 18 shows the average actual weekly hours worked in part-time employment. Up until 2017, the average amount of hours worked part-time by men and women was following an increasing trend. Since 2018, the hours have decreased for women. For men, hours dipped in 2018 but rose again in 2019. There appears to be strong seasonality in part-time working hours. The hours consistently peak in the third quarter, which is summer. The hours are the lowest in the first quarter. The seasonal fluctuations are wider for men than for women.

In the time period before the pandemic, women on average worked 20 hours 26 minutes in control countries and 20 hours 43 minutes in treatment countries. Meanwhile, men worked 20 hours part-time in control countries and 20 hours 22 minutes in treatment countries. The gender difference in weekly hours shown in graph 19 is negative as women on average work more hours. The gap is usually its widest in the third quarter (summer) and its most narrow in the first. In the years 2015-2017, the gap was widening. In 2018, the gap narrowed. In 2019, the gap even turned positive. The pre-pandemic average gap in control countries was 26 minutes compared to 21 minutes in treatment countries.

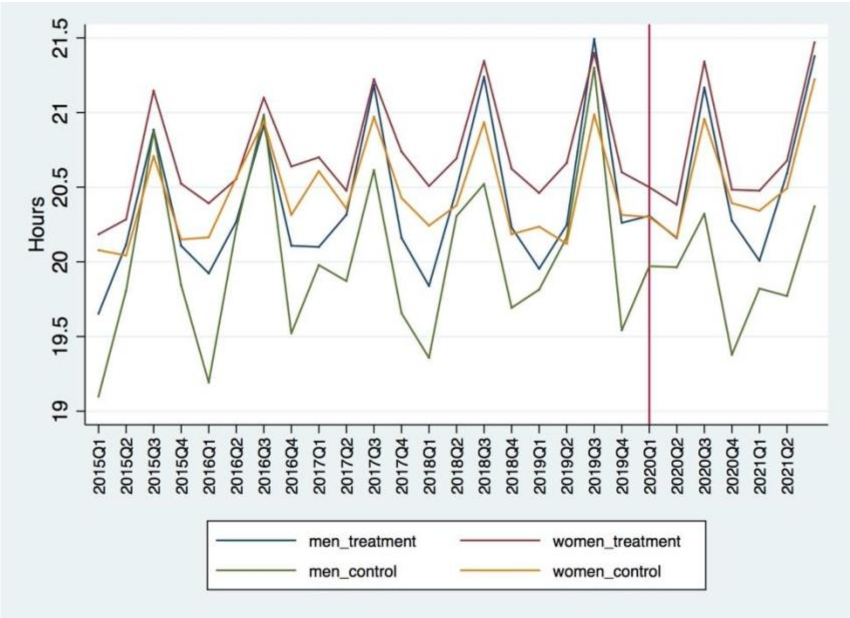
Hours worked part-time are higher in treatment countries than in control countries. Men work on average 22 minutes more. This difference shown in table 22 is statistically significant at 10%. Meanwhile, women work 17 minutes more in treatment countries. The difference is also statistically significant at 10% (table 23). The average gender gap is slightly higher in control countries. The 5 minute difference between treatment and control countries is much smaller compared to the difference in hours worked full-time, and is also not statistically significant in table 24. The trends between the control and treatment groups are roughly similar.

The effect of the pandemic is not as clearly visible in graph 18 as it was for full-time hours worked. The peak in the hours worked in the summer of 2020 was lower than in pre-pandemic years. This was especially the case for men in countries with mild NPIs. However, the results in table 22 demonstrate that in the EU, men worked on average 3 minutes more per week in the post-pandemic period compared to before. However, this increase was not statistically significant. Meanwhile men in mild NPI countries worked on average 5 minutes less. The change was nevertheless not statistically significant. In countries with strict NPIs, the average hours worked part-time for men increased by 11 minutes. Since men in mild NPI countries worked less and men in strict NPI countries worked more, the DiD coefficient is positive and equal to 16 minutes in the baseline model. However, the coefficient is not statistically significant in any of the model specifications. However, the magnitude of the coefficient decreases considerably to 7 minutes after the inclusion of country fixed effects in the regression model.

On average, women in the EU worked 5 minutes more in their part-time jobs during the post-pandemic period compared to before the pandemic. This change was not statistically significant in table 23. Women in countries that implemented mild NPIs worked on average 7 minutes more, although not at a statistically significant level. In strict countries, women worked on average 3 minutes more. Changes in both groups are smaller than 1% changes. Since the minutes worked increased slightly more in mild than in strict countries, the DiD is negative and is equal to 4 minutes. The coefficient increases to 6 minutes after the inclusion of country fixed effects into the model. However, the coefficient is not statistically significant in any of the model specifications.

As women worked more and men worked less, the gender gap widened by 12 minutes in countries with mild NPIs. According to the results in table 24, this effect was not statistically significant. In strict NPI countries, the gender gender difference decreased by 8 minutes as the increase in minutes worked was larger for men than for women. The DiD is positive and equal to 19 minutes in the baseline model. When the model controls for country fixed effects, the coefficient decreases to 13 minutes. The coefficient is however not statistically significant.

Graph 18 - Quarterly Average Weekly Hours Worked Part-time



Graph 19 – Gender Gap in Quarterly Average Weekly Hours Worked Part-time

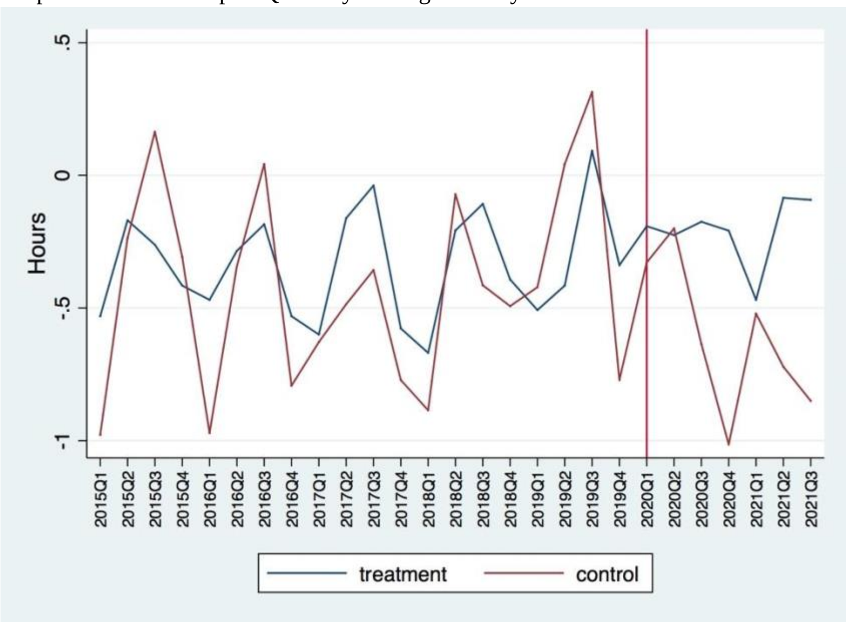


Table 22 –Average Weekly Hours Worked Part-Time for Men

Model specification	1	2	3	4	5	6

Time	0.0428 (0.23)		-0.0754 (-0.38)	.	.	.
Treated		0.422** (2.54)	0.356* (1.83)	0.356* (1.82)	0.356* (1.86)	.
DiD			0.260 (0.69)	0.257 (0.69)	0.257 (0.70)	0.115 (0.66)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 23 –Average Weekly Hours Worked Part-Time for Women

