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The effect of Paternal Leave on Female Employment Outcomes in Nordic countries

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Abstract

This thesis explores the effect of the use of paternal leave on female employment outcomes in Nordic countries Sweden, Norway and Finland. To thoroughly address this issue, this study uses data spanning from 2010 to 2020 levied by various Global Economic and Statistical Institutions, such as the OECD, Statista and the World Bank. I employ a variety of proxies to measure female employment, including the employment rate, the Full-time equivalent (FTE) employment rate and the weekly working hours, all for females. Three separate fixed effects regressions are performed for these proxies. Results show that an increase in the uptake of paternal leave has a small significant positive effect on all three proxies of female employment outcomes. This research contributes to the understanding of gender equality in the labor market and offers valuable insights for policymakers aiming to promote balanced parental responsibilities.

Contents

1 Introduction

Gender equality in the workplace is a crucial aspect of a progressive society, and the Nordic countries have often been seen as the pioneers of this movement. The countries are known for their high levels of gender equality, including evenly divided parental leave and high female employment rates. To add to this, Norway, Finland, and Sweden make up three of the five highest ranked countries in the global gender gap index in 2023 (World Economic Forum, 2024). This index is used to measure national gender gaps on economic, political, education, and health-based criteria. The index ranges from 0 to 1, where a score of 1 represents perfect gender parity.

Figure 1 presents the female employment rate, measured as the percentage of the female working population that has a job (OECD, 2024). Here SWE, NOR, FIN and EU represent the outcomes for Sweden, Norway, Finland and Europe in 2020, respectively. Also in this domain, the three nordic countries Sweden, Norway and Finland score above the European average. Where in Europe the average female employment rate is only 62 percent, the three Nordic countries each have a female employment rate of at least 70 percent in 2020.

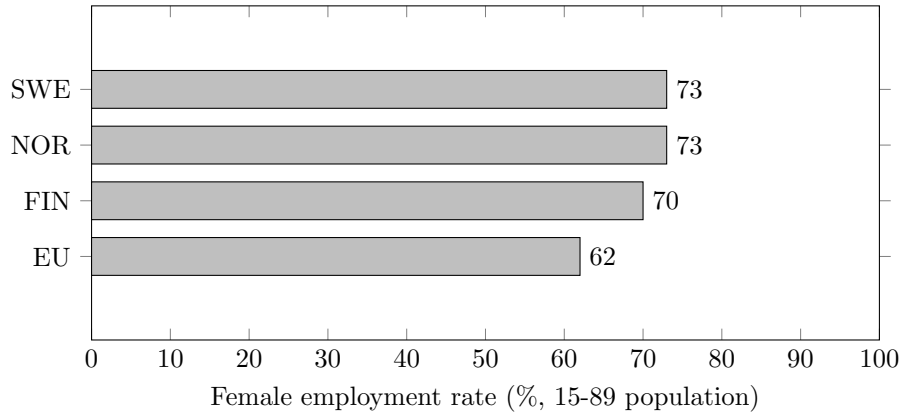


Figure 1: Female employment rates 2020

From figure 1, we can conclude that Scandinavian countries are performing well in the field of employment for females. Moreover, the gender employment rate gap is relatively minimal in each of these countries. Already in 2015, the female employment rate differed less than five percent from that of men for all three countries (OECD, 2024). This is a significant contrast from the employment rate gap in the European union as a whole, which was 9.8 percent in 2015. According to the OECD (2024), the gaps in employment

rate for the countries have hovered around this percentage afterwards, although Finlands gap in employment rate made a significant decrease leading to an employment gap of only 0,2% in 2023.

Another important metric for female employment is the FTE employment rate. This rate is a standardized measure of employee workload, where one FTE is equivalent to the workload of a full-time employee, thus enabling the conversion of part-time hours into full-time equivalents. Both the FTE- and the general female employment rate can be used to proxy employment. In addition, Thévenon and Solaz (2013) use average weekly working hours to proxy female employment. Weekly working hours offer a clear and quantifiable measure of employment intensity. Tracking changes in weekly working hours allows researchers to determine whether these policies encourage women to return to work more quickly or enable them to balance work and family responsibilities more effectively. Thévenon and Solaz (2013) highlight the effectiveness of this approach in their study on the labor market effects of parental leave in OECD countries.

This research delves into the impact of paternal leave on female employment outcomes in Sweden, Norway and Finland, a topic that has not been extensively isolated in previous studies. The goal of this paper is to zoom in on these countries' success in gender equalization in employment. Despite advancements, disparities in employment outcomes between men and women persist. By focusing specifically on three proxies for female employment—employment rate, FTE employment rate and weekly working hours—this study aims to provide a nuanced understanding of how men's uptake of paternal leave influences women's participation in the labor market. The findings from this research are particularly relevant as they can inform policy recommendations not only in the studied countries, but also in other countries striving to enhance gender equality. Understanding the distinct effects of paternal leave can help shape policies that promote a more balanced division of parental responsibilities. As a result, better labor market outcomes for women can be achieved.

In this section, I briefly introduced the topic of my thesis. Furthermore, I discussed the relevance of the research. In the following section, relevant existing theories are examined and academic concepts are clarified. This paper will focus on addressing the following research question:

RQ: *How does the usage of paternal leave by men impact female employment outcomes in Sweden, Norway and Finland from 2010 to 2020?*

I use publicly available data on the employment rate, the FTE employment rate, and the average usual weekly hours worked in the main job for females to proxy female employment. I create my own dataset using data provided by the OECD, National Statistical Insitutes and the World Bank. The used data is comprehensive and covers the years 2010 to 2020 (including). To answer the research question, I performe a fixed effects OLS regression analysis. The analysis includes data from the three countries Sweden, Norway and Finland, forming a panel data set. To control for country-specific characteristics, fixed effects are added to the regression. As female employment outcomes can be measured in various ways, I conduct the same analysis for each dependent variable I chose. The study will be conducted in multiple steps, guided by three hypotheses. The hypotheses aim to explore correlations related to paternal leave, based on relevant existing literature:

H1. *There is a positive correlation between paternal leave days taken and the female employment rate.*

H2. *There is a positive correlation between paternal leave days taken and the female FTE employment rate.*

H3. *There is a positive correlation between paternal leave days taken and female weekly working hours.*

The rest of the paper is structured as follows. In the third and fourth section, Data and Methodology used to gain the results are analyzed. Here, an elaborate description of the research methodology used to interpret the data is provided. The Results section displays the implementation of the methodology and the obtained outcomes. In the fifth section, I finalize my research with the Conclusion and a Discussion. In this section, I answer my research question using the obtained results. In the Discussion, limitations and shortcomings are addressed. In addition, implications and the importance of the thesis are evaluated.

2 Theoretical framework

2.1 Parental Leave Policies in Sweden, Norway and Finland

The Nordic countries have globally led the way in establishing paid maternity leave. Moreover, during the 1970s and 1980s, they were among the first to introduce paid parental leave schemes (Haas et al., 2011). One of these countries is Sweden, a country that has championed gender equality through various policies aimed at facilitating gender parity and enhancing women's opportunities in the labour market (Ekberg et al., 2013). To add on, Sweden was the first country to introduce a gender-neutral paid parental leave benefit in 1974, providing a leave that could be split between two parents of a child. This policy has evolved to ensure each parent has non-transferable paid months, encouraging both parents to share childcare duties. As of now, both parents are entitled to 480 days of paid leave per child, with 90 days reserved for each parent (Swedish Government Ministry of Employment, 2020). Of these days, 390 days are compensated based on income and the remaining 90 days at a flat rate. Sweden's system has been pivotal in transitioning Sweden from single-earner to dual-earner family models, often termed earner-carer families (Ferrarini and Duvander, 2010).

Similar to Sweden, the Norwegian government has pursued an active policy of promoting gender equality since the 1970s. In 1978, Norway adopted the Gender Equality Act, which prohibits discrimination on the grounds of sex in all areas of society and obliges all public institutions to promote gender equality across various domains, including labor, education, and health (ILO, 2005). Similar to Sweden, Norway offers an extensive parental leave system. Initially, the country had a 12-week unpaid leave policy, which was replaced by more generous provisions over time (ILO, 2004). Since 1977, fathers could take parental leave, at the expense of the mother's leave period. As a result, very few fathers took parental leave. In 1993, the "father's quota" was introduced in Norway, marking a significant milestone in Norway's road to gender equality. With this policy, Norway was the first country to earmark a paternity leave for fathers. The policy exclusively reserved 4 weeks of leave for the father to use during the infant's first year (Finseraas & Kotsadam, 2011). The "use it or lose it" feature was aimed as an incentive for fathers to take parental leave. After the introduction of the daddy quota, the take-up rate for fathers rose sharply, from 4 percent before the reform to 70 percent in 1995 (Brunning &

Plantenga, 1999) and in 2003, 89 percent of all fathers took some parental leave (O'Brien et al., 2007). The ongoing evolution of Norway's parental leave policies demonstrates a robust commitment to fostering gender equality and supporting family life.

