Returning to Work – Mothers' Willingness to Pay for Amenities*

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Abstract

Are working mothers willing to give up part of their wage in order to avoid adverse job features, such as hazards, physical strains or inflexible working schedules? This study is the first to directly estimate mothers' marginal willingness to pay (MWP) to reduce these disamenities. The identification strategy relies on German maternal leave length data. Among OECD countries, Germany entitles mothers with the most generous parental leave (36 months). The key aspect of the maternal leave framework is that mothers can decide whether and when to return to their guaranteed job. Thus, in contrast to previous studies that analyze the job search of employed workers, this framework allows us to overcome the limitations of modeling an explicit wage/disamenity offer process. A theoretical model of the leave length decision is derived from a random utility approach. Using data from the German Socio-Economic Panel and the Qualification and Career Survey, the model is estimated by a discrete duration method that assumes a logistic hazard function. The MWP to avoid disamenities can be inferred through the estimated elasticities of the leave length with respect to the disamenities and the wage. The results provide evidence that mothers are willing to sacrifice a significant fraction of their wage to reduce hazardous working conditions (25% for a decrease of one standard deviation) and to enjoy a working schedule compatible with available daycare (more than 50%).

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1. Introduction

The balance between work and family is one of the main issues on the current political agenda of the OECD countries. In spite of recent achievements in the compatibility of family and work, mothers still encounter difficulties in some countries to participate in the labor market. Germany, along with Spain, Greece and Italy, has the lowest labor force participation rate (LFP) among mothers: 44.3% compared to more than 60% in other OECD countries such as Austria, Belgium, France, Portugal, the Netherlands, the UK and the US.[1] In Germany, this low share of working mothers contrasts with the high participation rate among childless women; a difference that is less pronounced only at higher ages (see figure 1). Career interruptions, as is generally known, lead to a depreciation in human capital and hence to a loss in long-term income and career opportunities. Therefore, an explicit goal of family policy, as set out by the European Council in 2000, is to increase women's, and in particular mothers' LFP. For this purpose, it is crucial to understand the disincentives that mothers face when deciding whether and when to return to work after childbirth. It is indispensable to know how much mothers are deterred by certain adverse job features, so-called disamenities, and which fraction of their wage they are willing to sacrifice to avoid them; in other words, this research seeks to estimate mothers' marginal willingness to pay (MWP) to reduce certain job-related disamenities.

Previous studies about the MWP to diminish disamenities focus mainly on young males. The distribution of men and women across occupations with respect to the level of disamenities shows, however, sharp differences. Ranking jobs according to the level of hazardous conditions, where the jobs with the highest level of hazards are ranked one and those with the lowest level on place ten, reveals that women are, relative to men, over-represented in jobs that expose them to fewer inconveniences and health risks (see figure 2).[2]

[1] Numbers are taken from the and http://unstats.un.org/unsd/demographic/products/indwm
[2] A similar distribution can be observed for the level of workload and inflexible working schedules.

At the moment of having a child, this crowding is even more pronounced. This empirical evidence suggests that mothers with young children differ from men and women without or with older children in their MWP to avoid disamenities. Thus, in order to design an efficient family policy aimed at increasing mothers' LFP, it is essential to investigates mothers' MWP.

There are only a few studies about the averseness of women, in particular mothers, towards disamenities. Some empirical evidence has shown that a low risk of injuries, job protection and employment stability are relevant job features for mothers, in particular when deciding whether and when to return to work after childbirth (see Bratti, del Bono and Vuri (2004), De Leire and Levy (2004)). It seems also that mothers tend to work fewer hours and under more favorable working conditions (see Felfe (2007)). These studies, however, investigate only few job aspects and do not measure mothers' aversion towards disamenities.

To my knowledge, this study is the first to provide direct estimates of mothers' MWP to reduce disamenities. The identification strategy relies on German maternal leave length data. Among OECD countries, Germany belongs to the ones offering the longest parental leave; since 1992 German working mothers are entitled to a leave of 36 months.[3] During this period mothers enjoy a job guarantee and hence, are free to decide whether and when to return to their jobs.[4] The remarkable length of this period enables us to observe sufficient variation in the chosen duration of maternal leave. Using the estimated elasticities of the leave length with on the one hand respect to wages and on the other hand to disamenities I can infer mothers' MWP to moderate disamenities.

The specific framework, maternity leave, allows me to overcome some methodological limitations of previous studies that estimated the MWP to avoid disamenities.

[3] Germany, Austria, Finland and France, provide the most generous parental leave system in the OECD. The US, for instance, entitles recent mothers only to a leave of 12 weeks. For a comparison see: http://unstats.un.org/unsd/demographic/products/indwm/.

[4] A woman has to inform her employer six weeks in advance of when she wants to take maternal leave and how long she wants to go on leave (she has to declare her leave intention for the first 24 months at least).

Earlier research focused on the job search of employed workers.[5] One shortcoming of this approach is that we cannot observe potential job offers. In other words, the studies based on job search only estimate the impact of current job features on the job tenure, but fall short of separating these effects from those of wage and disamenities of latent job offers. The advantage of the maternal leave setting is that we can examine the features of all relevant options mothers face while on leave: staying at home or returning to their guaranteed job during their legally granted leave period of 36 months. One may argue that mothers search for a new job while being on leave, and hence we may likewise fail to observe possible outside job offers. The data shows, however, that mothers rarely change jobs during maternal leave (only 2%). The job guarantee during the maternal leave period is thus the key element of our strategy to estimate the MWP.

A further reason for choosing Germany, besides its generous parental leave system, is the availability of two excellent datasets, the German Socio-Economic Panel (GSOEP, 1984-2005) and the Qualification and Career Survey (QCS, 1998/99). The GSOEP is a panel dataset, providing yearly data on personal and occupational attributes, and monthly data on activities such as working, being on leave, and so forth. Its longitudinal nature permits the construction of maternal leave spells and the determination of the detailed occupation previous to giving birth. The QCS contains a wide range of occupations and a great variety of disamenities, from which it is possible to create objective disamenities for the different occupations. Combining these two datasets via the occupation und using the years 1992-2005, I can estimate the impact of wage and disamenities on maternal leave length and hence, infer the parameter of interest. The results show that mothers are willing to accept significant wage losses to reduce hazardous working conditions and to enjoy a working schedule compatible with available childcare.

[5] See Gronberg and Reed (1984), which is explained in more detail in Section 2.

This study, thus, provides a first insight into mothers' MWP to reduce disamenities, whose understanding is essential for an effective family policy design aimed at increasing mothers' LFP. It furthermore contributes to improving the measurement of the MWP to diminish disamenities, using the special setting of maternal leave, in which all relevant alternatives available to mothers eligible for parental leave are observable.

The paper is structured in the following way. Section 2 briefly reviews previous literature, while Section 3 introduces the German leave legislation. The theoretical and empirical model is developed in Section 4. Section 5 describes the data and Section 6 reports the detailed results of the basic model and additional specifications. Section 7 concludes, with suggestions for an efficient policy design targeted at an increase of maternal LFP.

2. Previous Compensating Wage Differential Studies

The idea of compensating disadvantages with advantages of a job was first suggested by Adam Smith in his seminal work *An inquiry into the Nature and Causes of the Wealth of Nations, Book I.* Rosen (1986) formalized this idea and established the theory of compensating wage differentials (CWD), which postulates that jobs are bundles of wages and disamenities and that a loss in one dimension has to be compensated by a gain in the other. Many researchers have tried to test the hypothesis of CWD on the labor market and to estimate workers' MWP to avoid disamenities, but so far the results have suffered from several limitations.

