

CENTRE FOR  
VOCATIONAL  
EDUCATION  
RESEARCH



# Variation in Parenthood Wage Effect: A human capital approach

**Maria Petrillo**

Research Discussion Paper 037

**May 2022**

The Centre for Vocational Education Research (CVER) is an independent research centre based at LSE, with partners in the University of Sheffield, National Institute of Economic and Social Research and London Economics. It was funded by the UK Department for Education (DfE) between 2015 and 2020.

Any views expressed are those of the authors and do not represent the views of DfE. For more details on the Centre go to [cver.lse.ac.uk](http://cver.lse.ac.uk)

Published by:  
Centre for Vocational Educational Research  
London School of Economics & Political Science  
Houghton Street  
London WC2A 2AE

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of the publisher nor be issued to the public or circulated in any form other than that in which it is published.

Requests for permission to reproduce any article or part of the Working Paper should be sent to the editor at the above address.

© M. Petrillo. May 2022.

# Variation in Parenthood Wage Effect:

## A human capital approach\*

Maria Petrillo†

*University of Sheffield and CVER*

### Abstract

Using German Socio-Economic Panel (GSOEP) microdata this paper contributes new empirical evidence by examining the implications of motherhood and fatherhood for wages of a sample of women and men between 2005-2015. Making use, for the first time for this research question, of a difference-in-differences approach, the study uncovers inequalities among women and men in terms of parenthood wage effects. Moreover, the study takes this analysis a step further and investigates additional possible correlations between educational background (vocational versus general background) and motherhood wage gaps by exploiting, for the first time, the difference between skills acquired through a vocational educational path versus those developed following a general one, as one of the keys factors to help to shed light on the motherhood wage gap. Results support the idea that women with a vocational background suffer from a wider motherhood wage penalty if compared to those women having a general background, which is likely due to the higher rate of vocational skills depreciation.

**Keywords:** motherhood, fatherhood, wage penalty, gender, inequality, education.

**JEL Classification:** I26, J16, J24, J31

\*The project is funded by the Centre for Vocational Education Research at the London School of Economics (CVER: [cver@lse.ac.uk](mailto:cver@lse.ac.uk)). CVER is an independent research centre funded by the UK Department for Education (DfE). Any views expressed are solely mine and do not represent the views of the DfE. I am grateful to all participants at the Internal Seminar at the University of Sheffield (November 2021), the Webinar in Gender and Family Economics (January 2022), the 36th National Conference of Labour Economics (AIEL, November 2021) and the 13th International Scientific Conference (Institute of Economic Sciences, November 2021) for useful suggestions. I am particularly thankful to Steven McIntosh for his invaluable guidance and thoughtful insights and to Andy Dickerson, Sandra McNally, Melanie Jones and Konstantina Maragkou for their meticulous comments that helped improve earlier versions of this paper. Any remaining errors are exclusively my own.

†Department of Economics, University of Sheffield, 9 Mappin St., Sheffield, S1 4DT.  
Email: [mpetrillo1@sheffield.ac.uk](mailto:mpetrillo1@sheffield.ac.uk)

# 1. Introduction

The fact that women earn less than men is a well-established phenomenon, known as the gender wage gap. Earlier studies have tried to provide an explanation for this ongoing trend, mainly relying on two pillars, namely the human capital theory and labour market discrimination theory. However, even after controlling for individual observable and unobservable characteristics, taking into account possible differences in educational attainment (DiPrete and Buchmann, 2006), school content (Brown and Corcoran, 1997), occupational segregation (Bayard et al., 2003, Kunze, 2005), career and life expectation (Chevalier, 2002, Chevalier, 2007) and personality traits (Strain and Webber, 2017), a large gender wage gap remains unexplained.

What is common among the abovementioned studies is that differences in the educational path, school content, career and life expectation, and personality traits could in part be explained by different expectations in terms of women and men's social roles; where women are still perceived as caregivers and as rearers of their children, and men, as those who should provide reliable financial assistance for their families.

It is, indeed, undeniable that the different social expectations, in terms of men's and women's behaviours and traditional social roles of the sexes, have been shaped by the biological event of motherhood, which continues to be the only immutable gender difference (Schwartz, 1989). Given that, motherhood certainly is a critical event behind much of the gender wage gap (Bertrand, 2020).

In view of this evidence, the differential impact of motherhood and fatherhood on wages, that is, respectively, the pay gap between mothers/fathers and childless individuals with similar characteristics, has been recognized as a key factor in explaining gender inequality in the labour market. Indeed, while the literature (Budig and England, 2001, Gangl and Ziefle, 2009, Meurs et al., 2010) agrees on the negative consequences of motherhood in terms of career opportunities and wage rates, a positive impact of fatherhood on wages has been found, confirming the existence of a fatherhood wage premium (Trappe and Rosenfeld, 2000, Meurs et al., 2010).

The aim of this paper is to make a novel contribution to the literature by investigating the impact of parenthood on wages. Previous studies have analysed the impact of parenthood on wages by using different econometric techniques: Ordinary Least Squares estimators (OLS) (Kumlin, 2007, Budig et al., 2012); Fixed effects models (Budig and England, 2001, Lundberg and Rose, 2000, Gangl and Ziefle, 2009, Wilde et al., 2010), Heckman regression model (Kellokumpu, 2007, Zhang et al., 2008); Quantile regression (Nestić, 2007); Instrumental variables (Simonsen and Skipper, 2012); Inverse probability of treatment weight (Pal and Waldfogel, 2014). This study contributes to the literature and uncovers inequalities among women and men in terms of parenthood wage effects by disentangling the effect of parenthood on wages, for the first time within a difference-in-differences framework. The latter will involve comparing treated individuals, that is mothers/fathers who had a child at a given point in time, with childless women/men, with similar background characteristics, in order to estimate the effect of interest, hence the existence of a motherhood wage penalty/ fatherhood wage premium. The peculiarity of this difference-in-differences model is that both the treatment and the control group are not defined by the exploitation of a pure exogenous event. Hence, to justify the results achieved, additional robustness checks for concerns regarding the time window and the threshold chosen will be performed. Furthermore, results are reinforced through the implementation of a generalised fixed effect estimation. In addition, the present paper throws further light on the factors that may exacerbate the motherhood wage gap, by investigating the human capital theory as one of the possible explanations for the different magnitude of the family-career trade-off faced by women during the childbearing age. In brief, the human capital theory identifies career interruptions, which lead to human capital depreciation and lost job experience, as one of the main factors impacting wage growth rates. Consequently, the rate of depreciation of skills acquired over the educational path plays a fundamental role in defining the wage penalties faced by women over birth-related leave.

Following this line of thought, this paper is unique in that is the first study to exploit the difference in terms of skills acquired through a vocational or a general educational path to evaluate the impact of skills and, in particular, of skills depreciation, on the motherhood wage gap. The results are consistent with the main hypothesis of this study which supports the idea according to which women with a

vocational background suffer from a larger motherhood wage penalty if compared to those women having a general background. The main hypothesis and, consequently, the significance of the results achieved, relies on three main theoretical pillars. First, the existence of a strong trade-off between early advantages and late disadvantages in labour market outcomes for individuals with vocational education compared with those having a general background (Ryan, 2001, Zimmerman, 2013, Hanushek et al., 2017). Second, the difference in terms of skills developed following a general and a vocational path, where the latter is known to provide skills that are less adaptable to occupational changes, less transferable, and more easily atrophied over time (Weber, 2014, Hanushek et al., 2017). Third, the different allocation over occupational domains shown by individuals with a vocational or a general background, which might be a natural consequence of the different competencies acquired through different educational paths (Heijke et al., 2003).

Germany looks to be a good setting for this analysis for two main reasons. First, it is one of the European countries with the highest shares of vocational programs in the country's educational system (Hanushek et al., 2017). This means that individuals in Germany have a wide range of choices in terms of educational qualifications when it is time to embark on an educational path. Moreover, German legislation offers a legislative framework with extensive potential parental leave aiming at guaranteeing the return of individuals to their former workplace<sup>1</sup>.

The remainder of this paper is organised as follows. The next section provides a review of the motherhood wage gap and the fatherhood wage premium and a comparison of vocational versus general education. Section 3 describes the data and section 4 explains our identification strategy. Section 5 presents the main findings. Finally, Section 6 concludes.

---

<sup>1</sup> Mothers are legally entitled to fourteen weeks of maternity leave (six weeks before and eight weeks after the birth of a child). In addition, both parents can take advantage of parental leave. The parental leave can be up to three years, and it is unpaid. However, parents can apply for the "*Elterngeld*", a parental allowance that grants between 300 to 1800 euro per months accordingly to the income parents had before having a child.

## **2. Literature review**

### **2.1. The impact of parenthood on wage**

The motherhood wage gap consists of the difference in pay between mothers and childless women with similar characteristics, with non-mothers defined as those employed women who do not fulfil the dual requirements of having children and being female.

Several different mechanisms are identified by social science research investigations, to provide a plausible explanation for the existence of the motherhood wage gap (Grimshaw and Rubery, 2015, Cukrowska-Torzewska and Matysiak, 2020). According to the rational economics approach, mothers experience more career interruptions; consequently, the time spent out of the labour force might have an impact on the level and the growth rate of earnings. It is indeed well documented that there is a wage gap between an intermittent worker relative to a continuously employed worker (Cox, 1984, Jacobsen and Levin, 1995) due to the forgone human capital investment, lost job experience, and skill depreciation (Mincer and Polachek, 1974); thus, a difference in wage between mothers and non-mothers is anticipated.

Jacobsen and Levin (1995) summarize the main reasons to motivate the decrease in wages faced by women after career interruption as follows. First, women who experience career breaks do not build up seniority, which, by itself, leads to a higher wage. Second, women who return to the labour force are less likely to invest in on-the-job training to enhance their skills and productivity and, consequently, their wages. Third, job skills and knowledge deteriorate during periods of non-employment.

Several studies (Budig and England, 2001, Gangl and Ziefle, 2009, Cukrowska-Torzewska and Matysiak, 2020) have shown that part of the above-mentioned wage gap could be explained by the fact that those birth-related career breaks lead to a loss and non-accumulation of human capital. Using the French Families and Employers survey, Meurs et al. (2010) provide information related to the impact of career interruptions and time out of the labour market. Their results support the human capital theory,

according to which the motherhood wage gap can be explained by differences in human capital acquisition and human capital depreciation.

Furthermore, the expectations of future career interruption, by themselves, may impact current earnings growth. De facto, women could predict to be in the labour force for a shorter period of time; therefore, they will be less incentivized to enhance their skills, given that they will benefit from the human capital investment for a shorter time period (Polachek, 1981, Blakemore and Low, 1984, Anderson et al., 2003, Kalist, 2008, Simonsen and Skipper, 2012). This attitude could suggest that women can exhibit a weaker attachment to their job (Munasinghe et al., 2008).

Finally, the existence of work interruptions could also lead women to change their labour market behaviour. Indeed, women might be more likely to select family-friendly jobs, part-time jobs, or jobs with less responsibility, usually characterized by lower salaries (Waldfogel, 1997, Budig and England, 2001, Amuedo-Dorantes and Kimmel, 2008). Nielsen et al. (2004) point out a severe penalty after care-related leave in sectors with non-family-friendly policies. This justifies the self-selection of mothers into female-dominated occupations, which allows them to meet family responsibility by sacrificing the wage received. Lundberg and Rose (2000) find that while mothers return to their jobs working fewer hours and suffer from a decrease in wages, men, after becoming fathers, work more and earn more. Using the German Socio-Economic Panel data and by implementing a first difference analysis, Felfe (2012) investigates women's work conditions after they became mothers. Given that for women who work full-time and have children the pressure on their time may be extreme, the study reports a decrease in terms of working hours, and a stronger preference for jobs with a lower level of stress.

While the negative consequences of motherhood, both in terms of career opportunities and wages, have been exhaustively addressed in the literature, there are relatively few studies that focus on the effect of parenthood on men.

The general findings agree that fathers experience a wage premium if compared to childless men (Trappe and Rosenfeld, 2000, Meurs et al., 2010). By estimating a fixed effect model on two cohorts of

men using the Panel Study of Income Dynamics, Lundberg and Rose (2002) find a significant increase in the hourly wage rate, with bonuses of 4 to 7 per cent, and a positive impact on labour supply.

Those results are confirmed by Koslowski (2010), who analyses, using the European Community Household Panel data, whether fathers work longer hours compared to childless men and if the time spent with the children has an impact on the wage. The study concludes that parental status does not seem to impact the weekly working hours and that fathers who report spending more time with their children earn 1 per cent more than childless men.

The literature tries to explain the existence of the fathers' wage premium by exploiting different factors. The most accepted theory is that the fatherhood wage premium depends strictly on women's uptake of employment after giving birth to a child and whether the child's mother works part or full time. An early study from Presser (1994), shows how employment schedules might impact family life. The author analyses the factors that can impact men's choice to share household labour, pointing out that men share household work only when the employment schedules of the couple do not overlap. Other studies support those early findings, showing the wage premium results to be bigger, indeed, when the child's mother works part-time or does not work at all (Hodges and Budig, 2010). Those findings strictly connect with the traditional division of labour concerning the socially prescribed gender roles, which see the women fulfilling family responsibilities and the men as the "breadwinner".

However, "a move towards a universal caregiver or dual-earner/dual carer society is a necessary one if true gender equality is to be achieved" (Fraser, 1994 pp 116). If men do not participate in household labour the only way to lift the barrier and achieve gender equality is the outsourcing of childcare. Thus, another factor that might impact the father wage premium is the implementation of childcare related policy interventions such as parental leave which might impact mothers' and fathers' work decisions. Using Norwegian registry data, Rege and Solli (2013) investigate the effect of paternity leave on fathers' wages. Through the use of a difference-in-differences model, the authors disentangle the effect of the introduction of a paternity leave quota by the Norwegian Government in 1993 on wages, finding that fathers taking paternity leave are subject to earnings decreases five years later.

Other studies, instead, focus the attention on factors such as race and level of education to provide an explanation of the size of the fathers' premium. Glauber (2008) shows that the wage premium depends, indeed, on the race of the father, with black fathers having a significantly lower premium than white fathers. Hodges and Budig (2010), instead, indicate that graduate fathers have a larger premium if compared with non-graduate fathers.

## **2.2. Vocational versus general education**

As previously stated, this study aims to contribute to the literature by analysing the impact of motherhood and fatherhood on wages, according to the type of educational background.

Earlier studies (Ryan, 2001, Zimmerman, 2013, Hanushek et al., 2017) have provided extensive evidence that while holding a vocational qualification enhances the probability of being employed at the early career stage, providing ready to use skills and an initial relative earnings premium, these advantages turn into later disadvantages in terms of lower employment opportunities in later life and lower wages when compared to individuals with a general background (Cörvers et al., 2011, Golsteyn and Stenberg, 2017, Brunello and Rocco, 2017).

Moreover, previous studies have confirmed that the skills acquired through studying vocational qualifications become more easily obsolete and may require updating more often compared to skills and knowledge acquired through a general path (Hanushek et al., 2015, Hampf and Woessmann, 2017). Weber (2014) uses data from the Swiss Labour Force Survey over the period 1998-2008, to examine the human capital depreciation rate across different education types and by different occupations, skills levels, and technology intensity. The study identifies that “concept-based” qualifications (e.g., general qualifications), provide greater worker protection against skills obsolescence when compared to “skills-specific” qualifications (e.g., vocational qualifications). While technical obsolescence, the depreciation of skills due to under-utilization of skills, may impact both educational types, the economic obsolescence, the depreciation due to the workers' environment and technological changes, may impact more heavily on those workers with a vocational background. The latter will be less able to adapt effectively to new situations in the labour market.

Following this line of thought, where human capital depreciation varies according to the educational qualifications and associated skills held by the individual, with vocational skills being more easily obsolete; and given the existence of a strong trade-off between early advantages and late disadvantages in labour market outcomes for individuals with vocational education when compared with those having a general qualification, this paper aims to contribute to the literature by investigating whether, in the long term, women with a vocational background are likely to face a wider motherhood wage gap.

### **3. Data**

The primary data source used in this study is the German Socio-Economic Panel (GSOEP). In particular, the paper is going to use the SOEP-Core which is the centrepiece of the GSOEP. The GSOEP is an interdisciplinary longitudinal survey of private households for the representative analysis of social and economic behaviour in the Federal Republic of Germany. The data collection of the GSOEP started in 1984, by the German Institute for Economic Research, DIW (Deutsches Institut für Wirtschaftsforschung) Berlin, and shortly after German reunification, it was enlarged by including a representative sample from East Germany. The GSOEP surveys about 30,000 individuals annually in about 15,000 households. German citizens living in Germany, overseas citizens residing in Germany, and from 2016 a representative proportion of refugees, are included in the GSOEP sample. Every year each participating household member, aged 18 years and older, is requested to fill out a questionnaire which comprises a wide range of questions providing information about demographic, epidemiological, geographic, health science, political science, socio-psychological and even sport-science issues.

GSOEP is the most suited database for this analysis due to the rich set of information provided. It does not only provide useful data related to the demographic characteristics, the background of respondents, educational attainment, labour force, and health status but it also offers valuable information on women's fertility history and the mother-child relationship. Most importantly, using the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN) classification, the highest qualification achieved by each respondent can be easily classified as either vocational or general orientated.

### 3.1. The Sample

The data used for this paper comes from wave “v”, in 2005, to wave “bf”, in 2015<sup>2</sup>, of the GSOEP. Thus, the study relies on an unbalanced panel of eleven years of data.

The final analytical sample used in this paper comprises 25,088 women and 30,890 men. This study considers only women of fertile age, defined as age 18 to 47. To make the sample of men similar to the sample of women considered, the same restrictions, in terms of age, are applied to men. Given that this paper aims to investigate the impact of having a child on wages, men and women not currently employed are also excluded from the sample. Moreover, to allow a comparison of the impact of parenthood on women and men with different educational backgrounds, individuals with no qualifications or training are excluded from the sample. Finally, to make the sample of mothers and fathers as homogenous as possible, this study will focus on those parents whose first child is born during or after 2005. People working for the army and students are also excluded. Table 3.1 summarises the number of observations in the sample following the above-mentioned exclusions. The final sample does not diverge significantly from the full sample in terms of background characteristics.

*Table 3.1 Sample size summary*

	<b>Women</b>	<b>Men</b>
<b>Total number of observations (2005-2015)</b>	235,947	222,719
<b>If the individual is younger than 18 and older than 47</b>	(-139,484)	(-137,211)
	96,463	85,508
<b>If the individual is not employed</b>	(-44,770)	(-33,083)
	51,693	52,425
<b>If the individual is currently studying or has no qualifications/training</b>	(-312)	(-271)
	51,381	52,154
<b>Mothers/Fathers who gave birth to their first child before 2005</b>	(-26,266)	(-20,915)
	25,115	31,239
<b>Other exclusion (army)</b>	(-27)	(-349)
	25,088	30,890
<b>Total number of usable observations</b>	<b>25,088</b>	<b>30,890</b>

<sup>2</sup> This study focuses on 2005-2015 data as those are identified to be the most recent years reporting the highest numbers in terms of women giving birth to the first, second or third child among all the years available in the GSOEP database.

## 3.2. Variables

### Dependent variable

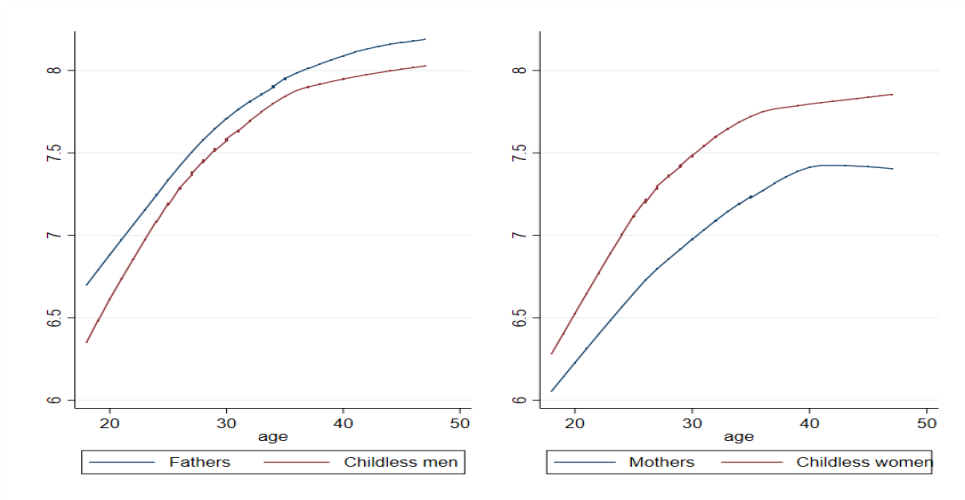
The dependent variable is the natural logarithm of the individual's current labour monthly wage. While overtime payments are included in the monthly wage, no irregular one-time payments such as holidays or bonuses are considered. Income details are consistently provided in euros for all waves. To limit the influence of outliers, this analysis trims the bottom and the top one per cent of the wage distribution. The variable is then adjusted for inflation using the consumer price index provided by the GSOEP (base year 2015- survey year 2016).

### Key variables

#### Mothers / Fathers

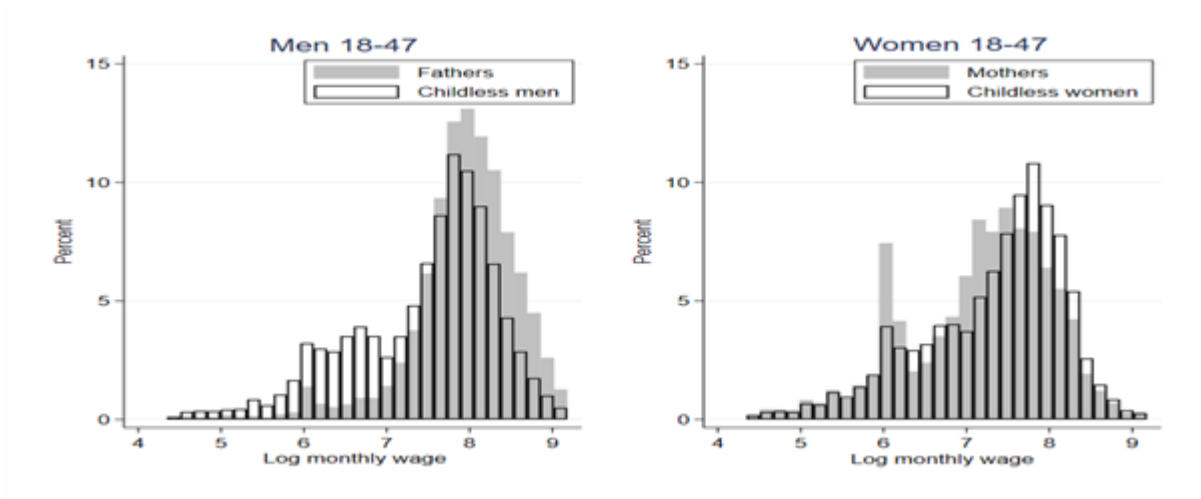
This study defines "Childless women" as those women who never had a child and as those women who became mothers, in the years before they gave birth. Mothers are identified as those women who gave birth to a child, in the years after they give birth. The same classification is adopted for "Fathers" and "Childless men". Consequently, our key independent variables, that identify the wage penalty/premium of mothers/fathers, are two dummy variables: "mother" and "father", both taking value one when the individual has a child.