Model specification	1	2	3	4	5	6
Time	0.0835 (0.58)		0.117 (0.87)	.	.	.
Treated		0.259** (2.00)	0.276* (1.84)	0.276* (1.84)	0.276* (1.86)	.
DiD			-0.0638 (-0.21)	-0.0681 (-0.23)	-0.0681 (-0.23)	-0.103 (-0.82)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 24 –Gender Gap in Average Weekly Hours Worked Part-Time

Model specification	1	2	3	4	5	6

Time	-0.0407 (-0.30)		-0.192 (-1.03)	.	.	.
Treated		0.163 (1.35)	0.0798 (0.57)	0.0798 (0.57)	0.0798 (0.57)	.
DiD			0.324 (1.20)	0.325 (1.20)	0.325 (1.20)	0.219 (1.44)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	725	725	725	725	725	725

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Absence rate

Graph 20 shows the share of workers who reported being absent from work. It is calculated by dividing the amount of absences by the number of workers for each quarter. Data is missing in certain years for Germany and Malta. In the period 2015-2016, the rate of absences was decreasing. However, since 2017, the absence rate has followed a slightly increasing trend. There is also clearly some seasonality. The peaks in absences occur in the third quarter, coinciding with the (school) summer holidays. The rates are the lowest in the second quarter. On average, women workers have higher absence rates than men. The average rate for women in the pre-pandemic time period was 9.9% in control countries and 11% in treatment countries. Meanwhile, for men it was 6.3% in control countries, and 7.9% in treatment countries. Therefore, as shown in graph 21, the gender gap is negative. The average gender gap for the pre-pandemic period was -3.8 pp in control countries and -3.1 pp in treatment countries.

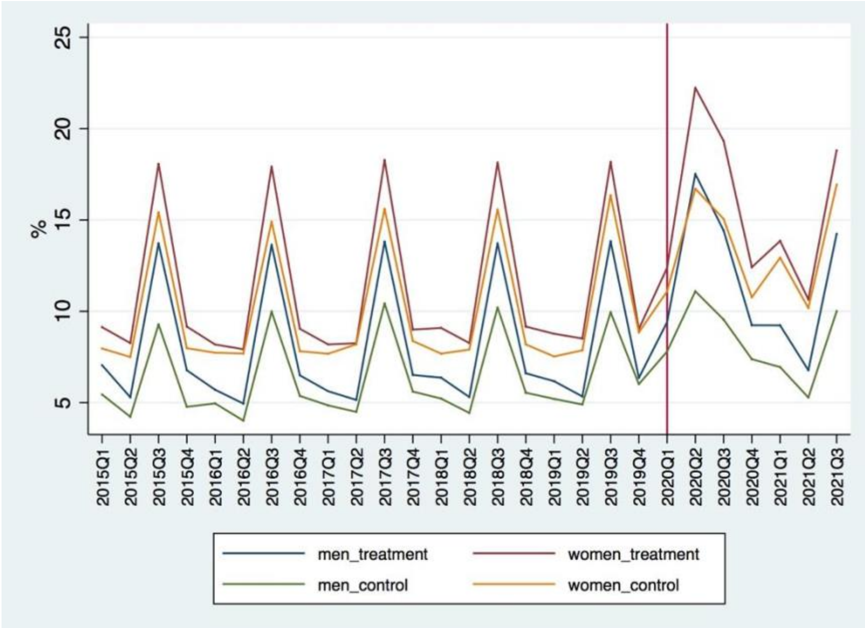
Slight differences between the treatment and control groups exist. Treatment countries on average have higher rates of absences. For men, the pre-pandemic average rate of absence was 1.67 pp higher, whereas for women, the rate was 1.15 pp higher. Both differences are statistically significant according to the results in the tables 25 and 26. The 0.68 pp difference in the average gender gap between the treatment and control group is statistically significant at 1% (table 27). The two groups follow very similar trends, meaning that the parallel trend assumption seems to hold.

It can be seen from graph 20 that the pandemic increased the rates of absences. In 2020, the rates did not peak in the third quarter as in previous years, but in the second quarter. Since 2020Q2, the rates did fall, but did not dip as low as in the previous years. Another unusual peak occurred in 2021Q1. However, the increase was less pronounced for men than for women. For the summer of 2021, the rates increased again. Women’s absence rates stay at a more elevated level throughout 2020-2021 in comparison to before the pandemic. This is reflected in the regression results in table 26. Women’s average absence rate in the EU increased by 4 pp. This is statistically significant at 1%. In mild NPI countries, the rate increased by 3.5 pp with 1% significance. This was a 35.4% increase from the pre-pandemic average absence rate. In strict NPI countries, absence rates increased by 4.6 pp, which represents a 41.7% change. Since the average absence rate increased more in countries that implemented strict NPIs than in mild countries, the DiD is positive and equal to 1.1 pp. The coefficient decreases in magnitude after the inclusion of country fixed effects to 0.92 pp. The coefficient is however not statistically significant. COVID-19 cases and deaths appear to be negatively correlated with the women's absence rate, which is an unexpected finding. The effect is however not statistically nor economically significant.

Meanwhile, men's average absence rates significantly (1%) increased by 2.7 pp in the EU (table 25). In mild NPI countries, the rate increased by 2 pp. The increase was significant at 1% and represents a 32.5% increase in comparison to the pre-pandemic period. In strict NPI countries, absence increased by 3.6 pp, which was a 45% increase. As for women, the increase was larger in strict NPI countries. The DiD coefficient is equal to 1.54 pp. In contrast to women, it is statistically significant at 5% at least in all model specifications. The DiD increases to 1.58 pp with the inclusion of year fixed effects, but then decreases to 1.56 pp when quarters are taken into account, and even further decreases to 1.51 pp when country fixed effects are included. Similarly to women, COVID-19 cases and deaths are negatively correlated with the absence rate. The effect of deaths is significant at 10% but the effect is very small in magnitude.

The effect of the pandemic on the gender gap is also clear from graph 21. The gender gap widened in both groups of countries as women's absence rates increased more in magnitude. However, important to note is that the percentage change was 3.3 pp larger for men than women in strict NPI countries. The gap significantly (at 1%) widened by 1.3 pp in control countries (table 27). This was a 34.4% change in comparison to before. In treatment countries, the gap widened by 1.03 pp, representing a 33% change. Since the gap increased more in countries with mild NPIs than in strict NPIs, the DiD coefficient is positive and equal to 0.28 pp in the baseline model. It is not statistically significant until the inclusion of country fixed effects. The coefficient then increases to 0.51 pp. COVID-19 cases and deaths are negatively but not significantly correlated with the gender gap.

Graph 20 - Quarterly Average Absence Rate



Graph 21 – Gender Gap in Quarterly Average Absence Rate

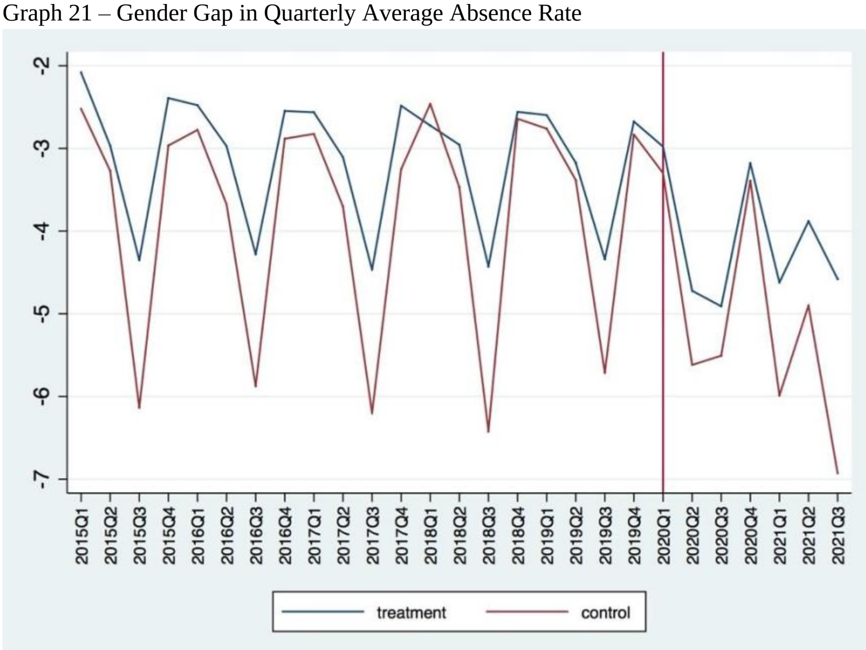


Table 25 – Absence Rate for Men

Model specification	1	2	3	4	5	6	7
Time	2.717*** (6.18)		2.034*** (4.26)	.	.	.	.
Treated		2.009*** (5.32)	1.662*** (3.97)	1.663*** (3.96)	1.679*** (4.88)	.	.