A substantial literature has estimated hedonic wage regression models to infer whether or not labor markets place a wage premium on jobs that involve disamenities. A hedonic wage regression is a Mincer wage regression including disamenities as further control variables. Early studies using hedonic wage regressions provided mixed results.[6] One

[6] See Lucas (1977) for an early application of hedonic wage regressions in the US. In Germany, Lorenz and Wagner (1989) find that job requirements of physical effort affect wages negatively, contrary to the predictions

critique of this first approach to estimate CWD has been its failure to control properly for workers' heterogeneity. Brown (1981) overcomes this criticism using panel data and applying a first difference approach, but he finds no systematic effect of disamenities on wages in the US. Duncan and Holmlund (1983), using Swedish panel data and estimating a fixed effects model, find a significant effect only for stress and hazards on wages.

Hwang, Mortensen and Reed (1998) (henceforth HMR) provide the theoretical proof why hedonic wage regressions, even when considering heterogeneity between workers, deliver inconsistent results. The standard hedonic wage regression is a static model which assumes that workers make a once and for all decision when accepting a job. In reality, though, the labor market is considerably dynamic; workers search for better jobs, and firms for more productive workers, such that there is a constant turnover. This might give an incentive for firms to create jobs offering attractive wage-disamenity bundles. Firms, on the one hand, may differ in their cost efficiency of avoiding disamenities. Thus, a more cost efficient firm might be able to offer jobs with both a higher salary and less disamenities. Workers, on the other hand, might not be perfectly aware or informed about the differences in the wage-disamenity bundles offered by different jobs. Hedonic wage regressions, conversely, neither take into account search frictions nor labor market imperfections; thus, the estimated premium for disamenities may be underestimated or even wrongly signed.

A new generation of research on CWD has focused on incorporating job search behavior when studying the trade-off between wage and disamenities. One of the first studies of this generation is the one by Gronberg and Reed (1994, GR) who do not focus on estimating the premium paid to compensate for disamenities, expressed by the CWD, but rather workers' MWP to avoid disamenities. They use data on job tenure and propose that tenure in jobs with higher wages or less disamenities is expected to be longer if quits are voluntary. Given this proposition they derive the MWP for disamenities by simply taking the

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of the theory. For the French case, Daniel and Sofer (1998) find mixed evidence for compensating differentials associated with environmental conditions on the job, such as noise, physical effort, or exposure to vibration.

ratio of the elasticity of job tenure with respect to a certain disamenity over the elasticity with respect to the wage. One limitation of their study, considered not negligible, is the failure to incorporate an explicit wage/disamenity offer process, which would permit them to isolate the effects of the current wage and disamenities from those of wage and disamenities of subsequent jobs.[7] The present study suggests an alternative framework that enables us to overcome this limitation. The focus is on maternal leave and thus on the time mothers spend out of the labor force after childbirth. In Germany, working mothers are entitled to a leave of 36 months. During this period mothers can decide whether and when to return to their guaranteed job. Mothers view this job guarantee as insurance and hence rarely chance job after maternal leave (only 2% do so). Thus, in contrast to the framework used by GR (1994), this setting allows us to examine the features of all relevant alternatives mothers face while on leave: staying at home or returning to their guaranteed job at any of the 36 months. The job guarantee during the maternal leave period is thus the key element to estimate the MWP more accurately.

In the following section, I provide an overview of the maternity leave legislation in Germany which serves as a natural setting that allows for an accurate measurement of mothers' MWP to decrease certain disamenities.

3. Parental Leave Legislation

Germany is one of the OECD countries with the most generous parental leave system. It consists of three parts: maternity protection, protected parental leave and parental benefits.

The first, maternity protection, regulated by the maternity protection law (1979), refers to a period of 6 weeks before and 8 weeks after birth during which mothers must not

[7] One recent study by Bonhomme and Jolivet (2005) explicitly models the wage/ amenity offer process. They show that despite weak CWD in cross-sectional data, there is a systematic and significant MWP for amenities such as the type of work or working conditions. A further approach to measure the CWD accurately has been suggested by Villanueva (2007); using only voluntary job changers, he derives bounds on the monetary returns to disamenities in the West German labor market.

work.[8] The second, protected parental leave, allows the mother to choose between staying on leave and returning to work during a certain period after giving birth.[9] Since the maternal leave is the true period during which a mother is free to decide about her participation in the labor market, the present study focuses on this period.

The Federal Law of Parental Leave and Parental Benefit (henceforth LPL) was introduced in 1986. It allows a woman to take some extra months off beyond the maternity protection period[10], while keeping the option to return to her former job. This means that the employer has to guarantee her a position comparable to her former one. A mother is eligible for parental leave if she has worked at least six months in the same job when giving birth. As we can see in table a, the parental leave has been subsequently extended from a length of 10 months at the time of its introduction in 1986 to a length of 36 months from 1992 onwards.

Year	**Parental Leave**	**Benefit**
1986	10 months	10 months (300Euros)
1988	12 months	12 months (300Euros)
1989	15 months	15 months (300Euros)
1990	18 months	18 months (300Euros)
1992	36 months	24 months (300Euros)
2001	36 months	12months(450€)/24months (300€)

Table a: Introduction and reforms of the Federal Law of Parental Leave and Parental Benefit

The LPL also regulates the maternity benefits, the third pillar of the maternity leave legislation. The government pays the benefit conditional on the mother taking care of her child; in other words, it is paid as long as the mother remains on leave[11]. Until 1992 this benefit was provided for the whole leave period, but from then on only for at most 24 months of the total parental leave period. While before 1994 the parental benefit was independent

[8] During this period, the mother receives her net wage rate. The social security pays 13€ per day, while the employer has to cover the remaining amount.
[9] In theory both parents can qualify for parental leave. In practice however, not even 5% of the fathers currently take parental leave. Thus, I will use the terms parental and maternal leave synonymously.
[10] The time of the maternity protection is included in the maternity leave period, thus a women can legally be on leave up to the maximum time of the maternity leave period without losing the right to return to her job.
[11] A mother is allowed to work at most 19h/week (from 2001 on: 30h/week) to receive the benefit.

from total household income, afterwards it became income dependent. There are two income thresholds, one affects the payment of the benefit in months 1-6 and the other applies to months 7-24.[12,13]An income higher than the respective threshold incurs a gradual reduction of the benefit after month six, but a complete loss during the first six months. Since 2001 a mother has the choice between two different benefit versions; either, as before, she receives a benefit of 300€ for 24 months or a higher benefit of 450€ for a shorter period of 12 months.

Previous studies have shown that the leave legislation, especially the total leave length, affects mothers' decisions of when to return to work[14]. Therefore, in the following analysis I consider only the years 1992 up to 2005, during which the parental leave of 36 months has gone unchanged.[15] The parental leave legislation during this period provides an appealing framework to estimate mothers' MWP to reduce disamenities; the job guarantee that allows a mother to freely decide whether and when to return to her job permits the observation of the relevant alternative possibilities a mother has while on leave.

The empirical analysis stems from an underlying random utility model, which sheds light on the relation between the leave length and the wage on the one hand, and the disamenities on the other hand. The following section describes this model.

4. A Model of Maternal Leave Length

4.1. The basic model

The following model captures the relevant considerations of a mother when deciding about the maternal leave length. The objective is to reveal the impact of the characteristics of a woman's job, such as wage on the one hand and disamenities on the other hand, on the

[12] The total income during the first six months after birth cannot be more than 51000€ for a two parent household and not more than 38000€ for a single parent household.

[13] The total income during the months 7-24 can not exceed an amount of 20500€ for a two parent household and not more than 16500 € for a single parent household.

