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DISCUSSION PAPER SERIES

IZA DP No. 13216

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ABSTRACT

Gender-Specific Duration of Parental Leave and Current Earnings

Although male employees are increasingly making use of parental leave, gender differences in both usage and duration of parental leave are still prevalent. In this contribution, we explore the role of gender for the relation between the incidence/duration of parental leave and earnings after returning to a job. We use data on middle managers in the German chemical industry and show that parental leave pay gaps are much more severe for males than they are for females.

JEL Classification: M52, M12, J16, J31

Keywords: compensation, gender, parental leave, stigma, wages

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Gender-Specific Duration of Parental Leave and Current Earnings

1. Introduction

For quite some years, we have been observing attempts to increase fathers' share of parental leave in many countries in order to align the labor market outcomes of females and males. Although reforms of the legislation have shown some positive effects (see e.g. Ekberg et al. (2013) for Sweden), gender differences in both usage and duration of parental leave are still prevalent (World Economic Forum 2018).

Research quite comprehensively addresses the role of paternity leave for household issues, such as childcare, housework and maternal health (e.g. Schober 2014; Bünning 2015; Persson & Rossin-Slater 2019). Scholars also investigate the situation in which employees return to work and point out earnings effects of previous career interruptions in general (Beblo & Wolf 2002; Spivey 2005) and for parental leave in particular. Most of these studies focus on women, as they have been more likely to take parental leave than men (Anderson et al. 2003; Gangl & Ziefle 2009; Buligescu et al. 2009; Budig & Hodges 2010; Schmelzer et al. 2015; Lott & Eulgem 2019). Few other studies concentrate on paternal leave (Coltrane et al. 2013; Rege & Solli 2013). Usually, lower wages subsequent to those career interruptions are explained by human capital arguments including skill depreciation (Mincer & Polachek 1974) or by negative signaling effects of parenthood (Coltrane et al. 2013). Evidence on gender comparisons of parental leave for future careers and compensation is rare, and predominantly examined the Swedish labor market: The results of Stafford & Sundström (1996), Albrecht et al. (1999) and Evertsson (2016) indicate that parental leave is related to lower subsequent wages for male employees in particular.

In this contribution, we extend the literature by explicitly exploring possible gender differences in the relation between the incidence/duration of parental leave and later earnings after returning to the job. Possible explanations of gender differences first include a gender-specific role of human capital depreciation based on job segregation (Kunze 2002; Görlich & Grip 2009). Second, gender-specific signaling effects can be relevant in the sense that males may violate social norms and may not meet the expectations of employers if making use of parental leave (Albiston 2007; Wharton et al. 2008). By making use of middle managers working in the German chemical sector and holding a university degree in the STEM fields, we have a very homogeneous sample of employees and hence rule out major parts of the first explanation in contrast to the use of much broader samples. We also contribute to the literature on gender pay gaps by highlighting differences for groups of employees with and without parental leave spells. Since expected or actual gender pay gaps interact with inequalities of labor supply decisions within households (Albanesi & Olivetti 2009), insights from our study are relevant from a policy point of view, too.

The remainder of the paper is organized as follows: Section 2 imparts the relevant theoretical considerations and gives an overview of previous empirical research. On this basis, we derive hypotheses on how parental leave may be associated with earnings consequences. We describe the data and variables in Section 3. In Section 4, we present our results. Section 5 concludes.

2. Theoretical considerations, previous empirical studies and hypotheses

Observed negative effects of parental leave spells on future earnings after returning to work are often explained by human capital theory in conjunction with the skill depreciation hypothesis. According to this theory, workers' remuneration depends positively on their stock of human capital. Workers increase their value to the employer by the accumulation of work skills and knowledge, resulting in greater productivity (Mincer 1958; Becker 1964; Mincer & Polachek 1974). During periods of paternal leave, employees forego work experience and skill development and defer investments in on-the-job training until they return to the labor market. The payoff period of investments in on-the-job training is consequently shortened. Rational employees hence provide fewer investments in training activities than workers with continuous career paths (Corcoran 1979; Mincer & Ofek 1982). It is also conceivable that the stock of already acquired human capital may even depreciate during the period of absence (Mincer & Polachek 1974). Employees may forget accustomed operating processes as they are no longer using them. Besides, they may fail to adopt new techniques or to keep up with technical progress during their absence from work and may, therefore, be confronted with technical as well as economic obsolescence of their human capital (Grip & van Loo 2002; Beblo & Wolf 2002; Edin & Gustavsson 2008). Even without depreciation of human capital, we may still observe a negative relation between the incidence and duration of parental leave and earnings after returning to the labor market, because human capital has still decreased relatively compared to workers without career interruptions, who have continued to increase human capital during that period (Neuman & Weiss 1995). In addition to human capital depreciation, parental leave spells may evoke negative expectations on the part of the employers regarding the employee's commitment and work dedication (Cohen & Single 2001; Coltrane et al. 2013). We therefore formulate

Hypothesis 1: Employees who have taken parental leave currently receive lower pay compared to employees with a continuous career path.

The arguments presented above are the more relevant the longer the parental leave spells are. This directly leads to

Hypothesis 2: The interruption pay gap increases with the duration of paternal leave.

Then the question occurs of whether male and female employees are affected to the same extent. Exploring employment gaps of managers of a large US financial service organization, Judiesch & Lyness (1999) do not find gender-specific effects with regard to promotions and wage increases after leaves of absence. They focus on general leave of absence spells, not having been able to focus on parental leave due to too few observations of paternal leave. Stafford & Sundström (1996), Albrecht et al. (1999) and Gerst & Grund (2019) find a more pronounced negative payment effect after parental leave for men compared to female workers in Sweden and Germany. Evertsson (2016) focusses on wages during the first years subsequent to returning to the labor market. Her results indicate that wages of males are already affected after relatively short parental leave spells, whereas females only suffer when making use of much longer maternal leave spells for the case of Sweden. Gender-specific differences regarding the effect of parental leave on compensation may first of all be the result of occupational sex segregation. Kunze (2002) and Görlich & Grip (2009) find depreciation rates to differ between female- and male-dominated occupations in Germany. Another argument for differences between men and women may stem from stereotypes that lead to gender-specific social norms. Research in social psychology indicates that traditional gender roles and the gender division of labor act as main reasons here (Eagly & Steffen 1984; Eagly 1987; Rudman & Phelan 2008). Acker (1990) and Williams (2001) put forward the concept of the "ideal workers", who are completely and fully dedicated to their work and unencumbered by external family obligations. The ideal worker concept is attributed more to male workers, who traditionally take on the role of the breadwinner, whereas women are expected to serve as the primary caregivers (Rudman & Mescher 2013). These norms can then lead to gender-specific expectations from employers towards the use of parental leave. While women rather fulfill the norm when making use of maternal leave, men, in contrast, violate the male norm of the ideal worker (Acker 1990; Williams 2001). Paternal leave may then act as a negative signal for males with regard to their lacking career commitment (Albiston 2007; Wharton et al. 2008). In consequence, males with parental leave spells will be stigmatized more than female workers, resulting in the former's lower earnings and limited future career opportunities (Cohen & Single 2001; Coltrane et al. 2013). These considerations lead to

Hypothesis 3: The negative relation between parental leave and subsequent compensation is more pronounced for males than it is for females.

3. Data, variables and descriptive statistics

The data used in this study are based on a yearly salary survey among middle managers in the German chemical sector during the years 2013 and 2018. The sector is dominated by large firms, such as BASF or Bayer, and employs around 460,000 blue- and white-collar workers (VCI 2017, 2019). Collective wage agreements are prevalent for regular employees of these firms. Focusing on middle managers, we analyze a

group of non-tariff employees, though, who represent a share of around 0.17 of the total sector workforce (Bundesarbeitgeberverband Chemie e.V. 2013). We conduct our survey in collaboration with the German Association of Managers in the Chemical Industry (official abbreviation: VAA). The VAA contacts around 17.600 active members each year on average. Therefore, the association is rather well organized with a quota of about 0.25 of suitable employees, covering a representative part of appropriate non-tariff employees in the German chemical industry. Contrary to most regular employees in the sector with collectively agreed wages and wage increases, there is much more discretion in negotiations of the wage level and determination of wage increases between middle managers and employers.