DiD			1.541* (1.79)	1.580* (1.85)	1.564* (1.94)	1.507** (2.33)	1.504** (2.34)
Year fixed effects				.	.	.	.
Quarter fixed effects					.	.	.
Country fixed effects						.	.
COVID-19 cases							-0.0000810 (-0.61)
COVID-19 deaths							-0.00988* (-1.91)
Observations	710	710	710	710	710	710	710

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 26 – Absence Rate for Women

Model specification	1	2	3	4	5	6	7
Time	3.995*** (7.91)		3.502*** (5.76)	.	.	.	.
Treated		1.368*** (3.02)	1.148** (2.30)	1.148** (2.29)	1.187*** (3.07)	.	.
DiD			1.098 (1.09)	1.119 (1.11)	1.080 (1.16)	0.917 (1.21)	0.913 (1.22)
Year fixed effects				.	.	.	.
Quarter fixed effects					.	.	.
Country fixed effects						.	.
COVID-19 cases							-0.0000772 (-0.40)
COVID-19 deaths							-0.00737 (-0.91)
Observations	715	715	715	715	715	715	715

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 27 – Gender Gap in Absence Rate

Model specification	1	2	3	4	5	6	7
Time	-1.190*** (-5.96)		-1.301*** (-4.10)	.	.	.	.
Treated		0.777*** (4.96)	0.681*** (4.14)	0.682*** (4.14)	0.682*** (4.97)	.	.
DiD			0.276 (0.72)	0.294 (0.77)	0.295 (0.81)	0.513* (1.69)	0.520* (1.73)
Year fixed effects				.	.	.	.
Quarter fixed effects					.	.	.
Country fixed effects						.	.
COVID-19 cases							-0.00000349 (-0.03)
COVID-19 deaths							-0.00287 (-0.53)
Observations	708	708	708	708	708	708	708

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Share of temporary workers

Graph 22 shows the share of temporary workers in the labour force. The share is calculated by dividing the number of temporary workers by the labour force. During the years 2015-2017, there was an increasing trend in the rates of temporary workers. Since 2018, the rate has been decreasing for men and women in the control group. As with part-time employment rates, there is some seasonality in the share of temporary workers. The shares are higher during the summer months.

The share is consistently higher for women than for men.

The average share of temporary workers among women in the time period before the pandemic was 9.2% in the control group and 12% in the treatment group. Meanwhile, for men the average share was 7.6% in control countries and 10% in treatment countries. Therefore, as shown in graph 23, the gender gap is negative. The gender gap has increased in magnitude over the years, especially for the control group. The gap is its widest in the second quarter and its most narrow in the third quarter.

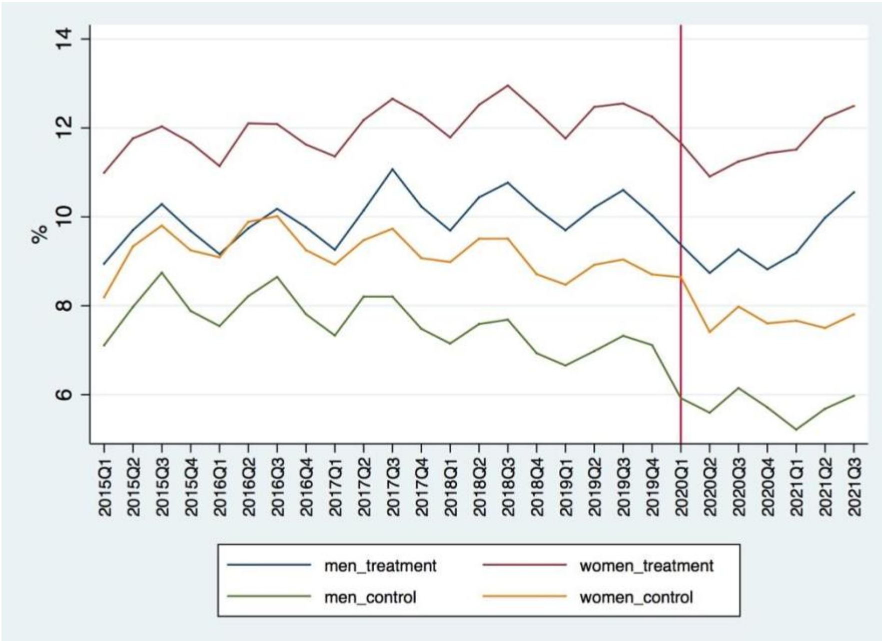
The differences between the two country groups are visible in the graphs. As confirmed by the regression results in tables 28 and 29, the shares of temporary workers are significantly (at 1%) higher in treatment countries. For men, the share is 2.4 pp higher, and for women, 2.8 pp higher. The average gender gap is also significantly 0.45 pp wider in the control group. The overall patterns of the trends in the rates appear to be similar in the treatment and control groups. Therefore, the parallel trend assumption is likely to hold.

The pandemic clearly caused a sharp decrease in the rates for both genders. The usual peak in the third quarter did not reach the same heights as in the previous years. Since 2021Q1, the shares of temporary workers seem to have started to increase again, except for women in control countries. The average shares are lower in the post-pandemic time period compared to the period before. Table 28 shows that overall in the EU, men's shares of temporary workers decreased significantly (at 1%) by 1.29 pp. For men in the mild NPI group, the average share significantly (at 1%) decreased by 1.89 pp. This was a 24.7% change in comparison to the pre-pandemic time period. In strict NPI countries, the shares on average decreased by 0.56 pp, which was only a 5.6% change. The DiD is therefore positive and equal to 1.32 pp. It is statistically significant at 10% in the baseline models and becomes even more significant at 1% when including country fixed effects. The coefficient also increases in magnitude to 1.34 pp when controlling for time invariant country characteristics.

Women's share of temporary workers decreased by 0.93 pp in the EU. The effect of the pandemic was statistically significant at 5%. In mild NPI countries, the share significantly (at 5%) decreased by 1.4 pp. This was a 15.2% change. In strict countries, the share decreased by 0.37 pp, which is only a 3.1% change. Therefore, the women's share also decreased more in countries with mild NPIs than in countries with strict NPIs. The DiD coefficient is equal to 1.03 pp. However, as for men, it is not statistically significant until the inclusion of country fixed effects. The coefficient also increases in magnitude to 1.14 pp.