[14] See Ondrich, J., Spiess, K., Yang Q. and Wagner G. (2003) and Schönberg and Ludsteck (2006).

[15] The total period, including all years during which mothers have the right to some leave (1986-2004) is considered in the robustness checks in section 6.3.

chosen duration of the leave. The decision about the length is implicitly assumed to be the result of rational decision-making, in the sense that choice is influenced by the expected costs and benefits of the alternatives available to the individual.

I assume that a woman derives utility from her own consumption, leisure time and the disamenities implied by her job. Leisure is assumed to be binary; in other words, the woman can only derive utility from leisure when being on leave[16]. At the same time, she only suffers from the disamenities when being back to work. She faces a budget constraint that, besides other income sources such as her husband's income, capital income and so forth, is determined by her own wage and by the maternity benefit. Given her budget constraint, she chooses the leave length in order to maximize her total utility during the guaranteed leave period of 36 months. After month 36, the job guarantee no longer exists, so she would have to start searching for a new job if she would like to participate in the labor market again. Therefore, the model considers only the 36 months of the total leave period during which a mother enjoys a job guarantee and thus, does not need to search for a job to re-join the labor market.

The utility function of a mother i for every single month t of the leave period, before making any assumptions about functional forms, can be expressed as follows:

$$U_{it} = U(C_{it}; tL_{it}; D_{i0}(1 - L_{it}); X_i; \epsilon_{L_{it}it}) \quad (1)$$

where C_{it} is the consumption level of woman i in month t and L_{it} stands for the binary variable leisure, which is 1 if mother i in month t is on leave and 0 if she is back to work. The interaction between the dummy leisure and the months the mother has been already on leave, indicated by the variable t, allows the utility of leisure to change over time. This accounts for the possibility that a mother's time spent at home might be worth less over time, e.g. due to home productivity decreasing with the age of the child (e.g. reduced need of breastfeeding). D_{i0} are the disamenities implied by the guaranteed job. The index 0 of the disamenities refers to the period previous to birth and indicates the disamenities do not change during the leave

[16] In the following I use the terms leisure and leave synonymously.

period. This is due to the fact that a woman on maternal leave has the right to return to her previous job, where she will face the same disamenities as before leave was taken. The interaction of the disamenities with the leave variable indicates that a mother can only experience disutility from disamenities while working. X_i contains both relevant personal and professional characteristics. Finally, $\varepsilon_{Lit,it}$ incorporates the heterogeneity between women, depending on their working status, with respect to the utility they derive from having a baby in the different months after giving birth.

A mother's consumption is determined by her wage if she is back to work, by the benefit if still on leave, and by other income sources. Her budget constraint is as follows[17]:

$$C_{it} = I_{i0} + W_{i0}(1 - L_{it}) + B(I_{i0}; yr; t)L_{it} \qquad (2)$$

where I_{i0} stands for other income sources such as the husband's earnings, capital income etc.[18], W_{i0} is the wage she receives when being back to her guaranteed job and $B(I_{i0};yr;t)$ represents the maternal benefit while being on leave. The benefit, as explained in Section 3, is a function of other income sources I_{i0}, the year yr in which the baby is born, and t, the number of months woman i has been already on leave.

The above stated problem describes a utility maximization problem: conditional on being eligible for maternal leave and given her budget constraint, a mother decides about the duration of her leave in order to maximize her utility over the 36 months period. If working, the utility is assumed to stay constant over the total leave period, since a mother has the right to return to her former job with the same wage and the same disamenities[19]. The utility

[17] Note that I assume no savings.

[18] Other income sources are assumed to be constant over the whole leave period since, first, a mother has to decide about the length of her leave before actually taking it and, second, the benefit is calculated using the average income of the year previous to birth.

[19] The LPL obliges the employer to guarantee the mother a comparable job. There is no wage guarantee. Note, however, that the majority of workers in Germany (ca. 75 %) are covered by collective bargaining agreements. Firms that recognize unions have to pay at least the union wage to its workers. This restricts firms by how much they can reduce wages of returning mothers. In section 6.3, I discuss the assumption that the job features remain the same, present a comparison of pre- and post-leave job features and extend the model by incorporating the possibility of a wage decrease over the time of maternal leave.

gained by staying on leave, however, is dependent on time. On the one hand, this is due to the declining benefit, and on the other hand, due to the decreasing utility of staying at home over time. Thus, once the utility of being on leave is lower than that of working in a given month t, it remains below for the rest of the leave period. The decision of returning to work is thus a once-and-for-all decision; i.e., as soon as the utility of working is greater than or equal to the utility of being on leave, a mother returns to work and stays "forever", i.e. until the end of the total leave period. The hazard rate, which is the probability that a mother i starts working in month t conditional on having been on leave until month t-1, is thus as follows:

$$\begin{aligned} h(work_{it}) &= h(U_{work_{it}} > U_{leave_{it}}) \\ &= h(U(I_{i0} + W_{i0}; 0; D_{i0}; X_i; \epsilon_{0it}) > U(I_{i0} + B(I_{i0}; yr; t); t; 0; X_i; \epsilon_{1it})) \end{aligned} \tag{3}$$

This expression allows some predictions regarding the effect of the variables of interest on mothers' decision to return to work. The first important determinant of the leave decision is the wage a mother is sacrificing while not working: the higher the wage, the higher the opportunity costs of being on maternal leave and thus the higher the probability of returning to work (i.e., the shorter the leave). Assuming that disamenities, the second group of variables of interest, enter negatively into the utility function, a mother is more likely to stay at home when she is exposed to disamenities.

Our final objective is to estimate mothers' MWP to avoid certain disamenities. Following the approach by GR (1994), we can use the elasticities of the hazard to return to work with respect to wage and to a certain disamenity to derive the MWP:

$$MWP = \frac{\delta W_{i0}}{\delta D_{i0}} = \frac{\frac{\delta h(work_{it})}{\delta D_{i0}}}{\frac{\delta h(work_{it})}{\delta W_{i0}}} \tag{4}$$

From here it is straightforward, using the derivatives of the hazard rate with respect to wage and disamenities, to calculate the MWP to reduce a certain disamenity:

$$MWP = \frac{U_D}{U_C} \tag{5}$$

We can see that the MWP is determined by the marginal utility of consumption U_C and the marginal utility of the disamenity U_D. The MWP is inversely related to the marginal utility of consumption; i.e., the higher the marginal increase in utility due to more consumption, the less wage a mother is willing to sacrifice to decrease the amount of a certain disamenity. The opposite is true for disamenities; i.e., the higher the marginal disutility of a disamenity the more wage a mother would give up in order not to suffer from this disamenity.

This model is of course simplistic and ignores the possibility that mothers might search for a new job while being on leave. However, as the data demonstrate, this assumption is far from being unrealistic, since mothers see their job guarantee as a kind of insurance and thus rarely change jobs during maternal leave. [20] This assumption of no job searching is the key stone of the model; in contrast to the approach by GR (1994), the setting of maternal leave allows us to observe the features of all relevant alternatives mothers face when being on leave: staying at home or returning to their previous job, which offers the same wage and the same disamenities as before leave was taken. The model thus offers a framework that allows for an economic interpretation of the parameters, for a better understanding of the problems mothers face when deciding whether and when to return to work after childbirth, and for the derivation of mothers' MWP to diminish certain disamenities.