Lastly, Finland's parental leave policies are also robust, providing 320 days of parental leave that can be shared between parents (European commission, 2024). Finland was relatively later in progressing parental and paternal leave laws compared to Sweden and Norway. In 1985, Finland extended parental leave to include fathers, albeit with limited uptake (Lammi-Taskula, 2008). Ten years after Norway, in 2003, Finland introduced a mandated leave period for fathers. Recently, in 2020, Finland reformed its parental leave system again to give each parent an equal quota of 160 days. In terms of outcomes, Finland has shown promising results. The OECD (2024) finds that the average duration of parental leave taken by men has increased from 16.4 days in 2010 to 31 days in 2020. Although the uptake of paternal leave in Finland has steadily increased over the recent years, it remains lower than in Sweden and Norway (OECD, 2024). Finally, the employment rate for women in Finland is high, but there are still significant gender gaps in part-time work and average earnings (Statista, 2024; World bank, 2024).

Table 1: Comparison of Parental Leave Policies in Sweden, Norway, and Finland (2024)

Country	Total Leave	Paid Leave	Non-transferable Quota for Each Parent	Compensation Rate
Sweden	480 days	480	90 days each	390 days based on the annual income. 90 days based on the minimum level.
Norway	49 weeks 59 weeks	49 weeks 59 weeks	15 weeks 19 weeks	100% of annual income 80% of annual income
Finland	320 days	320 days	97 days	Based on annual income

Note: Data provided by the Nordic Co-operation (2024) & Social Insurance Institution of Finland (2024)

Table 1 summarizes the current parental leave systems of Sweden, Norway and Finland. The parental leave policies in Sweden, Norway, and Finland share a common goal of promoting gender equality and supporting female employment outcomes. Sweden's system is the most extensive, offering 480 days of leave, whereas Norway and Finland offer 49 or 59 weeks and 320 days, respectively. All three countries have implemented non-transferable quotas to encourage fathers to take leave.

2.2 Literature review

Research has shown that having children has a significant impact on both the short- and long-term labor market outcomes of women (Cools et al., 2017). Through policies like parental leave, child care and the scheduling of public education employment outcomes of mothers can be influenced and potentially optimized (Jaumotte, 2003). In this section, the most relevant literature on parental and paternal leave reforms and its effects on female employment will be evaluated.

Ruhm (1996) investigates the impact of parental leave mandates on labor market outcomes using data from 16 European countries between 1969 and 1988. Ruhm's primary focus is the effect of these mandates on the employment-to-population ratios, weekly work hours, and wages, particularly examining the gap between male and female outcomes. The study uses a triple difference-in-difference model to account for unobserved heterogeneity across countries and over time. At the time of the study, women effectively used all parental leave. As a result, older women (45-54 years) and men serve as a control group, considering that they are not expected to take any leave. The study's findings indicate that parental leave mandates generally increase the female employment-to-population ratio. Implementing leave legislation is estimated to boost the employment-to-population ratio for all women by approximately 4%. For women of childbearing age, this increase is around 9%. Notably, up to 25% of this overall increase can be attributed to a higher rate of leave-taking among employed women. This outcome suggests that parental leave policies help retain women in the workforce by providing necessary leave options.

While Ruhm (1996) evaluates the relationship between parental leave taken by women and its effect on female employment outcomes, this research focuses on the effects of leave taken by fathers. In 1993, Norway was the first country to introduce a paternity leave

earmarked for fathers (Lappegard, 2008). The reform aimed to promote equalization between parents, in the form of childcare and 'economic parenting' or 'breadwinning'. Lappegard (2008) finds a mixed effect of the introduction of the father's quota on female employment. His research shows that the leave taking of fathers can support mothers' earlier return to work. However, according to Lappegard (2008), income affects the decision of the father to take leave. Fathers working part-time or with low incomes are less likely to take leave, therefore they negatively affect mothers' employment outcomes by perpetuating traditional gender norms. The "Daddy-Month" reform in Sweden provides another valuable case study regarding the effects of paternity leave. This policy allocated a specific leave exclusively for fathers, which if not taken, would be lost ("use-it-or-lose-it" policy). Ekberg et al. (2013) focus on the reform that provided one month of this type of paternal leave in 1995. They create a natural experiment by comparing outcomes of parents of children born in different cohorts just before and just after the implementation of the policy. The reform led to an increase in the share of fathers using approximately one month of parental leave from 9 percent to 47 percent (Ekberg et al., 2013). In contrast to Ruhm's (1996) findings, small positive long-term effects on female earnings and a slight decrease in employment rates was observed. These effects, however, were not substantial and not robust against the choice of cohort size.

Internationally, the impact of paternal leave on female employment outcomes has been studied in various contexts. Byker (2016) analyzed the effects of paid parental leave laws in the United States, finding that short-duration leave for fathers can increase women's labor-force attachment by facilitating a more equitable distribution of childcare duties. This, in turn, helps to mitigate the career disruptions that typically accompany childbirth and early childcare.

Alike Ekberg et al. (2013), Patnaik (2019) examines a policy reform providing paternal leave. To specify, the introduction of the Quebec Parental Insurance Plan (QPIP) of Canada in 2006 is studied. The QPIP policy incorporated a "daddy quota", allocating five weeks of parental leave exclusively for fathers. The main goal of the reform was the promotion of gender equality within households and an increase in the fathers' participation in childcare. Patnaik (2019) combines a sharp regression discontinuity (RD) design to estimate the immediate effects of QPIP and a difference-in-differences (DD) approach to evaluate its long-term impact. The findings reveal that QPIP significantly increased

fathers' participation in parental leave, with claim rates rising by 53 percentage points and the duration of leave extending by three weeks. More importantly, the policy also influenced mothers' labor market behavior positively. Mothers exposed to QPIP appeared to spend more time in paid employment and were more likely to hold full-time positions. Similar to Ruhm (1996), the study suggests that parental leave policies can facilitate the retainment of women in the workforce.

Pylkkänen and Smith (2003) perform a comparative study of Denmark and Sweden. Despite their cultural similarities and shared welfare state ideology, these countries implement notably different family policies. Pyllkänen and Smith (2003) evaluate how family policies in the two countries influence women's career interruptions due to childbirth. Between the two countries, there is a significant difference in the role of the fathers. In Sweden, fathers have much longer parental leave periods compared to the fathers in Denmark. A noticeable result from the study is that if fathers were given more parental leave, it would promote the labour supply of women. For Denmark, this substitution effect is not observed among the parents. Lastly, the study by Rønsen and Sundström (1996) also provides comparative insights into the effects of paternal leave policies. They compare the leave policies of Norway and Sweden. Rønsen and Sundström (1996) find that Norwegian mothers, who had less flexible paternal leave policies, returned to work more quickly but with higher variability in employment patterns compared to Swedish mothers. This underscores the importance of policy design in shaping employment outcomes.

The literature reviewed highlights the significant role that parental leave policies, particularly those targeting fathers, can play in shaping female employment outcomes. Ruhm's (1996) findings underscore the positive impact of parental leave mandates on female employment ratios. Adding on, all discussed papers find the same effect of paternity leave on women's carreer interuptions. Namely, they agree that the leave of fathers supports women's continuous employment. Ultimately, comparative studies by Pylkkänen and Smith (2003) and Rønsen and Sundström (1996) emphasize the importance of tailored policy designs to maximize positive employment outcomes for women.

3 Data

This section will describe the dataset and explain the variables used to analyse the impact of paternal leave taken on female employment outcomes in Sweden, Norway and Finland. I have employed various public datasets from the OECD, the World Bank and national statistical institutes. By combining these, I create a unique dataset suited to my analysis. The dataset is a panel data set, which combines cross-sectional and time-series data. Specifically, it includes annual observations from three countries—Sweden, Norway, and Finland—over the period 2010 to 2020. The OECD provides the required data on female employment outcomes in the datasets Labour Market Statistics (2024) and Labour Force Statistics (2024). These datasets provide information on the female working population, referring to women aged 15 to 64. The OECD also collects useful data on parental leave policies. In the OECD Family Database (2024), indicators on family outcomes and family policies such as child-related leave are provided. I use this database for my independent variable total paternal leave taken. For all relevant variables, data was available for the period spanning from 2010 to 2020 (including), ensuring a comprehensive dataset. By choosing this time period, ample time is given for a possible effect of an increase in use of paternal leave days. Also, a relatively longer time frame ensures that the analysis is not skewed by short-term fluctuations. The longer length enhances the statistical power of the analysis, making the results more reliable and generalizable.