The survey collects individual information on workers' demographics, such as work experience and field of study, and job characteristics, e.g. level of hierarchy, functional area, and firm size. For the main analysis, the sample is limited to university graduates with a STEM degree, working full-time in the chemical industry in Western Germany. In addition, top managers have been excluded from the analysis, as the wage-setting process for them may also differ considerably from that for middle managers. We restrict our analysis to employees who have had either no career interruption at all or no interruption other than periods of parental leave. These restrictions result in a rather homogenous sample of managers who have a similar educational background and are working in the same industry (n=17,141). The sector is somewhat male-dominated, which is also reflected in our sample. About 0.13 of observations do come from females, though (n=2,187).

We use yearly total compensation of managers as our main dependent variable. All observations have been deflated by the consumer price index to the base year of 2013. On average, managers in the sample receive a total compensation of €134,000. Compensation differs considerably between males (€138,000) and females (€112,000, see Table 1).

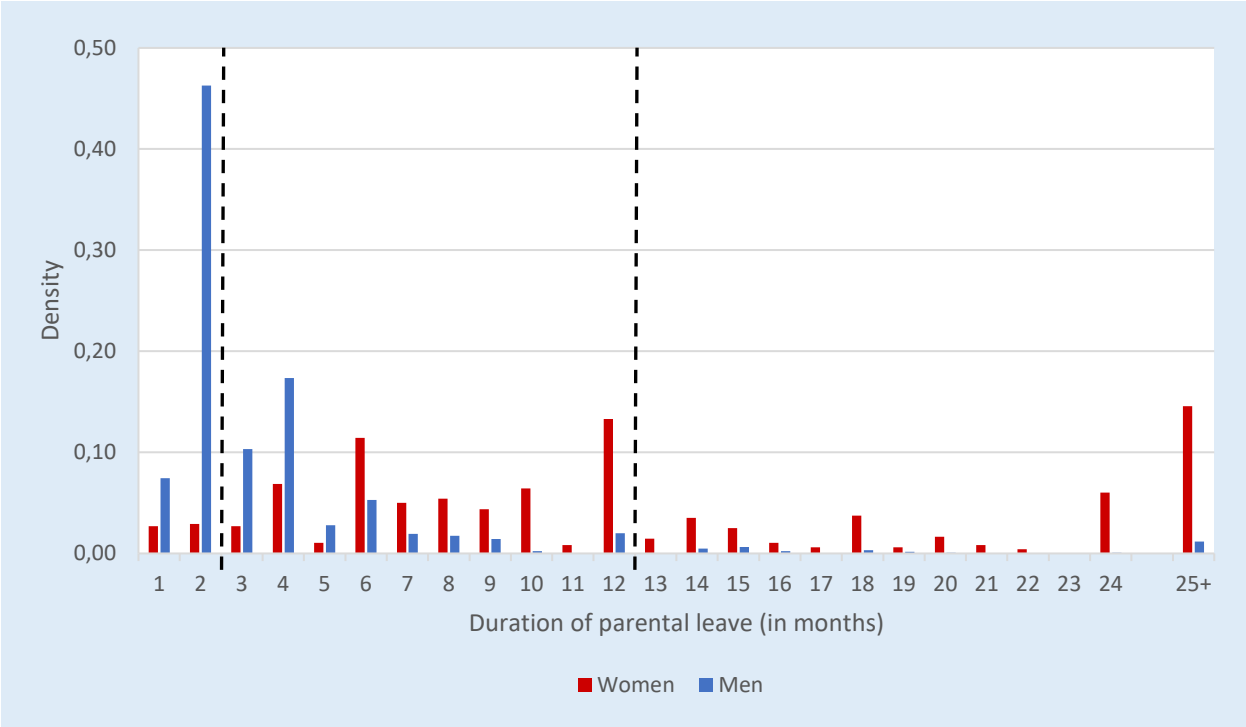
Table 1: Descriptive statistics of total compensation by gender (in €)

		Whole Sample (n=17,141)	**Females (n=2,187)**	**Males (n=14,954)**
Total compensation	Mean	134,397	112,098	137,659
	SD	57,006	45,719	57,758

Survey participants were asked to report the total number of months they have taken parental leave during their professional careers, i.e. after graduating from university. One out of ten individuals reports having taken parental leave during their career. This share is considerably higher among females (0.22) than it is

for males (0.08).[1] Male and female employees also differ with respect to the total duration of parental leave during their careers. More than half of the male workers with interruptions made use of up to 2 months only of parental leave, whereas this is true for only a small minority of females (0.05 of employees with interruptions due to parental leave). In contrast, rather long-term interruptions of more than 12 months are much more relevant for female employees than they are for males. Both the median and the mode of parental leave duration by women point to 12 months, while they are two months for male managers (see Figure 1).

Figure 1: Distribution of parental leave duration by gender in sample



These gender-specific distributions are likely to be affected by formal parental leave regulations in Germany. In addition to a mandatory 'maternity protection' period of 14 weeks for mothers surrounding childbirth, parents are eligible to take a job-protected parental leave of up to three years. A parental allowance in the percentage of the previous salary is provided by public entities for up to 14 months. Each parent can make use of a paid maximum of 12 months, though. More representative data from Germany confirm that most fathers with parental leave spells (0.79) receive parental allowances for two months only.

[1] Note that we consciously abstain from taking the role of children into account. Hence, employees without children and those with children, but without parental leave spells, are not separated but considered as one group. Within our sample, many more males (0.66) than females (0.30) report having children. Qualitative results are robust to the subsample of employees with children.

Mothers, on the other hand, receive parental allowance for 12 months on average (BMFSFJ 2016). In our empirical study, we consequently distinguish three categories of duration of parental leave, next to employees without parental leave, according to the aforementioned thresholds. These are (i) up to two months of parental leave, (ii) three to twelve months, and (iii) more than twelve months of parental leave. Using these categories, we can identify also possible non-linear relations between parental leave duration and current remuneration. Table 2 shows the corresponding distribution of observations. These differ considerably by gender. Although there are relatively few observations of parental leave spells of more than a year among men, the male-dominated sample still leads to a number of at least n=45 for this category.

Table 2: Distribution of parental leave duration categories by gender

	Whole Sample (n=17,141)	**Females (n=2,187)**	**Males (n=14,954)**
No parental leave	0.899	0.781	0.916
1-2 months	0.041	0.012	0.045
3-12 months	0.047	0.126	0.036
>12 months	0.013	0.081	0.003

We use several control variables. Next to gender, we take other individual characteristics such as work experience (in years), field of study (7 dummies) and a dummy for holding a doctoral degree into account. We also control for job-based characteristics in additional estimations, which allows us to disentangle wage effects between and within comparable jobs. The German chemical sector is characterized by rather long-term employment relations, which is expressed by an average amount of firm tenure of 17 years. Almost half of the middle managers are employed in large firms with more than 10,000 employees. We distinguish between three levels of the firms' hierarchies, from Level 4 (some management responsibilities) to Level 2 (senior management). More than half of the managers are on Level 3. The top management (Level 1) is excluded because of essential different compensation principles as stated above. We also consider the functional areas that managers work in (11 dummies) and managers' actual weekly working hours. Table 3 summarizes the descriptive statistics of these variables.

Table 3: Descriptive statistics

	Whole Sample (n=17,141)		Females (n=2,187)		Males (n=14,954)	
	Mean	SD	Mean	SD	Mean	SD
Individual characteristics						
Female	0.128					
Experience (in years)	22.06	8.726	18.60	9.295	22.57	8.523
Field of Study						
Chemistry	0.602		0.560		0.609	
Engineering	0.200		0.065		0.220	
Biology	0.054		0.116		0.045	
Physics	0.027		0.012		0.029	
Medical science	0.019		0.055		0.014	
Pharmaceutics	0.060		0.129		0.050	
Other natural sciences	0.038		0.063		0.034	
Doctoral degree	0.807		0.782		0.810	
Job characteristics						
Tenure (in years)	16.53	9.630	12.49	9.119	17.12	9.560
Level of hierarchy						
Level 2	0.115		0.064		0.122	
Level 3	0.552		0.437		0.568	
Level 4	0.334		0.499		0.310	
Functional area						
Production	0.192		0.110		0.204	
Research & Development	0.344		0.451		0.328	
Technical & Process Engineering	0.087		0.025		0.096	
Applications engineering	0.059		0.049		0.061	
Sales, Marketing, Logistics, Sourcing	0.085		0.074		0.087	
Finance, Controlling. Human resources	0.039		0.028		0.041	
Technical supervision	0.057		0.048		0.058	
IT	0.020		0.013		0.021	
Other	0.117		0.202		0.105	
Firm size						
Fewer than 1,000	0.182		0.226		0.175	
1,000 - 5,000	0.204		0.204		0.205	
5,001-10,000	0.121		0.113		0.123	
>10,000	0.493		0.457		0.498	
Weekly working hours	45.83	5.392	44.75	5.372	45.99	5.376
Year						
2013	0.185		0.190		0.184	
2014	0.177		0.161		0.179	
2015	0.168		0.167		0.168	
2016	0.163		0.164		0.163	
2017	0.158		0.167		0.156	
2018	0.150		0.151		0.150	