Figure 3.1 shows the lowess smoothed values of the logarithm of the monthly wage across ages, separating mothers/fathers from childless individuals for employed individuals aged between 18 to 47. The graph confirms that the degree of curvature in the relationship between age and the logarithm of monthly wage differs based on whether an individual has a child. The wage gap is wider among women, with mothers having a lower wage, on average, compared with non-mothers. In particular, the figure highlights that there is a fatherhood wage premium and a motherhood wage penalty at all ages, not just on average.

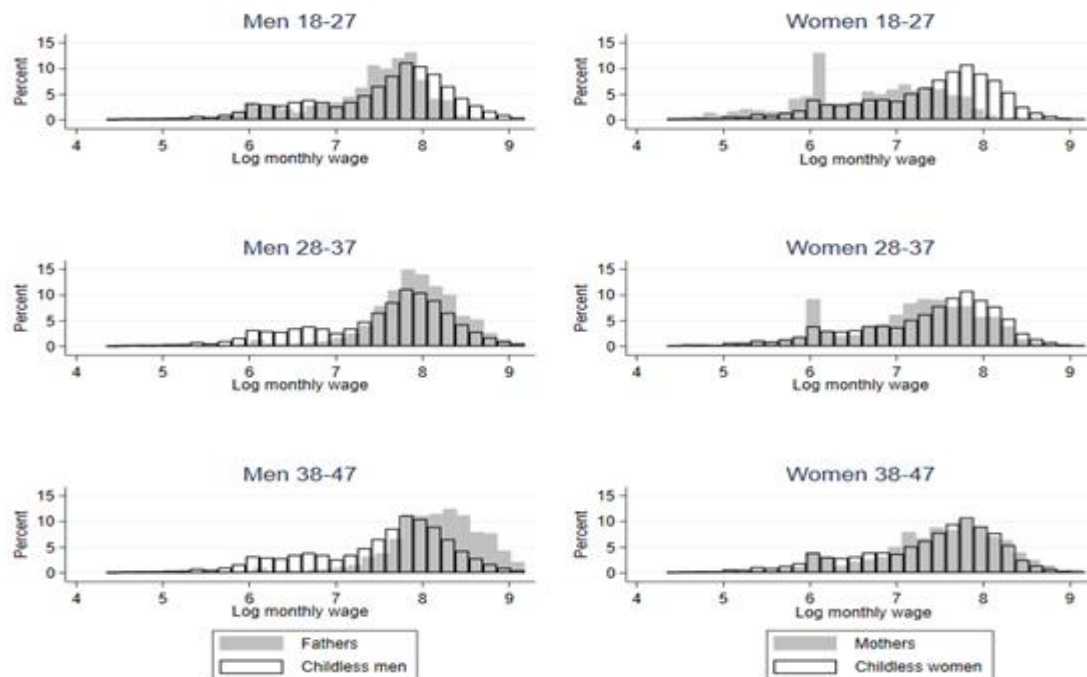


**Figure 3.1 Age-log monthly wage relationship for mothers/fathers and childless individual**

Figure 3.2 shows the distribution of log monthly wages. On the horizontal axis there is the logarithm of the monthly wage and on the vertical axis the corresponding percentages. Both distributions are skewed to the left or negatively skewed. While for the distributions of fathers and childless men, fathers show a greater frequency for the highest values of the logarithm of the monthly wage; the distributions of mothers and non-mothers lead to a different conclusion, with non-mothers showing a higher frequency for the highest wage values.



**Figure 3.2 Monthly wage distribution by gender (Parents vs childless individuals)**



**Figure 3.3 Monthly wage distribution by gender (Parents vs childless individuals) and by age range**

Figure 3.3 shows the distribution of the log monthly wage this time taking age into account. It shows that even after taking age into account by plotting the distribution according to the age range considered, the conclusions that one could derive are still the same. During the child-bearing age, non-mothers show a higher frequency for the highest wage if compared with mothers. The two distributions become closer only when the age range 38-47 is examined. Non-fathers show higher frequency for the highest wage values only for the age range 18-27.

#### Highest qualification achieved

The highest qualification achieved by the individual is identified according to the CASMIN classification which is an internationally comparable measurement instrument for educational attainment (Brauns et al, 2003). The CASMIN classification was developed in the 1970s to take into consideration the effects of different educational systems on inter and intra-generational mobility.

Müller (2000) describes the German qualifications falling in each CASMIN level (Table 3.2).

**Table 3.2 CASMIN Classification - German qualifications**

	Qualifications	VET/NO VET
<b>1a</b>	<b>Inadequately completed general education</b> ohne Abschluß, berufliches Praktikum	-
<b>1b</b>	<b>General elementary education</b> Haupt-/Volksschulabschluß	GEN
<b>1c</b>	<b>Basic vocational qualification/general elementary education and vocational qualification</b> Haupt-/Volksschulabschluß mit Abschluß einer Lehr-/Anlernausbildung oder Meister-/Technikerausbildung	VET
<b>2a</b>	<b>Intermediate vocational qualification/ Intermediate general qualification</b> Realschulabschluß (Mittlere Reife) mit Abschluß einer Lehr-/Anlernausbildung oder Meister-/Technikerausbildung	VET
<b>2b</b>	<b>Intermediate general qualification</b> Realschulabschluß (Mittlere Reife)	GEN
<b>2c_gen</b>	<b>General Maturity certificate</b> Fachhochschulreife, Hochschulreife (Abitur)	GEN
<b>2c_voc</b>	<b>Vocational maturity/ General maturity and vocational qualification</b> Fachhochschulreife, Hochschulreife (Abitur) mit Abschluß einer Lehr-/Anlernausbildung oder Meister-/Technikerausbildung	VET
<b>3a</b>	<b>Lower tertiary education</b> Fachhochschule, Ingenieurschule	VET
<b>3b</b>	<b>Higher tertiary education</b> Hochschule	GEN

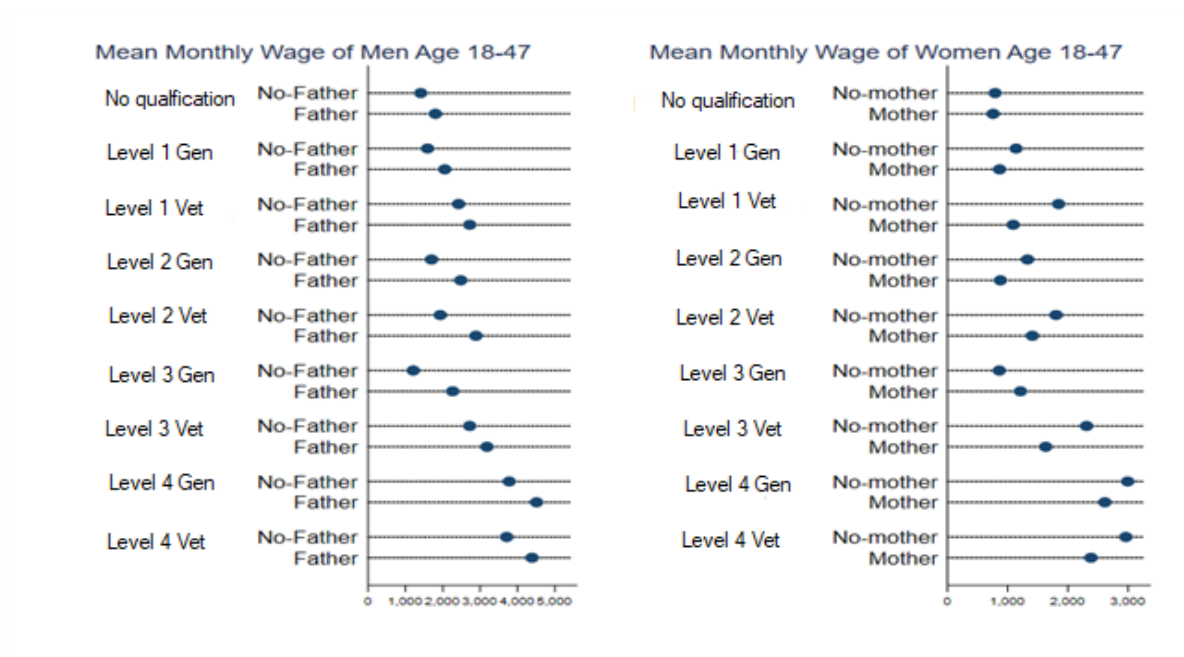
According to Table 3.2, one can distinguish 9 different CASMIN levels:

- *Level 1a, inadequately completed general education*: which includes individuals without a completion certificate or internship.
- *Level 1b, general elementary education*: that considers the certifications that an individual can achieve with the completion of the *Hauptschule*.
- *Level 1c, basic vocational qualification/general elementary education and vocational*: that includes the certifications achieved with the completion of the *Hauptschule* with a completed apprenticeship.
- *Level 2a, intermediate vocational qualification/ intermediate general qualification and vocational qualification*: that comprises the *Realschule* leaving certificate with a completed apprenticeship or vocational training.

- *Level 2b, intermediate general qualification*: that includes the *Realschule* leaving certificate without a completed apprenticeship or vocational training.
- *Level 2c\_gen, general maturity certificate*: that considers the *Fachhochschulreife*, school leaving certificate after *Realschule* and/or the *Hochschulreife*, also called *Abitur*, a maturity certificate usually achieved after 13 years of *Gymnasium* and that allows access to universities.
- *Level 2c\_voc, vocational maturity certificate/ general maturity certificate and vocational qualification*: school leaving certificate after *Realschule* and/or the *Hochschulreife*, also called *Abitur*, a maturity certificate usually achieved after 13 years of *Gymnasium* and that allows access to universities, plus a completed apprenticeship or vocational training.
- *Level 3a, lower tertiary education*: that considers degrees from *Fachhochschule*, *Ingenieurschule*, polytechnic or engineering college.
- *Level 3b, higher tertiary education*: that includes degrees from the *Hochschule*, that is University.

Accordingly, this paper considers as general level 1 and 2 those qualifications that fall in CASMIN level 1b and 2b, as general level 3 those included in CASMIN level 2c\_gen, and finally as general level 4 those contained in CASMIN level 3b. For how it concerns, instead, vocational qualifications, those qualifications included in level 1c and 2a CASMIN are considered as level 1 and level 2 vocational, while those in level 2c\_voc and 3a define, respectively, level 3 vocational and level 4 vocational.

Consequently, eight dummy variables have been generated “level 1 general”, “level 2 general”, “level 3 general”, “level 4 general”, binary variables taking value one when the highest qualification achieved by the respondent is level 1 general, 2 general, 3 general or 4 general respectively, and “level 1 vocational”, “level 2 vocational” “level 3 vocational” and “level 4 vocational” (with level 4 vocational being the base category), that assume value one when the individual has as highest qualification achieved a level 1 vocational, 2 vocational, 3 vocational or 4 vocational respectively.



**Figure 3.4 Mean of the log of the monthly wage of mothers/fathers and childless individuals by education type**

Figure 3.4 shows the average monthly wage for both men and women by education type separating mothers and fathers from childless individuals, for employed individuals aged 18-47. While mothers are shown to have a lower monthly wage, on average, if compared with childless women for all the qualification types (the only exception being level 3 General), fathers show, instead, a slightly higher monthly wage if compared with childless men.

### Control variables

The GSOEP dataset provides very rich information concerning the background characteristics of the individuals. To control for other conflating factors that may impact an individual's monthly wage and the motherhood wage gap/ father wage premium, the model will consider background characteristics, relationship status, educational background, and job characteristics.

A summary of both key variables and other control variables is provided in Table A.1.

The choice of explanatory variables is based on the existing literature. For instance, a set of two dummy variables "Single" (reference category) and "Married", is used to control for the relationship status of

the respondent given the impact that the latter could have on wages for both men and women (Becker, 1981, Barg and Beblo, 2009, Pollmann-Schult, 2011).

An important part of the literature has focused on the positive returns to experience and seniority (Altonji and Williams, 1997, Dustmann and Meghir, 2005). It is also well known that women who decide to become mothers need to consider that birth-related leave will lead to foregone human capital investment, lost job experience, and skill depreciation (Mincer and Polachek, 1974) which consequently will impact their wage rate; the same effect is not observed for men. Relying on the importance given to experience from the previous literature, the model implemented in this study will consider both part-time and full-time years of experience. Those variables reflect the total length of full-time and part-time employment in the respondent's career. Also, binary variables for current "Full-time", "Public sector" and "Self-employed" status are included in the model. The variables will assume value one if the respondent works full time, in the public sector, and is self-employed, respectively.

The model will also include dummy variables to classify the occupation of the respondent. The categorization of the different occupations is made according to the third version of the International Standard Classification of Occupation (ISCO-88) for European Union purposes. "Elementary occupation" (the base category) indicates whether the individual has an elementary occupation; "Agricultural/fishery workers", "Craft and trade workers" and "Machine operators" if the respondent is, respectively, a skilled agricultural and fishery worker, a craft worker or a plant and machine operator; "Clerks" "Service workers" "Technicians" if the respondent is a clerk, a service worker/market sale worker or a technician and associate professional; "Managers" and "Professionals" if the individual is a legislator, senior officials and manager or a professional.

Finally, in agreement with the literature which sees unstable employment and low income as significantly related to precarious workers' perceived health (Lim et al., 2015) the model will include a dummy variable "Good health" which takes the value of one when the respondents define their health status as rather good, zero otherwise.

### **3.3. Descriptive statistics**

The descriptive statistics of the analytical sample are provided in Appendix A. The data show the existence of a raw motherhood wage penalty (Table A.2) and a fatherhood wage premium (Table A.3) both if the comparison is made among people with a vocational qualification or with a general qualification as the highest qualification achieved (Table A.4, A.5). The difference in means of the monthly wage remains negative and statistically significant across the selected age ranges for women with general or vocational qualifications; in contrast, the difference in means of the monthly wage for men remains positive across age and education type.

Lining up with the literature, while the gap, within gender groups, between the monthly wage of individuals having a vocational qualification and those having a general background is positive if we consider individuals aged 18-27 (for both mothers and non-mothers), this gap turns instead negative if we consider individuals aged 28-37 or 38-47. This can be explained by the fact that vocational educational paths help to develop specific job-related skills that prepare students to work in particular occupations while general education provides students with broad knowledge and basic skills as a foundation for further learning and/or on-the-job training. This leads to a strong early advantage and a late disadvantage in terms of labour market outcomes (wage, employment, school-to-work transition) for individuals with a vocational qualification as their highest qualification.

The latter could also help to understand why the motherhood wage gap is, on average, bigger for women with a vocational background compared to women with a general background (the only exception being women aged 18-27). Indeed, previous studies have confirmed that while holding a vocational qualification enhances the probability of being employed and having a higher wage at the early career stage by providing ready-to-use skills, this advantage comes at the cost that the skills acquired through studying vocational qualifications become more easily obsolete. Thus, the early advantage of studying vocational qualifications turns into a later disadvantage. In this respect, women with a vocational background, who give birth to a child and who then take some time off from their job, would be exposed to a depreciation of their skills which will cost more in terms of future income as compared to women

with a general background. The path is not clear, instead, if the comparison is made between men with a vocational versus those with a general background. Indeed, the educational background does not seem to affect the fatherhood wage premium.

The monthly wage appears to be higher, on average, for childless women if compared to mothers, even though mothers are, on average, older than no-mothers. Employment rates are also very different for women by motherhood status, with 53% of mothers being employed compared to 75% of non-mothers; the employment rate is instead higher for fathers if compared with childless men (90% compared with 75%). Not surprisingly, childless women have a higher probability to work full-time (77%) while only 31% of mothers work full-time. On the contrary, fathers are more likely to work full time than non-fathers (93% vs 88%). Further striking differences, which can be partly explained by the age differences, can be observed with respect to work experience: mothers show more years of both part-time (2.0) and full-time (5.7) job experience when compared with non-mothers (with respectively 1.4 and 4.9 years of experience). The difference in years of full-time job experience is even greater if the comparison is made between fathers (11.2) and childless men (5.8). It is interesting to highlight that, in agreement with the literature, while men show, on average, more years of full-time job experience, women show, on average, more years of part-time experience when compared with men.

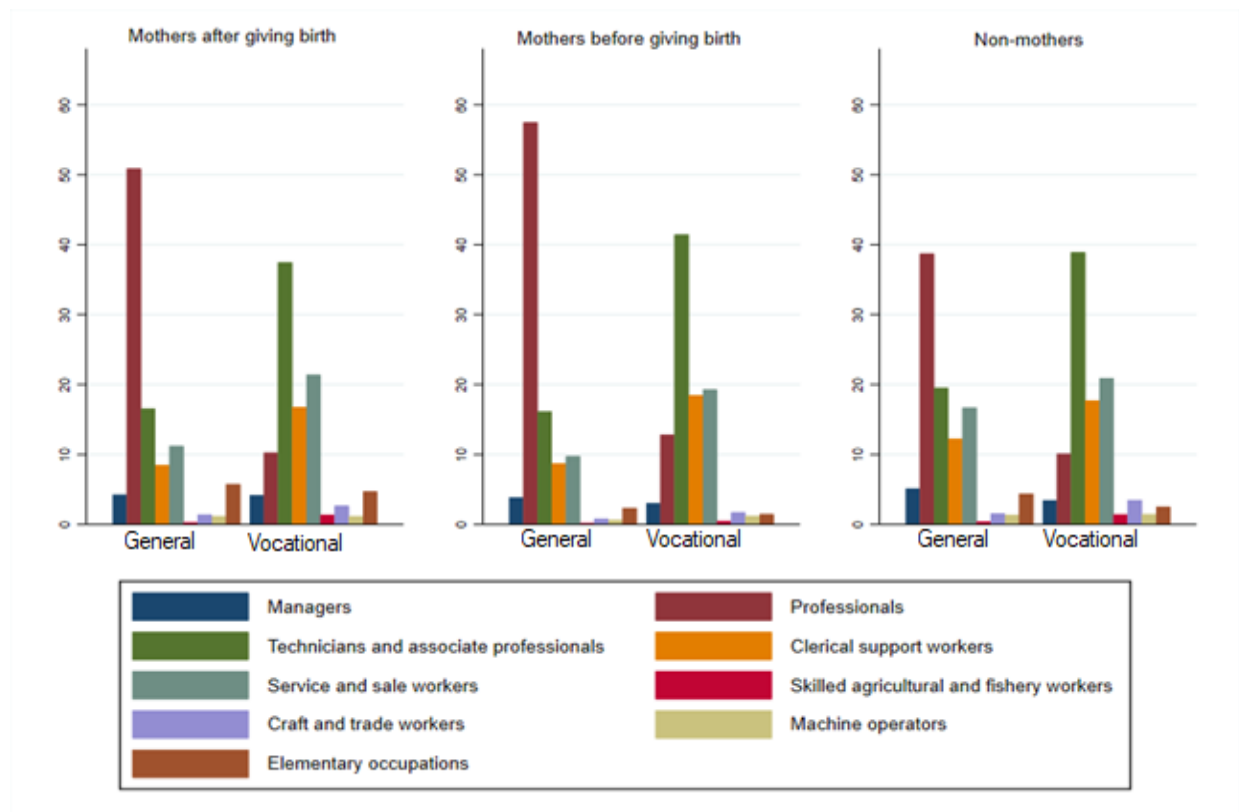
Figures 3.5 and 3.6 provide a clear framework of differences in terms of occupational distribution with a clear comparison between individuals with (before and after they give birth to a child) and without children and across education types (vocational versus general).

Women with a vocational background appear to secure employment more as “Technicians and associate professionals”, “Service and Sales workers” and “Clerical support workers” while those with a general background are more likely to segregate into “Professionals” occupations. Men with a vocational background seem instead to be more segregated into occupations such as “Craft and trade” and “Technicians and associate professionals”; those with a general background are more into “Professionals” occupations. The occupational distribution between mothers before and after giving birth is quite alike. The only perceptible difference is a reduction of women into “Professional” occupations and an increase of women working in “Elementary occupations”, regardless of their

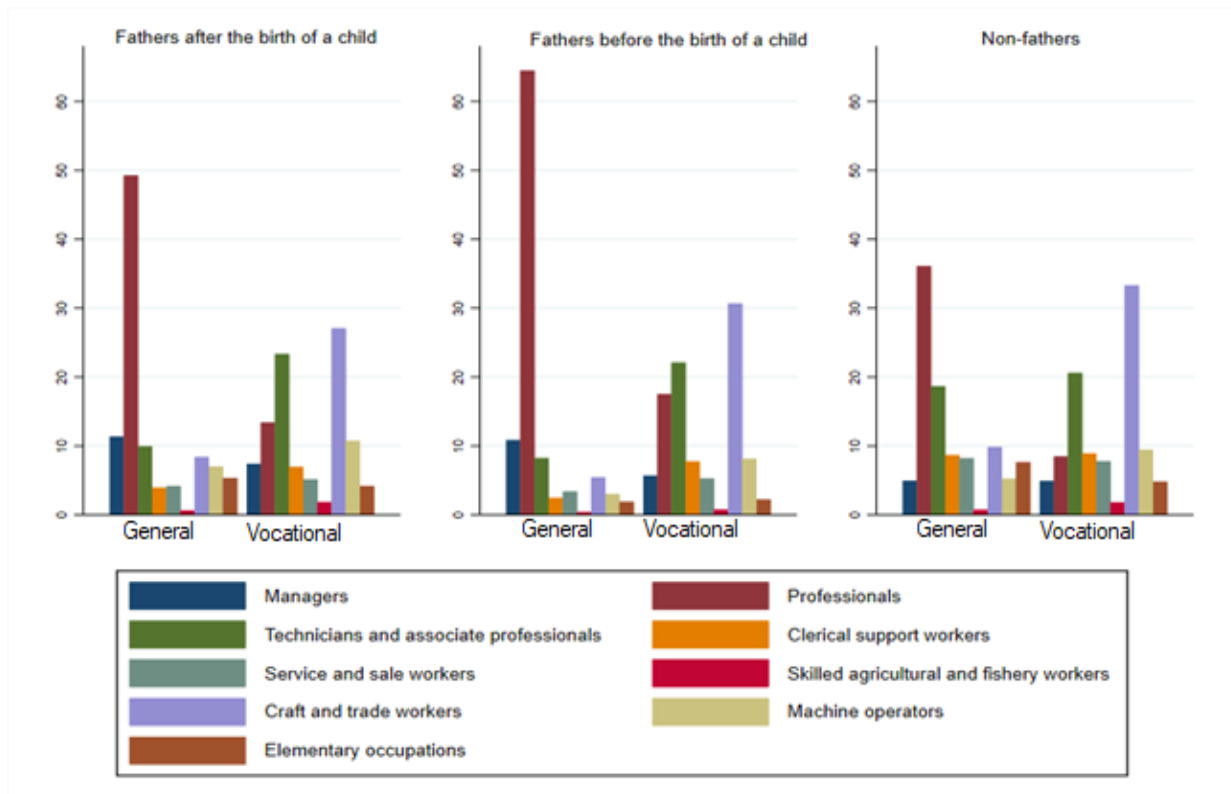
educational background. The same is detected when we compare fathers before and after the birth of a child.

As expected, 70% of the mothers and 78% of the fathers in the sample have a partner while less than 15% of childless men and women have one.

Childless women and mothers show the same average of years of schooling (12 years), and the same can be said for fathers and non-fathers. More than 57% of the women and men considered in this study have as their highest qualification a vocational qualification.