3.1 Main variables

The independent variable is the total paternal leave taken, specified per year. Data on the use of childbirth-related leave benefits is derived from the "OECD Family Database" (2024). I use the variable 'Recipients/users of publicly administered parental leave benefits or publicly administered paid parental leave per 100 live births, by gender'. It is important to note however, that this variable represents the total instances of leave taken rather than the number of unique fathers taking leave. It is therefore possible that this variable reaches 100 or more users/recipients for every 100 children born. For example, if a birth occurs late in the year, fathers may be on paternity leave both in December and January, thus entering the statistics in separate years. In addition, one father taking multiple leave periods within a year can be counted multiple times. The birth of their child,

however, enters the denominator of the recipients/users per 100 live births and is thus only counted once. For this reason, the variable I name 'total paternal leave taken' is measured in instances of paternal leave taken, rather than the number of fathers taking leave.

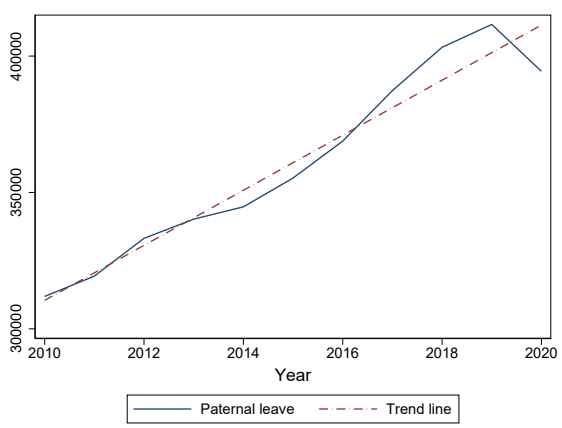
I convert the OECD variable 'Recipients/users of publicly administered parental leave benefits or publicly administered paid parental leave per 100 live births, by gender' to the total instances of leave taken by men per year using data on the number of live births of each country. National Institutes Statistics Sweden, Statistics Norway and Statistics Finland provide the required information on the number of births per year.

The total paternal leave taken is calculated using the following steps:

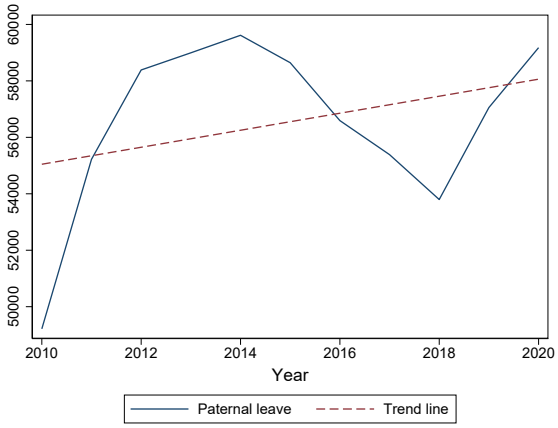
$$\text{Male users per live birth} = \left(\frac{\text{Male users per 100 live births}}{100}\right) \tag{1}$$

$$\text{Total paternal leave taken} = \text{Male users per live birth} \times \text{Total live births} \tag{2}$$

Figure 2 shows the trend in the independent variable, total paternal leave taken, for each studied country from 2010-2020. By analysing this figure, it can be noticed that the three countries show contrasting trends. Firstly, Sweden shows a relatively stable positive linear trend in the uptake of paternal leave. Similarly, Norway shows a positive trend line over the years. However, the actual paternal leave uptake in Norway is more fluctuating, with a noticeable decline in 2018. Lastly, Finland's trend line has a negative slope, indicating an average decline in the total usage of paternal leave over the years.

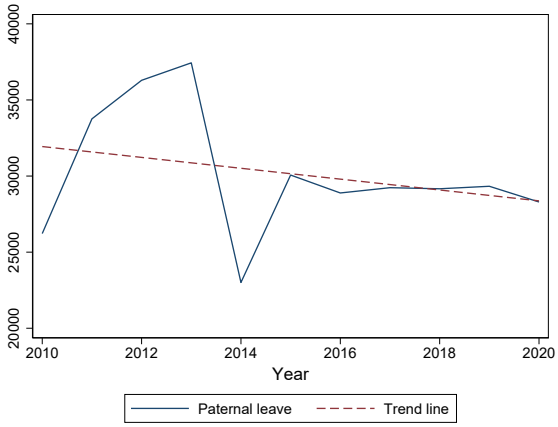


(a) Sweden's trend in Paternal leave



(b) Norway's trend in Paternal leave

Figure 2: Comparison of paternal leave usage in Sweden and Norway from 2010 to 2020



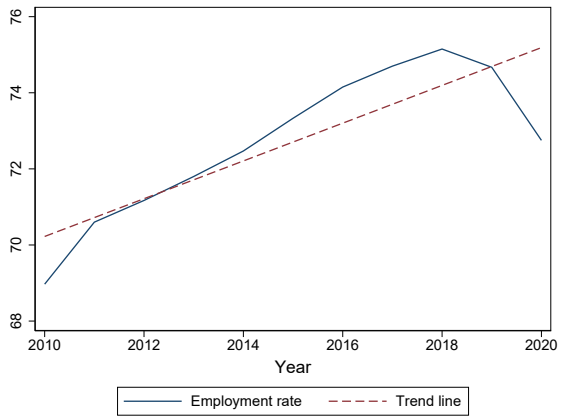
(c) Finland's trend in Paternal leave

Figure 2: Comparison of paternal leave usage in Sweden, Norway, and Finland from 2010 to 2020

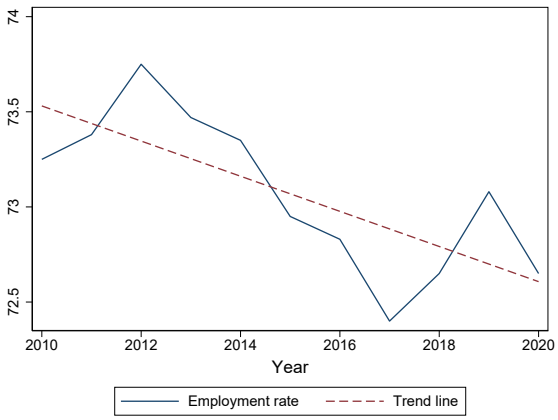
In my analysis three separate outcome variables are of interest. These dependent variables are the employment rate, the FTE employment rate and the weekly working hours, each for women. Data on the FTE employment rate and the weekly working hours are from the "Labor Force Statistics" dataset (OECD, 2024) and the data on employment rates is extracted from the "Labour Market Statistics" dataset (OECD, 2024). For consistency, the data on all of the dependent variables covers the age group from 15-64 years old. The employment rate is defined as the employment/population ratio. The FTE employment rate is the same rate, adjusted to reflect full-time work. Both variables are expressed as a percentage. Lastly, the variable weekly working hours is defined by the OECD (2024) as the average usual weekly working hours on the main job and is based on

total declared employment. It is the employment weighted sum of average usual weekly hours worked by full-time and part-time workers.

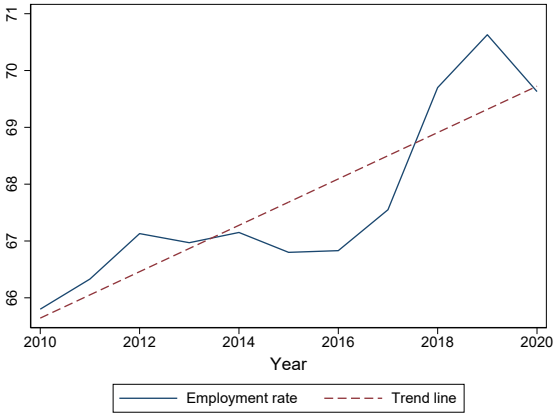
Figure 3,4 and 5 show the trends in employment rate, FTE employment rate and weekly working hours, respectively. From figure 3, we can conclude that Norway on average has the highest employment rate, with a rate of 73,07 percent. The employment rate in Sweden is slightly lower, on average 72,75 percent, and the rate for Finland is 67,68 percent. While Sweden and Finland both show an increase in the employment rate from 2010-2020, Norway's employment rate decreased.