4. Results

We apply Mincer-type wage regressions using pooled OLS estimations with robust standard errors clustered at the firm level.[2] As dependent variables, we use the log of total compensation. To investigate the extent to which parental leave uptake is associated with compensation outcomes in the presence of individual and job-related characteristics, we conduct a two-stage hierarchical regression analysis in the sense that we first consider only individual characteristics and subsequently also job characteristics. By gradually adding additional independent variables, we can explore whether potential wage differentials are relevant because employees with previous parental leave spells are assigned to different jobs, or whether differences in compensation can also be observed within comparable jobs. As mentioned above, we consider four categories of parental leave: "*No leave*", "*1-2 months*", "*3-12 months*" and "*>12 months*".

We start with a joint estimation of females and males (Table 4). Model (1) shows significantly lower earnings for managers who have taken parental leave spells compared to those employees without career interruptions. These are increasing with the duration of parental leave. This is in line with our baseline hypotheses 1 and 2 and confirms previous empirical results.

Next, the job-specific characteristics are entered in model (2). After accounting for tenure, hierarchy level within the firm, functional areas, working hours and firm size, only those spells of leave that lasted longer than 12 months remain significant. Step-by-step inclusion of the variables (not reported) shows that the level of hierarchy and weekly working hours are major reasons for the decrease in the coefficients representing parental leave durations. Those employees who have taken parental leave have lower working hours than those with continuous career paths, even among those with full-time contracts in our sample. This hints at an altered time allocation towards taking on more family responsibilities after returning from parental leave on average. Similarly, Bünning (2015) found that fathers who had taken parental leave reduced their working hours subsequently and increased their involvement in childcare even after short spells of leave. In addition, employees with previous parental leave spells are assigned to jobs at lower levels of the hierarchy, indicating that taking parental leave conflicts with climbing the internal hierarchical ladder or achieving inter-firm career progress. These findings are in line with the results of Judiesch & Lyness (1999), who found evidence that leaves of absence are associated with fewer subsequent promotions. Besides, individuals who have taken parental leave spells of more than a year face pay gaps amounting to almost ten percent even within similar jobs.

[2] We cannot make use of individual fixed estimations, since parental leave is surveyed in retrospect; thus, there is hardly any variation during the observation period.

Table 4: Pooled OLS regressions on total earnings

Log total compensation	(1)		(2)	
Parental leave (base: No leave)				
1-2 Months	-0.0170*	(0.010)	-0.00419	(0.006)
3-12 Months	-0.0455***	(0.015)	-0.0156	(0.010)
>12 Months	-0.0965***	(0.022)	-0.0902***	(0.016)
Female (1=yes)	-0.0672***	(0.010)	-0.0280***	(0.008)
Experience	0.0650***	(0.003)	0.0431***	(0.003)
Experience squared	-0.000937***	(0.000)	-0.000652***	(0.000)
Field of Study (base: chemistry)				
Engineering	0.123***	(0.029)	0.0705***	(0.018)
Biology	-0.0326	(0.023)	-0.000739	(0.015)
Physics	0.0315	(0.032)	0.0258	(0.020)
Medical Science	0.0936**	(0.042)	0.102***	(0.024)
Pharmaceutics	0.0900***	(0.023)	0.0900***	(0.016)
Other natural sciences	0.0313*	(0.018)	0.0262*	(0.014)
Doctoral degree	0.0810***	(0.011)	0.0450***	(0.010)
Tenure			0.00506***	(0.001)
Level of hierarchy (base: level 3)				
Level 2			0.253***	(0.038)
Level 4			-0.165***	(0.017)
Functional area (base: R&D)				
Production			0.0203**	(0.010)
Technical & Process engineering			-0.00164	(0.013)
Applications engineering			-0.00869	(0.018)
Sales, Marketing, Logistics, Sourcing			0.0691***	(0.014)
Finance, Controlling, HR			0.0480***	(0.012)
Technical supervision			-0.0183	(0.012)
IT			-0.0297*	(0.018)
Other			-0.0124	(0.013)
Firm size (base: 1,000 – 5,000 employees				
Fewer than 1,000			-0.133***	(0.014)
5,001-10,000			0.0651**	(0.027)
>10,000			0.137***	(0.014)
Actual weekly working hours			0.00944***	(0.001)
Year dummies	Yes		Yes	
Intercept	10.72***	(0.049)	10.52***	(0.096)
Observations	17,141		17,141	
Adj. R-squared	0.463		0.662	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01

Table 4 also reveals the relevance of gender pay gaps in the sector.[3] In a next step, we examine whether the reported pay gaps due to parental leave are more severe for males, as hypothesized above. Expecting a moderating effect, we interact parental leave dummies with gender in Table 5. Again, we start by controlling for individual characteristics only in model (1). The female dummy now shows a significant gender pay gap amounting to 0.08 among employees without parental leave. Male workers who have taken parental leave receive significantly lower earnings than men without career interruptions. On average, men with up to two months of parental leave receive 0.02 lower earnings than male workers with continuous career paths. This difference increases to almost a quarter for men who have taken more than twelve months away from work due to caring for their children. Most importantly: The interaction between parental leave and gender is also significant for periods of parental leave longer than three months, which provides support for our hypothesis 3. These results are reinforced by additionally considering job characteristics in model (2), although differences are considerably smaller and are captured by further control variables.

Table 5: Pooled OLS regressions on total compensation evaluating the interaction of gender and duration of parental leave

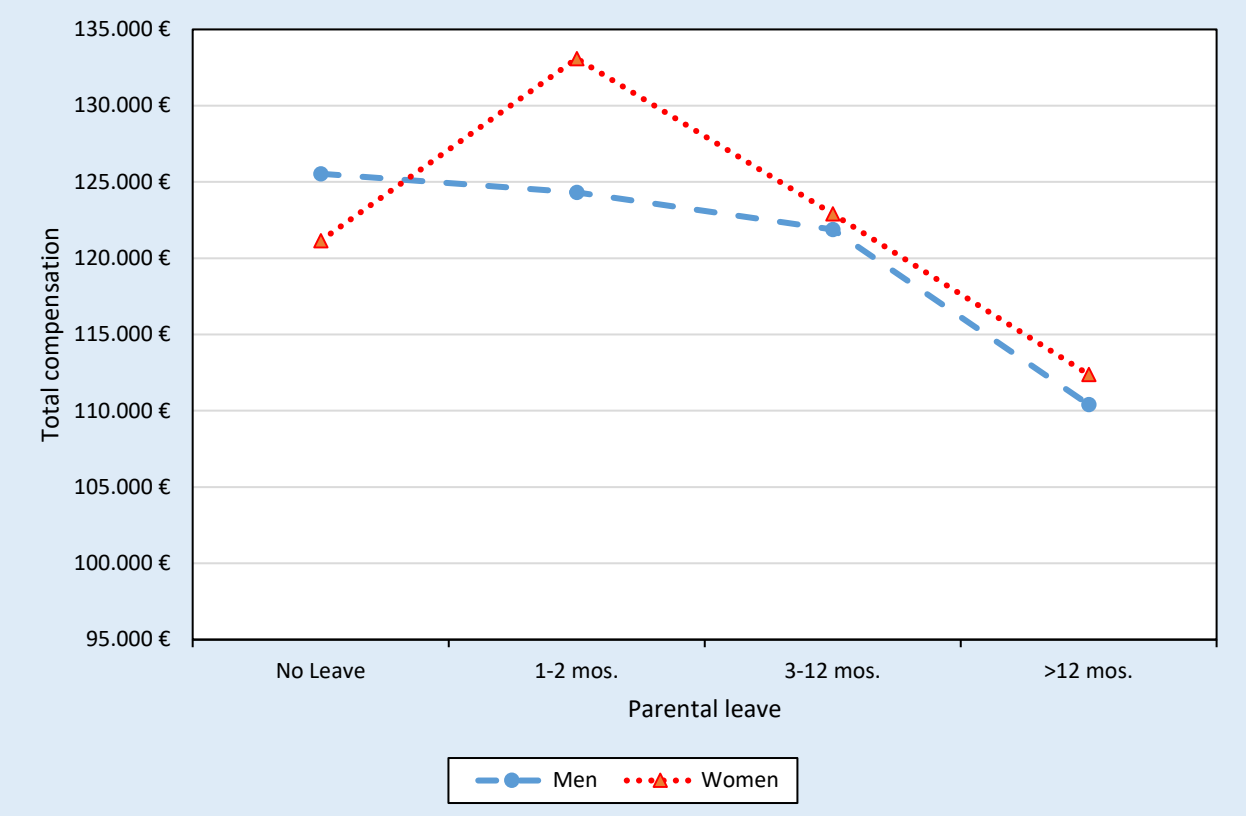
Log total compensation	**(1)**		**(2)**	
Parental leave (base: No leave)				
1-2 Months	-0.0215**	(0.010)	-0.00979	(0.007)
3-12 Months	-0.0739***	(0.023)	-0.0295**	(0.014)
>12 Months	-0.245***	(0.041)	-0.128***	(0.023)
Female (1=yes)	-0.0815***	(0.010)	-0.0355***	(0.008)
1-2 Months x Female	0.0408	(0.106)	0.104	(0.073)
3-12 Months x Female	0.0901***	(0.029)	0.0439**	(0.018)
>12 Months x Female	0.194***	(0.046)	0.0532**	(0.025)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	10.73***	(0.050)	10.52***	(0.096)
Observations	17,141		17,141	
Adj. R-squared	0.464		0.662	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