*Figure 3.5 Occupational distribution - Women*



*Figure 3.6 Occupational distribution – Men*

## 4. Methodology

The model seeks to compare the difference in monthly wages between two groups of women/men: the ones who had a child at a given time  $t$  and the ones who are childless throughout the sample period. Simply regressing the parental status (giving birth to a child versus not giving birth to a child) over the wage could suffer from an endogeneity bias. By using a difference-in-differences technique, instead, one can disentangle the effect of motherhood/fatherhood on the wage. Thus, this study identifies a treatment (women/men who have a child in year  $t$ ) and a control (childless women/men) group.

The key identification assumption is that the difference in wages between the treatment and the control group would have remained constant over time if women/men in the treatment group had not had a child. In other words, the two series followed a common trend before treatment, so that the difference between them was constant. Hence, for the method to provide a valid estimate of the counterfactual, one must assume that in the absence of the treatment, the difference in the average earnings between

mothers/fathers and non-mothers/non-fathers would be constant, thus the average outcome should have increased or decreased at the same rate in both groups.

The baseline model implemented in this study can be represented as a multi-period difference-in-differences approach under the two-way fixed effect estimator framework:

$$\ln y_{it} = \alpha_0 + \beta \text{Treatment}_i * \text{Time}_t + \gamma X_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad 1)$$

where  $y_{it}$  denotes the outcome of interest, thus the monthly wage of individual  $i$  at time  $t$ .

$\text{Time}_t$  is the indicator of the post-treatment period, and it switches on to 1 from time  $t$  onwards.

$\text{Treatment}_i$ , instead is the treatment dummy variable and it takes a value of one if the individual is treated, zero otherwise. In particular, the treatment considered in this analysis is whether the individual has a baby at a given point at time  $t$ .

$\beta$  is the main coefficient of interest given by the interaction term between the two dummies mentioned above and it measures the treatment effect, thus, the difference in trends in terms of the logarithm of the monthly wage between an individual who had a child at a given point at time  $t$  and those who are childless throughout the sample period, after the birth of a child.

The parameter  $\gamma$  is a vector of coefficients on the characteristics of individual  $i$  at time  $t$  that might affect the dependent variable including, importantly, background characteristics, highest qualification achieved, relationship status and job characteristics.

The model also includes individual fixed effects ( $\mu_i$ ) to account for time-invariant heterogeneity at the individual level and eliminate any confounding factors that might be caused by effects that are constant over time at the individual level; and time fixed effects ( $\delta_t$ ) to adjust for time-specific unobserved confounders. Finally,  $\varepsilon_{it}$  is an error term.

The log-linear relationship between wage and human capital is justified by the investment paradigm developed by Mincer (1974b).

The peculiarity of the difference-in-differences model implemented in this study is that both the

treatment and the control group are not defined by the implementation of a policy or a program, thus a truly exogenous event. Indeed, the year  $t$ , used as a threshold in this analysis and essential to identify the treatment and the control group, is chosen among all the years available to the study. Hence, to justify the results achieved, additional robustness checks for concerns regarding the time window and the threshold chosen will be performed.

Moreover, through the adoption of a set of robustness checks, the paper will deal with the validity of the common trend assumption. Indeed, one usual concern when using a difference-in-differences approach is that the results achieved might be driven by pre-treatment trends and by the existence of confounding factors. The study will test this key assumption in different ways. First, a graphical inspection of the common trend assumption will be provided. Then, the graphical analysis will be complemented with placebo regressions by testing the effect of a “fake” treatment period prior to the actual treatment of having a child.

## 5. Results

The baseline model implemented in this analysis considers a threshold  $t = 2010$  and investigates the event of giving birth to a child<sup>3</sup> in 2010 looking at five years before and five years after the event and considering a sample of employed women and men aged 18-47 between 2005 and 2015. Individuals with no qualifications and who are currently studying are excluded from the sample. Consequently, the results reported in this section consider mothers/fathers who had a child in the year  $t=2010$  as the treatment group. Women/men who are childless throughout the all-sample period, constitute the control group<sup>4</sup>. The results for the sample of women and men are reported, respectively<sup>5</sup>, in Table 3.1 and

---

<sup>3</sup> Due to concerns related to the sample size, this analysis considers the event of giving birth to any child in year  $t=2010$ . This means that women and men in the treatment group may already have other children, and consequently they could already have been subject to the parenthood wage effect. However, results of the same model run, this time, by considering the event of giving birth to the first child in 2010 confirm the reliability of the results achieved with our baseline model, albeit with fewer observations. Moreover, the same model has been implemented including the number of children in the vector of covariates. Despite the decrease in the number of observations, the results achieved from the baseline regression are still confirmed.

<sup>4</sup> Women and men who had a child either between 2005 and 2009 or between 2011 and 2015 are excluded from the sample.

<sup>5</sup> The full results from the model, showing the controls for the background characteristics, education, relationship status and job characteristics, are provided in the Appendix (Table B.6, Table B.7).

Table 3.2, taking into consideration three different specifications: Columns 1 and 2 consider all women/men of any educational background; columns 3 and 4 include women/men whose highest qualification achieved is a vocational qualification; columns 5 and 6 comprise women/men with a general background. For each specification two models are implemented: the model in columns 1, 3 and 5 accounts for individual-level fixed effects, the one reported in columns 2, 4, and 6 for individual and time-level fixed effects.

The main coefficient of interest, for Treatment\*Time, is the interaction term between the variable Treatment, which takes a value of one if woman<sub>i</sub> /man<sub>i</sub> has a child in 2010, and Time, which switches on to one from 2010 onwards. With regards to the framework of this analysis, the coefficient of interest captures the monthly change in the wages between women/men in the treatment and control group after the birth of a child.

Table 3.3 shows a negative and statistically significant difference-in-differences coefficient in the first and second specification, hence when all women and when those with a vocational background are considered. The effect of having a child is similar across both models with a slight increase in magnitude with the progressive inclusion in the model of control variables. Consequently, looking at the complete model, giving birth in 2010 results in a further decrease in monthly earnings by 28% for all women and by 38% for women with a vocational background, relative to the control group of non-mothers. The coefficient is instead negative and not statistically significant for women with a general background.<sup>6</sup>

These results are consistent with the main hypothesis of this paper which supports the idea that women with a vocational background suffer from a larger motherhood wage penalty compared to those women having a general background. This could suggest that a birth-related leave will have a higher cost in terms of human capital loss for those with vocational qualifications due to the fact that skills acquired

---

<sup>6</sup> Given the East-West Germany differences in attitude towards gender division of labour (Kolinsky, 1992; Adler & Brayfield, 1996) shaped also by the different provision of public care for children (Leitner et al., 2007) the baseline model was also implemented by estimating separate equations for East and West Germany. Results are confirmed in both subgroups.

through vocational studies depreciate quicker, may require to be updated more often and may lead individuals to secure employment in different occupation types.

**Table 5.1 Baseline model: DID Log Wage Results - Women**

	All women	All women	Vocational Education	Vocational Education	General Education	General Education
Treatment* time	<b>-0.278***</b>	<b>-0.278***</b>	<b>-0.374***</b>	<b>-0.377***</b>	<b>-0.025</b>	<b>-0.025</b>
	[0.058]	[0.058]	[0.069]	[0.069]	[0.087]	[0.087]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	14839	14839	10041	10041	4716	4716

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3.4 shows the results for the difference-in-differences model implemented for men, once again, by education type. The coefficients are small and positive but not statistically significant for all the specifications and models considered, confirming, in accordance with the previous literature, that men's wages are unaffected from the birth of a child.

**Table 5.2 Baseline model: DID Log Wage Results - Men**

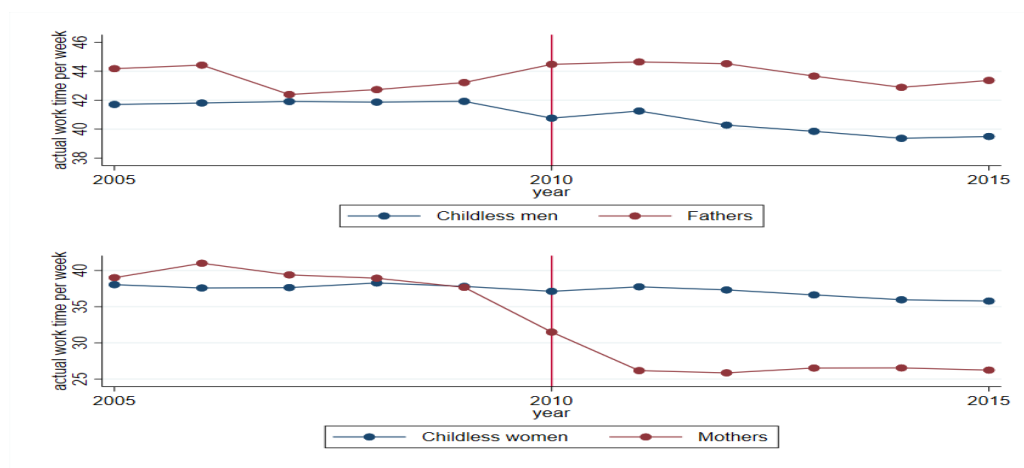
	All men	All men	Vocational Education	Vocational Education	General Education	General Education
Treatment* time	<b>0.010</b>	<b>0.009</b>	<b>0.014</b>	<b>0.013</b>	<b>0.005</b>	<b>0.002</b>
	[0.035]	[0.035]	[0.041]	[0.041]	[0.068]	[0.069]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	18296	18296	12959	12959	5143	5143

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

One of the main factors explaining the heterogeneous effect of parenthood on women's and men's wages is the change in the average number of weekly working hours experienced after the birth of a child. Figure 3.7 shows the average weekly worked hours by gender distinguishing between mothers/fathers and childless individuals. The difference between fathers' and non-fathers' average weekly hours worked after the event is similar to the gap before the event, with the two lines moving in parallel after 2010 and with fathers working, on average, more hours on a weekly basis than non-fathers. Fathers

seem to diverge from childless men in the year before the event where the average of the weekly worked hours slightly increases when compared to childless men.

On the contrary, women show a large decrease in the actual work time per week immediately after they give birth. Indeed, while before the event, mothers work, on average, more hours than non-mothers, the event of giving birth in 2010 drastically reduces the average hours worked, leading to the existence of a “motherhood hours penalty” which does not seem to close in the following years. The decrease starts from the pregnancy period and persists for several more years after the event. The drastic drop in terms of weekly working hours after 2010 is registered by all women, independently from their educational route (Figure A.1). Consequently, the difference in motherhood wage penalties between women with a vocational background and those with a general background cannot be simply attributed to a differential hours response.



*Figure 5.1 Change in weekly working hours by gender across time, before and after the event.*

## 5.1. Robustness checks

In this section, the study will introduce several robustness checks to support the results of the baseline model presented in the previous section.

### Different time windows

First, the same difference-in-differences model is implemented, this time taking into consideration different time windows to the one analysed in the baseline model (2005-2015) while using the same

threshold year ( $t=2010$ ). In particular, the time before and after the “event” is reduced first from 5 to 4 years, and then to 3 years. The results for the sample of women considered by education type are shown in Tables 3.5 and 3.6<sup>7</sup>. Table 3.5 refers to a period of time which goes from 2006 to 2014 (4 years before and 4 years after the “event”), while Table 3.6 considers the years 2007-2013 (3 years before and 3 years after the “event”).

Despite reducing the number of observations, the results are consistent and qualitatively similar to the main results. Specifically, giving birth in 2010 leads to a decrease in monthly earnings of 24% (2006-2014) and 21% (2007-2013) more for mothers than for non-mothers amongst all women and by 33% (2006-2014) and 27% (2007-2013) more for mothers than for non-mothers amongst those women with a vocational qualification as their highest qualification.

**Table 5.3 Baseline model, different time windows (2006-2014) – Women**

	All women 2006-2014	All women 2006-2014	Vocational Education 2006-2014	Vocational Education 2006-2014	General Education 2006-2014	General Education 2006-2014
<b>Treatment* time</b>	<b>-0.243***</b> [0.054]	<b>-0.244***</b> [0.054]	<b>-0.323***</b> [0.065]	<b>-0.326***</b> [0.065]	<b>-0.053</b> [0.093]	<b>-0.051</b> [0.094]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	11873	11873	8140	8140	3673	3673

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.4 Baseline model, different time windows (2007-2013) – Women**

	All women 2007-2013	All women 2007-2013	Vocational Education 2007-2013	Vocational Education 2007-2013	General Education 2007-2013	General Education 2007-2013
<b>Treatment* time</b>	<b>-0.206***</b> [0.063]	<b>-0.206***</b> [0.052]	<b>-0.271***</b> [0.093]	<b>-0.274***</b> [0.063]	<b>-0.074</b> [0.095]	<b>-0.073</b> [0.095]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	9161	9161	6330	6330	2786	2786

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

<sup>7</sup> The results from the full model, including controls on the background characteristics, education, relationship status and job characteristics, are provided in the appendix Tables B.8 and B.9

Again, having a child does not have a statistically significant impact on men’s monthly earnings (Table 3.7 and 3.8<sup>8</sup>). Consistently with the baseline specification and despite the fact that the time window considered for the analysis is reduced, the results achieved are still persistent.

**Table 5.5 Basic specification, different time windows (2006-2014) – Men**

	All Men 2006-2014	All Men 2006-2014	Vocational Education 2006-2014	Vocational Education 2006-2014	General Education 2006-2014	General Education 2006-2014
<b>Treatment* time</b>	<b>0.002</b>	<b>0.001</b>	<b>0.002</b>	<b>0.002</b>	<b>0.018</b>	<b>0.016</b>
	[0.034]	[0.034]	[0.034]	[0.039]	[0.039]	[0.068]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristic</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	14781	14781	10589	10589	4037	4037

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.6 Basic specification, different time windows (2007-2013) – Men**

	All Men 2007-2013	All Men 2007-2013	Vocational Education 2007-2013	Vocational Education 2007-2013	General Education 2007-2013	General Education 2007-2013
<b>Treatment* time</b>	<b>-0.004</b>	<b>-0.004</b>	<b>-0.012</b>	<b>-0.011</b>	<b>0.010</b>	<b>0.010</b>
	[0.030]	[0.030]	[0.034]	[0.034]	[0.071]	[0.071]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristic</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	11557	11557	8342	8342	3092	3092

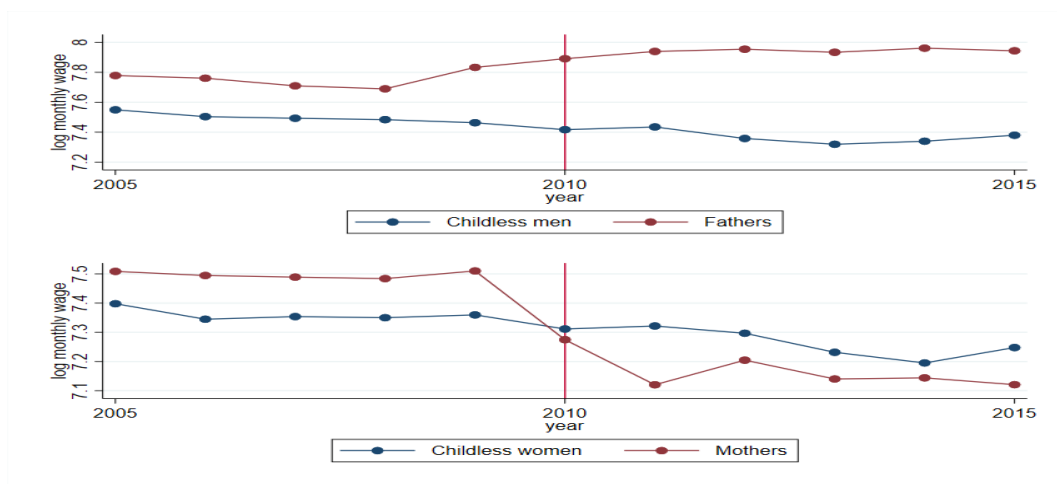
Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## **Common trends assumption**

Second, a test of whether the common trends assumption is credibly maintained in this setting is provided. The aim is to compare changes in outcomes for the treatment and control groups before the “event”. One usual concern when using the difference-in-differences model is that results can be driven by differences in pre-event trends between treatment and control groups or by confounding factors. For this reason, a graphical inspection is provided in this section. The graphical analysis of the common trend assumption, in the basic difference-in-differences framework, requires both groups to follow a parallel path prior to the event. Figure 3.8 shows the trend of the logarithm of monthly earnings by

<sup>8</sup> The results from the full model, including controls on the background characteristics, education, relationship status and job characteristics, are provided in the appendix Table B.10 and Table B.11.

gender for both treatment and control groups across the years. The lines move in parallel before the event, for both genders confirming the credibility of the common trend assumption in the setting implemented in this analysis<sup>9</sup>. The only exception is in 2009 when a small divergence in trends is noticed, particularly for men. This is quite expected given that the event (giving birth to a child) manifests its effects already 9 months before, during the pregnancy period.



**Figure 5.2 Common trend: Logarithm of the monthly wage by gender**

Moreover, given that the treatment analyzed manifests some “pre-treatment” effect, due to the nine months of pregnancy period preceding the event of giving birth, for the sake of robustness the baseline model has also been implemented by excluding 2009 from the pre-treatment sample. The results achieved are still in line both in terms of coefficient and significance level with those achieved with the baseline model, confirming that the results are not driven by pre-event effects.

On the basis of this, it is possible to conclude that the performed visual inspections give a certain level of confidence about the credibility of the common trend assumption.

### **Placebo test**

Third, the visual inspection of the common trend is complemented with placebo regressions. The purpose is to test if there is an observed effect even where not expected, in the absence of treatment. This study implements placebo tests using previous periods, by shortening the sample period up to the

<sup>9</sup> A visual inspection of the common trend of the raw data on real monthly earnings can be found in Appendix A (Figure A.2). Figure A.3 provides instead a visual inspection on the common trend for the sub-sample of women classified accordingly to their educational background.

year before the event, and by generating a fake Time dummy variable. In particular, in Tables 3.9 and 3.10<sup>10</sup> a fake dummy Time2006, which switches to one from 2006 onwards, is included in the analysis which considers a period of time 2005-2008<sup>11</sup>. The results related to the difference-in-differences coefficient show that there are no statistically significant coefficients in any specifications, suggesting that there are no significant variations in monthly earnings trends between treatment and control groups before treatment occurs.

**Table 5.7 Placebo test with a fake dummy time 2006 - Women**

	All women 2005-2008	All women 2005-2008	Vocational Education 2005-2008	Vocational Education 2005-2008	General Education 2005-2008	General Education 2005-2008
<b>Treatment*Time2006</b>	<b>-0.040</b> [0.051]	<b>-0.040</b> [0.051]	<b>-0.040</b> [0.059]	<b>-0.040</b> [0.059]	<b>-0.121</b> [0.096]	<b>-0.121</b> [0.095]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	4365	4365	3186	3186	1167	1167

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.8 Placebo test with a fake dummy time 2006 - Men**

	All Men 2005-2008	All Men 2005-2008	Vocational Education 2005-2008	Vocational Education 2005-2008	General Education 2005-2008	General Education 2005-2008
<b>Treatment*Time2006</b>	<b>-0.074</b> [0.076]	<b>-0.074</b> [0.076]	<b>-0.143</b> [0.079]	<b>-0.143*</b> [0.079]	<b>0.263</b> [0.230]	<b>0.263</b> [0.230]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	5497	5497	4123	4123	1341	1341

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Different time-period

As mentioned in the previous section, the peculiarity of the difference-in-differences approach implemented in this analysis is that both the treatment and the control group are not defined by the

<sup>10</sup> The full results, including controls on the background characteristics, education, relationship status and job characteristics, are provided in the appendix Table B.12 and B.13.

<sup>11</sup> Year 2009 is omitted from the regression due to the possible contamination with the birth effect. This could be happening given that women giving birth in 2010 might be pregnant already in 2009.

implementation of a policy or a program. The fact that the year  $t$  used as a threshold is arbitrarily chosen may raise some concerns. For this reason, to demonstrate that the results obtained are not particular to the choice of 2010, we perform the same baseline model using different combinations of time windows associated with different thresholds. In Tables 3.11 and 3.12 the model considers a time-window 2005-2013 and the event analysed is “giving birth in 2009”. In Tables 3.13 and 3.14, the time window analysed is 2007-2015 and the event is “giving birth in 2011”. In Tables 3.15 and 3.16 the time window is 2005-2011 while the event is “giving birth in 2008”; and finally, Tables 3.17 and 3.18<sup>12</sup> look at the years 2009-2015 considering “giving birth in 2012” as the event. While the effect of fatherhood on men is, again, not statistically significant, the results derived for women are, once again, confirmed: women with a vocational background show a wider motherhood wage gap if compared to women with a general background, who instead show a non-statistically significant difference-in-differences coefficient.

**Table 5.9 DID Treatment= giving birth in 2009 (2005-2013) - Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.248***</b>	<b>-0.250***</b>	<b>-0.325***</b>	<b>-0.325***</b>	<b>-0.051</b>	<b>-0.066</b>
	[0.059]	[0.059]	[0.062]	[0.062]	[0.138]	[0.140]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	11901	11901	8303	8303	3541	3541

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.10 DID Treatment= giving birth in 2009 (2005-2013) - Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>0.017</b>	<b>0.016</b>	<b>0.024</b>	<b>0.023</b>	<b>0.030</b>	<b>0.028</b>
	[0.037]	[0.037]	[0.045]	[0.045]	[0.059]	[0.059]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	14755	14755	10749	10749	3872	3872

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

<sup>12</sup> Full results reported in Tables B.14, B.15, B.16, B.17, B.18, B.19, B.20, B.21 in the Appendix

**Table 5.11 DID Treatment: giving birth in 2011 (2007-2015) - Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.197***</b>	<b>-0.203***</b>	<b>-0.272***</b>	<b>-0.277***</b>	<b>-0.075</b>	<b>-0.084</b>
	[0.050]	[0.050]	[0.059]	[0.059]	[0.084]	[0.084]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	11904	11904	7943	7943	3895	3895

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.12 DID Treatment: giving birth in 2011 (2007-2015) Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.019</b>	<b>-0.025</b>	<b>-0.029</b>	<b>-0.035</b>	<b>0.069</b>	<b>0.064</b>
	[0.030]	[0.030]	[0.034]	[0.034]	[0.056]	[0.057]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	14556	14556	10199	10199	4219	4219

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.13 DID Treatment= giving birth in 2008 (2005-2011) - Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.218***</b>	<b>-0.216***</b>	<b>-0.303***</b>	<b>-0.303***</b>	<b>-0.035</b>	<b>-0.035</b>
	[0.061]	[0.061]	[0.073]	[0.073]	[0.091]	[0.091]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	8934	8934	6362	6362	2545	2545

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.14 DID Treatment= giving birth in 2008 (2005-2011) - Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.003</b>	<b>-0.003</b>	<b>-0.022</b>	<b>-0.022</b>	<b>0.084</b>	<b>0.086</b>
	[0.032]	[0.032]	[0.032]	[0.032]	[0.091]	[0.091]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	10938	10938	8038	8038	2811	2811

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.15 DID Treatment= giving birth in 2012 (2009-2015) - Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.127**</b>	<b>-0.132***</b>	<b>-0.173**</b>	<b>-0.177**</b>	<b>-0.094</b>	<b>-0.104</b>
	[0.050]	[0.050]	[0.071]	[0.071]	[0.065]	[0.065]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	9511	9511	6185	6185	3266	3266

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.16 DID Treatment= giving birth in 2012 (2009-2015) - Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
<b>Treatment* time</b>	<b>-0.027</b>	<b>-0.030</b>	<b>-0.034</b>	<b>-0.037</b>	<b>0.016</b>	<b>0.015</b>
	[0.030]	[0.030]	[0.030]	[0.030]	[0.070]	[0.070]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	11438	11438	7868	7868	3451	3451

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## **Selection into education**

The baseline model implemented in this analysis has focused on the selection into motherhood and has investigated the differences between a treated group of mothers compared to a control group of childless women while controlling for observable and unobservable characteristics, between the two groups, that remain fixed over time and that are not correlated with the treatment itself, as well as controlling for any other factors that can change over time but affect both groups equally. However, when comparing the analysis implemented for the vocational sample with the one for the general sample, two different regressions are being compared. Consequently, if there are differences between individuals with a vocational background and those having a general background, these differences could account for part of the difference in the results obtained.