(a) Sweden's trend in Employment rate



(b) Norway's trend in Employment rate

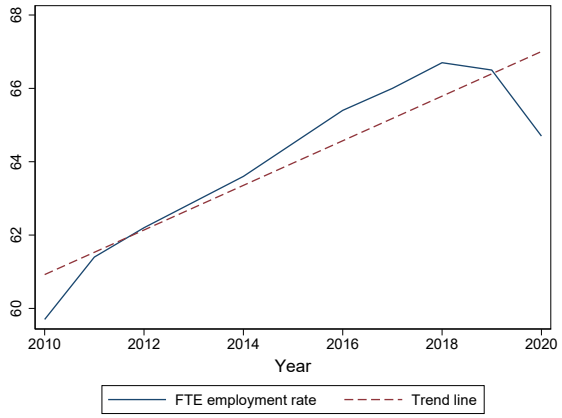


(c) Finland's trend in Employment rate

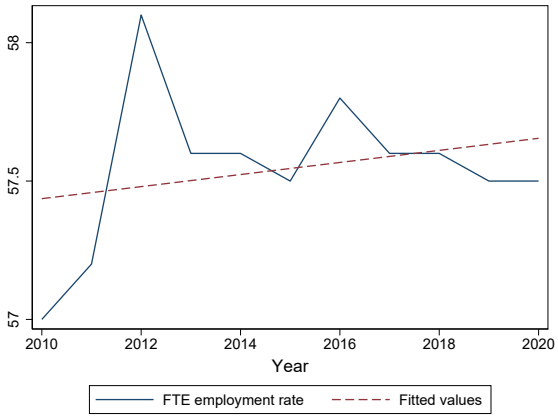
Figure 3: Comparison of Employment rates in Sweden, Norway, and Finland from 2010 to 2020

The trends in FTE employment rate in figure 4 find close to identical trends as shown in figure 3 for the countries Sweden and Finland. All countries display a positive trend. Norway has the lowest average FTE employment rate, which is 57,55 percent. Lastly, the trends in Weekly working hours of females in Sweden, Norway and Finland are visible in

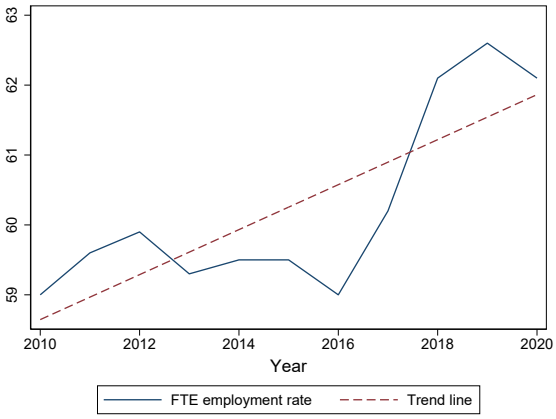
Figure 5. weekly working hours in Sweden follow a strong linear trend. In Finland and Norway, more fluctuations in the Weekly working hours can be interpreted from the trend graphs.



(a) Sweden's trend in FTE Employment rate

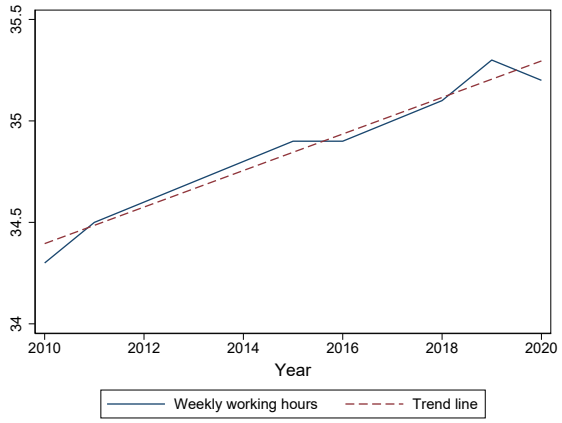


(b) Norway's trend in FTE Employment rate

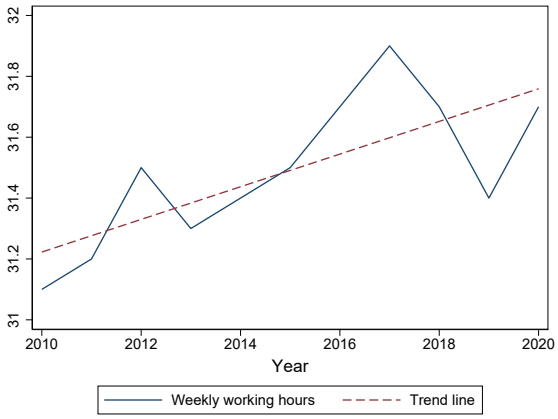


(c) Finland's trend in FTE Employment rate

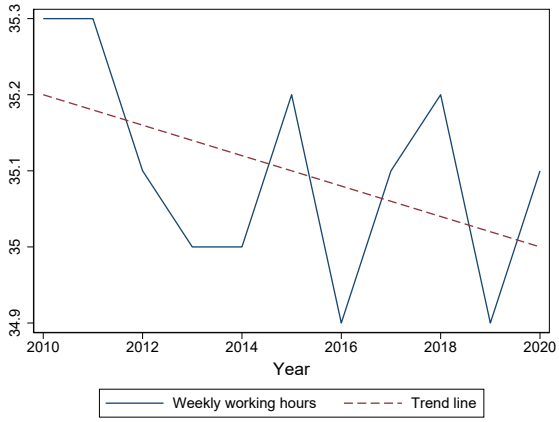
Figure 4: Comparison of FTE Employment rates in Sweden, Norway, and Finland from 2010 to 2020



(a) Sweden's trend in Weekly working hours



(b) Norway's trend in Weekly working hours



(c) Finland's trend in Weekly working hours

Figure 5: Comparison of Weekly working hours in Sweden, Norway, and Finland from 2010 to 2020

3.2 Control variables

To answer my research question, I perform a multiple regression analysis. By controlling for confounding variables, I aim to isolate the true effect of the paternal leave taken on the three separate proxies for female employment outcomes. The control variables I use are education level, GDP growth rate, fertility rate, GDP per capita, gender wage gap and average wages.

The education level variable represents the percentage of the female population above 25 years old that has at least completed post secondary level of education. The GDP growth rate and the GDP per capita are measures for economic growth of the specific country. Data on the fertility rate specifically for the working population is not available.

As a result, I choose to use the total fertility rate reported by the OECD (2024). This variable is defined as the average number of children born to a woman. The variable average wages is the total wage bill of a country divided by the number of employees, adjusted for average weekly hours worked. Finally, the gender wage gap is a measure of the inequality in earnings between men and woman. It is the difference in median earnings between these two genders, expressed as a percentage of men's median earnings.

3.3 Descriptive statistics

To test the main hypothesis, whether a relationship exists between the total paternal leave taken and female employment outcomes, a data sample is created from 3 Nordic countries for the period from 2010 to 2020. Table 2 shows the countries used to estimate the effect. The three chosen countries are Sweden, Norway and Finland.

Table 2: The chosen Nordic countries

Nordic country	Observations
Sweden (SWE)	11
Norway (NOR)	11
Finland (FIN)	11

In anticipation of the succeeding analyses, it is useful to examine and summarize the available data. Table 3 provides an overview of the descriptive statistics of my dataset. The number of observations, means and standard deviations of the variables can be found in this table. In addition to the key variables and the control variables, I included two general variables related to the population in the descriptive statistics overview. The variable live births indicates the number of births in a specific year. The variable female working population illustrates the total size of the female working population aged 15 to 64. These two variables offer contextual insight and might help to understand the demographic backdrop from 2010 to 2020.

Table 3: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Paternal leave					
Total paternal leave taken	33	149206.2	153651.4	23007.26	411595.7
Average duration paternal leave	33	36.855	9.748	16.4	60
Female employment outcomes					
Employment rate	33	71.153	2.869	65.8	75.15
FTE employment rate	33	60.588	3.048	57	66.7
Weekly working hours	33	33.812	1.686	31.1	35.3
Control variables					
Education level	33	41.567	4.678	35	56
GDP growth rate	33	1.415	1.843	-2.4	6
Fertility rate	33	1.721	0.171	1.35	1.98
GDP per capita	33	62970	18393	42802	103554
Gender wage gap	33	10.855	5.471	4.37	20.18
Average wages	33	49879.4	1723.9	45337	52415
Population					
Live births	33	75498.9	28336.1	45613	117425
Female working population	33	2140923	655671	1584705	3142874

Note: This table provides the descriptive statistics of the dataset from the years 2010 - 2020.