The decrease in the share of temporary workers was larger for men than for women, both in magnitude and proportionately. Therefore, the pandemic widened the average gender gap. The effect was larger in mild NPI countries, where the gender difference increased by 0.36 pp at 10% significance level. This was a 22.6% change. In strict countries, the gap widened by 0.18 pp which is only a 8.9% change. The DiD is positive and equal to 0.18 pp. It increases to 0.22 pp when including country fixed effects in the regression. It is not however statistically significant in any of the model specifications.

Graph 22 - Quarterly Average Share of Temporary Workers in the Labour Force



Graph 23 – Gender Gap in Quarterly Average Share of Temporary Workers in the Labour Force

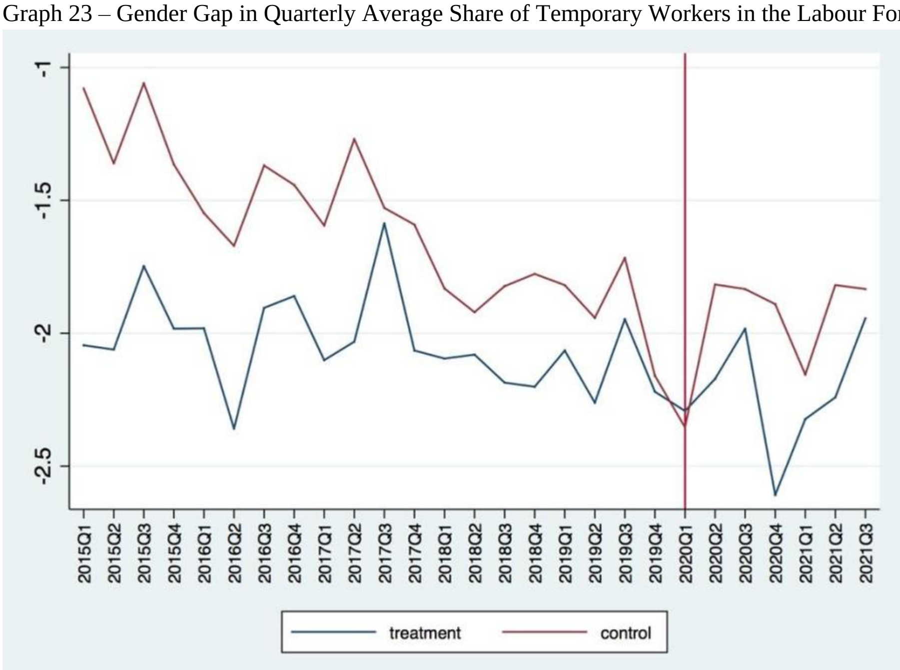


Table 28 – Share of Temporary Workers for Men

Model specification	1	2	3	4	5	6
Time	-1.287*** (-3.46)		-1.882*** (-4.29)	.	.	.

Treated		2.709*** (8.13)	2.360*** (5.90)	2.360*** (5.89)	2.361*** (5.90)	.
DiD			1.324* (1.91)	1.318* (1.90)	1.317* (1.90)	1.337*** (5.57)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	724	724	724	724	724	724

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 29 – Share of Temporary Workers for Women

Model specification	1	2	3	4	5	6
Time	-0.930** (-2.00)		-1.400** (-2.37)	.	.	.
Treated		3.099*** (7.74)	2.836*** (6.01)	2.836*** (5.99)	2.836*** (5.99)	.
DiD			1.025 (1.16)	1.020 (1.16)	1.028 (1.16)	1.135*** (4.31)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	723	723	723	723	723	723

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 30 – Gender Gap in Share of Temporary Workers

Model specification	1	2	3	4	5	6
Time	-0.272 (-1.62)		-0.360* (-1.66)	.	.	.

Treated		-0.401*** (-2.80)	-0.448*** (-2.74)	-0.447*** (-2.73)	-0.447*** (-2.73)	.
DiD			0.178 (0.52)	0.175 (0.52)	0.177 (0.52)	0.222 (1.64)
Year fixed effects				.	.	.
Quarter fixed effects					.	.
Country fixed effects						.
Observations	722	722	722	722	722	722

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

5. Discussion & Limitations

This section will first summarise the results described in the previous section and contextualise them into the wider literature about the pandemic. Each labour market outcome is discussed separately. This is followed by an evaluation of the limitations of the thesis, especially with regards to the data set and the regression analysis used. The section then concludes the thesis.

Discussion

Against expectations, the full-time employment average rates increased in comparison to the 2015-2019 pre-COVID-19 time period. This was despite a noticeable dip in the rates in graph 6. Rather than the pandemic causing a surge in the rates, the pre-COVID-19 average was likely weighed down by the very low rates in the beginning of the, probably due to the 2008-2009 recession. The regressions attempted to mitigate for the effects of the previous recession by including year fixed effects. Women's employment rate increased more than men's employment rate both in terms of magnitude and percentage change. Therefore, the post-pandemic average gender gap was narrower than the pre-pandemic average gap in both groups of countries. It is possible that the smaller increase in the employment rate is due to men's employment being more affected by the NPIs. Previous research (Hoynes et al., 2012) has shown that men are more hit during recessions. Perhaps women's important role as key workers buffered them against employment losses. Therefore, the closure of the retail and hospitality sectors did not seem to lead to greater employment losses among women. The increase in the employment rate for men and women was larger in mild NPI countries than in strict NPI countries. Perhaps employment in the strict NPI countries was more hurt by the pandemic recession. However, the percentage increase in the employment rate for women was in fact larger in strict NPI countries than in mild countries.

The pandemic slightly decreased the part-time employment rate for both men and women. In line with expectations, women experienced a larger drop in magnitude and percentage than men. For this reason, the negative gender gap narrowed. The effect was also significantly stronger in countries with strict NPIs than in countries with mild NPIs. Therefore, strict NPIs may have disproportionately affected women. The reasons for the drop in women's part-time employment can be twofold. Firstly, part-time employment is more common in sectors such as hospitality and retail that were shut down due to NPIs. Secondly, women who were working part-time before the pandemic were likely to be the main person responsible for child care in the household. Therefore, with the closure of schools, their care load may have increased to the extent that they had to leave their job. This has been called "opting out behaviour", where women leave the labour force due to struggles in combining their career with child care and housework duties.

The transition from employment to unemployment significantly increased only in mild NPI countries. In strict countries, the transition rate actually slightly decreased for both men and women. As for the full-time rate, perhaps the 2008-2009 recession weighed up the pre-pandemic average transition rate. The strict countries may also have been better able to put in place policies to prevent unemployment, such as short-term employment schemes (Yerkes et al., 2020). For example, in their analysis Farré et al. (2021) found that instead of workers losing their jobs, most were placed on the Spanish furlough scheme. Since prior to COVID-19 men in mild NPI countries were already facing higher transition rates than women, the difference between genders widened further. The gender gap was not affected in strict NPI countries.

Meanwhile, the average rate of transition from unemployment to employment slightly decreased for men in both groups of countries. However, the change was not statistically significant. For women, the average rate did not change in either group. Therefore, although the gap slightly narrowed, there was no statistically significant change. It could be that the regression results lacked statistical significance due to the smaller amount of observations. Multiple countries were missing data for transition rates.

The average transition rates from employment to inactivity increased after the start of the pandemic. They increased more in strict NPI countries than in mild NPI countries for both men and women. However, the change was not statistically significant. As expected, the transition rates into inactivity increased more for women. While the average gender gap remained the same in strict NPI countries, the gender gap widened in mild countries. However, the change was also not statistically significant.

Both men and women experienced a large drop in full-time weekly hours worked after the introduction of the NPIs. In line with expectations, the decrease in hours worked was stronger in countries with strict NPIs than in mild NPI countries. Hours worked decreased more for men than women, which narrowed the gender gap. The gap decreased significantly more in mild NPI countries than in strict countries. In strict NPI countries, hours worked decreased by a similar percentage for men and women. Since that was not the case in mild NPI countries, it may be evidence that strict NPIs had a disproportionate impact on women's working hours.