In order to provide some robustness to the results achieved and take into account the possible bias due to selection into vocational education, a triple difference in difference model is implemented as an additional specification (Table 3.19<sup>13</sup>).

**Table 5.17 Triple Difference in Differences – Selection into education**

	All women	All women
<b>Treatment*Time</b>	<b>-0.105</b>	<b>-0.105</b>
	[0.094]	[0.093]
Vet	0.204***	0.204***
	[0.050]	[0.050]
Treatment*Vet	0.138	0.146
	[0.227]	[0.227]
Time*Vet	-0.123***	-0.125***
	[0.030]	[0.030]
<b>Treatment*Time*Vet</b>	<b>-0.282**</b>	<b>-0.281**</b>
	[0.118]	[0.118]
<b>Background</b>	Yes	Yes
<b>Education</b>	Yes	Yes
<b>Relationship Status</b>	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes
<b>Individual FE</b>	Yes	Yes
<b>Time FE</b>	No	Yes
Observations	14757	14757

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The coefficient on the triple interaction term, given by Treatment\*Time\*Vet, is negative and strongly significant, showing that the difference-in-differences result is significantly different for people with a vocational qualification compared to people with a general one, within a triple difference-in-differences analysis and so controlling for differences between people with the two types of qualification. The coefficient for the interaction Treatment\*Vet is clearly insignificant and suggests that differences between vocational and general educated women remain the same amongst mothers as amongst childless women, before the treatment. This is useful in suggesting that there is no interaction between motherhood and vocational status before treatment has taken place. Hence, there is no additional effect from the two together, over and above the individual effects of each, which might have been affecting the vocational versus general results.

<sup>13</sup> Full results reported in Table B.22

## Change in occupation versus human capital depreciation

A possible concern that this analysis may raise is whether one can consider skills depreciation rather than occupational differences, between women with vocational versus a general background, as the main driver behind the differential amplitude of the motherhood wage effect on women with different educational backgrounds. In light of this concern, this section implements a triple difference-in-differences model (Table 3.20<sup>14</sup>) taking into consideration whether women in both the treatment and the control group change their occupation<sup>15</sup> after the event of giving birth.

**Table 5.18 Triple Difference in Differences – Change in occupation**

	All women	All women	Vet	Vet	General	General
<b>Treatment*Time</b>	<b>-0.102*</b> [0.060]	<b>-0.104*</b> [0.060]	<b>0.001</b> [0.050]	<b>-0.000</b> [0.050]	<b>0.001</b> [0.083]	<b>-0.006</b> [0.084]
Mover*Time	-0.089** [0.041]	-0.090** [0.041]	-0.042 [0.033]	-0.043 [0.033]	-0.024 [0.070]	-0.021 [0.070]
<b>Treatment*Mover*Time</b>	<b>-0.176</b> [0.170]	<b>-0.175</b> [0.172]	<b>0.091</b> [0.090]	<b>0.095</b> [0.091]	<b>-0.076</b> [0.204]	<b>-0.064</b> [0.207]
<b>Background</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Relationship status</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Job characteristics</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Observations	6192	6192	6536	6536	2143	2143

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The coefficient on the difference-in-differences term, given by Treatment\*Time, explicates the treatment effect for non-movers. This is found to be negative and statistically significant only in the first specification. The triple difference-in-differences coefficient, Treatment\*Time\*Mover, provides evidence on the extent to which the treatment effect is any different for movers compared to individuals who did not change job after 2010. The coefficient is not statistically significant in all the specifications considered, suggesting that the difference-in-differences results are not statistically different between

<sup>14</sup> Full results are reported in Table B.23

<sup>15</sup> Once again, the categorization of the different occupations is made according to the third version of the International Standard Classification of Occupation (ISCO-88) for European Union purposes. The analysis considers the following major groups: 1) Legislators, senior officials and managers, 2) Professionals, 3) Technicians and associate professionals, 4) Clerks, 5) Service workers and shop market sales workers, 6) Skilled agricultural and fishery workers, 7) Craft and related trades workers, 8) Plant and machine operators and assemblers, 9) Elementary occupations.

those who moved occupation and those who did not. Consequently, this test seems to provide a signal that moving occupation is not an important cause of the fall in wages; that is, the different amplitude of the motherhood wage gap between women with a general or a vocational background may be mainly driven by declining human capital rather than occupational differences. However, one must consider that it could also be the case that the high standard error, in turn due maybe to small numbers of movers, is driving the insignificant triple difference-in-differences coefficient, not that the true effect of interest is really zero.

### **Generalised fixed effects model**

To support the robustness of the previous findings, the wage penalty for motherhood was therefore also estimated using a generalised fixed effects panel data regression model. While the baseline difference-in-differences models implemented previously looked at the effect of giving birth to a child in a particular year  $t$ , the generalised fixed effects model performed now analyses the effect on the monthly wage for births in all years.

In other words, the generalised fixed effects model allows the consideration of the birth of a child at any time within the sample period, in a single model.

More specifically:

$$\ln y_{it} = \alpha_0 + \alpha_1 Age_{it} + \alpha_2 Age_{it}^2 + \beta Mother_{it} + \gamma X_{it} + v_i + \rho_t + \varepsilon_{it} \quad 2)$$

Equation 2 relates the logarithm of the monthly wage observed for respondent  $i$  at time  $t$  to a set of covariates. The key interest is the estimation of parameter  $\beta$  that provides the wage penalty/premium for motherhood/fatherhood keeping constant a set of covariates through the vector,  $X_{it}$ . Mother/Father is a dummy variable that will switch to one when the individual becomes a parent, at any point within the sample period. Finally,  $v_i$  and  $\rho_t$  represent individual-specific and year fixed effects. By including  $v_i$  one can ensure that the model will be able to control for any possible unobserved but time-constant factors that might impact the individual's wage. Hence, it eliminates the need to include in  $X_{it}$

explanatory time-invariant characteristics, and it allows for efficient estimation of the effect of giving birth to a child on women's and men's wages over time.

Tables 3.21 and 3.22<sup>16</sup> report the main results for both women and men by education type. The coefficient of interest is mother/father, a binary variable that takes the value one if the individual has a child, zero otherwise. As shown, motherhood is consistently associated with a significant wage penalty for the overall sample and women with a vocational background. Consistent with the main hypothesis of this study, the motherhood wage penalty is found again to be highest among women with a vocational background, with a 20% decrease in monthly earnings. The overall sample reports, instead, a decrease in earnings of 14%. For women with general education, there is an absence of any significant effects of motherhood on wages. Again, no significant effects are found for fathers.

**Table 5.19 Generalised fixed effects Log Earnings Results Women (2005-2015)**

	All women	Vocational Education	General Education
<b>Mother</b>	<b>-0.140</b> <sup>***</sup>	<b>-0.198</b> <sup>***</sup>	<b>-0.030</b>
	[0.017]	[0.019]	[0.033]
<b>Background</b>	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes
<b>Relationship-status</b>	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes
Observations	22439	15254	7067

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 5.20 Generalised fixed Effects Log Earnings Results- Men (2005-2015)**

	All men	Vocational Education	General Education
<b>Father</b>	0.003	-0.008	0.039
	[0.013]	[0.015]	[0.026]
<b>Background</b>	Yes	Yes	Yes
<b>Education</b>	Yes	Yes	Yes
<b>Relationship Status</b>	Yes	Yes	Yes
<b>Job Characteristics</b>	Yes	Yes	Yes
Observations	27409	19193	7868

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 6. Conclusion

Using German GSOEP data for 2005-2015, this study examines the impact of the birth of a child on mothers' and fathers' monthly earnings, documenting a significant wage penalty for mothers, while

<sup>16</sup> Full results reported in Table B.24 in the Appendix

registering no impact on men's earnings. This study, for the first time, applies an innovative difference-and-differences model using the birth of a child in year  $t$  as an event generating two groups, that is the control group, made of childless women/men, and a treatment group, consisting of those mothers/fathers who had a child in year  $t$ .

In particular, the baseline analysis setting uses  $t=2010$  as the threshold-year. Results show that giving birth in 2010 leads to a 28% decrease in mothers' monthly earnings compared to childless women. The coefficient of interest is, instead, positive but not statistically significant for men. All of these results are still coherent and robust if different time frames and different thresholds are adopted to perform the same analysis. All results are also robust to using an alternative, generalised fixed effects, estimation methodology.

The study takes this analysis a step further by investigating a possible correlation between human capital skills depreciation and the motherhood wage gap. The main assumption relies on the human capital theory according to which women suffer from a motherhood wage gap because birth-related leave and, in general, career interruptions, lead to human capital depreciation and lost work experience. In this context, in order to analyse the impact of human capital depreciation on earnings, the study exploits, for the first time, the difference between skills acquired through a vocational educational path versus those developed following a general one, as one of the keys factors to help to shed light on the motherhood wage gap. Given that skills acquired through vocational studies depreciate quicker and may require to be updated more often, and that changes in labour market behaviours, that is occupational changes driven by the birth of a child (Waldfogel, 1997, Budig and England, 2001, Amuedo-Dorantes and Kimmel, 2008), may be more easily handled by women with a general background whose skills are well known to be more adaptable to changes in work environments, this study supports the hypothesis that a birth-related leave will have a higher cost in terms of human capital loss/loss of job experience for those women with a vocational qualification when compared to those having a general one. The hypothesis is confirmed by the results which uncover a 37% larger decrease in monthly earnings for women with a vocational qualification as their highest qualification. The coefficient is instead positive and not significant for women with a general background. Once again, the same conclusions can be

reached if different time windows and thresholds are used to perform the same analysis, and also in a generalised fixed effects framework.

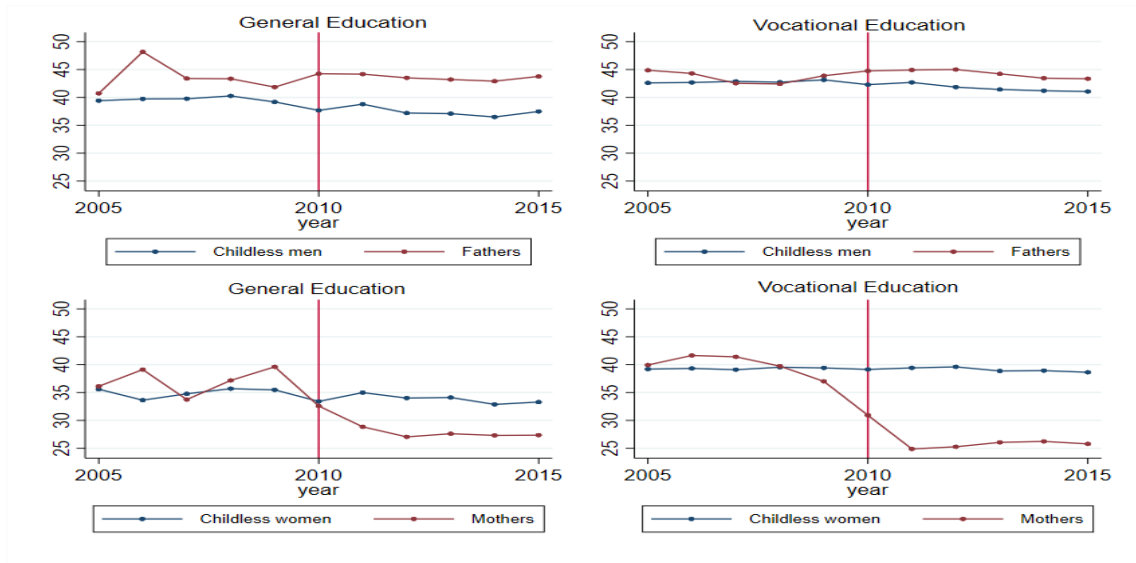
One possible explanation which may help to understand the reason for such a distinct impact of motherhood and fatherhood on earnings might be the different responses of women and men in terms of changes in the total amount of weekly working hours after the event. While fathers' average weekly hours worked after the event does not reveal a substantial change compared to childless men, the average of mothers' weekly working hours drastically decreases compared to the average of childless women. Nevertheless, the absence of a differential hours effect between women with a vocational and with a general qualification means that such an hours response is not the cause of the difference in the motherhood wage penalty between the two education groups.

In conclusion, the results achieved in this analysis confirm previous results in the literature with regard to the motherhood wage gap, arguing for the first time that part of this gap could be affected by the different rates of skills depreciation.

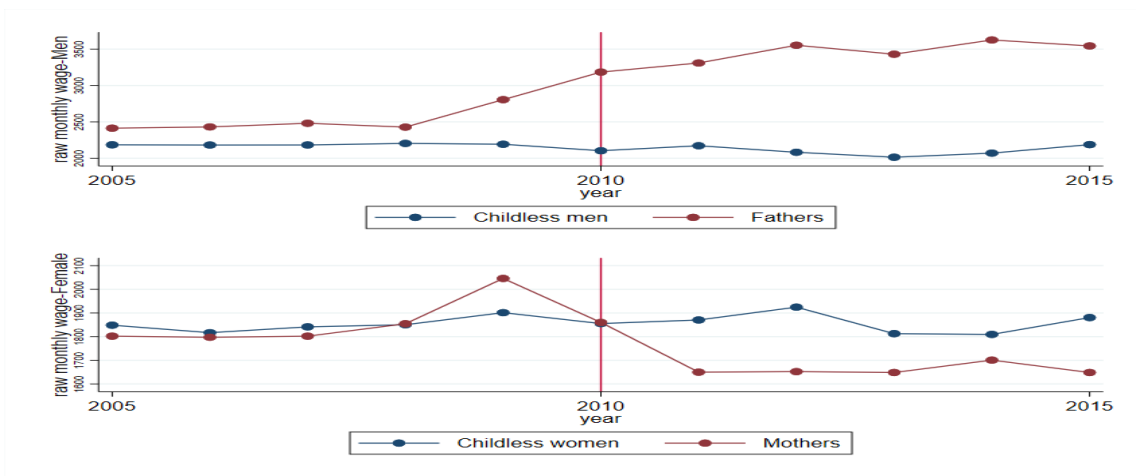
Given the established existence of a wage penalty for women who decide to have a child, the country's institutional environment must consider changes to improve family and market labour systems. In particular, as already proven by recent studies, a welfare system that can financially support mothers, could be beneficial for mothers who intend to keep working after childbirth. Ensuring job security (Hegewisch and Gornick 2013), paid maternity leave (De Henau et al. 2007), providing childcare (Pettit and Hook 2009) and ensuring job flexibility (Neuburger, et al. 2010) are only some of the much-needed steps to be undertaken in order to reduce the motherhood wage gap and ensure gender equality. However, the implementation of those policies is still not enough. Given the abovementioned decrease in terms of women's working hours and given the potential impact of skill depreciation on women's wages, which depends on the time spent out of the labour force, what must be ensured in a welfare system, that aims to guarantee equal opportunity to its citizens, is to implement tools allowing for greater work-flexibility. In other words, guaranteeing a labour market that can reconcile women's work and their caring responsibilities is the key to a potential reduction in the gender wage gap. Boosting the use of strategies such as flexible working hours, job sharing, remote working and compressed hours could be

needed in a society aiming to attract more women into the job market in all positions and levels of seniority.

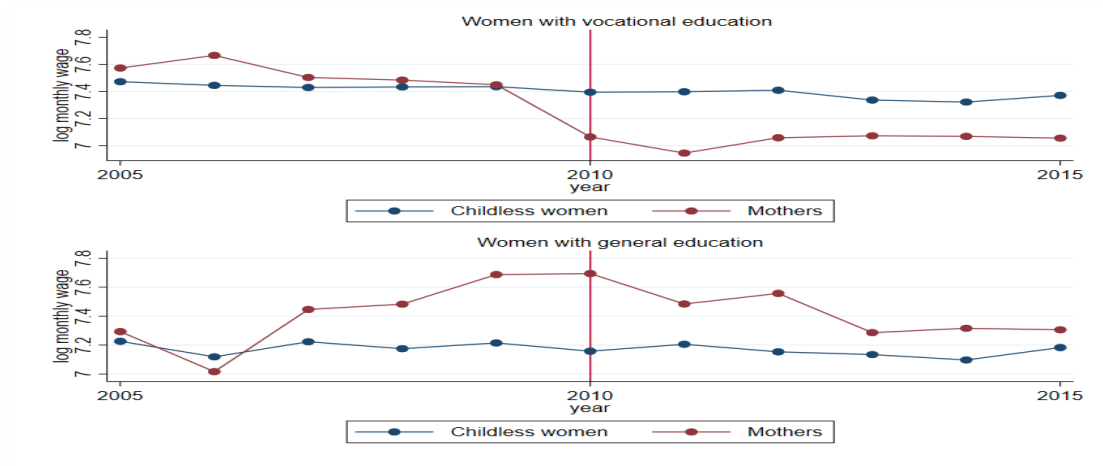
# Appendix A



*Figure A. 1 Change in weekly working hours by gender across time, before and after the event.*



*Figure A. 2 Common trend: Raw data monthly wage by gender*



**Figure A. 3 Logarithm of the monthly wage by education type (Women)**

Note: In the upper part of the graph, the trend for women with a vocational qualification as highest qualification is inspected, in the lower one for women with a general qualification. The graphical inspections, which are based now on a smaller number of women observed, continue to show a generally parallel trend both among women with a general and vocational background.

## Appendix B

**Table B. 1 Definition of the variables used in the analysis.**

Variable	Category	Description
Age	Background characteristics	Continuous-variable in years
<i>West</i>	Background characteristics	Dummy variable (0, 1). 1 if the individual is resident in West Germany; 0 otherwise.
Female	Background characteristics	Dummy variable (0, 1). 1 if the individual is female; 0 otherwise
<i>No-migration background</i>	Background characteristics	Dummy variable (0, 1). 1 if the individual has no migration background; 0 otherwise.
<i>Second-generation background</i>	Background characteristics	Dummy variable (0, 1). 1 if the individual has a second-generation migration background; 0 otherwise.
<i>Migration background</i>	Background characteristics	Dummy variable (0, 1). 1 if the individual is an immigrant; 0 otherwise.
Good_health	Background characteristics	Dummy variable (0, 1). 1 if the individual has a rather good health status; 0 otherwise.
Mother	Background characteristics	Dummy variable (0, 1). 1 if the individual has a child; 0 otherwise.
Father	Background characteristics	Dummy variable (0, 1). 1 if the individual has a child; 0 otherwise.
Single	Relationship status	Dummy variable (0, 1). 1 if the reference person has no partner; 0 otherwise
Married	Relationship status	Dummy variable (0, 1). 1 if the reference person has a partner; 0 otherwise
Divorced/Separated	Relationship status	Dummy variable (0, 1). 1 if the reference is legally divorced or separated; 0 otherwise
Widowed	Relationship status	Dummy variable (0, 1). 1 if the reference is widowed; 0 otherwise
<i>Years of Education</i>	Educational background	Continuous and centered variable <sup>17</sup> (in years)
<i>Vocational</i>	Educational background	Dummy variable (0, 1). 1 if the respondent has any vocational qualification as highest qualification achieved; 0 otherwise
Level 1 Vocational	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 1 vocational qualification as highest qualification achieved; 0 otherwise

<sup>17</sup> For ease of interpretation, the age variable is centered, and it is derived by subtracting the mean age from all the observations related to age in the dataset such that the new mean age is zero.

Level 1 General	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 1 general qualification as highest qualification achieved; 0 otherwise
Level 2 Vocational	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 2 vocational qualification as highest qualification achieved; 0 otherwise
Level 2 General	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 2 general qualification as highest qualification achieved; 0 otherwise
Level 3 Vocational	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 3 vocational qualification as highest qualification achieved; 0 otherwise
Level 3 General	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 3 general qualification as highest qualification achieved; 0 otherwise
Level 4 Vocational	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 4 vocational qualification as highest qualification achieved; 0 otherwise
Level 4 General	Educational background	Dummy variable (0, 1). 1 if the respondent has a level 4 general qualification as highest qualification achieved; 0 otherwise
Employed	Job characteristics	Dummy variable (0, 1). 1 if the individual is employed; 0 otherwise
Monthly wage	Job characteristics	Continuous variable, in Euros
Manager /Professional	Job characteristics	Dummy variable (0, 1). 1 if the respondent works as a manager or professional; 0 otherwise
Clerks/Service workers	Job characteristics	Dummy variable (0, 1). 1 if the respondent works as clerk or service worker; 0 otherwise
Agricultural/Craft/Machine operators	Job characteristics	Dummy variable (0, 1). 1 if the respondent works as a skilled agricultural worker, craft or machine operators; 0 otherwise
Elementary occupations	Job characteristics	Dummy variable (0, 1). 1 if the respondent has an elementary occupation; 0 otherwise
Full-time	Job characteristics	Dummy variable (0, 1). 1 if the respondent works full-time; 0 otherwise
Self-employed	Job characteristics	Dummy variable (0, 1). 1 if the respondent is self-employed; 0 otherwise
Full-time experience	Job characteristics	Continuous variable in years.
Part-time experience	Job characteristics	Continuous variable in years.
Public-Sector	Job characteristics	Dummy variable (0, 1). 1 if the respondent works in a public sector; 0 otherwise

**Table B. 2 Descriptive statistics (women sample)**

Variable	Mothers			Non-mothers		
	N	Mean	SD	N	Mean	SD
Employed	15005	0.527	0.499	22736	0.745	0.436
Monthly wage	7799	1742.710	1304.390	16805	2009.438	1389.788
Age	17827	32.708	5.792	29853	27.593	7.787
Years of education	14574	12.804	2.825	20398	12.812	2.632
Vocational education	17167	0.641	0.480	26798	0.576	0.494
Married	15312	0.698	0.459	23281	0.154	0.361
Divorced	15312	0.054	0.226	23281	0.037	0.190
Widowed	15312	0.002	0.039	23281	0.001	0.038
Single	15312	0.246	0.431	23281	0.807	0.395
Good health	14998	0.908	0.289	22820	0.908	0.289
Manager/Professional	7526	0.578	0.494	16063	0.562	0.496
Clerks/Service	7526	0.324	0.468	16063	0.354	0.478
Agri/Craft/Machine	7526	0.046	0.209	16063	0.051	0.221
Elementary occupation	7526	0.052	0.223	16063	0.033	0.178
Full time	7920	0.309	0.462	17055	0.772	0.419
West	17799	0.804	0.397	29718	0.831	0.375
Public sector	7392	0.249	0.432	16110	0.268	0.443
Work experience FT	14602	5.733	5.177	22579	4.904	6.858
Work experience PT	14602	2.005	2.756	22579	1.363	2.633
No migration background	17800	0.666	0.472	29784	0.751	0.433
Second generation	17800	0.105	0.306	29784	0.141	0.348
Migrant	17800	0.229	0.420	29784	0.109	0.311

Note: The tables show averages of person-year observations, using GSOEP data for women aged 18 to 47, and considering a time frame 2005-2015. Individuals with no qualifications are excluded from the sample.