4.2. Implementation

In order to estimate the model, we need to make some assumptions about the functional form of the utility and the distribution of the residuals. For simplicity, I assume a linear individual utility function, so that equation (1) becomes:

$$U_{it} = \beta C_{it} + \gamma_0(1 - \gamma_1 t)L_{it} + \delta D_{i0}(1 - L_{it}) + \eta_{L_{it}} X_i + \epsilon_{L_{it}it} \qquad (6)$$

[20] In our dataset during the period of maternal leave only 2% of the women change their job when back to work.

where again C_{it} stands for consumption, L_{it} for the binary variable leave, D_{i0} for the disamenities of the guaranteed job, and X_i for both personal and professional characteristics.

Consumption, as given by equation (2), is determined by the total income of a household which consists of the mother's wage W_{i0}, if she is back to work, of the maternal benefit otherwise, plus other income sources I_{i0}. The amount of the maternal benefit varies, as explained in Section 3, with the total available household income (proxied by I_{i0}), the year the child is born and the length of maternal leave. Thus, in order to capture the determinants of the maternal benefit, I include additionally a set of year and month dummies. The coefficient β is expected to be positive since an increase in disposable income is assumed to lead to an increase in utility.

As already introduced in the main model, the effect of leisure on utility is assumed to be not only direct but also to change over time. This is captured by a decomposition of the leisure coefficient: one general coefficient, γ_0, and another one, γ_1, which interacts with the leave length t. In this way, I allow the marginal utility of leisure to decrease over time. This effect is controlled for by a set of month dummies.

The main interest lies in the impact of disamenities on utility. Thus, a great variety of disamenities D_{i0} is included in the regression. The disamenities and the construction of some indices are described in detail in Section 5.2. The coefficient δ is expected to be negative, indicating a decreasing effect of the presence of a disamenity on utility.

Last, utility is assumed to vary with both personal characteristics, such as age, marital status, education, region and the number of children, and with professional features, such as the sector in which the woman works, all captured by X_i. Including the sector shall account for several differences between sectors, especially differences in the rate of human capital depreciation. Allowing the coefficient η to depend on the working status of the mother reflects the possibility that professional and personal features might influence the utility differently, depending on if a mother is on leave or back to work.

Under the additional assumption that (ε_{1it}-ε_{0it}) follows a logistic distribution, the probability of working in month t conditional on having been on leave in month t-1, equals: [21]

$$h(work_{it}) = \frac{e^{\beta W_{i0} + \delta D_{i0} - \beta B(I_{i0}; yr; t) - \gamma_0(1-\gamma_1 t) + \psi_t}}{1 + e^{\beta W_{i0} + \delta D_{i0} - \beta B(I_{i0}; yr; t) - \gamma_0(1-\gamma_1 t) + \psi_t}} \quad (7)$$

where ψ_t represents the set of personal variables, sector and year dummies. I estimate this hazard rate h($work_{it}$) to return to work at a given month by a discrete logistic duration model; the likelihood function includes all months a mother stays on leave, modeled by (1-h($work_{it}$)), and the month when she returns to work, expressed by the hazard rate h($work_{it}$). The estimation results are presented in Section 6. Using this functional form we can derive the MWP as follows:

$$MWP = \frac{\delta W_{i0}}{\delta D_{i0}} = \frac{\frac{\delta h(work_{it})}{\delta D_{i0}}}{\frac{\delta h(work_{it})}{\delta W_{i0}}} = \frac{\delta}{\beta} \quad (8)$$

Given the positive coefficient of the wage and the negative one of the disamenities, the MWP to reduce a disamenity should be negative. Thus, the model predicts that a mother would have to receive money in order to be compensated for a disamenity; or, conversely, that a mother is willing to sacrifice part of her wage to avoid suffering from a disamenity. An example might illustrate this result: Let's assume a mother has a job that exposes her to hazardous conditions, such as a certain gas. A mother would give up part of her wage, namely the exact fraction (8) given above, to diminish the quantity of gas she is exposed to.

Below I describe in detail the datasets used, the variety of disamenities and the construction of the indices.

5. Data

5.1. The German Socio-Economic Panel and the Qualification and Career Survey

For the analysis of mothers' MWP for disamenities, two datasets are used: the German Socio-Economic Panel (GSOEP) and the Qualification and Career Survey (QCS).

[21] The results are robust assuming different distributions of the error. Results are available upon request.

The GSOEP is an annually repeated survey of Germans and foreigners in West and East Germany, which has followed its members continuously since 1984. This study uses waves 1992-2005, since these waves correspond to the period during which the maternal leave period has remained unchanged. The QCS is a survey of employees carried out by the German Federal Institute for Vocational Training (Bundesinstitut für Berufsbildung) and the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung). There are four cross-sections launched in 1979, 1985/86, 1991/92, and 1998/99, each covering about 30,000 individuals. For this study, the latest cross-section is used since it lies within the time at which the sample of mothers takes parental leave and is the only cross-section that includes a 4-digit occupational code for the current profession that allows a merging of the two datasets. [22]

The GSOEP and the QCS have several features that make them especially suitable for the proposed methodology to estimate mothers' MWP to reduce disamenities using the maternal leave decision. The GSOEP has detailed annual information on personal as well as on some professional characteristics such as the individual's occupation, the wage and the working schedule. Furthermore, it provides monthly information on fertility as well as professional activities, such as working, being on maternal leave, and so forth. This information allows us to construct maternal leave spells for each woman and to determine her occupation prior to childbirth. Besides occupation, the QCS contains a great variety of disamenities, which complement the occupational information provided by the GSOEP. Details about the disamenities contained in the QCS are given in the next section.

The sample of interest includes all women who gave birth during 1992-2004 and are eligible for maternal leave. [23] As described in Section 3, a woman is eligible for maternity leave conditional on having worked for at least 6 months in her job. According to the Federal

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[22] In section 6.3, results using a 3-digit occupational code available for waves 1991/92 and 1998/99 are shown.
[23] An important part of the information is reported retrospectively; thus, not all necessary information can be recovered for the last available wave 2005.

Statistical Office, in 2003, 90% of West German women qualified for maternal leave, while not even two thirds of the East German mothers did so. In spite of being less eligible for maternal leave, East German women more often exercise their right to maternal leave: more than 95% of eligible women in East Germany take some leave, while in West Germany only slightly more than 80% do so.

The data provided by the GSOEP suffer from two shortcomings: first, the monthly activity history is partly left censored, which complicates the exact derivation of mothers' eligibility for maternal leave. Relaxing the eligibility condition and treating every woman as eligible who is observed to have been in an employment contract for at least one month before giving birth, 85% of West and 65% of East German women in the sample qualified for maternal leave in 2003.

The second problem in the data is that activities are often simultaneously and sometimes incorrectly reported. If declaring several parallel activities I give preference to being on leave. [24] According to the maternity protection law, women are not allowed to work in the first 8 weeks after giving birth. However, more than 5% of the women reported working during the maternity protection period. Since these spells are certainly mis-reported, I exclude all leave spells that are shorter than two months.

The final sample includes 1370 leave spells (26,559 individual-month observations). 623 women returned to their job, out of which 37 continued working immediately after the maternity protection period. [25,26] 193 women were on leave for the whole parental leave period and did not exercise their right to go back to work during the first three years after

[24] It might be the case that these women see themselves as working since during the maternity protection period their employment continues and even their full net wage is paid.

[25] This number might be too small since I excluded the women who reported working in month 0 or 1 after giving birth. As a robustness check, I treated these women as having returned to work after the maternity leave period; in this case 8.5% came back to work after two months. The estimation results using this sample are not significantly different and are available upon request.