The effect of the pandemic was not as strong for part-time hours worked as it was for full-time hours. According to the regression results, the pandemic did not have a negative effect on part-time hours worked. In fact, the average hours actually increased for women in both country groups and for men in strict NPI countries. This was against expectations. Arguably hours worked by part-time workers were the most vulnerable when some of the sectors were forced to close. However, none of the effects were statistically significant.

The average level of absenteeism was expected to increase in comparison to before the pandemic due to workers catching the virus. The thesis attempted to minimise the effect of COVID-19 on absences by controlling for the quarterly average number of COVID-19 cases and deaths in the EU countries. This was done in order to highlight the effect of the closure of schools and kindergartens on absenteeism. Indeed, graph 20 showed that during the pre-pandemic periods, absences peaked in the summer during school holidays. This hinted that closure of schools could increase absenteeism. The regression results evidenced that the pandemic did increase women's and men's average rates of absences. Women's rates increased more in magnitude than men's in both groups of countries. Therefore, the gender gap widened in both groups of countries. However, in percentage terms, men's absences actually increased more than women's in strict NPI countries. This perhaps indicates that fathers did increase their share in the burden of additional childcare due to the closure of schools. Multiple economic papers reported that fathers had increased their time spent on child care (Heggeness, 2020, Hupkau & Petrongolo, 2020, Yerkes et al., 2020, Mangiavacchi et al., 2021). Therefore, the gender gap increased more in countries with mild NPIs than in strict NPIs. As expected, absences increased more in strict NPI countries compared to mild NPI countries. However, the DiD coefficient was not statistically significant for women. Another surprising finding was that the quarterly average number of COVID-19 cases and deaths were negatively, although not significantly, correlated with the rates of absences.

The pandemic decreased the average shares of temporary workers in the labour force for both genders. The men's share of temporary workers decreased more in terms of magnitude and percentage compared to women. This was unexpected, since women's share of temporary workers is on average higher. The pandemic thus widened the average gender gap in both groups of countries. In addition, against expectations, the shares decreased more in countries with mild NPIs than in countries with strict NPIs. It is possible that the strict NPI implemented better measures to protect temporary workers against job loss.

Limitations

At least six limitations of the analysis can be identified. Firstly, the analysis is done using the Eurostat public aggregate country-level data. Access to the microdata was denied for a master thesis. Because of this, the analysis is not performed separately for different education levels and for economic sectors. With microdata, a comparison of the differences between shut-down sectors, essential work sectors and ability of working from home sectors could have been made. This would have been interesting since the likelihood of being employed during the pandemic and the ability to work while having to take care of children have been shown to depend on the sector (Alon et al. 2020b, Alon et al. 2021, Farré et al., 2021). Papers in the literature have also shown that the impact of the NPIs have varied between different education groups (Adams-Prassl et al., 2020a, Zamarro & Prados, 2021, Fabrizio et al., 2021, Del Boca et al., 2021, Kim, 2021).

Secondly and as already discussed in the data analysis section, it is possible that the decision to implement strict or mild NPIs was affected by the country's financial situation. Countries with less debt were perhaps more comfortable implementing strict NPIs as they had a better capacity to provide economic support. If this is the case, then the results of the analysis may be biased. Graphs 1, 4 and 5 showed that GDP per capita was on average higher in strict NPI countries, as was the economic support provided by the government. However, the strict NPI group included countries, such as Belgium, Greece, Spain, France, Italy, Cyprus and Portugal. According to Eurostat, in 2019, all these countries had levels of government consolidated gross debt as percentage of GDP that were higher than the EU average of 77% (Eurostat 2022c). In fact, none of the countries in the mild NPI group had levels of debt higher than the EU average. Nevertheless, it cannot be ignored that the strict NPI group includes all the largest economies as well as the most centrally located countries of the EU.

A third limitation is that the data is quarterly and not monthly. A monthly analysis would have allowed a more accurate split of the pre- and post-pandemic time periods. The World Health Organization (WHO) announced the pandemic on March 11, which is at the end of the first quarter. However, the post-pandemic dummy is equal to one for January and February, even though NPIs had not yet been implemented in those months. Therefore, the effects are expected to be smaller in the first rather than in the second quarter.

Fourthly, the regressions did not account for differences in employment protection. This was due to a lack of comprehensive quantitative data for all EU countries. For example, the widely used OECD Employment Protection Legislation (EPL) index is not appropriate for the analysis in this thesis as a few EU countries (Bulgaria, Croatia, Latvia, Lithuania, Romania) are not part of the OECD. As noted in the discussion, differences in labour force protection may have explained the unexpected regression results for the treatment and control countries.

Fifthly, it would have been interesting to look at the gendered effects of specific NPIs, such as the closure of schools. The countries could have been split into the two groups based on the severity of the particular policy. Unfortunately, this was beyond the scope of the thesis. Lastly, the thesis does not look at the gendered effects of the pandemic on earnings and does not differentiate the effects between different income groups. This is because information on earnings and income is not collected by the Labour Force Survey. It must also be noted that none of the dependent variables take into account the large amounts of informal or non-registered low-wage workers, which were likely to have been affected by the NPIs.

Conclusion

The DiD analysis carried out has demonstrated that the pandemic and the strictness of NPIs had gendered effects on labour market outcomes. However, the results cast some doubt on the first hypothesis that NPIs had stronger negative effects on women's employment, hours worked and share of temporary workers compared to men. Meanwhile, the results seem to support the second hypothesis that the closure of schools and kindergartens led to women reporting higher absence rates, reducing their working hours, switching to part-time employment or to leave the labour force. However, it is important to note that men's absenteeism increased more than women's in strict NPI countries. A surprising finding was that countries with stricter NPIs did not always suffer from a greater shock to labour market outcomes than countries with milder NPIs. It is possible that treatment countries had better schemes to prevent the negative effects of NPIs compared to control countries.

6. References

Acemoglu, D., Autor, D.H., & Lyle, D. (2004). Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury. *Journal of Political Economy*, 112, 3, 497–551.

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020a). Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys. *Journal of Public Economics*, 189, 104245. https://doi.org/10.1016/j.jpubeco.2020.104245

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020b). Furloughing. *Fiscal Studies*, 41, 3, 591–622.

Adda, J., Banks, J., & von Gaudecker, H-M. (2009). The Impact of Income Shocks on Health: Evidence from Cohort Data. *Journal of the European Economic Association*, 7, 6, 1361–1399.

Adda, J., Dustmann, C., & Stevens, K. (2017). The Career Costs of Children. *Journal of Political Economy*, 125, 2. Doi: https://doi-org.eur.idm.oclc.org/10.1086/690952

Albanesi, S. & Kim, J. (2021). The Gendered Impact of the COVID-19 Recession on the US Labour Market. National Bureau of Economic Research Working Paper 28505. Doi: 10.3386/w28505

Alemán, C., Busch, C., Ludwig, A., & Santaeulàlia-Llopis, R. (2020). Evaluating the Effectiveness of Policies Against a Pandemic. Centre for Economic Policy Research Discussion Paper 15390. Available at: https://cepr-org.eur.idm.oclc.org/active/publications/discussion_papers/dp.php?dpno=15390

Alon, T., Doepke, M., Olmstead-Rumsey, J., & Tertilt, M. (2020a). The impact of COVID-19 on gender equality. National Bureau of Economic Research Working Paper 26947. Doi: 10.3386/w26947

Alon, T., Doepke, M., Olmstead-Rumsey, J., & Tertilt, M. (2020b). This Time It's Different: The Role of Women's Employment in a Pandemic Recession. National Bureau of Economic Research Working Paper 27660. Doi: 10.3386/w27660

Alon, T., Coskun, S., Doepke, M., Koll, D., & Tertilt, M. (2021). From Mancession to Shecession: Women's Employment in Regular and Pandemic Recessions. National Bureau of Economic Research Working Paper 28632. Doi: 10.3386/w26947

Amano-Patĩno, N., Faraglia, E., Giannitsarou, C., & Hasna, Z. (2020). The Unequal Effects of COVID-19 on Economists' Research Productivity. Cambridge-INET Working Paper WP2022. doi: 10.17863/CAM.57979

Banks, J. & Xu, X. (2020). The mental health effects of the first two months of lockdown during the Covid-19 pandemic in the UK. *Fiscal Studies*, 41, 685–708.