[3] Grund (2015) has explored component-specific gender pay gaps in some more detail.

The empirical pattern becomes even more illustrative by plotting the relationship between total compensation and parental leave categories in Figure 2.[4] First, the plot shows that parental leave is much more noticeably linked to lower earnings for males. In contrast, females with minor parental leave duration of up to two months even receive a somewhat higher wage than those without leave spells (not significantly, though). In addition, payments of female employees with 3-12 months of parental leave do not differ significantly compared to those women with continuous career paths. Men, on the other hand, face significant earnings disadvantages already after three months of parental leave during their careers.

Figure 2: Interaction plot for parental leave and gender (controlled for individual and job characteristics)

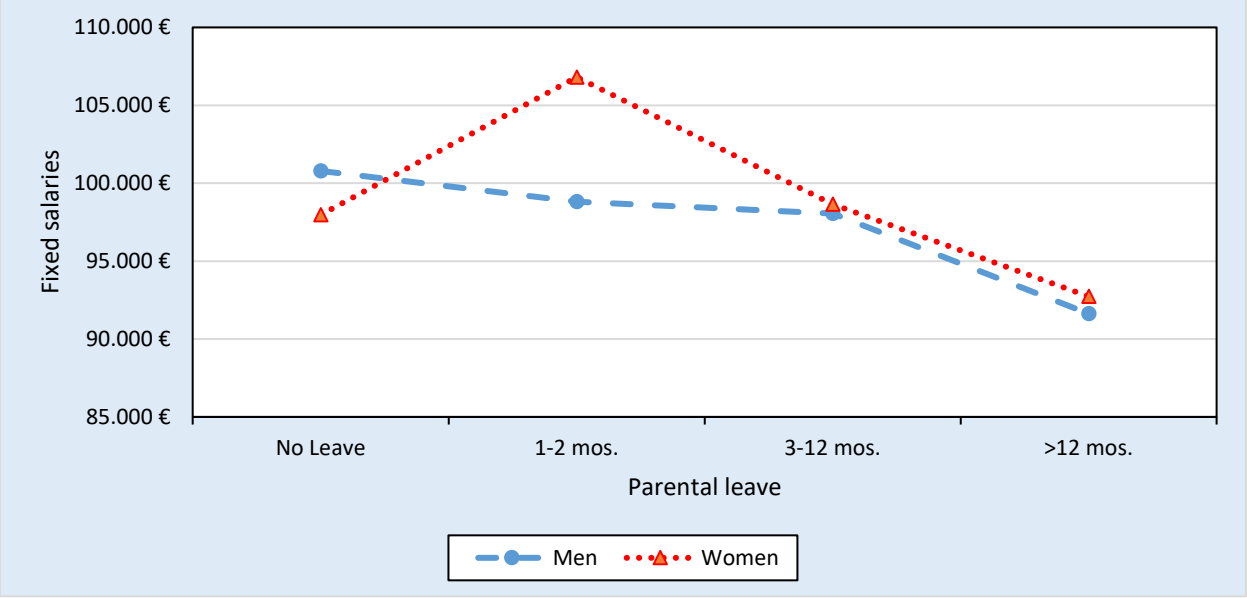


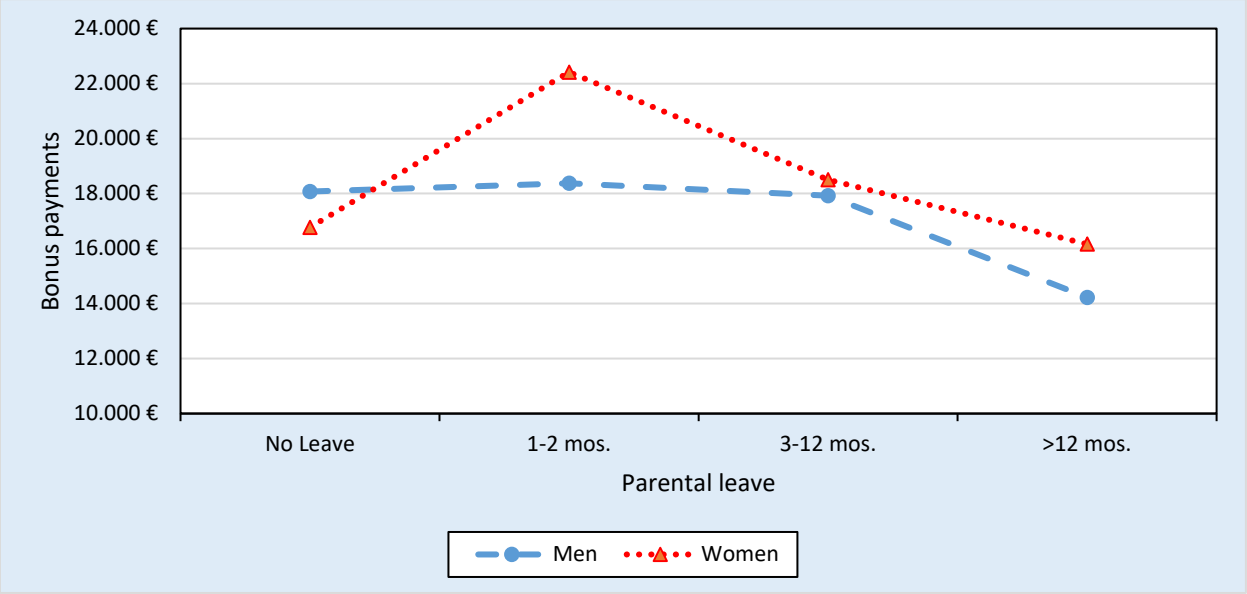
[4] Corresponding € values are calculated at the mean of metric variables and shares of categorical variables. Plots look similar when only considering individual characteristics (reported in the appendix in Figure A)

A possible explanation for the moderating effect of gender is that employers still have gender-specific expectations about the usage of parental leave, as discussed above. Figures 1 and 2 can also be read as gender pay gaps for separate parental leave categories. We observe the typical gender pay gaps in favor of males for employees without parental leave, which may be the result of statistical discrimination based on gender-specific ex-ante expectations. In this sense, though, expectations are not met if males make use of parental leave and if females take only a few months off from work. As a result, employers may adapt their ex-ante expectations of individuals' career commitment or behavior, which leads to diminishing or even reverse gender pay gaps among employees with parental leave spells.