[26] These spells include leave spells following the first until the fifth birth (56.5% are first births, 34.5% second, 7% third, 1.5% fourth and 0.5% are births of the fifth child). In cases where a woman reported being on leave several times, I treat these spells as separate spells, while controlling for the order of birth. In Section 6.3., I estimate additionally a competing risk model of only first birth leave spells and mothers choosing between returning to work, staying on leave or having a second child

birth. The remaining 554 spells are right censored, thus we do not know whether and when they returned to work. That said, we observe high panel attrition. In Section 6.3, I propose a robustness check in order to handle this attrition problem.

5.2. Disamenities

As mentioned above, the GSOEP contains information on individual wages and personal working schedules, in particular contracted working hours per week, actual working hours (including overtime), frequency of working in the evening (6-9pm), during the night (9pm-6am) and in rotating shifts.

The QCS provides information on additional, more specific job features that are not provided by the GSOEP:[27] physical demand of the job, lifting heavy weights (>20 kg), lying down or kneeling, standing during most of the shift, if the job is tiring for the eyes, if the job exposes the worker to dust or smoke, to a dirty working environment, to extreme temperatures or weather conditions, to noise, to risks of injury or death. These disamenities can be matched with our sample of women on maternal leave via the 4-digit occupational code of the Federal Statistical Institute, which is contained in both datasets.[28]

In other words, the final sample contains information about the occupation in which a woman worked prior to giving birth, the individual wage, the personal working schedule, and the average occupational aspects of workload and environmental hazards.

In order to create representative average occupational characteristics, I restrict the 1998/99 wave of the QCS to women in their child-bearing ages (16-46 years), like the ones in the sample of interest. These women are engaged in 772 different occupations. For each occupation I calculate the mean of every disamenity. On the one hand, due to the average of 15 women per occupation, these calculated disamenities can be regarded as being

[27] The GSOEP contains some information about disamenities. However, these disamenities are very general (such as being exposed to bad working conditions, having a physically demanding job, etc.) and highly subjective.
[28] The 4-digit occupational code is a classification that includes about 1400 different occupations.

"objective"[29]. On the other hand, due to the fine distinction between occupations, the average characteristics should match the job characteristics of every single woman in the GSOEP very well[30].

In the original QCS questionnaire, the women are asked if they are never, rarely, sometimes, often or always exposed to the respective disamenity, which is coded into discrete values of 0 to 4.[31] However, averaging these discrete values for different occupations produces values that are close to being continuous on a scale from 0 to 4, where higher values indicate suffering more from a certain disamenity. In order to make the comparison and the interpretation more comprehensible I rescale the average occupational disamenities from 0 to 100: the occupation with the highest level of a certain disamenity takes the value 100 and the lowest level takes 0.[32] An example might illustrate this ranking: workers in the plastic industry are the ones most exposed to risks of injury and death (they all report the value 4); while secretaries are least threatened by these dangers (all secretaries report the value 0). Thus, the plastic industry gets the average value of 100 for risks of injury and death, while secretaries get 0. All other occupations are ranked in between; painters, for example, have a value of 50, which means they are only exposed to half the risks workers in the plastic industry face.

The above described disamenities are very detailed and specific. For the purpose of significance and plausible interpretation, I create two indices (unweighted averages)[33], summarized as "workload" and "environmental conditions", according to the distinction made in the literature on CWD.[34] The following disamenities are included in each of the two

[29] I previously estimated the model using the available subjective disamenities in the GSOEP. However, the results display only low significance levels.
[30] An alternative is to use a 3-digit occupational classification, where 289 different occupations are observed and on average 37 women are working in each occupation. The estimation results barely alter and are shown in section 5.3.
[31] In the original specification, the lowest value stands for always being exposed to a certain disamenity and the highest value for never. I reverse this order for interpretational convenience.
[32] For every disamenity we observe both the highest (100) and the lowest (0) value in at least one occupation.
[33] Additionally I estimated weighted averages using factor analysis. The results are described in Section 6.3.
[34] See Rosen (1986) or Villanueva (2007).

indices: "workload" contains having a physically demanding job, lifting heavy weights (>20 kg), lying down or kneeling, standing all the time and having a job that is tiring for the eyes; while "environmental conditions" incorporate being exposed to dust or smoke, dirt or oil, extreme temperatures or bad weather conditions, noise and risks of injury. The respective disamenities within the two groups are sufficiently correlated among each other and hence represent reliable measures for the aspects of workload and working environment.[35]

To summarize, the sample used for estimation contains women eligible for maternal leave, their individual wages, their personal working schedule (hours, work in the evening, at night and in rotating shifts) and indices for average occupational workload and environmental hazards. In the subsequent section, I present some descriptive statistics of the sample, the estimation results and several robustness checks.

6. Estimation Results

6.1. Variables and Summary Statistics

As introduced in Section 4, I estimate the model of mothers' decision about maternal leave length. A mother decides to return to work as soon as the utility of working is higher than that of staying on leave. Under the assumptions discussed in Section 4, I estimate the leave decision, described by equation (7), using a discrete logistic duration model.

The determinants of interest are on the one hand the wage W_{i0} and on the other hand the disamenities D_{i0}. These job characteristics belong to the job a mother holds before going on maternal leave and to which she can return given the job guarantee during the whole leave period. An overview of the wage and the non-pecuniary job features in the sample can be found in Table 1. For illustrative purposes, Table 2 provides a ranking of the top ten jobs, ranked in a descending order according to their level of disamenities.

[35] The Cronbach's alpha is 0.75 for both workload and environmental conditions.

The pecuniary aspect of the job is included in the estimation as the natural logarithm of the real gross wage rate. The average monthly gross income is 1600€ (the ln of real gross wage is 2.3). The non-pecuniary characteristics are grouped into the following three aspects: the working schedule, workload and environmental working conditions. With respect to the working schedule, reported on the individual level, we observe the following: The contracts schedule on average a 33 hour-week, while the women report to be working on average around 2 hours more per week. Since workers are likely to over-report their hours worked, I use contracted working hours. Quite a few mothers work according to an unusual schedule: 20% work in the evening hours, 9% during the night and 11% in rotating shifts.

With respect to average occupational workload and environmental hazards the ranking shown in Table 2 tells us the following: The industry that demands the highest workload is the plastic industry. However, recent mothers work in occupations that require on average only 40% of the physical effort required in the plastic industry (which corresponds to the physical effort of a tailor or a high school teacher). The environmental hazards such as dust, dirt, noise, health hazards and so forth are also highest in the plastic industry. But again, most occupations of recent mothers involve only a small share of the bad working conditions of the plastic industry (on average 10%, which corresponds to the occupation of an elementary school teacher or a nurse).

Besides the conditions of the previous job, also institutions, such as the maternal benefit or the child care facilities, influence the maternal leave decision. The benefit is proxied by its determinants: the total household income I_{i0} and a set of year (1992-2004) and month dummies (36). The month dummies account furthermore for the fact that the utility of being on leave may decline with the age of the child. With the exception of East Germany (where we observe coverage of 35%), publicly available childcare for children under the age of three is, very precarious in Germany; only 3 out of 100 children can actually be taken care of in formal childcare. I control for this difference due to the region where the mother lives by including a dummy for East and West Germany. In Section 6.3, I present more detailed results focusing on the differences in the MWP to reduce disamenities between East and West Germans.

As explained in Section 4, individual characteristics may play an important role for the leave decision. Table 3 gives an overview of the personal and household characteristics of the women in the sample. I control for age, marital status (a dummy for having a partner), education (measured in years), income (dummies for income groups according to the thresholds for the parental benefit described in Section 3), and the number of previous children. I also include the sector in which the woman has been working (dummies for the technological, agricultural, industrial, manufacturing and public sector). This might be important due to the varying depreciation rate of human capital among different sectors; i.e., a woman working in a technology oriented occupation might find it more difficult to return to work after a prolonged absence than one working in agricultural or manufacturing occupations, where changes due to technological advances are less frequent.