Barber, B.M., Jiang, W., Morse, A., Puri, M., Tookes, H., & Werner, I.M. (2021). What Explains Differences in Finance Research Productivity during the Pandemic? *Journal of Finance, American Finance Association*, 76, 4, 1655-1697.

Beauregard, P-L., Connolly, M., Haeck, C., & Molnár, T.L. (2021). Primary School Reopenings and Parental Work. Research Group on Human Capital Working Paper Series, Working Paper No. 20-06. Research Group on Human Capital, University of Quebec in Montreal's School of Management.

Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*,75, 493–515.

Beland, L-P., Brodeur, A., Mikola, D., Wright, T. (2021). The Short-Term Economic Consequences of COVID-19: Occupation Tasks and Mental Health in Canada. *Canadian Journal of Economics*, forthcoming.

Bertrand, M., Kamenica, E., & Pan, J. (2015). Gender Identity and Relative Income within Households. *Quarterly Journal of Economics*, 130, 3, 571–614.

Bicchieri, C., & Mercier, H. (2014). Norms and beliefs: how change occurs. In : Xenitidou M., Edmonds B. (eds) The Complexity of Social Norms. Computational Social Sciences. Springer, Cham, 37–54.

Biroli, P., Bosworth, S., Della Giusta, M., Di Girolamo, A., Jaworska, S., & Vollen, J. (2021). Family Life in Lockdown. *Frontiers in Psychology*, 12, 687570. doi: 10.3389/fpsyg.2021.687570

Blau, F.D. & Winkler, A.E. (2018). Women, Work, and Family. In S. L. Averett, L. M. Arys, S. D. Hoffman (Eds.), *Oxford Handbook of Women and Economy*. New York, Oxford University Press

Blazquez Cuesta, M. & Moral Carcedo, J. (2014). Women's part-time jobs: “Flexirisky” employment in five European countries. *International Labour Review*, 153, 2, 269-292.

Bluedorn, J., Caselli, F., Hansen, N.-J., Shibata, I., & Tavares, M. M. (2021). Gender and employment in the COVID-19 recession: Evidence on “she-cessions”. Technical report, International Monetary Fund Working Paper, Washington DC.

Bratti, M. & Mendola, M. (2014). Parental health and child schooling. *Journal of Health Economics*, 35, 94-108.

Cajner, T., Crane, L.D., Decker, R.A., Grigsby, J., Hamins-Puertolas, A., Hurst, E., Kurz, C., Yildirmaz, A. (2020). The US Labor Market during the Beginning of the Pandemic Recession. Brookings Papers on Economic Activity, Summer 2020, Special Edition, 3-33.

Campa, P., Roine, J., Stromberg, S. (2021). Unemployment Inequality in the Pandemic: Evidence from Sweden. *Covid Economics*, 83, 1-24.

Casarico, A. & Lattanzio, S. (2020). The heterogeneous effects of COVID-19 on labor market flows: Evidence from administrative data. *Covid Economics*, 52, 152-174.

Couch, K.A., Fairlie, R.W., & Xu, H. (2020). Gender and the COVID-19 Labor Market Downturn. Stanford Institute for Economic Policy Research Working Paper 20-037. Accessed at: https://siepr.stanford.edu/publications/working-paper/gender-and-covid-19-labor-market-downturn

Craig, L. & Churchill, B. (2021). Working and Caring at Home: Gender Differences in the Effects of Covid-19 on Paid and Unpaid Labor in Australia. *Feminist Economics*, 27, 1-2, 310-326.

Cuberes, D., & Teignier, M. (2017). Macroeconomic costs of gender gaps in a model with entrepreneurship and household production. *The B.E. Journal of Macroeconomics*, 18, 1. https://doi-org.eur.idm.oclc.org/10.1515/bejm-2017-0031

Del Boca, D., Oggero, N., Profeta, P., & Rossi, M. C. (2021). Household division of labor during two waves of COVID-19 in Italy, *COVID Economics*, 75, 60-80.

Deryugina, T., Shurchkov, O., & Stearns, J. (2021). COVID-19 Disruptions Disproportionately Affect Female Academics. National Bureau of Economic Research Working Paper No. 28360. doi: 10.3386/w28360

Desai, S., Deshmukh, N., & Pramanik, S. (2021). Precarity in a Time of Uncertainty: Gendered Employment Patterns during the Covid-19 Lockdown in India. *Feminist Economics*, 27,1-2, 152-172.

Deshpande, A. (2021). The Covid-19 pandemic and gendered division of paid work, domestic chores and leisure: evidence from India's first wave. *Economic Politica*. https://doi-org.eur.idm.oclc.org/10.1007/s40888-021-00235-7

Doepke, M. & Tertilt, M. (2016). Families in Macroeconomics. In J.B. Taylor & H. Uhlig (Eds.), *Handbook of Macroeconomics Vol. 2b* (pp. 1789-1891). Elsevier

Doorley, K., O'Donoghue, C., & Sologon, D. (2021). The gender gap in income and the COVID-19 pandemic. ESRI DISCUSSION PAPER SERIES IZA Discussion Paper No. 14360. Accessed at: https://ftp.iza.org/dp14360.pdf

EC (2020). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS: A Union of Equality: Gender Equality Strategy 2020-2025. European Commission. Accessed at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0152&from=EN

EC (2021). 2021 report on gender equality in the EU. European Commission. Accessed at: https://ec.europa.eu/info/sites/default/files/aid_development_cooperation_fundamental_rights/annual_report_ge_2021_en.pdf

ECDC (2021). COVID-19 in children and the role of school settings in transmission - second update. European Centre for Disease Prevention and Control, Stockholm. Accessed from: https://www.ecdc.europa.eu/en/publications-data/children-and-school-settings-covid-19-transmission#copy-to-clipboard

EIGE (2017). Economic Benefits of Gender Equality in the European Union: Overall economic impacts of gender equality. European Institute for Gender Equality. Publications Office of the European Union. Accessed at: https://eige.europa.eu/publications/economic-benefits-gender-equality-european-union-overall-economic-impacts-gender-equality

EIGE (2020). Gender Equality Index 2019–Work–Life Balance. Publications Office of the European Union. Accessed at: https://eige.europa.eu/publications/gender-equality-index-2019-work-life-balance

EIGE (2021). Gender equality and the socio-economic impact of the COVID-19 pandemic. European Institute for Gender Equality. Publications Office of the European Union

Ellingrud, K., Krivkovich, A., Nadeau, M-C., & Zucker, J. (2021). Closing the gender and race gaps in North American financial service. McKinsey. Accessed at: https://www.mckinsey.com/industries/financial-services/our-insights/closing-the-gender-and-race-gaps-in-north-american-financial-services

Eurostat (2020). LFSI_PT_A and LFSQ_EGAIS at the Eurostat Data Base. https://ec.europa.eu/eurostat/databrowser/view/LFSI_PT_A__custom_1395252/default/table?lang=en https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

Eurostat (2021). Women remain outnumbered in management. Eurostat. Accessed at: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/edn-20210305-2

Eurostat (2022a). Database - Employment and unemployment (Labour Force Survey). Accessed at : https://ec.europa.eu/eurostat/web/lfs/data/database

Eurostat (2022b). Employment and unemployment (LFS) – Overview. Accessed at : https://ec.europa.eu/eurostat/web/lfs

Eurostat (2022c). Government finance statistics. Accessed at: https://ec.europa.eu/eurostat/databrowser/view/GOV_10DD_EDPT1__custom_2315558/default/table?lang=en

Fabrizio, S., Gomes D.B.P., & Tavares M.M. (2021). The COVID-19 she-cession: The employment penalty of taking care of young children. *Covid Economics,* 72, 136-166.