**Table B. 3 Descriptive statistics (men sample)**

Variable	Fathers			Non-fathers		
	N	Mean	SD	N	Mean	SD
Employed	11910	0.896	0.305	26367	0.748	0.434
Monthly wage	10451	3278.484	1725.906	19545	2330.321	1611.852
Age	14995	35.437	5.764	35220	28.546	8.149
Years of education	11655	12.638	2.942	23691	12.293	2.579
Vocational education	13841	0.670	0.470	31619	0.618	0.486
Married	12139	0.779	0.415	26906	0.125	0.331
Divorced	12139	0.034	0.181	26906	0.036	0.186
Widowed	12139	0.001	0.033	26906	0.001	0.036
Single	12139	0.186	0.389	26906	0.838	0.368
Good health	11902	0.918	0.275	26433	0.928	0.259
Manager/Professional	10400	0.514	0.500	18587	0.423	0.494
Clerks/Service	10400	0.110	0.313	18587	0.164	0.370
Agri/Craft/Machine	10400	0.327	0.469	18587	0.356	0.479
Elementary occupation	10400	0.050	0.217	18587	0.057	0.231
Full time	10680	0.926	0.262	19842	0.879	0.327
West	14967	0.815	0.388	35069	0.794	0.404
Public sector	10178	0.162	0.369	18470	0.156	0.363
Work experience FT	11551	11.150	6.413	26126	5.789	7.269
Work experience PT	11551	0.861	2.201	26126	0.810	1.877
No migration background	14938	0.671	0.470	35157	0.760	0.427
Second generation	14938	0.107	0.309	35157	0.135	0.341
Migrant	14938	0.222	0.416	35157	0.106	0.307

The tables show averages of person-year observations, using GSOEP data for men and men aged 18 to 47, and considering a time frame 2005-2015. Individuals with no qualifications are excluded from the sample.

**Table B. 4 Descriptive analysis of the monthly wage by education type (women)**

<b>AGE: 18-47</b>			
Log Monthly Wage	<b>Mothers</b>	<b>Non-mothers</b>	<b>Difference</b>
Total	7.153	7.311	-0.158***
Vet qualification	7.080	7.409	-0.329***
General qualification	7.329	7.191	0.138***
Difference	-0.249***	0.218***	
<b>AGE: 18-27</b>			
Log Monthly Wage	<b>Mothers</b>	<b>Non-mothers</b>	<b>Difference</b>
Total	6.635	6.875	-0.240***
Vet qualification	6.776	7.054	-0.278***
General qualification	6.364	6.594	-0.230***
Difference	0.412***	0.460***	
<b>AGE: 28-37</b>			
Log Monthly Wage	<b>Mothers</b>	<b>Non-mothers</b>	<b>Difference</b>
Total	7.134	7.672	-0.538***
Vet qualification	7.066	7.689	-0.623***
General qualification	7.328	7.665	-0.337***
Difference	-0.262 ***	0.024	
<b>AGE: 38-47</b>			
Log Monthly Wage	<b>Mothers</b>	<b>Non-mothers</b>	<b>Difference</b>
Total	7.415	7.819	-0.404***
Vet qualification	7.267	7.808	-0.541***
General qualification	7.638	7.911	-0.273**
Difference	-0.371 ***	-0.103***	

Note: The table provides descriptive statistics on the monthly wage of employed women across different age ranges and by educational background. The second and the third columns report the mean of the logarithm of the monthly wage for mothers and non-mothers. The last column provides a t-test for the difference in means of the dependent variable between mothers and childless individuals.

Source: GSOEP; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 5 Descriptive analysis of the monthly wage by education type (men)**

<b>AGE: 18-47</b>			
Log Monthly Wage	<b>Fathers</b>	<b>Non-Fathers</b>	<b>Difference</b>
Total	7.929	7.454	0.475 ***
Vet qualification	7.915	7.501	0.414 ***
General qualification	8.008	7.408	0.600 ***
Difference	-0.093 ***	-0.093 ***	
<b>AGE: 18-27</b>			
Log Monthly Wage	<b>Fathers</b>	<b>Non-Fathers</b>	<b>Difference</b>
Total	7.338	6.930	0.408 ***
Vet qualification	7.442	7.039	0.403***
General qualification	7.124	6.718	0.406* **
Difference	0.318 ***	0.321 ***	
<b>AGE: 28-37</b>			
Log Monthly Wage	<b>Fathers</b>	<b>Non-Fathers</b>	<b>Difference</b>
Total	7.879	7.776	0.103 ***
Vet qualification	7.873	7.793	0.080***
General qualification	7.939	7.785	0.154***
Difference	-0.066**	0.008	
<b>AGE: 38-47</b>			
Log Monthly Wage	<b>Fathers</b>	<b>Non-Fathers</b>	<b>Difference</b>
Total	8.115	7.982	0.133***
Vet qualification	8.068	7.939	0.129***
General qualification	8.247	8.141	0.106***
Difference	-0.179***	-0.202**	

Note: The table provides descriptive statistics on the monthly wage of employed men across different age ranges and by educational background. The second and the third columns report the mean of the logarithm of the monthly wage for fathers and non-fathers. The last column provides a t-test for the difference in means of the dependent variable between fathers and childless individuals.

Source: GSOEP; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 6 Baseline model: DID Log Wage Results- Women**

	All women	All women	Vocational Education	Vocational Education	General Education	General Education
Time	-0.024 [0.015]	-0.266** [0.114]	-0.026 [0.016]	-0.255* [0.135]	-0.009 [0.031]	-0.151 [0.208]
<b>Treatment* time</b>	<b>-0.278***</b> [0.058]	<b>-0.278***</b> [0.058]	<b>-0.374***</b> [0.069]	<b>-0.377***</b> [0.069]	<b>-0.025</b> [0.087]	<b>-0.025</b> [0.087]
Age	0.078*** [0.010]	0.099*** [0.014]	0.080*** [0.011]	0.100*** [0.016]	0.066*** [0.019]	0.078*** [0.027]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
Good health	0.005 [0.014]	0.005 [0.014]	0.017 [0.016]	0.018 [0.016]	-0.027 [0.026]	-0.025 [0.026]
<b>Education</b>						
Level 1 Vet	0.247* [0.150]	0.249* [0.150]	0.339** [0.161]	0.336** [0.163]		
Level 2 Vet	-0.263** [0.127]	-0.262** [0.127]	-0.157 [0.139]	-0.160 [0.140]		
Level 3 Vet	-0.048 [0.099]	-0.051 [0.099]	-0.367*** [0.121]	-0.372*** [0.120]		
Level 1 Gen	0.123 [0.157]	0.134 [0.156]			0.070 [0.345]	0.070 [0.338]
Level 2 Gen	0.066 [0.138]	0.066 [0.138]			-0.495*** [0.185]	-0.493*** [0.187]
Level 3 Gen	-0.501*** [0.097]	-0.504*** [0.097]			-0.512*** [0.090]	-0.509*** [0.090]
Level 4 Gen	0.113 [0.119]	0.109 [0.119]				
<b>Relationship status</b>						
Married/Relationship	-0.030 [0.024]	-0.030 [0.024]	-0.024 [0.029]	-0.023 [0.028]	-0.028 [0.048]	-0.029 [0.047]
Separated/Divorced	-0.017 [0.048]	-0.020 [0.048]	0.043 [0.055]	0.041 [0.055]	-0.169** [0.078]	-0.178** [0.077]
<b>Job characteristics</b>						
Managers	0.222*** [0.070]	0.222*** [0.069]	0.294*** [0.085]	0.296*** [0.084]	0.170 [0.117]	0.164 [0.116]
Professionals	0.171** [0.069]	0.171** [0.068]	0.219*** [0.084]	0.221*** [0.083]	0.171 [0.116]	0.168 [0.116]
Technicians	0.167*** [0.063]	0.165*** [0.063]	0.244*** [0.077]	0.244*** [0.077]	0.106 [0.112]	0.100 [0.111]
Clerks	0.088 [0.065]	0.086 [0.064]	0.148* [0.080]	0.148* [0.079]	0.044 [0.108]	0.038 [0.107]
Service workers	0.054 [0.066]	0.053 [0.065]	0.128 [0.082]	0.130 [0.081]	0.006 [0.108]	0.004 [0.108]
Skil_agricul/fishery	0.206* [0.113]	0.208* [0.114]	0.230 [0.155]	0.223 [0.154]	0.189 [0.147]	0.194 [0.146]
Craft and trade	-0.013 [0.071]	-0.013 [0.071]	0.020 [0.079]	0.017 [0.079]	-0.113 [0.149]	-0.114 [0.148]
Machine operators	0.024 [0.107]	0.025 [0.107]	0.055 [0.135]	0.055 [0.134]	-0.051 [0.120]	-0.045 [0.120]
Full time	0.488*** [0.027]	0.486*** [0.027]	0.426*** [0.034]	0.423*** [0.034]	0.561*** [0.044]	0.562*** [0.044]
Work Experience PT	-0.030*** [0.010]	-0.031*** [0.010]	-0.040*** [0.011]	-0.041*** [0.011]	-0.011 [0.022]	-0.013 [0.021]
Work Experience FT	-0.033*** [0.010]	-0.031*** [0.010]	-0.042*** [0.012]	-0.039*** [0.012]	-0.004 [0.020]	-0.004 [0.020]
Self employed	-0.280*** [0.071]	-0.277*** [0.071]	-0.107 [0.082]	-0.104 [0.082]	-0.418*** [0.101]	-0.414*** [0.101]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.667*** [0.150]	7.884*** [0.168]	7.796*** [0.187]	7.989*** [0.204]	7.439*** [0.224]	7.592*** [0.281]
Observations	14839	14839	10041	10041	4716	4716
Adjusted R <sup>2</sup>	0.334	0.336	0.246	0.249	0.403	0.406

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 7 Baseline model: DID Log Wage Results-Men**

	All men	All men	Vocational Education	Vocational Education	General Education	General Education
Time	-0.016 [0.013]	-0.033 [0.098]	-0.013 [0.015]	-0.072 [0.116]	-0.034 [0.026]	-0.145 [0.175]
<b>Treatment* time</b>	<b>0.010</b> [0.035]	<b>0.009</b> [0.035]	<b>0.014</b> [0.041]	<b>0.013</b> [0.041]	<b>0.005</b> [0.068]	<b>0.002</b> [0.069]
Age	0.105*** [0.009]	0.106*** [0.013]	0.113*** [0.011]	0.118*** [0.016]	0.057*** [0.021]	0.068** [0.029]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Good health	-0.008 [0.014]	-0.007 [0.014]	0.001 [0.015]	0.001 [0.015]	-0.033 [0.032]	-0.032 [0.032]
<b>Education</b>						
Level 1 Vet	0.187 [0.122]	0.186 [0.122]	0.131 [0.153]	0.130 [0.153]		
Level 2 Vet	-0.294*** [0.110]	-0.293*** [0.110]	-0.331** [0.141]	-0.329** [0.141]		
Level 3 Vet	-0.169* [0.091]	-0.169* [0.091]	-0.588*** [0.134]	-0.587*** [0.134]		
Level 1 Gen	0.254* [0.132]	0.257* [0.132]			-1.000*** [0.370]	-0.991*** [0.367]
Level 2 Gen	0.139 [0.130]	0.141 [0.130]			-0.683* [0.361]	-0.703* [0.359]
Level 3 Gen	-0.612*** [0.080]	-0.610*** [0.080]			-0.694*** [0.099]	-0.695*** [0.099]
Level 4 Gen	-0.037 [0.109]	-0.038 [0.109]				
<b>Relationship status</b>						
Married/Relationship	0.057** [0.025]	0.056** [0.025]	0.025 [0.027]	0.025 [0.027]	0.074* [0.045]	0.073 [0.044]
Separated/Divorced	0.056 [0.039]	0.054 [0.039]	0.036 [0.044]	0.034 [0.044]	0.079 [0.080]	0.078 [0.081]
<b>Job characteristics</b>						
Managers	0.071 [0.044]	0.071 [0.044]	0.045 [0.048]	0.045 [0.048]	0.180* [0.098]	0.181* [0.097]
Professionals	0.034 [0.043]	0.033 [0.043]	-0.014 [0.047]	-0.015 [0.047]	0.189** [0.095]	0.188** [0.094]
Technicians	0.008 [0.039]	0.006 [0.039]	-0.031 [0.044]	-0.033 [0.044]	0.134 [0.084]	0.134 [0.084]
Clerks	-0.026 [0.042]	-0.027 [0.042]	-0.078* [0.046]	-0.078* [0.045]	0.060 [0.092]	0.062 [0.092]
Service workers	0.010 [0.047]	0.010 [0.047]	-0.020 [0.060]	-0.020 [0.060]	0.150* [0.082]	0.148* [0.082]
Skil_agricul/fishery	-0.052 [0.072]	-0.055 [0.072]	-0.071 [0.080]	-0.076 [0.080]	0.031 [0.154]	0.041 [0.155]
Craft and trade	0.024 [0.036]	0.023 [0.036]	-0.008 [0.041]	-0.009 [0.041]	0.086 [0.087]	0.084 [0.087]
Machine operators	0.004 [0.036]	0.004 [0.036]	-0.017 [0.042]	-0.018 [0.041]	0.055 [0.081]	0.058 [0.081]
Full time	0.666*** [0.038]	0.667*** [0.038]	0.645*** [0.053]	0.645*** [0.053]	0.601*** [0.054]	0.605*** [0.054]
Work Experience PT	-0.042*** [0.013]	-0.043*** [0.013]	-0.032* [0.016]	-0.032* [0.016]	-0.012 [0.026]	-0.015 [0.026]
Work Experience FT	-0.064*** [0.010]	-0.064*** [0.010]	-0.074*** [0.012]	-0.073*** [0.012]	-0.016 [0.023]	-0.016 [0.023]
Self employed	-0.077 [0.051]	-0.075 [0.051]	-0.072 [0.070]	-0.071 [0.070]	-0.067 [0.074]	-0.065 [0.073]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.973*** [0.137]	7.995*** [0.156]	8.261*** [0.172]	8.311*** [0.189]	7.641*** [0.241]	7.748*** [0.292]
Observations	18296	18296	12959	12959	5143	5143
Adjusted R <sup>2</sup>	0.365	0.366	0.302	0.302	0.371	0.372

Note: GSOEP data, Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 8 Baseline model, different time windows (2006-2014) - Women**

	All women 2006-2014	All women 2006-2014	Vocational Education 2006-2014	Vocational Education 2006-2014	General Education 2006-2014	General Education 2006-2014
Time	-0.025*	-0.146*	-0.025	-0.151	-0.008	-0.224
	[0.015]	[0.087]	[0.016]	[0.097]	[0.031]	[0.166]
<b>Treatment* time</b>	<b>-0.243***</b>	<b>-0.244***</b>	<b>-0.323***</b>	<b>-0.326***</b>	<b>-0.053</b>	<b>-0.051</b>
	[0.054]	[0.054]	[0.065]	[0.065]	[0.093]	[0.094]
Age	0.084***	0.099***	0.084***	0.099***	0.080***	0.108***
	[0.012]	[0.016]	[0.014]	[0.018]	[0.023]	[0.029]
Age squared	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***	-0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Good health	0.015	0.015	0.023	0.024	0.010	0.011
	[0.015]	[0.015]	[0.017]	[0.017]	[0.028]	[0.028]
<b>Education</b>						
Level 1 Vet	0.265	0.267	0.368*	0.366*		
	[0.191]	[0.192]	[0.209]	[0.210]		
Level 2 Vet	-0.247	-0.246	-0.128	-0.129		
	[0.166]	[0.166]	[0.185]	[0.186]		
Level 3 Vet	-0.011	-0.012	-0.431***	-0.435***		
	[0.121]	[0.121]	[0.140]	[0.140]		
Level 1 Gen	0.255	0.259			0.485	0.496
	[0.207]	[0.207]			[0.409]	[0.393]
Level 2 Gen	0.061	0.058			-0.563**	-0.559**
	[0.176]	[0.176]			[0.244]	[0.245]
Level 3 Gen	-0.460***	-0.462***			-0.490***	-0.484***
	[0.119]	[0.119]			[0.110]	[0.109]
Level 4 Gen	0.107	0.102				
	[0.146]	[0.146]				
<b>Relationship status</b>						
Married/Relationship	-0.042	-0.042	-0.025	-0.023	-0.055	-0.052
	[0.027]	[0.027]	[0.031]	[0.031]	[0.058]	[0.058]
Separated/Divorced	-0.010	-0.011	0.080	0.081	-0.268***	-0.272***
	[0.053]	[0.053]	[0.057]	[0.057]	[0.094]	[0.092]
<b>Job characteristics</b>						
Managers	0.242***	0.242***	0.367***	0.364***	0.109	0.102
	[0.087]	[0.088]	[0.104]	[0.104]	[0.133]	[0.134]
Professionals	0.189**	0.188**	0.284***	0.281***	0.089	0.086
	[0.085]	[0.085]	[0.100]	[0.100]	[0.137]	[0.137]
Technicians	0.177**	0.176**	0.296***	0.295***	0.038	0.033
	[0.079]	[0.079]	[0.093]	[0.093]	[0.132]	[0.133]
Clerks	0.093	0.092	0.202**	0.199**	-0.042	-0.047
	[0.080]	[0.081]	[0.096]	[0.096]	[0.124]	[0.125]
Service workers	0.072	0.072	0.191**	0.192**	-0.053	-0.054
	[0.082]	[0.082]	[0.097]	[0.097]	[0.131]	[0.131]
Skil_agricul/fishery	0.240*	0.238*	0.338*	0.325*	0.026	0.023
	[0.126]	[0.126]	[0.173]	[0.171]	[0.148]	[0.147]
Craft and trade	-0.022	-0.023	0.032	0.025	-0.192	-0.190
	[0.086]	[0.086]	[0.095]	[0.095]	[0.177]	[0.176]
Machine operators	0.027	0.030	0.121	0.123	-0.174	-0.174
	[0.138]	[0.138]	[0.177]	[0.176]	[0.150]	[0.151]
Full time	0.488***	0.488***	0.426***	0.424***	0.568***	0.570***
	[0.030]	[0.030]	[0.037]	[0.037]	[0.051]	[0.051]
Work Experience PT	-0.028**	-0.028**	-0.037***	-0.038***	-0.020	-0.022
	[0.012]	[0.012]	[0.013]	[0.013]	[0.025]	[0.024]
Work Experience FT	-0.037***	-0.036***	-0.046***	-0.044***	-0.017	-0.017
	[0.012]	[0.012]	[0.015]	[0.015]	[0.024]	[0.024]
Self employed	-0.298***	-0.299***	-0.144	-0.143	-0.402***	-0.403***
	[0.079]	[0.079]	[0.092]	[0.092]	[0.114]	[0.113]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.671***	7.785***	7.760***	7.868***	7.549***	7.767***
	[0.185]	[0.198]	[0.230]	[0.244]	[0.266]	[0.296]
Observations	11873	11873	8140	8140	3673	3673
Adjusted R <sup>2</sup>	0.323	0.323	0.245	0.247	0.384	0.387

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 9 Baseline model, different time windows (2007-2013) - Women**

	All women 2007-2013	All women 2007-2013	Vocational Education 2007-2013	Vocational Education 2007-2013	General Education 2007-2013	General Education 2007-2013
Time	-0.018 [0.015]	-0.061 [0.065]	-0.016 [0.016]	-0.147** [0.069]	0.005 [0.033]	0.039 [0.134]
<b>Treatment* time</b>	<b>-0.206***</b> [0.053]	<b>-0.206***</b> [0.052]	<b>-0.271***</b> [0.063]	<b>-0.274***</b> [0.063]	<b>-0.074</b> [0.093]	<b>-0.073</b> [0.095]
Age	0.084*** [0.013]	0.090*** [0.017]	0.091*** [0.015]	0.113*** [0.019]	0.068** [0.027]	0.060* [0.033]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
Good health	0.020 [0.018]	0.019 [0.018]	0.022 [0.019]	0.023 [0.019]	0.042 [0.031]	0.041 [0.031]
<b>Education</b>						
Level 1 Vet	0.157 [0.270]	0.159 [0.271]	0.075 [0.320]	0.074 [0.319]		
Level 2 Vet	-0.422* [0.244]	-0.420* [0.244]	-0.508* [0.303]	-0.508* [0.302]		
Level 3 Vet	-0.061 [0.143]	-0.062 [0.143]	-0.457*** [0.165]	-0.460*** [0.165]		
Level 1 Gen	0.086 [0.327]	0.088 [0.328]			1.441*** [0.172]	1.417*** [0.170]
Level 2 Gen	-0.089 [0.250]	-0.090 [0.250]			-0.492 [0.334]	-0.469 [0.340]
Level 3 Gen	-0.507*** [0.145]	-0.509*** [0.145]			-0.485*** [0.159]	-0.469*** [0.158]
Level 4 Gen	0.101 [0.187]	0.098 [0.187]				
<b>Relationship status</b>						
Married/Relationship	-0.051* [0.030]	-0.051* [0.030]	0.000 [0.033]	0.001 [0.034]	-0.113* [0.067]	-0.108 [0.067]
Separated/Divorced	-0.050 [0.055]	-0.052 [0.056]	0.071 [0.056]	0.070 [0.056]	-0.368*** [0.138]	-0.378*** [0.136]
<b>Job characteristics</b>						
Managers	0.233** [0.099]	0.232** [0.099]	0.310*** [0.111]	0.307*** [0.110]	0.102 [0.134]	0.092 [0.134]
Professionals	0.177* [0.095]	0.176* [0.095]	0.248** [0.105]	0.244** [0.104]	0.073 [0.140]	0.070 [0.140]
Technicians	0.166* [0.089]	0.165* [0.089]	0.248** [0.096]	0.245** [0.096]	0.023 [0.134]	0.021 [0.134]
Clerks	0.104 [0.090]	0.103 [0.090]	0.155 [0.099]	0.151 [0.099]	-0.020 [0.126]	-0.024 [0.125]
Service workers	0.077 [0.090]	0.076 [0.090]	0.181* [0.103]	0.181* [0.103]	-0.072 [0.127]	-0.073 [0.125]
Skil_agricul/fishery	0.249* [0.132]	0.246* [0.132]	0.359** [0.174]	0.349** [0.172]	-0.028 [0.151]	-0.034 [0.147]
Craft and trade	-0.002 [0.103]	-0.003 [0.103]	0.047 [0.105]	0.041 [0.104]	-0.234 [0.222]	-0.243 [0.222]
Machine operators	-0.038 [0.146]	-0.037 [0.146]	0.051 [0.174]	0.052 [0.172]	-0.287 [0.195]	-0.291 [0.194]
Full time	0.462*** [0.033]	0.463*** [0.033]	0.415*** [0.040]	0.414*** [0.039]	0.510*** [0.061]	0.515*** [0.061]
Work Experience PT	-0.031** [0.014]	-0.032** [0.014]	-0.051*** [0.016]	-0.051*** [0.016]	-0.007 [0.027]	-0.010 [0.027]
Work Experience FT	-0.035** [0.014]	-0.035** [0.014]	-0.054*** [0.016]	-0.052*** [0.016]	-0.002 [0.028]	-0.005 [0.028]
Self employed	-0.328*** [0.095]	-0.329*** [0.095]	-0.243** [0.113]	-0.243** [0.114]	-0.366*** [0.134]	-0.368*** [0.133]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.784*** [0.229]	7.832*** [0.236]	8.138*** [0.296]	8.263*** [0.300]	7.380*** [0.295]	7.360*** [0.308]
Observations	9161	9161	6330	6330	2786	2786
Adjusted R <sup>2</sup>	0.304	0.305	0.233	0.235	0.348	0.353