Before describing the regression results, let's have a brief look at the length of maternity leave and its relation with each disamenity.

Table 4 shows the duration of the leave and the Kaplan-Meier Survival estimates. We can see that out of the 1370 women, 1319 women go on leave for at least one month, in addition to the compulsory maternity protection period of two months. After month 2 for example, 37 women went back to their job, thus the probability that a woman stays on leave for more than 2 month is 97%.[36] 193 women do not go back to their guaranteed job after the maximum possible leave period. On average 3% drop out of the sample in every period, for instance after the maternity protection period (2 months of leave) 14 women are lost. For these women we are lacking any information on whether and when they return to work. This

[36] As discussed earlier, this percentage of mothers returning to work after the maternity protection period might be quite low. Reasons for this low number are that I exclude mothers underreporting their true duration of maternal leave.

relatively high attrition might be a matter of concern. In Section 6.3 I check the robustness of the estimation results assuming different scenarios for the women dropping out of the dataset.

A first look at the relation between leave length and wage on the one hand and disamenities on the other hand, without controlling for any other variables (see Table 5), gives already some useful insights before looking at the multivariate regression results. As expected, a higher wage is associated with a shorter leave length. A strong positive correlation can be observed between the maternal leave length and the environmental conditions and workload: the worse the environmental hazards or the workload, the longer the maternal leave. Perhaps surprisingly, night work is negatively correlated with the leave length: the more a woman works at night the earlier she returns to work. A lack of childcare facilities and inflexible working schedules might explain this phenomenon. This is, however, only a first impression gained from the raw data. In the next section I present the results of the multivariate regression analysis which allow for more interpretation.

6.2. Results

Table 6a shows the results of estimating equation (7), modeling mothers' decision whether and when to return to work after childbirth. The table displays the coefficients of the individual wage, the different aspects of the personal working schedule and the two average occupational disamenity indices "workload" and "environmental conditions" estimated by a discrete duration model assuming a logistic hazard function. The observations are clustered on the individual level, which shall account for serial correlation between the monthly observations for one spell. Since individual heterogeneity might be still a matter of concern, the issue is discussed in Section 6.3. The table includes furthermore the z-statistic and the marginal effects.

Model 1 to 3 compare the results of estimating equation (7), including first no other control variable, then personal characteristics (age, education, partner, region, total household income and birth order), and last sector, month and year dummies. I also estimate equation

(7) under different assumptions for the functional form of the baseline hazard: including, instead of month dummies, either the logarithm or a polynomial of the time being on leave (model 4 and 5 respectively). The results barely change with the different specifications. The following discussion of the results focuses on the specification assumed in model 3, including all control variables and using a non-parametric baseline hazard (month dummies).

The theory predicts that the higher the wage, and consequently the higher the opportunity costs of not working, the more likely a mother is to return to her job. The estimated coefficient of the ln of real gross wage confirms the predicted impact of the wage on mothers' decision about leave length: women who have a job that pays 10% more wage per hour are 0.1% more likely to return to work in a given month (at the 1% significance level).

The model, as introduced in Section 4, suggests a negative effect of disamenities on the decision to return to work. A significant impact, however, can only be found for environmental hazards: women who have been working under bad working conditions, such as dust, dirt, extreme temperatures, noise or certain health risks tend to stay significantly (at the 5% significance level) longer on maternal leave: women who work in a job that exposes them to one standard deviation more of environmental hazards (which corresponds, for example, to the difference in environmental hazards between the occupation of a secretary to the one of a nurse, or between an economist and an electrician), are 0.3% less likely to work in a given month. Estimating equation (7) using as controls each of the different aspects included in the index "environmental conditions" separately shows that the deterring effect stems mainly from jobs exposing the women to dust, smoke and extreme weather conditions, such as working in a hot or cold environment or even outside. [37]

The actual effect of workload is opposed to the effect predicted by the model: an increase in workload by one standard deviation, which corresponds to the difference in physical strains between a banker and an electrician or between an economist and a stewardess, leads to a 0.1% more likely return. This coefficient is, however, not significant. If we look at the separate effects of the different aspects of workload, we can observe that working in an uncomfortable position such as lying down, kneeling, etc., has a significantly negative effect on the probability of returning to work. [37]

The working schedule influences the decision of leave length as follows: on the one hand, mothers in jobs entailing on average ten hours more per week, are 0.1% less likely to work in a given month. Jobs requiring night work are also less attractive to mothers after childbirth: mothers in jobs that demand night work are 0.4% less likely to work in a given month. Both effects, however, are not significant. On the other hand, women who have jobs that involve working in the evening or in rotating shifts are significantly (at the 5% level) more likely to work in a given month: if working in the evening, women are 0.6% more likely to work in a given month, and if in rotating shifts, 0.9%. This result may perhaps be surprising. The precarious offer of childcare facilities, particularly in West Germany, may explain these results. While, in general, working outside the usual shopping hours are seen as unpleasant since one could spend this time with family or friends, mothers may not perceive an unorthodox working schedule as a disamenity in the traditional sense. It actually allows recent mothers to combine work and family since during these hours childcare can be arranged informally with partners, relatives or friends. An event-study analysis, estimating if having a child changes the features of fathers' job, supports this explanation. [38] On becoming a father, men work less in the evening and more in shifts. This indicates that both parents coordinate childcare among themselves. In Section 6.3. I discuss the aspect of childcare, proxied by differences in daycare facilities between East and West Germany, in more detail.

The effect of personal characteristics on the leave length decision is shown in Table 6b. As reported in previous studies, women who have a partner, several children and more

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[37] The results for the estimation including all disamenities separately are available upon request.
[38] Regression results of the event-study are available upon request.

financial resources are less likely to work soon after childbirth. Women who live in East Germany are older and highly educated and tend to return to work earlier.

Given the elasticities of the hazard rate to work with respect to wage and the selection of disamenities, it is straightforward to derive how much mothers are willing to pay to reduce these disamenities. As derived in Section 4, I calculate the MWP as follows:

$$MWP = \frac{\delta W_{i0}}{\delta D_{i0}} = \frac{\frac{\delta h(work_{it})}{\delta D_{i0}}}{\frac{\delta h(work_{it})}{\delta W_{i0}}} = \frac{\delta}{\beta} \tag{8}$$

Since the wage variable is measured in logarithms, the MWP calculated according to equation (8) indicates the percentage change in the wage a mother would be willing to pay to suffer from one unit less of a disamenity. Table 7a shows the results for the MWP in percentage. In order to yield the MWP measured in Euros, the MWP measured in percentage has to be multiplied by the individual wage. For illustrative reasons, I evaluate the MWP at the mean real gross wage rate for the sample of women on maternal leave (11.14 € per hour).

In line with the coefficients of the estimation results above, mothers are only willing to sacrifice a significant percentage of their wage for a decrease of environmental hazards and to overcome a working schedule incompatible with given daycare facilities.

For a less hazardous work, mothers are willing to give up a significant (at the 5% level) amount: in order to suffer one standard deviation less dust, dirt, noise, extreme temperature or health risks, recent mothers are willing to sacrifice almost 25% of their wage. This means that on average, a mother would pay 2.80€ per hour in order to decrease unpleasant and hazardous working conditions by one standard deviation. An example might help to illustrate this result: a difference in environmental conditions of one standard deviation corresponds to the change in hazards from the occupation of a secretary and to the one of a general nurse, or from an economist and to an electrician.