Farahati, F., Marcotte, D.E., & Wilcox-Gök, V. (2003). The effects of parents' psychiatric disorders on children's high school dropout, *Economics of Education Review*, 22, 2, 167-178.

Farré, L., Fawaz, Y., Gonzalez, L., & Graves, J. (2021). Gender Inequality in Paid and Unpaid Work During COVID-19 Times. *Review of Income and Wealth.* https://doi-org.eur.idm.oclc.org/10.1111/roiw.12563

Folbre, N. (2018). The care penalty and gender inequality. In S. L. Averett, L. M. Arys, S. D. Hoffman (Eds.), *Oxford Handbook of Women and Economy* (pp. 1–28). New York, Oxford University Press

Fortin, N.M. (2005). Gender Role Attitudes and the Labour Market Outcomes of Women Across OECD Countries. *Oxford Review of Economic Policy*, 21, 3, 416-438.

Frank, R.G. & Meara, E. (2009). The Effect of Maternal Depression and Substance Abuse on Child Human Capital Development. National Bureau of Economic Research Working Paper 15314. DOI:10.3386/w15314

Fuchs-Schündeln, N., Kuhn, M., & Tertilt, M. (2020a). The Short-Run Macro Implications of School and Child-Care Closures. IZA Discussion Paper, 13353. Accessed at: https://docs.iza.org/dp13353.pdf

Fukai, T., Ichimura, H., & Kawata, K. (2021). Describing the impacts of COVID-19 on the labor market in Japan until June 2020. *The Japanese Economic Review*, 72, 3, 439-470.

Gimenez-Nadal, J.I. & Sevilla, A. (2012). Trends in time allocation: A cross-country analysis. *European Economic Review*, 56, 6, 1338-1359.

Goldin, C. & Olivetti, C. (2013). Shocking Labor Supply: A Reassessment of the Role of World War II on Women's Labor Supply. *American Economic Review*, 103, 3, 257-62.

Graeber, D., Kritikos, A.S. & Seebauer, J. (2021). COVID-19: a crisis of the female self-employed. *Journal of Population Economics*, 34, 1141–1187.

Greenstone, M. & Nigam, V. (2020). Does Social Distancing Matter? University of Chicago, Becker Friedman Institute for Economics Working Paper No. 2020-26. http://dx.doi.org.eur.idm.oclc.org/10.2139/ssrn.3561244

Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*. https://doi.org/10.1038/s41562-021-01079-8

Ham, S. (2021). Explaining Gender Gaps in the South Korean Labor Market During the COVID-19 Pandemic. *Feminist Economics*, 27, 1-2, 133-151.

Heggeness, M. L. (2020). Estimating the immediate impact of the COVID-19 shock on parental attachment to the labor market and the double bind of mothers. *Review of Economics of the Household*, 18, 1053–1078.

Heggeness, M. L. & Suri, P. (2021). Telework, Childcare, and Mothers' Labor Supply. Federal Reserve Bank of Minneapolis. Working Paper 52. Accessed at: https://iceanet.org/wp-content/uploads/2021/11/Heggeness.pdf

Hochschild, A. (1989). *The Second Shift*. New York: Viking Press

Hoynes, H., Miller, D.L., & Schaller, J. (2012). Who Suffers during Recessions? *Journal of Economic Perspectives*, 26, 3, 27-48.

Huls, S.P.I., Sajjad, A., Kanters, T.A., Hakkaart-van Roijen, L., Brouwer, W.B.F., & van Exel, J. (2021). Productivity of Working at Home and Time Allocation Between Paid Work, Unpaid Work and Leisure Activities During a Pandemic. *PharmacoEconomics* https://doi-org.eur.idm.oclc.org/10.1007/s40273-021-01078-7

Hupkau, C., & Petrongolo, B. (2020). Work, care and gender during the covid-19 crisis. *Fiscal Studies*, 41(3), 623–651.

ILO (2020a). The impact of the COVID-19 pandemic on jobs and incomes in G20 economies. International Labour Organisation. Available online at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---cabinet/documents/publication/wcms_756331.pdf

ILO (2020b) ILO Monitor: COVID-19 and the World of Work. Fifth Edition. Geneva: ILO. Accessed at: https://www.oitcinterfor.org/en/node/7867

İlkkaracan, I. & Memiş, E. (2021). Transformations in the Gender Gaps in Paid and Unpaid Work During the COVID-19 Pandemic: Findings from Turkey. *Feminist Economics*, 27, 1-2, 288-309.

Joyce, R. & Xu, X. (2020). Sector shutdowns during the coronavirus crisis: which workers are most exposed? Institute for Fiscal Studies Briefing Note BN278. Accessed at: https://ifs.org.uk/publications/14791

Kahn, S. & Ginther, D. (2018). Women and Science, Technology, Engineering, and Mathematics (STEM): Are Differences in Education and Careers Due to Stereotypes, Interests, or Family? In S. L. Averett, L. M. Arys, S. D. Hoffman (Eds.), *Oxford Handbook of Women and Economy*. New York, Oxford University Press

Kalenkoski, C. M. & Pabilonia, S. W. (2021). Impacts of COVID-19 on the self-employed. *Small Business Economics*. https://doi-org.eur.idm.oclc.org/10.1007/s11187-021-00522-4

Kato, T. & Kodama, N. (2018). Women in the Workplace and Management Practices: Theory and Evidence. In S. L. Averett, L. M. Arys, S. D. Hoffman (Eds.), *Oxford Handbook of Women and Economy* (pp.). New York, Oxford University Press

Kim, J. (2021). Searching for the Cause of the Gender Gap in Employment Losses during the COVID-19 Crisis. *KDI Journal of Economic Policy*, 43, 2, 53–79.

Kristiansen, I.L. (2021). Consequences of serious parental health events on child mental health and educational outcomes. *Health Economics*, 30, 8, 1772-1817.

Kunze, A. (2018). The Gender Wage Gap in Developed Countries. In S. L. Averett, L. M. Arys, S. D. Hoffman (Eds.), *Oxford Handbook of Women and Economy* (pp.). New York, Oxford University Press

Le, H.T. & Nguyen, H.T. (2017). Parental health and children's cognitive and noncognitive development: New evidence from the longitudinal survey of Australian children. *Health Economics*, 26, 12, 1767-1788.

Le, H.T. & Nguyen, H.T. (2018). The Impact of Maternal Mental Health Shocks on Child Health: Estimates from Fixed-Effects Instrumental Variables Models for Two Cohorts of Australian Children. *American Journal of Health Economics*, 4, 2. https://doi-org.eur.idm.oclc.org/10.1162/ajhe_a_00100

Lee, S.Y.T., Park, M, & Shin, Y. (2021). Hit Harder, Recover Slower? Unequal Employment Effects of the Covid-19 Shock. National Bureau of Economic Research Working Paper 28354. Doi: 10.3386/w28354

Lewandowski, P., Lipowska, K., & Magda, I. (2021). The Gender Dimension of Occupational Exposure to Contagion in Europe. *Feminist Economics*, 27, 1-2, 48-65.