Note: GSOEP data, Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 10 Basic specification, different time windows (2006-2014) - Men**

	All Men 2006-2014	All Men 2006-2014	Vocational Education 2006-2014	Vocational Education 2006-2014	General Education 2006-2014	General Education 2006-2014
Time	-0.012 [0.013]	-0.198*** [0.073]	-0.010 [0.015]	-0.194** [0.083]	-0.025 [0.026]	-0.245* [0.134]
<b>Treatment* time</b>	<b>0.002</b> [0.034]	<b>0.001</b> [0.034]	<b>0.002</b> [0.039]	<b>0.002</b> [0.039]	<b>0.018</b> [0.068]	<b>0.016</b> [0.068]
Age	0.105*** [0.011]	0.129*** [0.014]	0.113*** [0.013]	0.136*** [0.016]	0.057** [0.026]	0.085*** [0.030]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Good health	-0.007 [0.015]	-0.006 [0.015]	0.013 [0.016]	0.014 [0.016]	-0.060** [0.030]	-0.061** [0.030]
<b>Education</b>						
Level 1 Vet	0.093 [0.149]	0.094 [0.149]	0.053 [0.187]	0.054 [0.187]		
Level 2 Vet	-0.381*** [0.132]	-0.380*** [0.132]	-0.394** [0.171]	-0.391** [0.171]		
Level 3 Vet	-0.117 [0.107]	-0.117 [0.107]	-0.569*** [0.163]	-0.568*** [0.163]		
Level 1 Gen	0.164 [0.158]	0.165 [0.158]			-1.140*** [0.418]	-1.138*** [0.416]
Level 2 Gen	0.077 [0.152]	0.077 [0.152]			-0.568 [0.398]	-0.599 [0.398]
Level 3 Gen	-0.614*** [0.090]	-0.613*** [0.090]			-0.653*** [0.109]	-0.655*** [0.108]
Level 4 Gen	-0.046 [0.122]	-0.046 [0.121]				
<b>Relationship status</b>						
Married/Relationship	0.061** [0.029]	0.061** [0.029]	0.046 [0.030]	0.046 [0.030]	0.029 [0.049]	0.029 [0.049]
Separated/Divorced	0.059 [0.047]	0.058 [0.047]	0.060 [0.052]	0.059 [0.052]	0.012 [0.094]	0.016 [0.095]
<b>Job characteristics</b>						
Managers	0.065 [0.051]	0.066 [0.051]	0.053 [0.057]	0.053 [0.057]	0.198* [0.115]	0.200* [0.114]
Professionals	0.038 [0.050]	0.037 [0.050]	-0.001 [0.055]	-0.003 [0.055]	0.208* [0.112]	0.208* [0.111]
Technicians	0.022 [0.045]	0.021 [0.045]	-0.017 [0.052]	-0.018 [0.052]	0.180* [0.099]	0.182* [0.098]
Clerks	-0.034 [0.048]	-0.034 [0.048]	-0.068 [0.053]	-0.068 [0.053]	0.074 [0.115]	0.079 [0.115]
Service workers	0.022 [0.056]	0.022 [0.056]	0.023 [0.073]	0.022 [0.073]	0.157* [0.091]	0.158* [0.091]
Skil_agricul/fishery	-0.075 [0.081]	-0.076 [0.081]	-0.098 [0.089]	-0.101 [0.089]	0.060 [0.178]	0.074 [0.181]
Craft and trade	0.026 [0.042]	0.026 [0.042]	-0.000 [0.049]	-0.000 [0.049]	0.118 [0.101]	0.118 [0.101]
Machine operators	0.011 [0.042]	0.011 [0.042]	-0.018 [0.048]	-0.018 [0.048]	0.124 [0.104]	0.132 [0.105]
Full time	0.649*** [0.043]	0.650*** [0.043]	0.608*** [0.060]	0.609*** [0.060]	0.609*** [0.059]	0.614*** [0.059]
Work Experience PT	-0.037** [0.016]	-0.037** [0.016]	-0.034* [0.020]	-0.033* [0.020]	-0.012 [0.030]	-0.012 [0.030]
Work Experience FT	-0.064*** [0.012]	-0.063*** [0.012]	-0.073*** [0.014]	-0.072*** [0.014]	-0.015 [0.028]	-0.014 [0.028]
Self employed	-0.111* [0.060]	-0.110* [0.060]	-0.134 [0.088]	-0.133 [0.088]	-0.103 [0.076]	-0.104 [0.075]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	8.020*** [0.161]	8.169*** [0.168]	8.305*** [0.211]	8.446*** [0.216]	7.633*** [0.289]	7.821*** [0.295]
Observations	14781	14781	10589	10589	4037	4037
Adjusted R <sup>2</sup>	0.343	0.343	0.272	0.273	0.353	0.355

Note: GSOEP data, Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 11 Basic specification, different time windows (2007-2013) - Men**

	All Men 2007-2013	All Men 2007-2013	Vocational Education 2007-2013	Vocational Education 2007-2013	General Education 2007-2013	General Education 2007-2013
Time	0.005 [0.014]	-0.025 [0.056]	0.005 [0.016]	0.035 [0.062]	0.010 [0.027]	-0.170 [0.118]
<b>Treatment* time</b>	<b>-0.004</b> [0.030]	<b>-0.004</b> [0.030]	<b>-0.012</b> [0.034]	<b>-0.011</b> [0.034]	<b>0.010</b> [0.071]	<b>0.010</b> [0.071]
Age	0.088*** [0.012]	0.092*** [0.015]	0.104*** [0.014]	0.098*** [0.017]	0.012 [0.028]	0.043 [0.031]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
Good health	-0.003 [0.016]	-0.002 [0.016]	0.013 [0.018]	0.013 [0.018]	-0.027 [0.035]	-0.030 [0.035]
<b>Education</b>						
Level 1 Vet	-0.054 [0.165]	-0.052 [0.166]	[0.216] -0.649***	-0.215 [0.217]		
Level 2 Vet	-0.523*** [0.148]	-0.522*** [0.148]	[0.200] -0.691***	-0.648*** [0.201]		
Level 3 Vet	-0.194 [0.123]	-0.194 [0.123]	[0.184]	-0.691*** [0.185]		
Level 1 Gen	0.069 [0.189]	0.070 [0.189]			0.000 [.]	0.000 [.]
Level 2 Gen	0.033 [0.164]	0.032 [0.164]			0.083 [0.529]	0.065 [0.533]
Level 3 Gen	-0.664*** [0.105]	-0.664*** [0.105]			-0.688*** [0.113]	-0.688*** [0.113]
Level 4 Gen	-0.050 [0.135]	-0.051 [0.135]				
<b>Relationship status</b>						
Married/Relationship	0.067* [0.034]	0.067* [0.034]	0.053 [0.035]	0.054 [0.035]	0.016 [0.063]	0.016 [0.062]
Separated/Divorced	0.082 [0.051]	0.083 [0.051]	0.099* [0.054]	0.101* [0.054]	-0.029 [0.105]	-0.028 [0.105]
<b>Job characteristics</b>						
Managers	0.119** [0.058]	0.119** [0.058]	0.099 [0.062]	0.100 [0.062]	0.251* [0.140]	0.252* [0.139]
Professionals	0.095* [0.056]	0.095* [0.056]	0.025 [0.056]	0.024 [0.056]	0.289** [0.136]	0.289** [0.135]
Technicians	0.072 [0.050]	0.072 [0.050]	0.022 [0.054]	0.021 [0.054]	0.243** [0.121]	0.245** [0.120]
Clerks	-0.012 [0.050]	-0.012 [0.050]	-0.038 [0.053]	-0.039 [0.053]	0.075 [0.129]	0.080 [0.129]
Service workers	0.034 [0.064]	0.034 [0.064]	-0.002 [0.080]	-0.003 [0.080]	0.131 [0.116]	0.131 [0.116]
Skil_agricul/fishery	-0.032 [0.102]	-0.031 [0.102]	-0.098 [0.117]	-0.096 [0.117]	0.017 [0.210]	0.027 [0.213]
Craft and trade	0.060 [0.048]	0.060 [0.048]	0.022 [0.052]	0.022 [0.052]	0.183 [0.115]	0.184 [0.115]
Machine operators	0.018 [0.046]	0.018 [0.046]	-0.003 [0.049]	-0.003 [0.049]	0.044 [0.129]	0.049 [0.129]
Full time	0.613*** [0.049]	0.613*** [0.049]	0.548*** [0.068]	0.549*** [0.068]	0.611*** [0.065]	0.612*** [0.065]
Work Experience PT	-0.027 [0.019]	-0.027 [0.019]	-0.026 [0.024]	-0.026 [0.024]	0.014 [0.035]	0.015 [0.035]
Work Experience FT	-0.049*** [0.013]	-0.049*** [0.013]	-0.066*** [0.015]	-0.067*** [0.015]	0.025 [0.030]	0.026 [0.030]
Self employed	-0.099 [0.073]	-0.098 [0.073]	-0.105 [0.114]	-0.104 [0.114]	-0.115 [0.081]	-0.115 [0.081]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.950*** [0.180]	7.975*** [0.183]	8.473*** [0.246]	8.448*** [0.251]	6.984*** [0.317]	7.140*** [0.309]
Observations	11557	11557	8342	8342	3092	3092
Adjusted R <sup>2</sup>	0.321	0.321	0.242	0.242	0.363	0.364

Note: GSOEP data, Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 12 Placebo test with a fake dummy time 2006 - Women**

	All women 2005-2008	All women 2005-2008	Vocational Education 2005-2008	Vocational Education 2005-2008	General Education 2005-2008	General Education 2005-2008
Time2006	-0.025 [0.017]	0.028 [0.033]	-0.024 [0.019]	-0.008 [0.035]	0.012 [0.040]	0.181** [0.074]
<b>Treatment*Time2006</b>	<b>-0.040</b> [0.051]	<b>-0.040</b> [0.051]	<b>-0.040</b> [0.059]	<b>-0.040</b> [0.059]	<b>-0.121</b> [0.096]	<b>-0.121</b> [0.095]
Age	0.142*** [0.021]	0.123*** [0.023]	0.129*** [0.024]	0.124*** [0.026]	0.055 [0.048]	-0.010 [0.051]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002** [0.001]	-0.002** [0.001]
Good Health	0.041 [0.028]	0.041 [0.028]	0.067** [0.031]	0.067** [0.031]	-0.028 [0.055]	-0.027 [0.055]
<b>Education</b>						
Level 1 Vet	0.200 [0.238]	0.202 [0.238]	0.397** [0.181]	0.397** [0.182]		
Level 2 Vet	-0.436** [0.201]	-0.430** [0.199]	-0.201 [0.124]	-0.200 [0.124]		
Level 3 Vet	-0.174 [0.167]	-0.176 [0.167]	-0.284* [0.170]	-0.285* [0.170]		
Level 1 Gen	-0.154 [0.253]	-0.152 [0.252]			-0.788** [0.359]	-0.767** [0.354]
Level 2 Gen	-0.085 [0.237]	-0.081 [0.236]			-0.687* [0.359]	-0.647* [0.355]
Level 3 Gen	-0.598*** [0.175]	-0.599*** [0.175]			-0.582*** [0.213]	-0.569*** [0.212]
Level 4 Gen	0.096 [0.240]	0.092 [0.240]				
<b>Relationship status</b>						
Married/Relationship	-0.043 [0.036]	-0.044 [0.036]	-0.021 [0.039]	-0.021 [0.039]	-0.087 [0.072]	-0.081 [0.072]
Separated/Divorced	-0.098* [0.050]	-0.102** [0.050]	-0.017 [0.052]	-0.018 [0.052]	-0.231** [0.105]	-0.241** [0.104]
<b>Job characteristics</b>						
Managers	0.167 [0.147]	0.165 [0.147]	0.163 [0.196]	0.161 [0.196]	0.216 [0.224]	0.232 [0.225]
Professionals	0.171 [0.147]	0.168 [0.147]	0.122 [0.194]	0.120 [0.194]	0.325 [0.227]	0.342 [0.228]
Technicians	0.190 [0.142]	0.187 [0.142]	0.141 [0.189]	0.139 [0.189]	0.317 [0.224]	0.327 [0.225]
Clerks	0.186 [0.147]	0.183 [0.147]	0.116 [0.196]	0.114 [0.196]	0.390* [0.219]	0.405* [0.221]
Service workers	0.150 [0.137]	0.148 [0.137]	0.114 [0.183]	0.113 [0.183]	0.282 [0.227]	0.305 [0.225]
Skil_agricul/fishery	0.265 [0.172]	0.260 [0.174]	0.247 [0.244]	0.248 [0.244]	0.309** [0.131]	0.248* [0.135]
Craft and trade	-0.018 [0.110]	-0.020 [0.110]	-0.097 [0.148]	-0.099 [0.148]	0.059 [0.100]	0.037 [0.098]
Machine operators	0.169 [0.150]	0.166 [0.149]	0.180 [0.198]	0.178 [0.198]	0.164 [0.203]	0.179 [0.205]
Full time	0.425*** [0.047]	0.428*** [0.047]	0.359*** [0.053]	0.360*** [0.053]	0.600*** [0.092]	0.608*** [0.091]
Work Experience PT	-0.106*** [0.027]	-0.106*** [0.027]	-0.088*** [0.028]	-0.088*** [0.028]	-0.042 [0.066]	-0.039 [0.065]
Work Experience FT	-0.104*** [0.021]	-0.105*** [0.021]	-0.095*** [0.023]	-0.095*** [0.023]	-0.016 [0.048]	-0.013 [0.048]
Self employed	-0.153 [0.162]	-0.155 [0.162]	0.366* [0.217]	0.366* [0.217]	-0.572*** [0.177]	-0.585*** [0.176]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	8.585*** [0.306]	8.521*** [0.306]	8.526*** [0.326]	8.510*** [0.326]	7.414*** [0.565]	7.098*** [0.568]
Observations	4365	4365	3186	3186	1167	1167
Adjusted R <sup>2</sup>	0.232	0.233	0.179	0.179	0.286	0.292

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 13 Placebo test with a fake dummy time 2006 - Men**

	All Men 2005-2008	All Men 2005-2008	Vocational Education 2005-2008	Vocational Education 2005-2008	General Education 2005-2008	General Education 2005-2008
Time2006	-0.009 [0.015]	0.020 [0.029]	0.005 [0.017]	0.034 [0.032]	-0.024 [0.034]	-0.014 [0.059]
<b>Treatment*Time2006</b>	<b>-0.074</b> [0.076]	<b>-0.074</b> [0.076]	<b>-0.143</b> [0.079]	<b>-0.143*</b> [0.079]	<b>0.263</b> [0.230]	<b>0.263</b> [0.230]
Age	0.117*** [0.023]	0.107*** [0.023]	0.106*** [0.025]	0.096*** [0.026]	0.175*** [0.055]	0.171*** [0.052]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.001 [0.001]	-0.001 [0.001]
Good Health	0.008 [0.026]	0.008 [0.026]	0.004 [0.026]	0.005 [0.026]	0.055 [0.080]	0.055 [0.080]
<b>Education</b>						
Level 1 Vet	0.448 [0.603]	0.449 [0.602]	0.572 [0.704]	0.569 [0.705]		
Level 2 Vet	-0.301 [0.581]	-0.299 [0.581]	-0.112 [0.688]	-0.114 [0.689]		
Level 3 Vet	0.038 [0.432]	0.035 [0.433]	-0.538 [0.550]	-0.543 [0.550]		
Level 1 Gen	0.189 [0.606]	0.187 [0.606]			0.000 [.]	0.000 [.]
Level 2 Gen	0.034 [0.587]	0.034 [0.587]			-1.147*** [0.333]	-1.146*** [0.334]
Level 3 Gen	-0.456 [0.408]	-0.457 [0.408]			-0.637** [0.286]	-0.638** [0.286]
Level 4 Gen	0.180 [0.486]	0.181 [0.486]				
<b>Relationship status</b>						
Married/Relationship	0.007 [0.028]	0.007 [0.028]	0.013 [0.034]	0.014 [0.034]	-0.023 [0.044]	-0.023 [0.044]
Separated/Divorced	-0.052 [0.036]	-0.051 [0.036]	-0.050 [0.041]	-0.050 [0.041]	0.034 [0.072]	0.035 [0.073]
<b>Job characteristics</b>						
Managers	-0.060 [0.083]	-0.061 [0.083]	-0.067 [0.090]	-0.068 [0.090]	-0.113 [0.198]	-0.113 [0.199]
Professionals	-0.039 [0.083]	-0.040 [0.083]	-0.063 [0.091]	-0.063 [0.091]	0.007 [0.177]	0.007 [0.177]
Technicians	-0.078 [0.075]	-0.078 [0.075]	-0.073 [0.081]	-0.073 [0.081]	-0.042 [0.169]	-0.042 [0.169]
Clerks	-0.096 [0.091]	-0.098 [0.092]	-0.112 [0.094]	-0.113 [0.094]	-0.146 [0.211]	-0.147 [0.212]
Service workers	-0.017 [0.095]	-0.017 [0.095]	-0.101 [0.103]	-0.101 [0.103]	0.321 [0.201]	0.321 [0.202]
Skil_agricul/fishery	-0.321 [0.211]	-0.319 [0.210]	-0.355 [0.228]	-0.352 [0.228]	-0.070 [0.180]	-0.073 [0.186]
Craft and trade	-0.047 [0.069]	-0.047 [0.069]	-0.045 [0.070]	-0.045 [0.070]	-0.148 [0.230]	-0.148 [0.229]
Machine operators	-0.095 [0.070]	-0.096 [0.070]	-0.120* [0.072]	-0.120* [0.072]	0.009 [0.196]	0.008 [0.197]
Full time	0.551*** [0.072]	0.551*** [0.072]	0.645*** [0.092]	0.644*** [0.091]	0.371*** [0.116]	0.371*** [0.116]
Work Experience PT	-0.109*** [0.037]	-0.110*** [0.038]	-0.054 [0.048]	-0.055 [0.048]	-0.165** [0.069]	-0.164** [0.069]
Work Experience FT	-0.074*** [0.023]	-0.075*** [0.023]	-0.067*** [0.025]	-0.068*** [0.025]	-0.134** [0.059]	-0.134** [0.059]
Self employed	0.001 [0.085]	0.002 [0.085]	0.006 [0.095]	0.009 [0.096]	-0.038 [0.164]	-0.038 [0.164]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	8.197*** [0.568]	8.173*** [0.567]	8.030*** [0.674]	8.011*** [0.675]	8.845*** [0.563]	8.833*** [0.547]
Observations	5497	5497	4123	4123	1341	1341
Adjusted R <sup>2</sup>	0.216	0.216	0.194	0.194	0.195	0.195

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 14 DID Treatment= giving birth in 2009 (2005-2013) - Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
Time	0.009 [0.016]	-0.144* [0.086]	-0.006 [0.019]	-0.177* [0.094]	0.021 [0.031]	-0.190 [0.177]
<b>Treatment* time</b>	<b>-0.248***</b> [0.059]	<b>-0.250***</b> [0.059]	<b>-0.325***</b> [0.062]	<b>-0.325***</b> [0.062]	<b>-0.051</b> [0.138]	<b>-0.066</b> [0.140]
Age	0.081*** [0.012]	0.098*** [0.015]	0.080*** [0.013]	0.100*** [0.017]	0.078*** [0.025]	0.104*** [0.033]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.003*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
Good health	0.033** [0.016]	0.031* [0.016]	0.042** [0.018]	0.042** [0.018]	0.008 [0.027]	0.007 [0.028]
<b>Education</b>						
Level 1 Vet	0.293* [0.168]	0.292* [0.168]	0.350** [0.162]	0.347** [0.162]		
Level 2 Vet	-0.210 [0.144]	-0.214 [0.144]	-0.133 [0.138]	-0.139 [0.139]		
Level 3 Vet	-0.131 [0.096]	-0.134 [0.095]	-0.372*** [0.114]	-0.375*** [0.114]		
Level 1 Gen	0.243 [0.185]	0.247 [0.183]			0.427 [0.694]	0.386 [0.687]
Level 2 Gen	0.173 [0.156]	0.164 [0.156]			-0.427* [0.236]	-0.427* [0.238]
Level 3 Gen	-0.559*** [0.099]	-0.562*** [0.098]			-0.543*** [0.131]	-0.534*** [0.131]
Level 4 Gen	0.104 [0.137]	0.100 [0.138]				
<b>Relationship status</b>						
Married/Relationship	-0.049* [0.028]	-0.050* [0.028]	-0.043 [0.030]	-0.043 [0.030]	-0.062 [0.064]	-0.071 [0.063]
Separated/Divorced	-0.043 [0.052]	-0.047 [0.052]	-0.001 [0.059]	-0.003 [0.058]	-0.254** [0.103]	-0.279*** [0.104]
<b>Job characteristics</b>						
Managers	0.209** [0.082]	0.204** [0.082]	0.267*** [0.093]	0.262*** [0.092]	0.127 [0.135]	0.124 [0.136]
Professionals	0.142* [0.080]	0.140* [0.081]	0.210** [0.090]	0.207** [0.090]	0.085 [0.141]	0.089 [0.142]
Technicians	0.145** [0.074]	0.142* [0.074]	0.194** [0.082]	0.192** [0.082]	0.077 [0.130]	0.077 [0.131]
Clerks	0.092 [0.075]	0.089 [0.076]	0.103 [0.085]	0.100 [0.085]	0.097 [0.128]	0.097 [0.129]
Service workers	0.061 [0.075]	0.058 [0.075]	0.112 [0.085]	0.109 [0.085]	-0.017 [0.129]	-0.010 [0.130]
Skil_agricul/fishery	0.209* [0.107]	0.213** [0.107]	0.283* [0.148]	0.279* [0.147]	0.078 [0.147]	0.104 [0.139]
Craft and trade	-0.027 [0.089]	-0.030 [0.089]	-0.031 [0.102]	-0.034 [0.102]	-0.108 [0.179]	-0.115 [0.180]
Machine operators	-0.040 [0.141]	-0.037 [0.142]	-0.010 [0.174]	-0.008 [0.174]	-0.068 [0.161]	-0.052 [0.164]
Full time	0.498*** [0.030]	0.495*** [0.030]	0.435*** [0.037]	0.433*** [0.036]	0.590*** [0.052]	0.589*** [0.053]
Work Experience PT	-0.043*** [0.012]	-0.044*** [0.012]	-0.050*** [0.013]	-0.050*** [0.013]	-0.021 [0.027]	-0.026 [0.027]
Work Experience FT	-0.044*** [0.012]	-0.042*** [0.012]	-0.048*** [0.014]	-0.046*** [0.014]	-0.026 [0.027]	-0.026 [0.027]
Self employed	-0.250*** [0.086]	-0.249*** [0.087]	-0.160 [0.109]	-0.158 [0.109]	-0.324*** [0.123]	-0.322*** [0.123]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.722*** [0.167]	7.872*** [0.185]	7.831*** [0.192]	7.991*** [0.209]	7.517*** [0.288]	7.760*** [0.330]
Observations	11901	11901	8303	8303	3541	3541
Adjusted R <sup>2</sup>	0.314	0.315	0.229	0.231	0.373	0.379