When examining Table 3, several statistics stand out and warrant closer attention. The mean total paternal leave taken is 149206 instances per year with a standard deviation of 153651, ranging from 23007 to 411596 instances. This significant variability in paternal leave taken indicates significant differences in the extent to which paternal leave policies are utilized. This variety reflects possible effects of diverse workplace cultures, policy implementations, and individual choices regarding paternity leave. Understanding this variability and its cause is crucial for interpreting how paternal leave impacts female employment outcomes, as it provides insight into the effectiveness of leave policies.

The mean employment rate for females is 71.15 percent, with minor fluctuations indicated by a standard deviation of 2.869 percent. This relatively stable employment rate suggests that the majority of women maintain consistent employment levels, despite some variability. This stability is critical for analyzing the resilience of female employment in the face of varying paternal leave policies. It could indicate that changes in paternal leave may not drastically affect overall employment rates. To add, Table 3 illustrates the moderate variability of the FTE employment rate. This value highlights differences in full-time and part-time employment among women. This value is relevant, since a moderate variability indicates that the FTE employment

rate could be influenced by paternal leave policies. More supportive leave policies might enable women to pursue full-time employment more feasibly.

The variables used in my analysis are shown below. To gain initial knowledge on the possible relationship between the dependent and independent variables of my study, I conduct a correlation analysis. Table 4 shows the results of the analysis. Based on the correlation analysis on the panel data study, the variables in this research are correlated with one another. The strongest link between the variables is the link between the GDP per capita and the weekly working hours, with a negative correlation of -0.9117. This result is as expected. A higher GDP per capita allows individuals and societies to prioritize quality of life over long working hours. The combination of increased income and improved productivity leads to a decrease in weekly working hours, indicating a negative and strong relationship. Other strong relationships are shown between the gender wage gap and the employment rate and between the total paternal leave taken and the FTE employment rate.

Variables used:

TP	Total paternal leave taken
ER	Employment rate
FE	FTE employment rate
WW	Weekly working hours
EL	Education level
GG	GDP growth rate
FR	Fertility rate
GC	GDP per capita
GW	Gender wage gap
AW	Average wages

Table 4: Correlation matrix variables

	TP	ER	FE	WW	EL	GG	FR	GC	GW	AW
TP	1.0000									
ER	0.4820	1.0000								
FE	0.8087	0.2505	1.0000							
WW	0.3847	-0.4959	0.7159	1.0000						
EL	0.2189	0.3884	0.3525	0.0332	1.0000					
GG	0.2487	0.0679	0.0695	0.0198	-0.3758	1.0000				
FR	0.4382	0.1289	0.0429	-0.0470	-0.5290	0.3793	1.0000			
GC	-0.2390	0.5645	-0.5623	-0.9117	-0.0461	0.0163	0.2170	1.0000		
GW	-0.3965	-0.8907	0.0360	0.6698	-0.2860	-0.1550	-0.2431	-0.6667	1.0000	
AW	-0.4630	0.1832	-0.2464	-0.3591	0.5605	-0.3734	-0.6565	0.2368	-0.1195	1.0000

4 Methodology

In this section, the chosen analysis methods are further explained. Fixed effects regression is the main method I utilise to answer my research question. This study uses panel data, making the evaluation of the dynamics of multiple countries over a specific period possible. By leveraging panel data, researchers can achieve more accurate and reliable parameter estimates (Hsiao, 2007). A significant advantage of panel data is its capacity to control for unobserved heterogeneity and reduce the multicollinearity problem, problems that are likely to appear in time series data.

4.1 Fixed effects regression

The panel data set used for the analysis contains a time-series variable (year) and a cross sectional variable (country). The relationship that this study may find between the total paternal leave taken and female employment outcome is possibly dependent on the included countries and years. Therefore, using a fixed effect model for this study is more appropriate than a pooled model. This type of model removes all time-invariant heterogeneity, making it more suitable when these unobserved variables could correlate with the predictors. As some impactful events happened during the time period of the analysis, this can be controlled for using fixed effects. Economic crisises and the COVID pandemic are examples of such events that took place between 2010 and 2020.

In the dataset, large differences in the economic and political environment might exist. This might lead to heteroskedasticity, as it can cause differences in the cross-sectional residuals. To test for heteroskedacity in the used regression model, a Breusch–Pagan/Cook–Weisberg test is performed. This test evaluates whether the variance of the errors from a regression model is constant or varies with the values of the independent variables. When the variance of errors varies, there is so calles heteroskedacity. The null-hypothesis assumes homoskedacity. Performing the Breusch–Pagan (Breusch & Pagan, 1979) test for the employment rate, FTE employment rate and the weekly working hours regressions results in p-values that are each greater than the conventional significance level of five percent. This result indicates that the null hypothesis is not rejected, and that the assumption of homoskedacity is supported. I interpret the regression results without controlling for heteroskedacity.

In total I conduct three fixed effects regression analyses to estimate the effect of total paternal leave taken on the separate dependent variables measuring female employment outcomes. As the treatment (total paternal leave taken) is not randomized, the estimated coefficient of a simple linear regression cannot be causally interpreted due to endogeneity. The major cause of

this endogeneity is the presence of omitted variables. To reduce omitted variable bias, I will incorporate a set of six control variables into the model. Control variables are those variables that can influence both the dependent and independent variables. In the context of this research, factors that might affect both total paternal leave taken and female employment outcomes. The factors I chose to take into account are education level, GDP growth rate, fertility rate, GDP per capita, gender wage gap and average wages.

I test three separate null hypotheses, each positing that the total paternal leave taken has no effect on one of the three measures of female employment. The regression I perform to estimate this effect uses the following equation:

$$\begin{aligned} \mathrm{y}_{it} = \beta_0 &+ \beta_1 * \text{Total paternal leave taken}_{it} + \beta_2 * \text{Education level}_{it} + \beta_3 * \text{GDP growth rate}_{it} \\ &+ \beta_4 * \text{Fertility rate}_{it} + \beta_5 * \text{GDP per capita}_{it} + \beta_6 * \text{Gender wage gap}_{it} \\ &+ \beta_7 * \text{Average wages}_{it} + \alpha_i + \epsilon_{it} \end{aligned} \tag{3}$$

In the equation above, the primary variable of interest is the total paternal leave taken, measured by β_1. I use the same equation to calculate the effect on the three different dependent variables employment rate, FTE Employment rate and weekly working hours. The coefficients of β_2 to β_7 estimate the effect of the control variables on the female employment outcomes. This subscript i denotes the cross-sectional unit, Sweden, Norway or Finland. Each country has its own unique identifier in the dataset. In addition, each year also has its own unique identifier, represented by subscript t. Variable α represents country fixed effects, which control for unobserved, time-invariant differences between the countries. Lastly, the ϵ is the error term. This term represents the part of the dependent variable y that cannot be explained by the independent variables in the model. Moreover, it explains captures the random variability in y due to factors that are not included in the model.

Firstly, the female education level directly influences female employment outcomes such as labor force participation (Jaumotte, 2003). To add on, Geisler and Kreyenfeld (2018) find that the relative education of the partner plays a role in the uptake of parental leave. According to them, men who are less educated than their female partners are more likely to take leave. From this we can conclude that female education level indirectly impacts paternal leave taken. Secondly, the GDP growth rate is added as a control variable. This variable is a measure for the economic growth of a country as a whole. According to Okun´s law, when the economy is improving, demand for products and services increases which will eventually decrease unemployment (Prachowny, 1993). This directly impacts the female employment rates. Fertility rate

is a relevant control variable to add. Higher fertility often leads to more career interruptions and reduced labor market participation for women due to childbearing and childcare responsibilities (Adda et al., 2017). Adda et al. (2017) find that fertility not only results in immediate interruptions, but also negatively impacts long-term skill accumulation and wage growth. In addition, an increase in the fertility rate causes a direct increase of paternal leave taken.

To add, GDP per capita is another control variable I use that measures economic growth. While GDP growth rate indicates how fast an economy is growing, GDP per capita shows the economic output on a per-person basis, capturing different aspects of economic conditions. Including GDP per capita as a control variable is therefore beneficial to isolate the specific impact of paternal leave on female employment. An increase in either the GDP growth rate or the GDP per capita indicates an increase in productivity, lowering weekly working hours (Jorgenson, 1991). The gender wage gap is a measure for the difference in median earnings of men and women relative to median earnings of men. An increase in the gender wage gap implies a growing disparity in earnings between men and women. This gap significantly affects female employment rates, because women are often overrepresented in lower-paying occupations. This means that wage inequality not only reduces overall earnings for women, but also limits their employment opportunities and career progression (Blau & Kahn, 1992). Lastly, I added average wages as a control variable. Higher wages attract more workers to a market, consequently influencing employment outcomes (Dickens et al., 1999).