As mentioned above, because of the poor availability of childcare facilities, especially in West Germany, it might be convenient for mothers to work outside the usual working hours, such as in the evening or in rotating shifts. The results of an event-study analysis, which shows changes in fathers' working schedule when having a baby; a type of working schedule that might allow them to coordinate childcare with their partner. Consequently, we can see that recent mothers are willing to sacrifice 45% of their wage to work in the evening and 66% for rotating shifts.

As proven theoretically by HMR (1998) and explained in Section 2, hedonic wage regressions might lead to biased results. The proposed method is one way to master the failure of the hedonic wage regression to account for labor market dynamics and frictions. Looking at the results of a cross-sectional hedonic wage regression (see table 7b), using the same sample (reduced to one cross-section) and variables as in the main specification, this weakness becomes clear. The hedonic prices, as predicted by HMR, are mostly insignificant, biased towards zero or even wrongly signed. For example, the coefficient of the environmental conditions, interpreted as the premium by which a worker is compensated if exposed to hazards, predicts a penalty. The compensation paid for an extra hour of work estimated by a hedonic wage regression is biased towards zero and insignificant; it only reaches 5% of the wage increase that mothers charge on average to return to work after childbirth. According to the results of a hedonic wage regression, work in the evening and in rotating shifts are accompanied by a wage increase (by 7% and 3%, respectively); women after childbirth, on the contrary, seem to appreciate these types of working schedule. However, one has to admit that mothers, relative to men and childless women, dispose of a high MWP to work during evening hours or in shifts, which contrasts the conventional premium paid on these working schedules. The comparison of the results shown in Tables 7a and b once more provides evidence of the striking differences between the hedonic prices and the MWP to avoid disamenities.

With knowledge of the basic results, it is now interesting to investigate individual or institutional characteristics that possibly trigger the high MWP for certain working conditions. Thus, in the next subsection, I study the MWP of different subgroups of the population and provide some robustness checks for the results presented above.

6.3. Additional Specifications and Robustness Checks

A. Subgroups: The main specification used in this paper stems from a simplified model assuming a linear utility function. The estimated measures of mothers' MWP to reduce a selected variety of disamenities represent only average values. In order to allow for more heterogeneity, I analyze the impact of wages and disamenities on the chosen leave duration, distinguishing between mothers that differ in their regional, financial and educational background. This enables us to shed some light on the sources of the MWP. For this purpose, I re-estimate equation (7) including interaction terms between variables representing each of the mentioned backgrounds (West and East Germany, three income groups and three educational levels), and the wage and the disamenities. Tables 8a to 8c provide an overview of the estimated MWP derived from a discrete logistic duration model estimated for each of the different subgroups separately. [39]

The results from regressions that control for interactions between the variety of job features and a dummy for East Germany highlight once again the differences between West and East Germany. As can be clearly seen in Table 8a, only West German women have the disposition to sacrifice significant (at the 5% level) amounts of their wage in order to adjust the working schedule to their family life; they are willing to accept a wage reduction of 2% to work one hour less, 69% to have a working schedule in the evenings and 72% to enjoy rotating shifts. East German women, on the contrary, do not reveal any significant willingness to trade wage for an unconventional working schedules; their MWP to work in rotating shifts does not even reach half of the one of West German women; in order to work in the evenings they would have to receive a premium (43% of their hourly wage). These sharp differences between East and West Germany can be traced back to institutional

[39] Results of the logistic duration model are available upon request.

arrangements. As mentioned above, the coverage of childcare facilities for children under the age of three is very poor in West Germany, as only 3% of the children can be accommodated in formal daycare. In East Germany, on the contrary, public childcare is available for every third child. I interpret the positive MWP for a schedule in the evening and in rotating shift as an informal solution of a lack in childcare facilities. An event-study analysis, shown above, indicates that different types of working schedules help parents to coordinate the childcare among each other; during the day the mother might take care of the child, while during the evening the husband does so. Rotating shifts may furthermore allow for some flexibility to arrange childcare, since they can be exchanged among employees.

The basic regression results reveal that women after childbirth are disposed to pay significant amounts to avoid environmental hazards at the workplace. Distinguishing between women with different financial and educational background, however, shows that not all women are willing or can afford to sacrifice significant parts of their wage to reduce unpleasant or unhealthy conditions. Tables 8b and 8c provide the MWP for selected job characteristics derived from estimating equation (7) including interactions between the wage and disamenities on the one hand and different income groups and educational levels on the other hand.[40] The estimated MWP to reduce environmental hazards show a clear pattern: the more financial resources, the more wage a mother is willing to give up to diminish these hazards (the MWP increases from an insignificant 1%, to a significant (at the 10% level) 5%); likewise the higher educated a woman, the bigger the accepted trade-off between wage and hazardous conditions (the MWP rises from 3% to 7%, significant at the 15% level).

Contrary to the estimated MWP to avoid hazards, only lower educated women charge a significant amount if their work requires certain physical effort. As we can see in Table 8c, only less educated women show a negative MWP not to bear physical strain (at the 5%

[40] The income groups are created according to the income thresholds of the maternal benefit payment described in Section 3. The educational levels correspond to the three school tracks offer in Germany; a lower one leading to a vocational training, an intermediate one, and a higher one allowing for university access.

significance level). One reason for this result might be the type of occupation in which lower and higher educated women are working: less educated women work, for example, as a cleaning lady or in a warehouse, jobs that demand a different amount of workload than jobs of higher educated women, who work, for instance, as a nurse, or a teacher.

Summarizing the results for different backgrounds of recent mothers, we can conclude that the MWP to avoid environmental hazards comes mainly from high-income and in particular high-educated women, in other words, women who can either afford to pay for better conditions or who are aware of the consequences. The disposition to work during non-standard working hours is only observed in West Germany and hence can be mainly attributed to a lack of publicly available childcare.

B. Fertility decisions: It is reasonable to think that the features of women's guaranteed jobs influence not only their decision to return to work, but also the one to have another child. The main sample includes, however, all leave spells, following first, second and further births. In case the birth of a further baby lies within the maternal leave period following the birth of a previous baby, this spell is treated as a censored spell. In order to take into consideration the possibility that women's fertility decision are influenced by their job situation, I use a sample including only spells after first birth and examine how these mothers behave within the 36 months of leave period. In particular I analyze their decision between staying on leave, returning to work or having another baby. For this purpose, I estimate a competing risk model that represents the choice of mothers between these three alternatives during the 36 months after the first childbirth. I can derive their MWP for certain job features through the elasticities of the decision to return to work with respect to the wage and the disamenities of their guaranteed job. As we can see in Table 9, the MWP estimated using the sample of only leave spells following first childbirth barely differs from the MWP of all mothers. First-time mothers demonstrate an equal willingness to accept significant wage cuts in order to reduce environmental hazards (35% for a decrease of one standard deviation), and to be able to work during the evening (62%) or according to rotating shifts (55%).[41]

One might further argue that the job situation has an impact already on the decision to have a first baby. Women might change their family plans due to an unsatisfying job situation; women who are exposed to unpleasant working conditions might, for instance, want to take a break from work and anticipate their family plans. In this case our sample would over-represent women in worse job conditions who stay longer on leave. Consequently, the estimated disamenities coefficients would be downward biased.[42]

Selection bias can be tested by applying a two step testing procedure suggested by Wooldridge (1998). This procedure implies as a first step the estimation of a selection equation: using a probit model separately for every single year and as exclusion restriction the number of a mother's siblings, I estimate the probability of having a baby. As a second step, I re-estimate the probability of returning to work (equation (7)) including besides the previous control variables the inverse mills ratio (calculated using the results of the first stage estimation). As the results, provided in Table 10, show, there doesn't seem to exist a selection bias due to endogeneity of fertility with respect to disamenities, i.e. the level of disamenities and wage does not seem to influence the fertility decision.