Total compensation comprises fixed salaries, bonus payments and some other payments, such as stocks, invention or anniversary premiums. In addition to fixed salaries for all middle managers, more than 0.9 of them receive bonus payments while other payments are given to around two-thirds of the managers. We explore the gender-specific role of parental leave on current compensation separately for fixed salaries and bonus payments by applying the same method. Figure 3 shows that the patterns reported above hold very similarly for both components (see Table A in the appendix for corresponding estimation results).

Figure 3: Interaction Plots (Controlled for individual & job-related characteristics) for fixed salaries and bonus payments





One limitation of our data is that we observe parental leave spells only in retrospect and do not have the exact timing of the parental leave spell(s); thus, we cannot disentangle short-term from long-term effects exactly or provide an ex-ante ex-post analysis. We first address this issue by running separate estimations on total compensation for younger and more mature employees, performing a median-split at 25 years of experience. The results indicate that parental leave gaps are even more pronounced for those employees with more experience, i.e. older employees. Yet we still observe the same pattern of gender differences in the relation between parental leave spells and compensation for both the younger and the older group. As

for the whole group, female workers seem to face lower earnings disadvantages compared to their male counterparts (see Figure B and Table B in the appendix). The lack of statistical significance of the interaction effect for the older group is explained by the fact that male workers hardly ever took parental leave during their early careers in previous decades; thus, the general link between parental leave and compensation is almost completely represented by women.

Second, we want to check whether individuals who have taken spells of leave are able to catch up or whether pay gaps even increase over time. Therefore, we compare the relative wage increase based on information about remuneration that was provided by the survey participants in two consecutive years (n=8,244 observations). Employees without interruptions face an average increase in total compensation amounting to +0.041 (n= 7.391). The average increase of those employees who have taken parental leave spells in the past is slightly higher at +0.056 (n= 853). Interestingly, individuals who have taken leave spells of up to 12 months in total do have even a slightly higher salary adjustment (+0.059), while employees whose leave spells altogether lasted longer than 12 months only receive an increase of +0.024 on average. However, when controlling for individual (and job-related) characteristics, by applying OLS estimations on the wage increases, we do not find considerable differences in wage increases between employees who have taken parental leave spells and those who have not (see Table 6). Coefficients are rather negative for males, but not for females, though (see Table C in the appendix).

Table 6: Pooled OLS regressions on relative increases in total compensation

	(1)		**(2)**	
Parental leave (base: No leave)				
1-2 Months	-0.00526	(0.008)	-0.00501	(0.008)
3-12 Months	0.00422	(0.007)	0.00689	(0.007)
>12 Months	-0.0161	(0.011)	-0.0157	(0.012)
Female (1=yes)	0.00170	(0.005)	0.00379	(0.005)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	0.132***	(0.017)	0.122***	(0.018)
Observations	8,244		8,244	
Adj. R-squared	0.025		0.030	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

We also made several robustness checks. One may argue that parental leave restricts the likelihood of receiving top compensation. Gender-specific quantile estimations (available upon request), however, show that parental leave pay gaps are quite stable across the distributions. If at all, they are slightly more pronounced at the bottom of the distribution for female workers, while being more pronounced at the top for male workers. As stated above, the group of employees without career interruptions include those without children and parents who choose not to take parental leave. We have, therefore, re-estimated the specifications used for Table 5 for the sub-sample of employees with children. We find our results to be robust, albeit the pay gaps compared to employees without parental leave spells and the corresponding interaction terms with gender are even somewhat larger than previously described.[5] This again hints at a positive signal of career commitment of those parents without interruptions, in particular for women (see Table D in the appendix). So far, we have not controlled for past part-time employment in our estimations. Our data shows that individuals with parental leave spells worked more often in part-time during their careers (0.175) compared to those without parental leave spells (0.011), though. On average, they also report having worked for 4.8 years on a part-time basis, while those employees with continuous careers report only 2.8 years of reduced working time. These differences are driven by past part-time work of females. Taking information about former part-time employment into account (see Table E in the appendix), results with regard to the interaction effects of gender and parental leave are reinforced and even greater in size.

5. Conclusion

We find evidence of an important role of gender for the relation between previous parental leaves and current remuneration. Men face much more severe interruption pay gaps than females do. This even turns around gender pay gaps among employees with parental leave. Although the proportion of fathers taking parental leave has increased in recent years, its incidence and duration are still dominated by mothers. Our results cast doubt on a full alignment in the near future if interruption pay gaps continue to be relevant for fathers in particular. Assuming that these differences are not completely caused by differences in preferences between males and females, this leads to a dilemma in the sense that female-dominated parental leave and more pronounced interruption pay gaps for males reinforce one another.

There may already be approaches at the firm level and the level of society to overcome this problem. Firms may have their own incentive of promoting workplace practices that support parental leave for males as well as females. Although empirical results hint at a positive relationship between family-friendly practices and

[5] Considering only those employees with no leave, we observe parents to have slightly higher earnings compared to workers with no children, albeit the estimate for parenthood is only significant among males (results are available upon request).

productivity (e.g. Konrad & Mangel 2000), Bloom et al. (2011) show that this relation is mainly driven by the quality of other implemented management practices.

One possibility at the societal level, in addition to subsidized early child care (Baker et al. 2008), is to provide parental leave benefits for up to a maximum of *n* months of allowances, where each parent has the opportunity to make use of a maximum of *n/2* months without the possibility of transferring unused leave entitlements to the other parent. In consequence, a gender alignment in parental leave would be incentivized more intensely, which may also diminish gender-specific expectations and social norms of firms, gender pay gaps and gender-specific interruption pay gaps in the future. The implementation of a comparable parental leave allowance system in Iceland has shown expected effects on the participation of fathers in child care (Gíslason & Símonardóttir 2018). Various measures have been introduced in order to encourage fathers to use parental leave in Sweden. While the introduction of one month reserved specifically for each parent under a "use it or lose it" system in 1995 and its stepwise extension to three months nowadays have increased the proportion of fathers taking parental leave, an additional introduction of tax credits for gender equality have not affected behavior that much (Duvander & Johansson 2012). Unterhofer & Wrohlich (2017) argue that next to the direct effects of such incentives in terms of individual decisions, also indirect, more long-term effects can be prevalent, including slowly changing social norms and attitudes towards gender roles within society. Future work may try to integrate the different facets of the topic of the individual and the household level with the corporate and the societal level.

References

Acker, Joan (1990): Hierarchies, Jobs, Bodies: A Theory of Gendered Organizations. In *Gender & Society* 4 (2), pp. 139–158.

Albanesi, Stefania; Olivetti, Claudia (2009): Home production, market production and the gender wage gap: Incentives and expectations. In *Review of Economic Dynamics* 12 (1), pp. 80–107.

Albiston, Catherine (2007): Institutional Perspectives on Law, Work, and Family. In *Annual Review of Law and Social Science* 3 (1), pp. 397–426.

Albrecht, James W.; Edin, Per-Anders; Sundström, Marianne; Vroman, Susan B. (1999): Career Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data. In *The Journal of Human Resources* 34 (2), pp. 294–311.

Anderson, Deborah J.; Binder, Melissa; Krause, Kate (2003): The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility. In *Industrial and Labor Relations Review* 56 (2), pp. 273–294.

Beblo, Miriam; Wolf, Elke (2002): Die Folgekosten von Erwerbsunterbrechungen. In *Vierteljahrshefte zur Wirtschaftsforschung* 71 (1), pp. 83–94.

Becker, Gary S. (1964): Human capital: A theoretical and empirical analysis, with special reference to education. New York: NBER Books.

Bloom, Nick; Kretschmer, Tobias; van Reenen, John (2011): Are family-friendly workplace practices a valuable firm resource? In *Strategic Management Journal* 32 (4), pp. 343–367.

BMFSFJ (2016): Bilanz 10 Jahre Elterngeld. Edited by Bundesministerium für Familie, Senioren, Frauen und Jugend. Berlin.

Budig, Michelle J.; Hodges, Melissa J. (2010): Differences in Disadvantage: Variation in the Motherhood Penalty across White Women's Earnings Distribution. In *American Sociological Review* 75 (5), pp. 705–728.

Buligescu, Bianca; Crombrugghe, Denis; Menteşoğlu, Gülçin; Montizaan, Raymond (2009): Panel Estimates of the Wage Penalty for Maternal Leave. In *Oxford Economic Papers* 61, i35-i55.