Lofton, O., Petrosky-Nadeau, N., & Seitelman, L. (2021). Parents in a Pandemic Labor Market. Federal Reserve Bank of San Francisco Working Paper 2021-04. https://doi.org/10.24148/wp2021-04

Lyttelton, T., Zang, E., & Musick, K. (2020). Gender Differences in Telecommuting and Implications for Inequality at Home and Work. SSRN. http://dx.doi.org.eur.idm.oclc.org/10.2139/ssrn.3645561

Ma, S., Sun, Z., & Xue, H. (2020). Childcare Needs and Parents' Labor Supply: Evidence from the COVID-19 Lockdown. SSRN. http://dx.doi.org.eur.idm.oclc.org/10.2139/ssrn.3630842

Mangiavacchi, L., Piccoli, L., & Pieroni, L. (2021). Fathers matter: Intrahousehold responsibilities and children's wellbeing during the COVID-19 lockdown in Italy. *Economics & Human Biology*, 42, 101016. doi: 10.1016/j.ehb.2021.101016.

Manning, A. & Petrongolo, B. (2008). The Part-Time Pay Penalty for Women in Britain. *The Economic Journal*, 118, 526, F28-F51.

Meekes, J., Hassink, W., & Kalb, G.R.J. (2020). Essential Work and Emergency Childcare: Identifying Gender Differences in COVID-19 Effects on Labour Demand and Supply. Life Course Centre Working Paper No. 2020-27. http://dx.doi.org.eur.idm.oclc.org/10.2139/ssrn.3727684

Moehring, K., Reifenscheid, M., & Weiland, A. (2021). Is the Recession a 'Shecession'? Gender Inequality in the Employment Effects of the COVID-19 Pandemic in Germany. https://doi.org/10.31235/osf.io/tzma5

Montenovo, L., Jiang, X., Lozano Rojas, F., Schmutte, I.M., Simon, K.I., Weinberg, B.A., & Wing, C. (2021). Determinants of Disparities in Covid-19 Job Losses. National Bureau of Economic Research Working Paper No. 27132. Doi: 10.3386/w27132

Nieuwenhuis, R. (2020). The situation of single parents in the EU. European Parliament. Accessed at: https://www.europarl.europa.eu/RegData/etudes/STUD/2020/659870/IPOL_STU(2020)659870_EN.pdf

OECD (2010). How Good is Part-Time Work? OECD Employment Outlook 2010: Moving beyond the Jobs Crisis, OECD Publishing, Paris, https://doi-org.eur.idm.oclc.org/10.1787/empl_outlook-2010-5-en.

Oreffice, S., & Quintana-Domeque, C. (2021). Gender inequality in COVID-19 times: Evidence from UK prolific participants. *Journal of Demographic Economics*, 87, 2, 261-287.

Petrongolo, B. & Ronchi, M. (2020). Gender gaps and the structure of local labor markets. *Labour Economics*, 64, 101819. https://doi.org/10.1016/j.labeco.2020.101819

Pouliakas, K. & Branka, J. (2020). EU Jobs at Highest Risk of COVID-19 Social Distancing: Will the Pandemic Exacerbate Labour Market Divide? ? Luxembourg: Publications Office of the European Union. Cedefop working paper, 1. http://data.europa.eu/doi/10.2801/968483

Power, K. (2020). The COVID-19 pandemic has increased the care burden of women and families, Sustainability. *Science, Practice and Policy*, 16, 1, 67-73.

Ruppanner, L., Brandén, M., Turunen, J. (2018). Does unequal housework lead to divorce? Evidence from Sweden. *Sociology*, 52, 75–94

Schoonbroodt, A. (2018). Parental child care during and outside of typical work hours. *Review of Economics of the Household*, 16, 453–476.

Seck, P.A., Encarnacion, J.O., Tinonin, C., & Duerto-Valero, S. (2021). Gendered Impacts of COVID-19 in Asia and the Pacific: Early Evidence on Deepening Socioeconomic Inequalities in Paid and Unpaid Work. *Feminist Economics*, 27, 1-2, 117-132.

Seiz, M. (2021). Equality in Confinement: Nonnormative Divisions of Labor in Spanish Dual-Earner Families During the Covid-19 Lockdown. *Feminist Economics*, 27, 1-2, 345-361.

Sevilla-Sanz, A., Gimenez-Nadal, J.I., & Fernández, C. (2010). Gender Roles and the Division of Unpaid Work in Spanish Households. *Feminist Economics*, 16, 4, 137-184.

Sevilla, A., & Smith, S. (2020). Baby steps: the gender division of childcare during the covid-19 pandemic. *Oxford Review of Economic Policy*, 36, S1, 196-186.

Sparreboom, T. (2014). Gender equality, part-time work and segregation in Europe. *International Labour Review*, 153, 2, 245-268.

UN (2015). Transforming our world: the 2030 Agenda for Sustainable Development. United Nations. Accessed at: https://sdgs-un-org.eur.idm.oclc.org/2030agenda

van Giessen, A., de Wit, A., van den Brink, C., Degeling, K., Deuning, C., Eeuwijk, J., van den Ende, C., van Gestel, I., Gijsen, R., van Gils, P., IJzerman, M., de Kok, I., Kommer., G.J., Kregting, L., Over, E., Rotteveel, A., Schreuder, K., Stadhouders, N., & Suijkerbuijk, A. (2020). Impact van de eerste COVID-19 golf op de reguliere zorg en gezondheid : Inventarisatie van de omvang van het probleem en eerste schatting van gezondheidseffecten. Rijksinstituut voor Volksgezondheid en Milieu RIVM. Accessed at: https://www.rivm.nl/en/bibcite/reference/337271

von Wachter, T. (2020). Lost Generations: Long-Term Effects of the COVID-19 Crisis on Job Losers and Labour Market Entrants, and Options for Policy. *Fiscal Studies*, 41, 3, 549-590.

Yalnizyan, A. (2020, October 23). Opinion: The 'she-cession' is real and a problem for everyone. *Financial Post.* Accessed at: https://financialpost.com/opinion/opinion-the-she-cession-is-real-and-a-problem-for-everyone

Yamamura, E. & Tsutsui, Y. (2021) School closures and mental health during the COVID-19 pandemic in Japan. *Journal of Population Economic*s, 34, 1261–1298.

Yerkes, M.A., Andre, S.C.H., Besamusca, J.W., Kruyen, P.M., Remery, C.L.H.S., van der Zwan R, Beckers, D.G.J., & Geurts, S.A.E. (2020). Intelligent' lockdown, intelligent effects? Results from a survey on gender (in)equality in paid work, the division of childcare and household work, and quality of life among parents in the Netherlands during the Covid-19 lockdown. *PLoS ONE*, 15,11, e0242249. https://doi.org/10.1371/journal.pone.0242249

Yerkes, M.A., Andre, S.C.H., Besamusca, J.W., Hummel, B., Remery, C.L.H.S., van der Zwan R, Kruyen, P., Beckers, D.G.J., & Geurts, S.A.E. (2021). Derde policy brief: update over de periode november 2020. https://www.uu.nl/sites/default/files/COGIS%20NL%20Policy%20brief%20nr3.pdf

Zamarro, G. & Prados, M.J. (2021) Gender differences in couples' division of childcare, work and mental health during COVID-19. *Review of Economics of the Household,* 19, 11-40.