4.2 Multicollinearity

To check for multicollinearity, I perform a multicollinearity test using the variance inflation factor (VIF) and the tolerance (1/VIF). The VIF tells how much of one predictor's variance is explained by the other predictors, and how much a coefficient's standard error is increased due to multicollinearity (Alin, 2010). The tolerance indicates the proportion of variance in an independent variable that is not explained by other predictors. Performing a multicollinearity test is an essential step following multiple regression analysis to ensure the reliability and interpretability of the model. When independent variables exhibit high correlations, the estimates of regression coefficients can become unstable, undermining the statistical significance of predictors.

Table 5: Multicollinearity of the variables

Variable	VIF	1/VIF
Total paternal leave taken	6.94	0.144070
Gender wage gap	6.32	0.158258
GDP per capita	6.04	0.165610
Education level	4.07	0.245573
Fertility rate	3.86	0.258811
Average wages	3.56	0.280603
GDP growth rate	1.43	0.699985
Mean VIF	4.60	

Table 5 provides an overview of the multicollinearity analysis of the used variables. Generally, a VIF above 10 is considered high and indicative of serious multicollinearity problems. The Mean VIF is 4.60, which suggests that, on average, the predictors exhibit moderate multicollinearity. All predictors have a VIF below 10 and are therefore kept in our analysis.

5 Results

5.1 The fixed effects model

In this subsection, the effect sizes of paternal leave on female employment outcomes will be estimated using a fixed effects model. Table 6, 7 and 8 show the results of the fixed effects regressions for the three outcome variables employment rate, FTE employment rate and weekly working hours, respectively.

Table 6: Panel Data Regression with Country Fixed Effects using Employment rate as the outcome variable

Variables	(1)	(2)	(3)	(4)	(5)	(6)
TP	0.0000429***	0.0000429***	0.0000507***	0.0000526***	0.0000527***	0.0000561***
	(0.0000128)	(0.000013)	(0.0000116)	(0.00001)	(0.00001)	(0.0000136)
EL	0.0416	0.0415	-0.114	-0.133**	-0.131*	-0.124*
	(0.0541)	(0.059)	(0.0722)	(0.061)	(0.065)	(0.0683)
GG		-0.000612	-0.0297	-0.0158	-0.0131	-0.0111
		(0.127)	(0.111)	(0.0932)	(0.101)	(0.103)
FR			-5.542***	-7.567***	-7.640***	-7.838***
			(1.804)	(1.616)	(1.856)	(1.961)
GC				0.000071***	0.0000709***	0.0000696***
				(0.00002)	(0.000021)	(0.0000215)
GW					0.0212	0.0123
					(0.248)	(0.254)
AW						-0.000093
						(0.000244)
Constant	63.03***	63.03***	77.91***	77.39***	77.20***	81.583***
	(1.855)	(2.189)	(5.205)	(4.356)	(4.995)	(12.563)
N	33	33	33	33	33	33
R^2						
Within	0.4642	0.4642	0.6069	0.7356	0.7356	0.7373
Between	0.2628	0.2628	0.2300	0.3667	0.3525	0.3239
Overall	0.2402	0.2402	0.2215	0.3493	0.3377	0.3239

Notes: This table shows the fixed effects model of total paternal leave taken on employment rate. The employment rate is specified for females, it is the number of employed females/ total female labor force. The standard error is given within parentheses, and the '*' provide the significance level as follows: * p<0.10 ** p<0.05 *** p<0.01.

Table 6 shows a small positive effect of total paternal leave taken on the female employment rate in all six models. The final model results in a positive correlation between paternal leave and the female employment rate of 0.0000561. This effect is significant with a p-value smaller than 0.01. This was earlier found by Ruhm's (1996) empirical studies on parental leave. The first model only adds the variable education level, which shows a positive, but insignificant

correlation. After adding the GDP growth rate and the fertility rate, the coefficient for education level becomes negative. This negative effect of education is significant for model 4, 5 and 6 with a significance level of 10 percent. There can be several possible explanations for the change of this coefficient. The inclusion of GDP growth rate and fertility rate, which are themselves influenced by education, can introduce multicollinearity. Even though the mean Variance Inflation Factor (VIF) of 4.60 indicates moderate multicollinearity, it can still distort the coefficient estimates. This distortion might lead to changes in the sign and significance of the education level coefficient, as the shared variance between these predictors interferes with the model's ability to estimate their unique contributions accurately. Lastly, the negative coefficient for education level might indicate interaction effects. In rapidly growing economies, the demand for low-skilled labor might increase, potentially overshadowing the benefits of higher education.

The GDP growth rate has a small negative impact on the employment rate, but this relationship is insignificant and therefore cannot be interpreted. In model 3, the fertility rate is added to the model. The fertility rate has a significant negative effect on female employment. The coefficient of the final model is -7.838 with a one percent significance level. This is aligned with earlier findings by Adda et al. (2017), arguing that increasing fertility rates leads to more significant career interruptions by mothers. GDP per capita is added, illustrating a small positive effect on the female employment rate of 0.0000696 in the final model. A positive estimate is in line with the expectations by Prachowny (1993). Lastly, model 5 and 6 add the gender wage gap and the average wages as control variables. These variables both show no significant effect on the female employment rate.

Table 7: Panel Data Regression with Country Fixed Effects using FTE employment rate as the outcome variable

Variables	(1)	(2)	(3)	(4)	(5)	(6)
TP	0.0000501***	0.0000502***	0.000057***	0.0000582***	0.0000584***	0.0000562***
	(0.0000107)	(0.0000109)	(0.0000096)	(0.0000089)	(0.0000092)	(0.0000124)
EL	0.0644	0.0688	-0.067	-0.0783	-0.0753	-0.0795
	0.045	(0.0495)	(0.0596)	(0.0553)	(0.0593)	(0.0624)
GG		0.0265	0.00113	0.00959	0.0147	0.0135
		(0.107)	(0.092)	(0.085)	(0.092)	(0.0939)
FR			-4.842***	-6.076***	-6.205***	-6.076***
			(1.489)	(1.465)	(1.693)	(1.791)
GC				0.0000433**	0.0000431**	0.000044**
				(0.0000186)	(0.000019)	(0.0000232)
GW					0.0376	0.0434
					(0.226)	(0.232)
AW						-0.0000606
						(0.000222)
Constant	50.43***	50.20***	63.20***	62.88***	62.54***	59.68***
	(1.557)	(1.836)	(4.297)	(3.975)	(4.556)	(11.476)
N	33	33	33	33	33	33
R^2						
Within	0.6485	0.6493	0.7507	0.7952	0.7954	0.7961
Between	0.7616	0.7610	0.7853	0.7171	0.7377	0.7346
Overall	0.6641	0.6635	0.6908	0.6414	0.6588	0.6604

Notes: This table shows the fixed effects model of total paternal leave taken on FTE employment rate. The FTE employment rate is here specified for females, it is the female employment rate, adjusted to reflect full-time work. The standard error is given within parentheses, and the '*' provide the significance level as follows: * p<0.10 ** p<0.05 *** p<0.01.

The final fixed effects model of paternal leave on the FTE employment rate is presented in table 7. The FTE employment rate takes part-time and full-time work into account to provide a more nuanced view of labor input. The model for the FTE employment rate finds a significant positive impact from the uptake of paternal leave with a coefficient of 0.0000562. This coefficient is almost identical to that of the fixed effects model estimating the female employment rate, which was 0.0000561. Alike in table 6, the effect of education changes after the addition of GDP growth rate and fertility rate to the model. In this model, the education level shows no significant effect on the FTE employment rate. For the GDP growth rate, the fertility rate and the gender wage gap, the results are strongly comparable to those found in table 6. The GDP growth rate and the gender wage gap illustrate small, insignificant relationships with the FTE employment rate. However, the fertility rate again shows a significant negative effect on the outcome variable. With a value of -6.076 compared to a coefficient of -7.838, the effect of the fertility rate on the FTE employment rate is moderately smaller than the effect for the general

employment rate. Finally, the average wages appear to have a small negative effect on the FTE employment rate, an effect that was positive for the general employment rate. No conclusions can be interpreted from this variable, since it has no significance.