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 15 DID Treatment= giving birth in 2009 (2005-2013)- Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
Time	-0.011	-0.012	-0.008	0.081	-0.037	-0.301*
	[0.013]	[0.074]	[0.014]	[0.081]	[0.028]	[0.160]
<b>Treatment* time</b>	<b>0.017</b>	<b>0.016</b>	<b>0.024</b>	<b>0.023</b>	<b>0.030</b>	<b>0.028</b>
	[0.037]	[0.037]	[0.045]	[0.045]	[0.059]	[0.059]
Age	0.107***	0.107***	0.118***	0.106***	0.058**	0.091***
	[0.011]	[0.014]	[0.013]	[0.016]	[0.028]	[0.032]
Age squared	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Good health	0.018	0.019	0.030*	0.031*	-0.013	-0.012
	[0.016]	[0.016]	[0.017]	[0.017]	[0.038]	[0.038]
<b>Education</b>						
Level 1 Vet	0.077	0.081	0.117	0.119		
	[0.146]	[0.146]	[0.172]	[0.172]		
Level 2 Vet	-0.389***	-0.385***	-0.317**	-0.315**		
	[0.129]	[0.129]	[0.156]	[0.157]		
Level 3 Vet	-0.083	-0.081	-0.393***	-0.392***		
	[0.097]	[0.097]	[0.148]	[0.148]		
Level 1 Gen	0.139	0.142			0.000	0.000
	[0.161]	[0.161]			[.]	[.]
Level 2 Gen	0.075	0.077			-0.722*	-0.721*
	[0.146]	[0.146]			[0.418]	[0.421]
Level 3 Gen	-0.580***	-0.578***			-0.724***	-0.723***
	[0.084]	[0.085]			[0.122]	[0.122]
Level 4 Gen	-0.001	0.001				
	[0.125]	[0.125]				
<b>Relationship status</b>						
Married/Relationship	0.028	0.029	0.003	0.004	0.085**	0.085**
	[0.021]	[0.021]	[0.025]	[0.025]	[0.038]	[0.037]
Separated/Divorced	0.045	0.046	0.038	0.039	0.086	0.080
	[0.040]	[0.040]	[0.046]	[0.046]	[0.083]	[0.084]
<b>Job characteristics</b>						
Managers	0.068	0.068	0.040	0.041	0.156	0.158
	[0.049]	[0.049]	[0.051]	[0.051]	[0.132]	[0.132]
Professionals	0.024	0.024	-0.019	-0.020	0.191	0.192
	[0.050]	[0.050]	[0.050]	[0.050]	[0.133]	[0.133]
Technicians	0.006	0.005	-0.033	-0.034	0.166	0.167
	[0.046]	[0.046]	[0.050]	[0.050]	[0.114]	[0.114]
Clerks	-0.058	-0.058	-0.086*	-0.086*	0.028	0.033
	[0.048]	[0.048]	[0.050]	[0.050]	[0.132]	[0.132]
Service workers	-0.022	-0.022	-0.073	-0.073	0.178	0.180
	[0.055]	[0.055]	[0.066]	[0.066]	[0.115]	[0.115]
Skil_agricul/fishery	-0.118	-0.118	-0.187	-0.186	0.008	0.015
	[0.103]	[0.103]	[0.114]	[0.114]	[0.227]	[0.228]
Craft and trade	0.010	0.010	-0.027	-0.027	0.095	0.093
	[0.043]	[0.043]	[0.046]	[0.046]	[0.119]	[0.119]
Machine operators	-0.004	-0.004	-0.024	-0.024	0.006	0.004
	[0.041]	[0.041]	[0.045]	[0.045]	[0.110]	[0.110]
Full time	0.612***	0.613***	0.633***	0.634***	0.511***	0.513***
	[0.041]	[0.041]	[0.057]	[0.057]	[0.060]	[0.059]
Work Experience PT	-0.056***	-0.056***	-0.049***	-0.049***	-0.018	-0.019
	[0.014]	[0.014]	[0.017]	[0.017]	[0.032]	[0.032]
Work Experience FT	-0.070***	-0.070***	-0.082***	-0.082***	-0.014	-0.015
	[0.012]	[0.012]	[0.013]	[0.013]	[0.030]	[0.030]
Self employed	-0.075	-0.074	-0.057	-0.058	-0.155**	-0.151**
	[0.054]	[0.054]	[0.074]	[0.074]	[0.076]	[0.076]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	8.125***	8.125***	8.316***	8.247***	7.574***	7.799***
	[0.158]	[0.166]	[0.197]	[0.207]	[0.298]	[0.311]
Observations	14755	14755	10749	10749	3872	3872
Adjusted R <sup>2</sup>	0.341	0.341	0.273	0.273	0.348	0.348

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 16 DID Treatment: giving birth in 2011 (2007-2015)- Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
Time	-0.017 [0.016]	-0.218** [0.093]	-0.033* [0.017]	-0.244** [0.111]	0.056 [0.036]	-0.078 [0.168]
<b>Treatment* time</b>	<b>-0.197***</b> [0.050]	<b>-0.203***</b> [0.050]	<b>-0.272***</b> [0.059]	<b>-0.277***</b> [0.059]	<b>-0.075</b> [0.084]	<b>-0.084</b> [0.084]
Age	0.084*** [0.010]	0.110*** [0.015]	0.095*** [0.012]	0.122*** [0.018]	0.072*** [0.020]	0.089*** [0.029]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]
Good health	0.005 [0.015]	0.005 [0.015]	0.007 [0.017]	0.007 [0.017]	-0.000 [0.029]	0.003 [0.029]
<b>Education</b>						
Level 1 Vet	0.176 [0.184]	0.176 [0.184]	0.352* [0.196]	0.352* [0.197]		
Level 2 Vet	-0.305* [0.158]	-0.303* [0.159]	-0.127 [0.172]	-0.124 [0.173]		
Level 3 Vet	-0.077 [0.116]	-0.080 [0.116]	-0.443*** [0.141]	-0.445*** [0.141]		
Level 1 Acad	0.080 [0.198]	0.078 [0.198]			0.261 [0.408]	0.278 [0.387]
Level 2 Acad	-0.046 [0.170]	-0.041 [0.170]			-0.506** [0.236]	-0.494** [0.239]
Level 3 Acad	-0.507*** [0.114]	-0.508*** [0.114]			-0.475*** [0.108]	-0.473*** [0.108]
Level 4 Acad	0.064 [0.140]	0.061 [0.140]				
<b>Relationship status</b>						
Married/Relationship	-0.031 [0.026]	-0.032 [0.026]	-0.005 [0.028]	-0.005 [0.028]	-0.067 [0.056]	-0.068 [0.055]
Separated/Divorced	-0.029 [0.053]	-0.030 [0.052]	0.061 [0.057]	0.059 [0.056]	-0.303*** [0.115]	-0.298*** [0.111]
<b>Job characteristics</b>						
Managers	0.222*** [0.072]	0.221*** [0.072]	0.270*** [0.089]	0.272*** [0.089]	0.183 [0.114]	0.178 [0.113]
Professionals	0.173** [0.071]	0.170** [0.070]	0.216** [0.089]	0.215** [0.089]	0.154 [0.111]	0.147 [0.110]
Technicians	0.167** [0.066]	0.163** [0.065]	0.221*** [0.084]	0.217*** [0.083]	0.116 [0.106]	0.110 [0.105]
Clerks	0.072 [0.067]	0.069 [0.067]	0.111 [0.085]	0.109 [0.085]	0.007 [0.098]	0.001 [0.098]
Service workers	0.045 [0.066]	0.042 [0.065]	0.104 [0.086]	0.104 [0.086]	0.012 [0.097]	0.007 [0.097]
Skil_agricul/fishery	0.251* [0.133]	0.249* [0.134]	0.259 [0.190]	0.256 [0.191]	0.181 [0.154]	0.172 [0.154]
Craft and trade	-0.060 [0.082]	-0.062 [0.082]	-0.063 [0.096]	-0.066 [0.095]	-0.114 [0.151]	-0.115 [0.149]
Machine operators	-0.062 [0.100]	-0.067 [0.100]	0.004 [0.135]	0.000 [0.135]	-0.159 [0.110]	-0.163 [0.112]
Full time	0.492*** [0.029]	0.491*** [0.029]	0.455*** [0.035]	0.455*** [0.035]	0.529*** [0.052]	0.528*** [0.052]
Work Experience PT	-0.038*** [0.012]	-0.039*** [0.012]	-0.057*** [0.012]	-0.058*** [0.012]	-0.019 [0.025]	-0.021 [0.025]
Work Experience FT	-0.033*** [0.011]	-0.033*** [0.011]	-0.051*** [0.013]	-0.050*** [0.013]	-0.011 [0.022]	-0.012 [0.022]
Self employed	-0.336*** [0.070]	-0.336*** [0.070]	-0.256*** [0.091]	-0.253*** [0.092]	-0.369*** [0.093]	-0.369*** [0.093]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.748*** [0.164]	7.961*** [0.180]	7.932*** [0.199]	8.137*** [0.216]	7.478*** [0.230]	7.644*** [0.285]
Observations	11904	11904	7943	7943	3895	3895
Adjusted R <sup>2</sup>	0.341	0.342	0.262	0.264	0.402	0.405

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 17 DID Treatment: giving birth in 2011 (2007-2015)- Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
Time	0.002	-0.067	0.006	-0.108	-0.026	-0.147
	[0.014]	[0.081]	[0.015]	[0.094]	[0.031]	[0.149]
<b>Treatment*time</b>	<b>-0.019</b>	<b>-0.025</b>	<b>-0.029</b>	<b>-0.035</b>	<b>0.069</b>	<b>0.064</b>
	[0.030]	[0.030]	[0.034]	[0.034]	[0.056]	[0.057]
Age	0.097***	0.105***	0.111***	0.125***	0.029	0.044
	[0.010]	[0.015]	[0.012]	[0.016]	[0.023]	[0.031]
Age squared	-0.003***	-0.002***	-0.003***	-0.003***	-0.002***	-0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Good health	-0.003	-0.002	0.007	0.009	-0.034	-0.035
	[0.015]	[0.015]	[0.016]	[0.016]	[0.031]	[0.031]
<b>Education</b>						
Level 1 Vet	0.151	0.146	0.093	0.089		
	[0.122]	[0.122]	[0.162]	[0.163]		
Level 2 Vet	-0.323***	-0.324***	-0.362**	-0.361**		
	[0.113]	[0.114]	[0.151]	[0.152]		
Level 3 Vet	-0.154*	-0.160*	-0.562***	-0.567***		
	[0.093]	[0.093]	[0.154]	[0.155]		
Level 1 Gen	0.275**	0.276**			-0.428	-0.424
	[0.139]	[0.139]			[0.450]	[0.450]
Level 2 Gen	0.145	0.147			-0.194	-0.230
	[0.134]	[0.135]			[0.442]	[0.442]
Level 3 Gen	-0.557***	-0.559***			-0.689***	-0.693***
	[0.080]	[0.080]			[0.101]	[0.100]
Level 4 Gen	0.055	0.052				
	[0.108]	[0.107]				
<b>Relationship status</b>						
Married/Relationship	0.028	0.028	0.001	0.002	0.066	0.063
	[0.026]	[0.026]	[0.028]	[0.028]	[0.056]	[0.057]
Separated/Divorced	0.023	0.024	0.060	0.059	-0.019	-0.012
	[0.046]	[0.046]	[0.055]	[0.055]	[0.080]	[0.081]
<b>Job characteristics</b>						
Managers	0.144***	0.145***	0.100*	0.100*	0.237**	0.237**
	[0.048]	[0.048]	[0.052]	[0.052]	[0.115]	[0.114]
Professionals	0.079	0.078	0.018	0.017	0.234**	0.234**
	[0.048]	[0.048]	[0.051]	[0.051]	[0.109]	[0.108]
Technicians	0.047	0.045	0.010	0.008	0.179*	0.181*
	[0.044]	[0.044]	[0.049]	[0.049]	[0.098]	[0.097]
Clerks	0.014	0.012	-0.045	-0.047	0.095	0.099
	[0.044]	[0.044]	[0.047]	[0.047]	[0.098]	[0.097]
Service workers	0.034	0.033	-0.031	-0.031	0.197**	0.191**
	[0.054]	[0.054]	[0.071]	[0.071]	[0.089]	[0.089]
Skil_agricul/fishery	0.003	0.005	-0.010	-0.010	0.030	0.037
	[0.076]	[0.075]	[0.072]	[0.072]	[0.183]	[0.185]
Craft and trade	0.056	0.057	0.019	0.019	0.155*	0.158*
	[0.041]	[0.041]	[0.046]	[0.046]	[0.085]	[0.084]
Machine operators	0.037	0.035	0.006	0.002	0.102	0.108
	[0.041]	[0.041]	[0.046]	[0.046]	[0.095]	[0.095]
Full time	0.684***	0.685***	0.646***	0.645***	0.639***	0.644***
	[0.043]	[0.043]	[0.062]	[0.062]	[0.062]	[0.062]
Work Experience PT	-0.033**	-0.035**	-0.031	-0.031	0.030	0.028
	[0.016]	[0.016]	[0.021]	[0.021]	[0.028]	[0.027]
Work Experience FT	-0.052***	-0.052***	-0.070***	-0.069***	0.017	0.018
	[0.011]	[0.011]	[0.013]	[0.013]	[0.025]	[0.025]
Self employed	-0.057	-0.056	0.029	0.031	-0.151	-0.151
	[0.059]	[0.059]	[0.078]	[0.078]	[0.094]	[0.093]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.802***	7.877***	8.195***	8.303***	7.139***	7.266***
	[0.147]	[0.162]	[0.189]	[0.202]	[0.271]	[0.316]
Observations	14556	14556	10199	10199	4219	4219
Adjusted R <sup>2</sup>	0.365	0.367	0.303	0.305	0.384	0.387

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 18 DID Treatment= giving birth in 2008 (2005-2011)- Women**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
Time	-0.008 [0.015]	-0.160** [0.077]	0.004 [0.016]	-0.050 [0.085]	-0.058* [0.035]	-0.425*** [0.163]
<b>Treatment* time</b>	<b>-0.218***</b> [0.061]	<b>-0.216***</b> [0.061]	<b>-0.303***</b> [0.073]	<b>-0.303***</b> [0.073]	<b>-0.035</b> [0.091]	<b>-0.035</b> [0.091]
Age	0.086*** [0.014]	0.109*** [0.019]	0.079*** [0.016]	0.087*** [0.020]	0.090*** [0.028]	0.151*** [0.042]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.001]	-0.002*** [0.001]
Good health	0.021 [0.017]	0.022 [0.017]	0.028 [0.018]	0.029 [0.018]	0.009 [0.037]	0.014 [0.037]
<b>Education</b>						
Level 1 Vet	0.238 [0.199]	0.239 [0.199]	0.297* [0.170]	0.295* [0.170]		
Level 2 Vet	-0.301* [0.170]	-0.300* [0.171]	-0.211 [0.138]	-0.211 [0.138]		
Level 3 Vet	-0.037 [0.126]	-0.037 [0.126]	-0.327** [0.134]	-0.327** [0.133]		
Level 1 Gen	0.196 [0.220]	0.208 [0.219]			0.399 [0.757]	0.345 [0.766]
Level 2 Gen	0.088 [0.187]	0.091 [0.187]			-0.547** [0.252]	-0.555** [0.249]
Level 3 Gen	-0.437*** [0.133]	-0.436*** [0.133]			-0.497*** [0.152]	-0.497*** [0.151]
Level 4 Gen	0.216 [0.179]	0.216 [0.179]				
<b>Relationship status</b>						
Married/Relationship	0.035 [0.031]	0.035 [0.031]	-0.003 [0.032]	-0.004 [0.031]	0.133** [0.065]	0.128** [0.065]
Separated/Divorced	-0.039 [0.053]	-0.042 [0.053]	-0.046 [0.061]	-0.047 [0.061]	-0.042 [0.098]	-0.057 [0.097]
<b>Job characteristics</b>						
Managers	0.158* [0.094]	0.155* [0.094]	0.265** [0.105]	0.264** [0.105]	0.182 [0.155]	0.166 [0.154]
Professionals	0.064 [0.095]	0.063 [0.095]	0.149 [0.109]	0.149 [0.108]	0.134 [0.164]	0.121 [0.164]
Technicians	0.082 [0.087]	0.081 [0.087]	0.184* [0.101]	0.184* [0.100]	0.073 [0.152]	0.059 [0.152]
Clerks	0.040 [0.088]	0.038 [0.088]	0.107 [0.103]	0.108 [0.103]	0.159 [0.147]	0.149 [0.146]
Service workers	0.020 [0.084]	0.018 [0.084]	0.088 [0.097]	0.088 [0.097]	0.050 [0.144]	0.043 [0.144]
Skil_agricul/fishery	0.211** [0.104]	0.215** [0.104]	0.340** [0.144]	0.347** [0.144]	0.143 [0.173]	0.134 [0.166]
Craft and trade	-0.014 [0.093]	-0.016 [0.094]	0.003 [0.100]	0.003 [0.100]	-0.159 [0.191]	-0.178 [0.193]
Machine operators	-0.022 [0.135]	-0.024 [0.136]	0.010 [0.160]	0.008 [0.161]	0.090 [0.212]	0.092 [0.215]
Full time	0.529*** [0.036]	0.529*** [0.036]	0.474*** [0.043]	0.474*** [0.043]	0.639*** [0.066]	0.638*** [0.066]
Work Experience PT	-0.038*** [0.014]	-0.039*** [0.014]	-0.035** [0.015]	-0.036** [0.015]	-0.029 [0.031]	-0.033 [0.031]
Work Experience FT	-0.049*** [0.014]	-0.048*** [0.014]	-0.052*** [0.016]	-0.052*** [0.016]	-0.028 [0.028]	-0.028 [0.028]
Self employed	-0.149 [0.094]	-0.147 [0.094]	0.012 [0.130]	0.013 [0.130]	-0.258** [0.125]	-0.252** [0.124]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.827*** [0.206]	7.984*** [0.219]	7.900*** [0.229]	7.957*** [0.238]	7.516*** [0.311]	7.952*** [0.384]
Observations	8934	8934	6362	6362	2545	2545
Adjusted R <sup>2</sup>	0.295	0.297	0.224	0.225	0.341	0.345

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 19 DID Treatment= giving birth in 2008 (2005-2011)- Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
Time	-0.007	-0.070	-0.010	-0.062	-0.007	-0.166
	[0.013]	[0.057]	[0.015]	[0.063]	[0.028]	[0.113]
<b>Treatment* time</b>	<b>-0.003</b>	<b>-0.003</b>	<b>-0.022</b>	<b>-0.022</b>	<b>0.084</b>	<b>0.086</b>
	[0.032]	[0.032]	[0.032]	[0.032]	[0.091]	[0.091]
Age	0.106***	0.117***	0.119***	0.128***	0.066	0.094*
	[0.014]	[0.016]	[0.014]	[0.017]	[0.042]	[0.049]
Age squared	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***	-0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Good health	0.016	0.016	0.017	0.017	0.011	0.010
	[0.018]	[0.018]	[0.019]	[0.019]	[0.048]	[0.048]
<b>Education</b>						
Level 1 Vet	0.105	0.108	0.255	0.256		
	[0.200]	[0.200]	[0.228]	[0.228]		
Level 2 Vet	-0.464**	-0.462**	-0.288	-0.288		
	[0.181]	[0.181]	[0.213]	[0.213]		
Level 3 Vet	-0.064	-0.063	-0.402**	-0.403**		
	[0.127]	[0.127]	[0.191]	[0.191]		
Level 1 Gen	0.068	0.069			-0.289**	-0.290**
	[0.207]	[0.207]			[0.125]	[0.125]
Level 2 Gen	-0.015	-0.013			-0.690	-0.692
	[0.197]	[0.197]			[0.471]	[0.471]
Level 3 Gen	-0.573***	-0.572***			-0.693***	-0.693***
	[0.114]	[0.114]			[0.163]	[0.163]
Level 4 Gen	-0.057	-0.054				
	[0.166]	[0.166]				
<b>Relationship status</b>						
Married/Relationship	0.008	0.008	0.009	0.008	0.050	0.048
	[0.023]	[0.023]	[0.028]	[0.028]	[0.044]	[0.044]
Separated/Divorced	0.006	0.006	0.023	0.023	0.007	0.004
	[0.043]	[0.043]	[0.048]	[0.048]	[0.091]	[0.092]
<b>Job characteristics</b>						
Managers	0.043	0.043	0.051	0.051	-0.002	-0.001
	[0.056]	[0.056]	[0.058]	[0.058]	[0.148]	[0.148]
Professionals	0.013	0.013	-0.004	-0.004	0.065	0.067
	[0.056]	[0.056]	[0.053]	[0.053]	[0.144]	[0.144]
Technicians	0.011	0.011	-0.015	-0.015	0.114	0.116
	[0.048]	[0.048]	[0.051]	[0.051]	[0.120]	[0.121]
Clerks	-0.065	-0.065	-0.097*	-0.097*	-0.031	-0.025
	[0.053]	[0.053]	[0.055]	[0.055]	[0.133]	[0.134]
Service workers	-0.019	-0.018	-0.066	-0.066	0.073	0.078
	[0.061]	[0.061]	[0.072]	[0.072]	[0.130]	[0.131]
Skil_agricul/fishery	-0.182	-0.181	-0.287*	-0.287*	-0.171	-0.161
	[0.129]	[0.129]	[0.158]	[0.158]	[0.252]	[0.257]
Craft and trade	-0.008	-0.008	-0.040	-0.039	0.008	0.009
	[0.046]	[0.046]	[0.047]	[0.047]	[0.152]	[0.152]
Machine operators	-0.025	-0.025	-0.042	-0.042	-0.057	-0.057
	[0.044]	[0.044]	[0.046]	[0.046]	[0.117]	[0.118]
Full time	0.553***	0.552***	0.599***	0.598***	0.380***	0.381***
	[0.049]	[0.049]	[0.064]	[0.064]	[0.078]	[0.078]
Work Experience PT	-0.063***	-0.063***	-0.064***	-0.064***	-0.019	-0.019
	[0.017]	[0.017]	[0.022]	[0.022]	[0.042]	[0.043]
Work Experience FT	-0.065***	-0.065***	-0.080***	-0.080***	-0.019	-0.020
	[0.014]	[0.014]	[0.015]	[0.015]	[0.042]	[0.043]
Self employed	-0.075	-0.074	-0.069	-0.069	-0.129	-0.125
	[0.055]	[0.055]	[0.077]	[0.077]	[0.079]	[0.079]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	8.236***	8.289***	8.356***	8.396***	7.861***	8.003***
	[0.207]	[0.211]	[0.241]	[0.246]	[0.398]	[0.420]
Observations	10938	10938	8038	8038	2811	2811
Adjusted R <sup>2</sup>	0.311	0.311	0.267	0.267	0.273	0.273

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 20 DID Treatment= giving birth in 2012 (2009-2015)**