Bundesarbeitgeberverband Chemie e.V. (Ed.) (2013): BAVC-Erhebung: Führungskräfte in der Chemie-Branche (BAVC-Informationsbrief 10/2013). Available online at https://www.bavc.de/bavc/mediendb.nsf/gfx/A7F99E4D9E5A7946C1257C0F003EB28E/$file/ib_10_13_F%C3%BChrungskr%C3%A4fte.pdf.

Bünning, Mareike (2015): What Happens after the ‘Daddy Months’? Fathers’ Involvement in Paid Work, Childcare, and Housework after Taking Parental Leave in Germany. In *European Sociological Review* 31 (6), pp. 738–748.

Cohen, Jeffrey R.; Single, Louise E. (2001): An Examination of the Perceived Impact of Flexible Work Arrangements on Professional Opportunities in Public Accounting. In *Journal of Business Ethics* 32 (4), pp. 317–328.

Coltrane, Scott; Miller, Elizabeth C.; DeHaan, Tracy; Stewart, Lauren (2013): Fathers and the Flexibility Stigma. In *Journal of Social Issues* 69 (2), pp. 279–302.

Corcoran, Mary (1979): Work experience, labor force withdrawals and women's wages: Empirical results using the 1976 Panel Study of Income Dynamics. In Cynthia B. Lloyd, Emily S. Andrews, Curtis L. Gilroy (Eds.): Women in the labor market. New York: Columbia University Press.

Duvander, Ann-Zofie; Johansson, Mats (2012): What are the effects of reforms promoting fathers’ parental leave use? In *Journal of European Social Policy* 22 (3), pp. 319–330.

Eagly, Alice; Steffen, Valerie (1984): Gender Stereotypes Stem from the Distribution of Women and Men in Social Roles. In *Journal of Personality and Social Psychology* 46, pp. 735–754.

Eagly, Alice Hendrickson (1987): Sex differences in social behavior. A social-role interpretation. Hillsdale, N.J.: Lawrence Erlbaum Associates, Inc. (John M. MacEachran Memorial Lecture series, 1985). Available online at http://www.loc.gov/catdir/enhancements/fy0742/86032921-d.html.

Edin, Per-Anders; Gustavsson, Magnus (2008): Time out of work and skill depreciation. In *Industrial & Labor Relations Review* 61 (2), pp. 163–180.

Ekberg, John; Eriksson, Rickard; Friebel, Guido (2013): Parental leave — A policy evaluation of the Swedish “Daddy-Month” reform. In *Journal of Public Economics* 97, pp. 131–143.

Evertsson, Marie (2016): Parental leave and careers: Women’s and men’s wages after parental leave in Sweden. In *Advances in Life Course Research* 29, pp. 26–40.

Gangl, Markus; Ziefle, Andrea (2009): Motherhood, labor force behavior, and women’s careers: An empirical assessment of the wage penalty for motherhood in britain, germany, and the united states. In *Demography* 46 (2), pp. 341–369.

Gerst, Benedikt; Grund, Christian (2019): Career interruptions and current remuneration. In *International Journal of Manpower* 40 (5), pp. 850–878.

Gíslason, Ingólfur; Símonardóttir, Sunna (2018): Mothering and Gender Equality in Iceland: Irreconcilable Opposites? In *Social Policy and Society* 17, pp. 1–10.

Görlich, Dennis; Grip, Andries de (2009): Human Capital Depreciation during Hometime. In *Oxford Economic Papers* 61, i98-i121.

Grip, Andries de; van Loo, Jasper (2002): The economics of skills obsolescence: A review. In A. de Grip, Jasper van Loo, Ken Mayhew (Eds.): The economics of skills obsolescence. Theoretical innovations and empirical applications, vol. 21. 1st ed. Amsterdam, Boston: JAI (Research in Labor Economics, v. 21), pp. 1–26.

Grund, Christian (2015): Gender pay gaps among highly educated professionals — Compensation components do matter. In *Labour Economics* 34 (C), pp. 118–126.

Judiesch, Michael K.; Lyness, Karen S. (1999): Left behind? The Impact of Leaves of Absence on Managers' Career Success. In *The Academy of Management Journal* 42 (6), pp. 641–651.

Konrad, Alison M.; Mangel, Robert (2000): The impact of work-life programs on firm productivity. In *Strategic Management Journal* 21 (12), pp. 1225–1237.

Kunze, Astrid (2002): The Timing of Careers and Human Capital Depreciation IZA Discussion Paper (509).

Lott, Yvonne; Eulgem, Lorena (2019): Lohnnachteile durch Mutterschaft. Helfen flexible Arbeitszeiten? Wirtschafts- und Sozialwissenschaftliches Institut (WSI) der Hans-Böckler-Stiftung. Düsseldorf (WSI Report, 49).

Mincer, Jacob (1958): Investment in Human Capital and Personal Income Distribution. In *Journal of Political Economy* 66 (4), pp. 281–302.

Mincer, Jacob; Ofek, Haim (1982): Interrupted work careers: Depreciation and restoration of human capital. In *Journal of Human Resources* 17 (1), pp. 3–24.

Mincer, Jacob; Polachek, Solomon (1974): Family investments in human capital: earnings of women. In *Journal of Political Economy* 82 (2), pp. 76–108.

Neuman, Shoshana; Weiss, Avi (1995): On the effects of schooling vintage on experience-earnings profiles: Theory and evidence. In *European Economic Review* 39 (5), pp. 943–955.

Persson, Petra; Rossin-Slater, Maya (2019): When Dad Can Stay Home: Fathers' Workplace Flexibility and Maternal Health. IZA Institute of Labor Economics. Bonn, Germany (Discussion Paper Series, 12386).

Rege, Mari; Solli, Ingeborg F. (2013): The Impact of Paternity Leave on Fathers' Future Earnings. In *Demography* 50 (6), pp. 2255–2277.

Rudman, Laurie A.; Mescher, Kris (2013): Penalizing Men Who Request a Family Leave: Is Flexibility Stigma a Femininity Stigma? In *Journal of Social Issues* 69 (2), pp. 322–340.

Rudman, Laurie A.; Phelan, Julie E. (2008): Backlash effects for disconfirming gender stereotypes in organizations. In *Research in Organizational Behavior* 28, pp. 61–79.

Schmelzer, Paul; Kurz, Karin; Schulze, Kerstin (2015): Einkommensnachteile von Müttern im Vergleich zu kinderlosen Frauen in Deutschland. In *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 67 (4), pp. 737–762.

Schober, Pia S. (2014): Parental Leave and Domestic Work of Mothers and Fathers. A Longitudinal Study of Two Reforms in West Germany. In *Journal of Social Policy* 43 (2), pp. 351–372.

Spivey, Christy (2005): Time off at what price? The effects of career interruptions on earnings. In *Industrial and Labor Relations Review* 59 (1), pp. 119–140.

Stafford, Frank P.; Sundström, Marianne (1996): Time Out for Childcare. Signalling and Earnings Rebound Effects for Men and Women. In *Labour* 10 (3), pp. 609–629.

Statistics Sweden (2018): Women and men in Sweden 2018. Edited by Statistics Sweden, Population and Economic Welfare. Örebro.

Statistisches Bundesamt (2019): Statistik zum Elterngeld - Leistungsbezüge - 2018. Wiesbaden.

Unterhofer, Ulrike; Wrohlich, Katharina (2017): Fathers, Parental Leave and Gender Norms. IZA – Institute of Labor Economics. Bonn, Germany (IZA Discussion Paper, 10712).

VCI (2017): Die deutsche chemische Industrie 2030 - Update 2015/2016. Verband der Chemischen Industrie e.V. Frankfurt am Main.

VCI (2019): Anzahl der betrieblich Beschäftigten in der deutschen chemisch-pharmazeutischen Industrie in den Jahren 1991 bis 2018. Verband der Chemischen Industrie e.V. Available online at https://de.statista.com/statistik/daten/studie/36287/umfrage/anzahl-der-beschaeftigten-in-der-chemieindustrie-seit-1991/, checked on 9/22/2019.