Table 8: Panel Data Regression with Country Fixed Effects using Weekly working hours as the outcome variable

Variables	(1)	(2)	(3)	(4)	(5)	(6)
TP	0.0000067***	0.0000067***	0.0000068***	0.0000065***	0.0000067***	0.0000042***
	(0.0000019)	(0.0000019)	(0.000002)	(0.0000018)	(0.0000018)	(0.0000024)
EL	0.0127	0.0154	0.0145	0.0171	0.0196	0.0149
	(0.008)	(0.0087)	(0.0124)	(0.0112)	(0.0119)	(0.0118)
GG		0.0161	0.016	0.014	0.0182	0.0169
		(0.0186)	(0.0191)	(0.0171)	(0.0184)	(0.0178)
FR			-0.0344	0.252	0.145	0.290
			(0.309)	(0.298)	(0.338)	(0.340)
GC				0.00001**	0.00001**	0.000009**
				(0.0000038)	(0.0000038)	(0.00002)
GW					0.0312	0.0377
					(0.452)	(0.044)
AW						0.0000681
						(0.000042)
Constant	32.28***	32.14***	32.24***	32.31***	32.02***	28.81***
	(0.276)	(0.321)	(0.891)	(0.802)	(0.911)	(2.178)
N	33	33	33	33	33	33
R^2						
Within	0.5568	0.5568	0.5690	0.6651	0.6716	0.7050
Between	0.1390	0.1368	0.1379	0.2464	0.3854	0.5562
Overall	0.1453	0.1432	0.1443	0.2536	0.3908	0.5487

Notes: This table shows the fixed effects model of total paternal leave taken on Weekly working hours. The Weekly working hours here are specified for females. These hours are calculated as the average usual weekly working hours on the main job. The standard error is given within parentheses, and the '*' provide the significance level as follows: * p<0.10 ** p<0.05 *** p<0.01.

Lastly, table 8 estimates the effect of paternal leave using the Weekly working hours as the outcome variable. The final model illustrates a small, but significant effect of paternal leave on weekly working hours of 0.0000042 with a one percent significance level. The GDP per capita added in model 4,5 and 6 also has a small significant effect on the weekly working hours. This result is not in line with existing literature. An increase in GDP per capita indicates a period of economic growth, this type of growth is generally associated with an increase in productivity (Jorgenson, 1991). Therefore we would expect the weekly working hours to decrease as the GDP per capita increases. The other variables used in the fixed effects model show no significant effect on weekly working hours.

5.2 Interaction effect

To extend the research, a possible interaction effect is studied. The interaction between total paternal leave taken and education level is further examined by creating the interaction term interaction effect education. This variable is the multiplication of the two variables of interaction. For all three indicators of female employment, the interaction variable is added to the multiple regression. Tables 8 shows the result of the introduction of the interaction term in the model of the employment rate, FTE employment rate and the weekly working hours, respectively.

For the employment rate, the addition of the interaction term for education level results in an increase in the coefficient for total paternal leave taken. The effect of total paternal leave taken on the employment rate is still positive and holds a significance of 5 percent. However, the interaction effect between education and the total paternal leave taken is negative, suggesting that the positive impact of paternal leave taken on employment rate diminishes as education level increases. This effect, however, is both small and insignificant. Therefore, no conclusion can be drawn from the interaction variable. In the case of the FTE employment rate, the results are nearly identical to those for the employment rate. Similar to the employment rate, the interaction effect here is negative, indicating that higher education levels reduce the positive effect of total paternal leave taken on full-time employment. Moreover, the found impact holds no value, since the coefficient of the interaction effect is insignificant.

Regarding weekly working hours, total paternal leave taken again shows a significant positive effect following the addition of the interaction term. The interaction effect of education is negative, highlighting that the beneficial impact of paternal leave on weekly working hours is less pronounced at higher education levels. These findings collectively suggest that while paternal leave positively influences female labor market outcomes, the extent of this benefit is moderated by education levels. Higher education appears to reduce the incremental advantages gained from increased paternal leave. Although we find the same negative interaction effect for each outcome variable, no finite conclusions can be drawn regarding the interaction effect since the findings are insignificant.

Table 9: Interaction effect education and paternal leave, using three different proxies for female employment as dependent variable

Variables	Employment rate	FTE employment rate	Weekly working hours
TP	0.0000744**	0.0000812***	0.0000098*
	(0.0000284)	(0.0000255)	(0.0000048)
EL	-0.0481	0.025	0.0383*
	(0.125)	(0.112)	(0.021)
GG	-0.00639	0.0199	0.0183
	(0.104)	(0.0936)	(0.0176)
FR	-7.157***	-5.144**	0.498
	(2.186)	(1.966)	(0.369)
GC	0.000067***	0.0000404*	-0.00001**
	(0.000022)	(0.0000198)	(0.0000037)
GW	0.0526	0.0987	0.05
	(0.262)	(0.236)	(0.044)
AW	-0.000159	-0.0000292	0.000048
	(0.000262)	(0.000235)	(0.000044)
Interaction EL	-2.44e-07	-3.34e-07	-7.44e-8
	(3.31e-07)	(2.98e-07)	(5.59e-8)
Constant	79.05***	56.22***	28.04***
	(13.148)	(11.82)	(2.22)
Observations	33	33	33
R^2			
Within	0.7416	0.8071	0.7270
Between	0.3081	0.7664	0.4458
Overall	0.2876	0.6720	0.4510

Notes: This table shows fixed effects regression estimations of total paternal leave taken on female employment outcomes, including the interaction effect between education and paternal leave. The standard error is given within parentheses, and the '*' provide the significance level as follows: * p<0.10 ** p<0.05 *** p<0.01.

6 Conclusion and Discussion

Multiple studies have looked at the effect of parental leave laws on female employment outcomes. However, there are less papers that focus on the effect of the use of paternal leave. Most of the research on the impact of paternal leave evaluates the "daddy quota," a non-transferable leave reserved for fathers. Previous literature, including studies by Patnaik (2019) and Pyllkanen and Smith (2003), has found that paternal leave is associated with improved female labor market outcomes. This positive effect can be largely attributed to the increased retention of women in the workforce facilitated by such policies. This thesis looks at the effect of the uptake of paternal leave on female employment outcomes in the Nordic countries Sweden, Norway and Finland from 2010 to 2020. The paper aims to establish whether the same positive association can be seen in these Nordic countries, countries that are often seen as the most gender equal countries worldwide, offering extensive parental leave arrangements.

This thesis uses fixed effects regressions to estimate the effect of paternal leave on three different proxies for female employment; the employment rate, the FTE employment rate and the weekly working hours. Multiple control variables are added to account for omitted variable bias. The research is guided by three distinct hypotheses. Hypotheses 1, 2 and 3 expect a positive correlation between paternal leave and the employment rate, the FTE employment rate and the weekly working hours, respectively. The results show that an increase in the use of paternal leave has a significant, albeit small effect on all three proxies used to measure female employment outcomes, as stated in the hypotheses. By adding more control variables to the fixed effects regressions, the one percent significance level stays in tact. The positive coefficient was expected, as the previous literature assumes a positive relationship. To extent my research, I added the interaction effect between paternal leave and education level as a control variable.The results for this interaction were statistically insignificant, indicating that no definitive conclusions can be drawn about the relationship between these two variables.

In the fixed effects regression, several variables other than paternal leave were found to impact female employment. The models using the employment rate and the FTE employment rate as a proxy for female employment both find that the fertility rate and the GDP per capita are significant predictors. As predicted by Adda et al. (2017), the fertility rate negatively influences female employment- and FTE employment rates. Moreover, a small, but significant positive effect of the GDP per capita on the female employment rate measures supports existing theory by Prachowny (1993). Finally, the results suggest a small positive effect of the GDP per capita on the weekly working hours of females. This is against existing literature by Jorgenson (1991). Jorgensen (1991) argues that an increase in GDP per capita goes along with an increase in productivity, decreasing the weekly hours. Therefore, expecting the relationship between GDP per capita and average weekly hours to be negative. This result can possible be explained by an increase in demand overshadowing the effect of productivity on weekly working hours.

This research consists of three Nordic countries and analyses the period between 2010 to 2020, resulting in 33 observations. This extensive type of data on the actual paternal leave taken in the time period is not publicly available for other countries than those used. To make the results of this study

more significant, more countries can be added and the time frame can be extended. Also, including more diverse countries in future research improves the generalizability of the findings. This might lead to different results. In further research, more control variables can be added to the model to minimize omitted variable bias and increase internal validity.

Secondly, in extensive studies, the independent variable paternal leave can be improved. The value paternal leave is described in the dataset as the 'Recipients/users of publicly-administered parental leave benefits or publicly-administered paid parental leave per 100 live births, by sex' (OECD, 2024). For the countries Sweden, Norway and Finland this value frequently exceeds 100, leading to the idea that more than one father takes leave per live birth. The counting method used possible lead to anomalies, where the leave taken by fathers spills over calendar years, thus inflating the number of recipients compared to the actual number of births in a given year. Refining this variable to accurately capture the number of leave days taken by fathers per year, would enhance the precision of the analysis.