	All Women	All Women	Vocational Education	Vocational Education	General Education	General Education
Time	-0.019 [0.015]	-0.141** [0.070]	-0.003 [0.016]	-0.098 [0.082]	-0.051* [0.030]	-0.093 [0.126]
<b>Treatment* time</b>	<b>-0.127**</b> [0.050]	<b>-0.132***</b> [0.050]	<b>-0.173**</b> [0.071]	<b>-0.177**</b> [0.071]	<b>-0.094</b> [0.065]	<b>-0.104</b> [0.065]
Age	0.087*** [0.013]	0.106*** [0.017]	0.099*** [0.015]	0.113*** [0.020]	0.103*** [0.025]	0.111*** [0.032]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.001]	-0.002*** [0.001]
Good health	0.002 [0.017]	0.001 [0.017]	0.004 [0.019]	0.005 [0.019]	-0.005 [0.031]	-0.007 [0.031]
<b>Education</b>						
Level 1 Vet	0.124 [0.177]	0.124 [0.177]	0.278* [0.160]	0.279* [0.162]		
Level 2 Vet	-0.346** [0.149]	-0.346** [0.149]	-0.182 [0.129]	-0.181 [0.131]		
Level 3 Vet	-0.082 [0.134]	-0.083 [0.134]	-0.531*** [0.165]	-0.534*** [0.165]		
Level 1 Gen	0.094 [0.187]	0.086 [0.185]			0.343 [0.419]	0.340 [0.395]
Level 2 Gen	-0.036 [0.176]	-0.034 [0.177]			-0.510** [0.259]	-0.523** [0.260]
Level 3 Gen	-0.492*** [0.128]	-0.496*** [0.128]			-0.390*** [0.117]	-0.394*** [0.116]
Level 4 Gen	-0.059 [0.155]	-0.059 [0.155]				
<b>Relationship status</b>						
Married/Relationship	-0.037 [0.028]	-0.038 [0.027]	-0.041 [0.030]	-0.041 [0.030]	-0.030 [0.055]	-0.031 [0.054]
Separated/Divorced	-0.035 [0.058]	-0.035 [0.058]	-0.009 [0.060]	-0.010 [0.062]	-0.094 [0.140]	-0.089 [0.137]
<b>Job characteristics</b>						
Managers	0.222*** [0.077]	0.219*** [0.077]	0.185* [0.099]	0.186* [0.098]	0.331** [0.135]	0.319** [0.134]
Professionals	0.158** [0.074]	0.154** [0.074]	0.116 [0.097]	0.117 [0.097]	0.258** [0.126]	0.248** [0.124]
Technicians	0.165** [0.068]	0.158** [0.068]	0.157* [0.089]	0.155* [0.088]	0.192 [0.120]	0.175 [0.119]
Clerks	0.080 [0.071]	0.075 [0.071]	0.079 [0.094]	0.079 [0.093]	0.049 [0.110]	0.035 [0.109]
Service workers	0.005 [0.067]	-0.001 [0.067]	0.008 [0.090]	0.008 [0.090]	0.069 [0.110]	0.057 [0.109]
Skil_agricul/fishery	-0.017 [0.123]	-0.028 [0.124]	0.014 [0.193]	-0.001 [0.194]	0.025 [0.152]	0.019 [0.144]
Craft and trade	-0.049 [0.093]	-0.051 [0.092]	-0.078 [0.106]	-0.080 [0.106]	-0.036 [0.190]	-0.042 [0.188]
Machine operators	0.034 [0.080]	0.029 [0.080]	0.065 [0.099]	0.061 [0.099]	-0.057 [0.123]	-0.060 [0.124]
Full time	0.473*** [0.033]	0.472*** [0.033]	0.439*** [0.041]	0.439*** [0.041]	0.479*** [0.055]	0.474*** [0.055]
Work Experience PT	-0.035** [0.014]	-0.037** [0.014]	-0.062*** [0.016]	-0.062*** [0.016]	-0.027 [0.028]	-0.031 [0.028]
Work Experience FT	-0.032** [0.013]	-0.032** [0.013]	-0.055*** [0.015]	-0.054*** [0.015]	-0.026 [0.027]	-0.030 [0.027]
Self employed	-0.318*** [0.076]	-0.317*** [0.076]	-0.260*** [0.094]	-0.259*** [0.093]	-0.363*** [0.109]	-0.367*** [0.109]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.824*** [0.183]	7.975*** [0.195]	8.127*** [0.205]	8.231*** [0.223]	7.642*** [0.269]	7.749*** [0.309]
Observations	9511	9511	6185	6185	3266	3266
Adjusted R <sup>2</sup>	0.313	0.315	0.254	0.255	0.351	0.353

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 21 DID Treatment= giving birth in 2012 (2009-2015)- Men**

	All Men	All Men	Vocational Education	Vocational Education	General Education	General Education
Time	-0.023	0.012	-0.014	-0.024	-0.051*	0.020
	[0.014]	[0.061]	[0.016]	[0.071]	[0.029]	[0.113]
<b>Treatment* time</b>	<b>-0.027</b>	<b>-0.030</b>	<b>-0.034</b>	<b>-0.037</b>	<b>0.016</b>	<b>0.015</b>
	[0.030]	[0.030]	[0.030]	[0.030]	[0.070]	[0.070]
Age	0.110***	0.103***	0.119***	0.120***	0.054**	0.042
	[0.012]	[0.016]	[0.014]	[0.019]	[0.027]	[0.036]
Age squared	-0.003***	-0.003***	-0.003***	-0.003***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Good health	0.004	0.003	0.011	0.010	-0.005	-0.006
	[0.020]	[0.020]	[0.021]	[0.021]	[0.042]	[0.042]
<b>Education</b>						
Level 1 Vet	0.402***	0.400***	0.321	0.321		
	[0.148]	[0.148]	[0.200]	[0.200]		
Level 2 Vet	-0.101	-0.102	-0.193	-0.191		
	[0.138]	[0.138]	[0.189]	[0.190]		
Level 3 Vet	-0.159	-0.160	-0.459**	-0.456**		
	[0.114]	[0.114]	[0.216]	[0.217]		
Level 1 Gen	0.448***	0.448***			-1.274***	-1.277***
	[0.167]	[0.167]			[0.197]	[0.196]
Level 2 Gen	0.349**	0.350**			-1.057***	-1.064***
	[0.169]	[0.169]			[0.138]	[0.139]
Level 3 Gen	-0.525***	-0.527***			-0.712***	-0.710***
	[0.098]	[0.098]			[0.108]	[0.108]
Level 4 Gen	0.184	0.181				
	[0.132]	[0.131]				
<b>Relationship status</b>						
Married/Relationship	0.007	0.008	-0.036	-0.035	0.089	0.090
	[0.030]	[0.030]	[0.033]	[0.033]	[0.061]	[0.061]
Separated/Divorced	0.067	0.069	0.074	0.074	0.066	0.068
	[0.070]	[0.070]	[0.089]	[0.089]	[0.079]	[0.079]
<b>Job characteristics</b>						
Managers	0.174***	0.174***	0.124**	0.124**	0.294**	0.295**
	[0.055]	[0.055]	[0.057]	[0.057]	[0.130]	[0.130]
Professionals	0.069	0.068	0.021	0.020	0.194*	0.195*
	[0.052]	[0.052]	[0.057]	[0.057]	[0.111]	[0.110]
Technicians	0.059	0.058	0.049	0.049	0.132	0.132
	[0.049]	[0.049]	[0.053]	[0.053]	[0.107]	[0.107]
Clerks	0.042	0.042	-0.002	-0.003	0.117	0.118
	[0.049]	[0.050]	[0.054]	[0.054]	[0.105]	[0.105]
Service workers	0.039	0.038	-0.010	-0.010	0.179*	0.181*
	[0.063]	[0.063]	[0.081]	[0.081]	[0.103]	[0.103]
Skil_agricul/fishery	0.067	0.068	0.082	0.082	0.170	0.174
	[0.069]	[0.069]	[0.072]	[0.071]	[0.109]	[0.109]
Craft and trade	0.098**	0.098**	0.089*	0.088*	0.138	0.138
	[0.046]	[0.046]	[0.051]	[0.051]	[0.095]	[0.095]
Machine operators	0.059	0.058	0.041	0.040	0.159	0.159
	[0.044]	[0.044]	[0.046]	[0.046]	[0.111]	[0.111]
Full time	0.709***	0.709***	0.686***	0.686***	0.688***	0.689***
	[0.048]	[0.048]	[0.072]	[0.072]	[0.068]	[0.068]
Work Experience PT	-0.039**	-0.040**	-0.024	-0.025	0.009	0.010
	[0.018]	[0.018]	[0.023]	[0.023]	[0.033]	[0.033]
Work Experience FT	-0.053***	-0.053***	-0.067***	-0.067***	0.009	0.009
	[0.012]	[0.013]	[0.014]	[0.015]	[0.030]	[0.030]
Self employed	-0.036	-0.037	0.004	0.003	-0.018	-0.018
	[0.065]	[0.064]	[0.080]	[0.080]	[0.116]	[0.116]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.664***	7.633***	7.976***	7.995***	7.425***	7.345***
	[0.173]	[0.187]	[0.233]	[0.245]	[0.299]	[0.349]
Observations	11438	11438	7868	7868	3451	3451
Adjusted R <sup>2</sup>	0.359	0.359	0.306	0.307	0.376	0.376

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 22 Triple DiD- Selection into education**

	All women	All women
Time	0.066** [0.028]	-0.164 [0.117]
<b>Treatment*Time</b>	-0.105 [0.094]	-0.105 [0.093]
Vet	0.204*** [0.050]	0.204*** [0.050]
Treatment*Vet	0.138 [0.227]	0.146 [0.227]
Time*Vet	-0.123*** [0.030]	-0.125*** [0.030]
<b>Treatment*Time*Vet</b>	<b>-0.282**</b> [0.118]	<b>-0.281**</b> [0.118]
Age	0.093*** [0.010]	0.114*** [0.014]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]
Good health	0.011 [0.015]	0.011 [0.015]
<b>Relationship status</b>		
Married/Relationship	-0.035 [0.025]	-0.036 [0.024]
Separated/Divorced	-0.020 [0.048]	-0.023 [0.048]
<b>Job characteristics</b>		
Managers	0.214*** [0.069]	0.214*** [0.069]
Professionals	0.190*** [0.068]	0.190*** [0.068]
Technicians	0.144** [0.062]	0.142** [0.062]
Clerks	0.066 [0.064]	0.064 [0.063]
Service workers	0.025 [0.064]	0.025 [0.064]
Skil_agricul/fishery	0.138 [0.103]	0.141 [0.104]
Craft and trade	-0.060 [0.070]	-0.060 [0.070]
Machine operators	0.016 [0.109]	0.017 [0.109]
Full time	0.491*** [0.027]	0.489*** [0.027]
Work Experience PT	-0.033*** [0.010]	-0.034*** [0.010]
Work Experience FT	-0.043*** [0.010]	-0.041*** [0.010]
Self employed	-0.302*** [0.071]	-0.300*** [0.072]
<b>Individual FE</b>	Yes	Yes
<b>Time FE</b>	No	Yes
Constant	7.568*** [0.129]	7.773*** [0.151]
Observations	14757	14757
Adjusted R2	0.302	0.304

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 23 Triple Difference in Differences – Change in occupation**

	All women	All women	Vet	Vet	General	General
Time	0.007 [0.018]	0.042 [0.157]	0.028 [0.017]	0.069 [0.130]	0.002 [0.029]	0.469** [0.216]
<b>Treatment*Time</b>	-0.102* [0.060]	-0.104* [0.060]	0.001 [0.050]	-0.000 [0.050]	0.001 [0.083]	-0.006 [0.084]
Mover*Time	-0.089** [0.041]	-0.090** [0.041]	-0.042 [0.033]	-0.043 [0.033]	-0.024 [0.070]	-0.021 [0.070]
<b>Treatment*Mover*Time</b>	<b>-0.176</b> [0.170]	<b>-0.175</b> [0.172]	<b>0.091</b> [0.090]	<b>0.095</b> [0.091]	<b>-0.076</b> [0.204]	<b>-0.064</b> [0.207]
Age	0.092*** [0.014]	0.084*** [0.020]	0.112*** [0.015]	0.105*** [0.020]	0.027 [0.034]	-0.020 [0.038]
Age squared	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]
Good health	0.041** [0.019]	0.039** [0.019]	0.005 [0.018]	0.005 [0.018]	-0.002 [0.049]	0.000 [0.049]
<b>Education</b>						
Level 1 Vet	0.330 [0.242]	0.323 [0.242]	-0.004 [0.229]	-0.013 [0.228]		
Level 2 Vet	-0.221 [0.214]	-0.230 [0.214]	-0.582*** [0.209]	-0.584*** [0.209]		
Level 3 Vet	0.026 [0.135]	0.019 [0.135]	-0.696*** [0.193]	-0.701*** [0.193]		
Level 1 Gen	0.255 [0.335]	0.257 [0.334]			0.000 [.]	0.000 [.]
Level 2 Gen	0.041 [0.226]	0.026 [0.226]			-0.675 [0.551]	-0.689 [0.553]
Level 3 Gen	-0.446*** [0.128]	-0.449*** [0.128]			-0.635*** [0.138]	-0.621*** [0.138]
Level 4 Gen	0.264 [0.167]	0.258 [0.168]				
<b>Relationship status</b>						
Married/Relationship	-0.017 [0.030]	-0.017 [0.030]	0.050 [0.033]	0.050 [0.033]	0.145** [0.060]	0.153** [0.059]
Separated/Divorced	-0.025 [0.056]	-0.029 [0.056]	0.048 [0.048]	0.046 [0.048]	0.147 [0.106]	0.160 [0.110]
<b>Job characteristics</b>						
Full time	0.536*** [0.043]	0.535*** [0.043]	0.611*** [0.070]	0.611*** [0.070]	0.566*** [0.078]	0.579*** [0.077]
Work Experience PT	-0.041*** [0.013]	-0.041*** [0.013]	-0.034* [0.020]	-0.034* [0.020]	0.016 [0.038]	0.013 [0.038]
Work Experience FT	-0.048*** [0.015]	-0.047*** [0.015]	-0.081*** [0.015]	-0.080*** [0.016]	0.012 [0.036]	0.009 [0.036]
Self employed	-0.224** [0.105]	-0.220** [0.105]	-0.145 [0.095]	-0.145 [0.095]	-0.081 [0.075]	-0.079 [0.074]
<b>Individual FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Time FE</b>	No	Yes	No	Yes	No	Yes
Constant	7.859*** [0.216]	7.857*** [0.230]	8.522*** [0.243]	8.520*** [0.250]	7.381*** [0.301]	7.155*** [0.320]
Observations	6192	6192	6536	6536	2143	2143

Note: GSOEP data; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table B. 24 Generalised Fixed effect Log Wage Results- (2005-2015)**

	All women	Vocational Education	General Education	All men	Vocational Education	General Education
Mother/Father	<b>-0.140***</b> [0.017]	<b>-0.198***</b> [0.019]	<b>-0.030</b> [0.033]	<b>0.003</b> [0.013]	<b>-0.008</b> [0.015]	<b>0.039</b> [0.026]
Age	0.034*** [0.005]	0.034*** [0.005]	0.022** [0.010]	0.096*** [0.004]	0.107*** [0.005]	0.057*** [0.011]
Age squared	-0.003*** [0.000]	-0.003*** [0.000]	-0.003*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]	-0.002*** [0.000]
Good health	-0.001 [0.012]	0.013 [0.013]	-0.032 [0.025]	0.011 [0.011]	0.017 [0.012]	-0.014 [0.023]
<b>Education</b>						
Level 1 Vet	0.269*** [0.078]	0.383*** [0.088]		0.245*** [0.050]	0.262*** [0.057]	
Level 2 Vet	-0.241*** [0.061]	-0.126* [0.074]		-0.305*** [0.043]	-0.264*** [0.051]	
Level 3 Vet	-0.091** [0.044]	-0.371*** [0.058]		-0.161*** [0.038]	-0.469*** [0.054]	
Level 1 Gen	0.221** [0.088]		-0.013 [0.249]	0.224*** [0.057]		-0.629*** [0.204]
Level 2 Gen	0.015 [0.071]		-0.653*** [0.129]	0.123** [0.058]		-0.648*** [0.157]
Level 3 Gen	-0.538*** [0.044]		-0.518*** [0.043]	-0.626*** [0.036]		-0.720*** [0.039]
Level 4 Gen	0.103** [0.051]			0.016 [0.044]		
<b>Relationship status</b>						
Married/Relationship	-0.046*** [0.016]	-0.056*** [0.018]	-0.011 [0.031]	0.028** [0.013]	0.002 [0.014]	0.065*** [0.025]
Separated/Divorced	-0.028 [0.029]	-0.011 [0.032]	-0.098 [0.062]	0.019 [0.025]	0.020 [0.027]	0.006 [0.054]
<b>Job characteristics</b>						
Managers	0.294*** [0.035]	0.356*** [0.042]	0.213*** [0.065]	0.059*** [0.021]	0.026 [0.025]	0.164*** [0.041]
Professionals	0.229*** [0.032]	0.287*** [0.039]	0.176*** [0.057]	0.022 [0.019]	-0.026 [0.023]	0.162*** [0.038]
Technicians	0.240*** [0.029]	0.304*** [0.035]	0.157*** [0.057]	0.005 [0.018]	-0.033 [0.021]	0.115*** [0.038]
Clerks	0.155*** [0.030]	0.199*** [0.036]	0.110** [0.056]	-0.027 [0.020]	-0.076*** [0.023]	0.052 [0.042]
Service workers	0.131*** [0.029]	0.196*** [0.034]	0.031 [0.053]	-0.029 [0.021]	-0.065** [0.026]	0.069* [0.040]
Skil_agricul/fishery	0.256*** [0.066]	0.288*** [0.080]	0.185 [0.125]	-0.056 [0.040]	-0.114*** [0.044]	0.066 [0.094]
Craft and trade	0.027 [0.040]	0.086* [0.046]	-0.191** [0.084]	0.016 [0.017]	-0.020 [0.020]	0.090** [0.037]
Machine operators	0.131*** [0.046]	0.185*** [0.054]	0.008 [0.090]	0.012 [0.018]	-0.018 [0.021]	0.054 [0.040]
Full time	0.512*** [0.011]	0.480*** [0.013]	0.542*** [0.020]	0.655*** [0.013]	0.670*** [0.017]	0.545*** [0.021]
Work Experience PT	0.009* [0.005]	0.006 [0.006]	0.026** [0.012]	-0.029*** [0.006]	-0.023*** [0.007]	-0.008 [0.012]
Work Experience FT	0.007 [0.005]	0.001 [0.006]	0.037*** [0.011]	-0.058*** [0.005]	-0.069*** [0.005]	-0.018 [0.012]
Self employed	-0.246*** [0.025]	-0.149*** [0.034]	-0.337*** [0.037]	-0.091*** [0.018]	-0.062*** [0.022]	-0.114*** [0.029]
Constant	7.165*** [0.069]	7.192*** [0.084]	7.081*** [0.112]	7.903*** [0.060]	8.114*** [0.073]	7.673*** [0.113]
Observations	22439	15254	7067	27409	19193	7868

Note: GSOEP data;; Standard errors in brackets; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Appendix C

## Institutional Background

The German school system is characterized by four different levels (Table 3.1):

- Early childhood education
- Primary education
- Secondary education
- Tertiary education

The curriculum is the same for all pupils until Primary education (age 9) but then gives way to a stratified system where pupils have to select between primarily a general or a vocational route.

German secondary education can be split into two different levels:

- Sekundarstufe I, that is lower secondary education which involves students aged ten to fifteen/sixteen.
- Sekundarstufe II, that is upper secondary education for pupils of age fifteen/sixteen to eighteen.

At this level, the German system allows students to choose between two different paths of secondary education, either a vocational or a general orientated path.

The German vocational education system is mostly based on the so-called “dual system” which can mainly be defined as a work-based education system that aims to help students adapt to the work environment and to decrease the high rates of unemployment. Full-time school vocational education, instead, occupies a less important position in Germany.

The institutions related to the vocational educational path are the following:

- *Hauptschule*: general elementary education which covers grade 5 to grade 9, leads to either a vocational or a university entrance qualification. Sometimes it can include grade 10, and it ends with a “*Hauptschulabschluss*” (certificate of completion of the *Hauptschule*). Afterwards,

students will be enrolled in a vocational school, namely the *Berufsschule*. The latter delivers practically orientated classes that seek to prepare students for higher vocational education, or for the labour market. Students usually attend the *Berufsschule* part-time in conjunction with on-the-job training or apprenticeship.

- *Realschule*: general intermediate education which covers grade 5 to grade 10, ending with a “*Realschulabschluss*”. It provides students with more extensive knowledge and puts more emphasis on language and mathematic skills rather than manual activities if compared with *Hauptschule*. Both *Hauptschule* and *Realschule* are designed for those pupils who would like access to an apprenticeship. However, while the *Hauptschule* leads more to manual trade, the *Realschule* is more suitable for those who want to start an apprenticeship in a medical profession such as nursing or in commercial trade. The *Realschule* entitles students to enter into a *Fachoberschule* which provides two years of education and will lead students to the achievement of the “*Fachhochschulreife*”. The latter is a prerequisite for jobs in the civil service, administration, business and to enter the university of applied sciences “*Fachhochschulen*”. If a 13th grade is accomplished, the student will achieve a “*Fachgebundene Hochschulreife*” or an “*Abitur*”.
- *Gesamtschule* or comprehensive school: this is an alternative to both *Hauptschule* and *Realschule*. The comprehensive school aims to avoid forcing children to choose their educational paths too early in life. It includes students of all ability levels from grade 5 through to grade 10. Students who conclude the *Gesamtschule* at the 9th grade achieve the *Hauptschule* certificate, while those who complete the *Gesamtschule* at the 10th grade will accomplish the *Realschule* certificate.

If students wish to follow instead an general path they will need to enrol in a *Gymnasium*, a general advanced education, which covers grade 5 to grade 13, leading to the *Hochschulreife*, also called “*Abitur*”, the maturity certificate. It prepares students for university study or a dual general vocational credential. The *Gymnasium* is based on a mandatory study of core subjects including languages, literature and arts, social sciences, mathematics, and natural sciences.

The German tertiary education system is relatively less stratified compared with the secondary educational system.

The different institutions supplying German students with tertiary education are of the following types:

- *Universitäten*, universities: these institutions are general-based, and the main program is characterized by theoretical and research-oriented components.
- *Fachhochschulen*, universities of applied sciences: mainly based on technical disciplines, design, agricultural economy, business, and social work; these institutions provide practically orientated programs in order to meet the needs of the labour market. The main feature of this qualification is the inclusion of the “*Praxissemester*”, that is paid training, in the core program of study.

**Table C. 1 German educational system**

	Grade	Education system				Age	
<b>Tertiary Education</b>		Fachhochschule		Universitäten			
<b>Secondary Education</b>	13	Berufsschule (dual system), Berufsfachschulen,Fachoberschule		Gesamtschule	Gymnasium	18/19	
	12					17	
	11					16	
	10	some schools have grade 10	Realschule				15
	9	Hauptschule					14
	8						13
	7						12
	6						11
	5						10
<b>Primary education</b>	4	Grundschule				9	
	3					8	
	2					7	
	1					6	
<b>Early childhood education</b>		Kinderkrippe, Kindergarten, Kindertagesstätte				5	
						4	
						3	
						2	
						1	