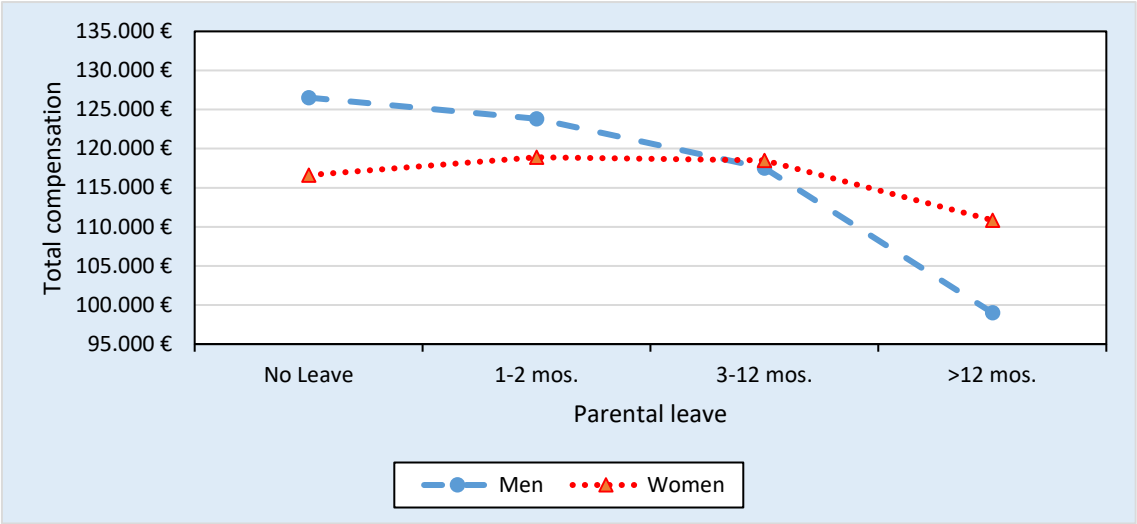
Wharton, Amy S.; Chivers, Sarah; Blair-Loy, Mary (2008): Use of Formal and Informal Work–Family Policies on the Digital Assembly Line. In *Work and Occupations* 35 (3), pp. 327–350.

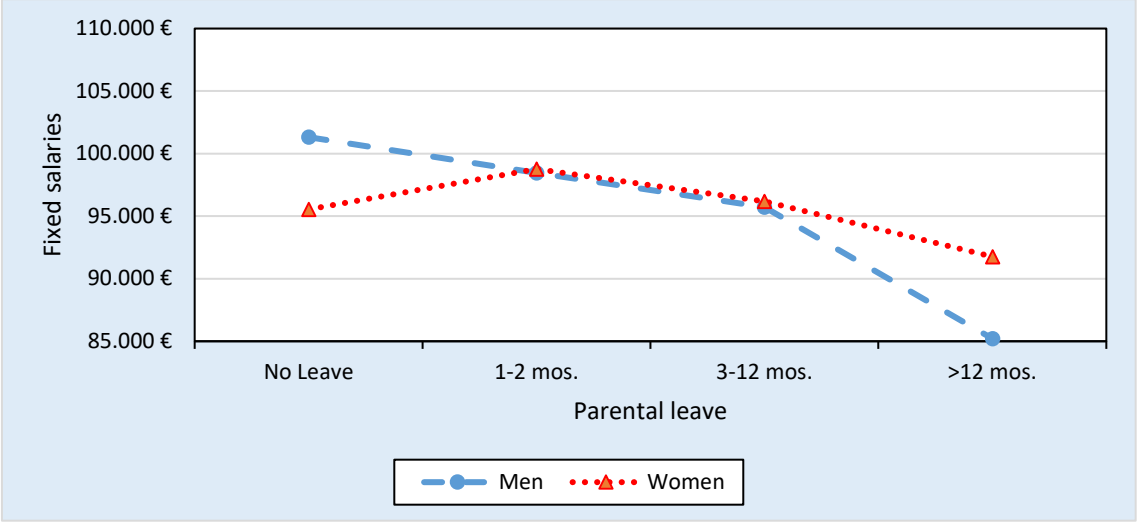
Williams, J. (2001): Unbending Gender: Why Family and Work Conflict and What To Do About It: Oxford University Press, USA.

World Economic Forum (Ed.) (2018): The Global Gender Gap Report 2018. Geneva.

Appendix

Figure A: Interaction Plots (Controlled for individual-related characteristics only)





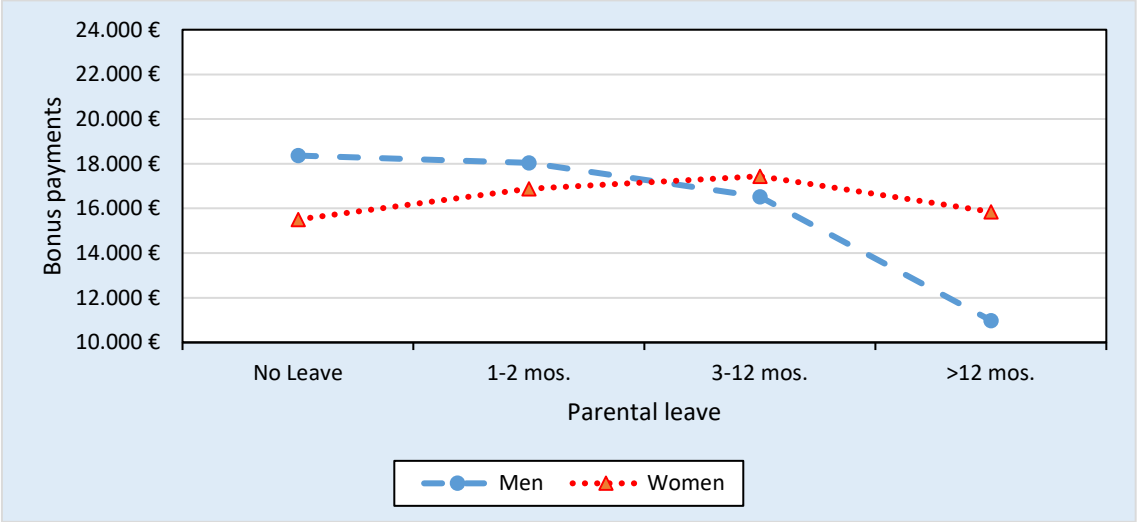
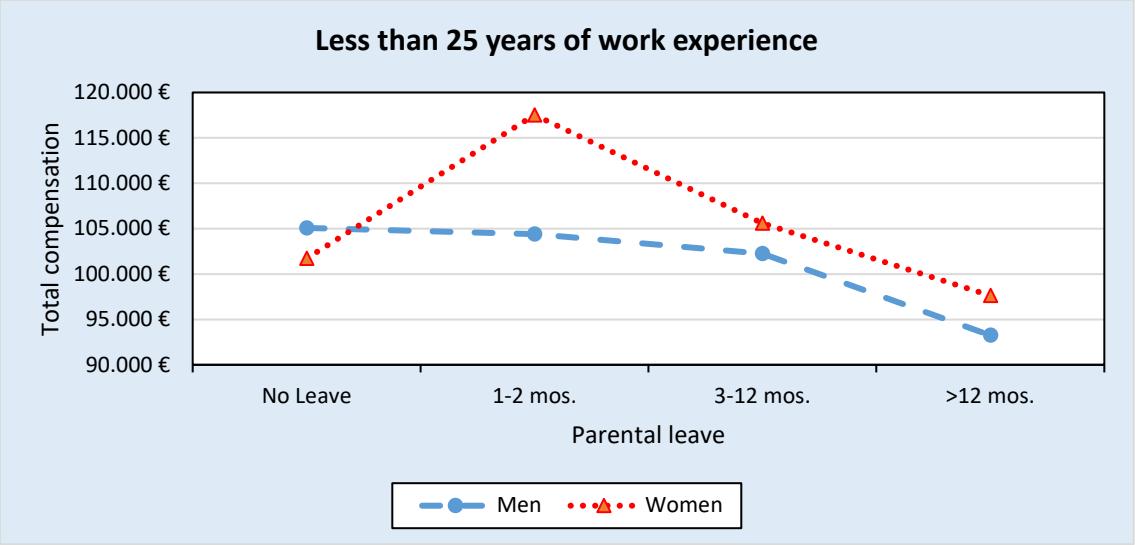