Lastly, another direction for future research could be to analyze the impact of recent specific policy changes in the parental leave systems within the studied countries. Researchers could use Regression Discontinuity (RD) design to compare employment outcomes before and after the implementation of a certain policy. RD design is particularly useful when there are clear policy thresholds or cutoffs, such as the introduction of a "daddy quota" or changes in the duration of paid leave. This research could provide more detailed insights into the mechanisms through which paternal leave influences female employment outcomes. For example, examining how different compensation rates and specific conditions for the uptake of paternal leave affect the overall usage of paternal leave can shed light on critical dynamics. Moreover, understanding these factors can help policymakers design more effective parental leave policies that promote gender equality and support both parents in balancing work and family responsibilities.

References

Alin, A. (2010). Multicollinearity. *Wiley Interdisciplinary Reviews: Computational Statistics, 2*(3), 370-374. https://doi.org/10.1002/wics.84

Adda, J., Dustmann, C., & Stevens, K. (2017). The career costs of children. *Journal of Political Economy, 125*(2), 293-337. https://doi.org/10.1086/690952

Blau, F. D., & Kahn, L. M. (1992). The gender earnings gap: Learning from international comparisons. *The American Economic Review, 82*(2), 533-538. https://www.jstor.org/stable/2117457

Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica: Journal of the Econometric Society, 47*(5), 1287-1294. https://doi.org/10.2307/1911963

Bruning, G., & Plantenga, J. (1999). Parental leave and equal opportunities: Experiences in eight European countries. *Journal of European Social Policy, 9*(3), 195-209. https://doi.org/10.1177/095892879900900301

Byker, T. S. (2016). Paid parental leave laws in the United States: Does short-duration leave affect women's labor-force attachment? *American Economic Review, 106*(5), 242-246. https://doi.org/10.1257/aer.p20161118

Cools, S., Markussen, S., & Strøm, M. (2017). Children and careers: How family size affects parents' labor market outcomes in the long run. *Demography, 54*(5), 1773-1793. https://doi.org/10.1007/s11113-007-9057-2

Dickens, R., Machin, S., & Manning, A. (1999). The effects of minimum wages on employment: Theory and evidence from Britain. *Journal of Labor Economics, 17*(1), 1-22. https://doi.org/10.1086/209911

Ekberg, J., Eriksson, R., & Friebel, G. (2013). Parental leave—A policy evaluation of the Swedish "Daddy-Month" reform. *Journal of Public Economics, 97*, 131-143. https://doi.org/10.1016/j.jpubeco.2012.10.006

European Comission. (2024). Finland - Maternity and paternity. Retrieved from https://ec.europa.eu/social/main.jsp?catId=1109&intPageId=4514&langId=en

Ferrarini, T., & Duvander, A. Z. (2010). Earner-carer model at the crossroads: Reforms and outcomes of Sweden's family policy in comparative perspective. *International Journal of Health Services, 40*(3), 373-398. https://doi.org/10.2190/HS.40.3.a

Geisler, E., & Kreyenfeld, M. (2019). Policy reform and fathers' use of parental leave in Germany: The role of education and workplace characteristics. *Journal of European Social Policy, 29*(2), 273-291.

Haas, L., & Rostgaard, T. (2011). Fathers' rights to paid parental leave in the Nordic countries: Consequences for the gendered division of leave. *Community, Work & Family, 14*(2), 177-195. https://doi.org/10.1080/13668803.2011.571398

Hsiao, C. (2007). Panel data analysis—Advantages and challenges. *Test, 16*(1), 1-22. https://doi.org/10.1007/s11749-007-0046-x

International Labour Organization. (2005). Modern daddy: Norway's progressive policy on paternity leave.
https://www.ilo.org/publications/modern-daddy-norways-progressive-policy-paternity-leave

Jaumotte, F. (2003). Female labour force participation: Past trends and main determinants in OECD countries. *OECD Economic Studies.* https://doi.org/10.2139/ssrn.2344556

Jorgenson, D. W. (1991). Productivity and economic growth. In E. R. Berndt & J. E. Triplett (Eds.), *Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth* (pp. 19-118). University of Chicago Press.
https://www.nber.org/system/files/chapters/c5973/c5973.pdf

Kotsadam, A., & Finseraas, H. (2011). The state intervenes in the battle of the sexes: Causal effects of paternity leave. *Social Science Research, 40*(6), 1611-1622.
https://doi.org/10.1016/j.ssresearch.2011.04.004

Lappegard, T. (2008). Changing the gender balance in caring: Fatherhood and the division of parental leave in Norway. *Population Research and Policy Review, 27*(2), 139-159.
https://doi.org/10.1007/s11113-007-9057-2

Nordic co-operation. (2024). Parental benefit in Sweden.
https://www.norden.org/en/info-norden/parental-benefit-sweden

O'Brien, M., Brandth, B., & Kvande, E. (2007). Fathers, work and family life: Global perspectives and new insights. *Community, Work and Family, 10*(4), 375-386.
https://doi.org/10.1080/13668800701574971

OECD. (2024). *Average annual wages.*
https://www.oecd.org/en/data/indicators/average-annual-wages.html

OECD.(2024). *Average usual weekly hours worked on the main job.*
$https://stats.oecd.org/Index.aspx?DataSetCode=Ave_HRS$

OECD. (2024). *Employment rate.* https://data.oecd.org/emp/employment-rate.htm

OECD. (2024). *PF2.2 Use of childbirth-related leave benefits*
https://web-archive.oecd.org/temp/2024-06-21/69263-database.htm

OECD.(2024). *Fertility rates.* https://www.oecd.org/en/data/indicators/fertility-rates.html

OECD. (2024). *Full-time equivalent employment rate, by sex.*
https://stats.oecd.org/index.aspx?queryid=54749

OECD.(2024). *Gender wage gap.* https://www.oecd.org/en/data/indicators/gender-wage-gap.html

Patnaik, A. (2019). Reserving time for daddy: The consequences of fathers' quotas. *Journal of Labor Economics, 37*(4), 1009-1059. https://doi.org/10.1086/703115

Prachowny, M. F. (1993). Okun's law: Theoretical foundations and revised estimates. *The Review of Economics and Statistics, 75*(2), 331-336. https://doi.org/10.2307/2109440

Pylkkänen, E., & Smith, N. (2003). Career interruptions due to parental leave: A comparative study of Denmark and Sweden. *OECD Social, Employment and Migration Working Papers.*
https://doi.org/10.1787/048564246616

Lammi-Taskula, J. (2008). Doing fatherhood: Understanding the gendered use of parental leave in

Finland. *Fathering: A Journal of Theory, Research & Practice About Men as Fathers, 6*(2). $https://www.researchgate.net/publication/247897052_{D}oing_{F}atherhood_{U}nderstanding_{t}he_{G}endered_{U}se_{o}f_{P}arental_{L}eave_{i}n_{F}inland$

Rønsen, M., & Sundström, M. (1996). Maternal employment in Scandinavia: A comparison of the after-birth employment activity of Norwegian and Swedish women. *Journal of Population Economics, 9*(3), 267-285. https://doi.org/10.1007/BF00176688

Ruhm, C. J. (1998). The economic consequences of parental leave mandates: Lessons from Europe. *The Quarterly Journal of Economics, 113*(1), 285-317. https://doi.org/10.1162/003355398555598

Social Insurance Institution of Finland. (2024). On parental leave. https://www.kela.fi/on-parental-leave

Statista. (2024). *Average monthly earnings in Finland 2013-2023, by gender.* https://www.statista.com/statistics/536388/finland-average-monthly-earnings-by-gender/

Statistics Finland. (N.d.). *Births.* https://stat.fi/en/statistics/synt

Statistics Norway. (N.d.) *Live births, by sex (M) 1972 - 2023.* https://www.ssb.no/en/statbank/table/04231/

Statistics Sweden. (N.d.). *Births by region, Mother's age and child's sex. Year 1968-2023.*https://www.scb.se/en/finding-statistics/statistics-by-subject-area/population/population-composition/population-statistics/

Thévenon, O., & Solaz, A. (2013). Labour market effects of parental leave policies in OECD countries. *OECD Social, Employment and Migration Working Papers.* https://doi.org/10.1787/5k8xb6hw1wjf-en

World bank group. (N.d.). *Educational attainment by level of education, cumulative (% population 25+)* https://liveprod.worldbank.org/en/indicator/se-cuat-zs?education=At+least+completed+post-secondary&year=2020.

World bank group. (N.d.). *GDP growth rate %.* texthttps://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG

World bank group. (N.d.). *GDP per capita (current US dollar).* https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

World Economic Forum. (2023). *Global Gender Gap Report.* https://www.weforum.org/publications/global-gender-gap-report-2023/