Table A: Pooled OLS regressions on compensation components

Log fixed salaries	**(1)**		**(2)**	
Parental leave (base: No leave)				
1-2 Months	-0.0286***	(0.008)	-0.0198***	(0.006)
3-12 Months	-0.0567***	(0.017)	-0.0274**	(0.011)
>12 Months	-0.173***	(0.017)	-0.0953***	(0.025)
Female (1=yes)	-0.0585***	(0.006)	-0.0283***	(0.005)
1-2 Months x Female	0.0616	(0.082)	0.106*	(0.056)
3-12 Months x Female	0.0631***	(0.021)	0.0343**	(0.014)
>12 Months x Female	0.133***	(0.023)	0.0402	(0.028)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	10.71***	(0.041)	10.59***	(0.067)
Observations	17,141		17,141	
Adj. R-squared	0.516		0.663	
Log bonus payments	**(3)**		**(4)**	
Parental leave (base: No leave)				
1-2 Months	-0.0179	(0.034)	0.0162	(0.030)
3-12 Months	-0.106	(0.070)	-0.00873	(0.049)
>12 Months	-0.514**	(0.202)	-0.240**	(0.120)
Female (1=yes)	-0.169***	(0.035)	-0.0754**	(0.035)
1-2 Months x Female	0.103	(0.182)	0.274*	(0.144)
3-12 Months x Female	0.223**	(0.097)	0.108	(0.074)
>12 Months x Female	0.535**	(0.210)	0.203	(0.141)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	7.971***	(0.158)	7.473***	(0.286)
Observations	15,802		15,802	
Adj. R-squared	0.218		0.413	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

Figure B: Interaction Plots, Median-Split at 25 years of work experience
(Controlled for individual-related characteristics only)



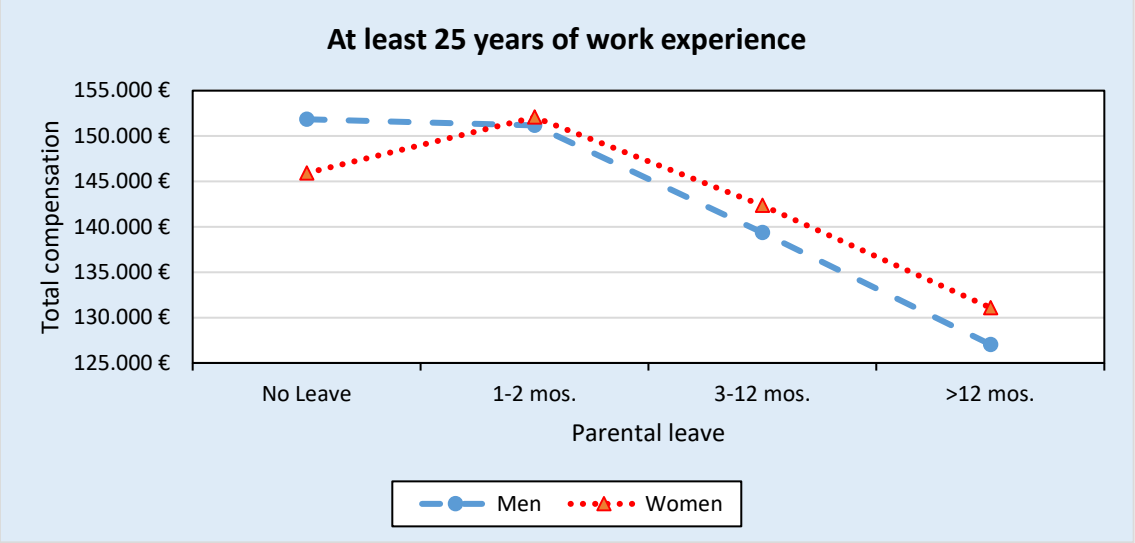


Table B: Median split at 25 years of work experience

Lot total compensation	**<25 years of work experience**		**>=25 years of work experience**	
Parental leave (base: No leave)				
1-2 Months	-0.0110	(0.011)	-0.0565	(0.071)
3-12 Months	-0.0610**	(0.024)	-0.129***	(0.041)
>12 Months	-0.204***	(0.047)	-0.323***	(0.058)
Female (1=yes)	-0.0662***	(0.010)	-0.108***	(0.032)
1-2 Months x Female	0.146	(0.110)	-0.0943	(0.110)
3-12 Months x Female	0.0981***	(0.031)	0.118**	(0.050)
>12 Months x Female	0.184***	(0.061)	0.252***	(0.081)
Individual characteristics		Yes		Yes
Job characteristics		**No**		**No**
Year dummies		Yes		Yes
Intercept	10.75***	(0.054)	10.74***	(0.429)
Observations		8.865		8.276
Adj. R-squared		0.487		0.063

Lot total compensation	**<25 years of work experience**		**>=25 years of work experience**	
Parental leave (base: No leave)				
1-2 Months	-0.00625	(0.007)	-0.00441	(0.053)
3-12 Months	-0.0271*	(0.016)	-0.0857*	(0.047)
>12 Months	-0.119***	(0.018)	-0.178***	(0.042)
Female (1=yes)	-0.0325***	(0.005)	-0.0397	(0.025)
1-2 Months x Female	0.151***	(0.046)	0.0456	(0.110)
3-12 Months x Female	0.0648***	(0.019)	0.0610	(0.051)
>12 Months x Female	0.0784**	(0.032)	0.0711	(0.044)
Individual characteristics		Yes		Yes
Job characteristics		**Yes**		**Yes**
Year dummies		Yes		Yes
Intercept	10.46***	(0.094)	10.63***	(0.208)
Observations		8.865		8.276
Adj. R-squared		0.661		0.447

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

Table C: Pooled OLS regressions on relative increases in total compensation

	(1)		(2)	
Parental leave (base: No leave)				
1-2 Months	-0.00654	(0.008)	-0.00686	(0.009)
3-12 Months	-0.0109*	(0.006)	-0.00838	(0.006)
>12 Months	-0.0238	(0.024)	-0.0156	(0.027)
Female (1=yes)	-0.00549	(0.005)	-0.00350	(0.006)
1-2 Months x Female	-0.00382	(0.022)	0.00735	(0.024)
3-12 Months x Female	0.0574***	(0.018)	0.0581***	(0.018)
>12 Months x Female	0.0169	(0.027)	0.00622	(0.029)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	1.135***	(0.017)	1.126***	(0.018)
Observations	8,244		8,244	
Adj. R-squared	0.026		0.031	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

Table D: Re-estimations of table 5 for a subsample of employees with children

	(1)		(2)	
Parental leave (base: No leave)				
1-2 Months	-0.0596***	(0.012)	-0.0307***	(0.009)
3-12 Months	-0.109***	(0.020)	-0.0459***	(0.011)
>12 Months	-0.263***	(0.048)	-0.144***	(0.022)
Female (1=yes)	-0.0594**	(0.028)	-0.0417**	(0.021)
1-2 Months x Female	0.0486	(0.084)	0.132**	(0.055)
3-12 Months x Female	0.0836**	(0.041)	0.0587**	(0.029)
>12 Months x Female	0.163***	(0.060)	0.0618*	(0.037)
Individual characteristics	Yes		Yes	
Job characteristics	**No**		**Yes**	
Year dummies	Yes		Yes	
Intercept	10.78***	(0.036)	10.59***	(0.102)
Observations	10,578		10,578	
Adj. R-squared	0.358		0.608	

Notes: Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.

Table E: Re-estimations of Table 5 including past part-time employment

	(1)		(2)	
Parental leave (base: No leave)				
1-2 Months	-0.0207**	(0.010)	-0.00937	(0.007)
3-12 Months	-0.0729***	(0.024)	-0.0290**	(0.014)
>12 Months	-0.251***	(0.042)	-0.131***	(0.022)
Female (1=yes)	-0.0803***	(0.010)	-0.0348***	(0.008)
1-2 Months x Female	0.0543	(0.104)	0.112	(0.071)
3-12 Months x Female	0.102***	(0.025)	0.0509***	(0.016)
>12 Months x Female	0.233***	(0.050)	0.0754***	(0.024)
Past part-time employment (years)	-0.00759*	(0.004)	-0.00448*	(0.003)
Individual characteristics		Yes		Yes
Job characteristics		**No**		**Yes**
Year dummies		Yes		Yes
Intercept	10.73***	(0.050)	10.52***	(0.096)
Observations		17,139[#]		17,139[#]
Adj. R-squared		0.464		0.662

Notes: #: We excluded two observations of males, who report to have been working part-time during their careers, but do not report its duration.
Cluster-robust standard errors in parentheses; significance level: * p < 0.10. ** p < 0.05. *** p < 0.01.
Individual characteristics: Experience, experience squared, field of study, doctoral degree.
Job characteristics: firm tenure, level of hierarchy, functional area, firm size, actual weekly working hours.