C. Ability and Preferences: Besides the observable characteristics controlled for in the main specification, women may be heterogeneous in other not (directly) observable aspects. In the economic literature, well known sources of unobservable heterogeneity are ability and preferences. Omitting both characteristics may bias the results. In the following I review critically a standard method how to handle unobserved heterogeneity, discuss the bias that may arise if not controlling for ability or preferences and suggest several specifications which can help to reveal the existence and direction of a possible bias.

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[41] Results of the competing risk model are available upon request.

[42] Lauer, C. and A. M. Weber (2003) and Bratti, del Bono and Vuri (2004) do not find any selectivity problem into fertility using a sample of mothers on leave.

One methodology correcting a bias due to unobserved heterogeneity in a discrete duration model has been suggested by Heckman and Singer (1984). They approach the problem by fitting an arbitrary distribution of the heterogeneity using a set of parameters that comprises a set of mass points and the probabilities of a person being located at each mass point. Using the method suggested by Heckman and Singer barely alters the estimated impact of wages and disamenities on the leave decision (see Table 11a) and the derived MWP (see Table 11b). The key assumption, however, is no correlation between the unobserved characteristics, such as ability and taste, and the control variables, here wage and disamenities. Once we suspect that the key assumption of exogenous control variables is violated, the suggested correction method is not successful in yielding unbiased estimators. Let me therefore discuss in more detail the bias that might arise due to unobserved heterogeneity.

To begin with, I explore the implications of individual ability. One may think that on the one hand employers are willing to offer more productive women both a higher wage and fewer disamenities. On the other hand, one might assume that more capable women are also more likely to return to work early. If ability is correlated with both better working conditions and a tendency to work, the coefficients estimated in the main specification may be overestimated; i.e., the wage coefficient might be too positive, while the hazard coefficient too negative. Firstly, we are considering average occupational characteristics, which should not be correlated with individual ability. Considering the nature of disamenities, such as dust, dirt, extreme temperatures, noise and certain health risks, it is furthermore difficult for an employer to discriminate differently productive women with respect to the level of these disamenities. Secondly, the wage, measured on the individual level, should be a function of education, experience, ability, and so forth, and thus should incorporate individual ability; i.e., the potential problem of endogeneity should be ruled out.[43]

The direction of the bias that may arise due to omitting preferences for work and career is less obvious. On the one hand, one could argue that women who are career oriented return earlier to work, have a high preference for wage but not a strong aversion against disamenities. In this case, our estimated disamenities coefficients would be biased towards zero and the estimated wage coefficient would be upward biased. The derived MWP for disamenities would consequently provide a lower bound of the price mothers are willing to pay to avoid certain hazards.

On the other hand, women who aim to combine career and family, i.e., want to have a child but also intend to work as soon as possible, may change into a job that offers them a low level of disamenities and thus allows for the compatibility of work and family. In this case of presorting, the disamenity coefficients and the MWP would be overestimated.[44]

One exercise to investigate if presorting may bias the coefficients is to re-estimate the model using a subsample of women who actually can not choose their job according to their personal preferences. In the former German Democratic Republic, people could not freely choose their job, but were assigned an occupation after finishing their education (in a so-called "interview about the personal appropriateness"). Consequently, East German women who had a baby shortly after the reunification had the same right to maternity leave as West German women, but did not have the chance to sort into a job according to their family plans. Thus, restricting the sample to the first three years after reunification, 1992-94, and estimating equation (7) including interaction terms for the wage and disamenities and a dummy for East German women should help us to investigate a bias that might arise due to

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[43] Instead of the individual wage, one might use average occupational wages which are less likely to be correlated with ability. The results barely alter, which indicates that the estimated coefficients might not suffer from a bias due to unobserved ability.

[44] Mothers are observed to change jobs in the years before giving birth; 11% of all mothers eligible for maternal leave, start to work in their guaranteed job only one year, 8% two years and 5% three years before childbirth Changes in the job characteristics are available upon request.

presorting.[45] The results of a discrete logistic duration model do not reveal any significant differences between the MWP for disamenities of East German women soon after the German reunification (1992-94) and all women who have a baby between 1992 and 2004. Hence, these results give rise to think that presorting into family friendly jobs might not seem to affect mothers' MWP for disamenities. However, the sample size might not be sufficiently big to conclude statistically significant results.

D. Job and Wage guarantee: One can furthermore question the assumption of our basic model that women go back to exactly the same job after giving birth. It may be the case that women, despite the job guarantee, change their job if they find a better offer. In our data we observe only a low turnover during the first 36 months after childbirth (2%). Besides changing jobs, though, women may face different conditions when returning to work[46]. Comparing the disamenities before and after maternal leave (Table 12), we can observe a slight decrease in wages. This reflects the fact, as already mentioned above, that the job guarantee does not imply a wage guarantee. A mother might be aware of the possible wage depreciation and integrate the wage discount into her decision about the leave length. Thus, the impact of the wage on the maternal leave decision might vary over time and is not, as previously assumed, stable over the whole leave period. For this purpose, I re-estimate the leave decision, including interaction terms between the wage and dummies for all three years of the leave period. As we can see in Table 13, the MWP to diminish environmental hazards increases slightly, but not significantly over the years.[47] This increase can be attributed to the expected depreciation of the wage over time.

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[45] A further reduction of the sample is not possible due to a small sample size. Due to high unemployment in the East German states, East German women, however, did not frequently change their job in the years 1992-1994. The results of the estimation on equation (7) including interaction terms between wage and disamenities and dummies for the East German women who gave birth in the early years after re-unification are available upon request.

[46] See Ondrich, Spiess and Wagner (2003)

[47] The results are available upon request.

Substantial differences in the previous and posterior job characteristics are also visible for working hours. The drop in working hours per week can be explained by the high fraction of mothers coming back only to a part-time job. Since 2001, one has the right to reduce working hours when the company has more than 15 employees. Table 14 shows the results of estimating equation (7) by a discrete logistic duration model that contains a dummy for the reform in 2001 and if a woman has worked part-time before going on leave. The results reveal that part-time work seems to be attractive to mothers and that the 2001 reform had a positive, but not significant impact on the leave length decision. Once more it can be shown that the working schedule, in particular its compatibility with the family life, is a crucial aspect in a mother's LFP decision.

E. Attrition: One further concern, as discussed in Section 5.1 and visible in Table 4 (fourth column "lost"), is the substantial fraction of women who drop out of the sample (on average 3% every month). In the main specification, I implicitly assume that "missing" women behave as the women continuously observed in the dataset. This is a strong assumption, since we cannot be sure that attrition is a random event. One way to check the robustness of the basic model is to re-estimate the model under two extreme assumptions: on the one hand the "missing" women might start working as soon as they drop out of the sample, on the other hand they might never return to their job during the potential maternal leave period of 36 months. Extending the sample according to the two assumptions, I re-estimate the discrete logistic duration model specified in equation (7). Under both extreme assumptions the estimation results, with respect to size and significance, are robust (see Table 15). As a result, our estimated coefficient and the derived MWP to avoid disamenities are not significantly influenced by treating attrition as random and including the censored spells in the sample.

F. Occupational classification and index construction: As described in Section 5.2, in order to construct objective disamenities, I create average characteristics for each occupation using a 4-digit classification. For this categorization, we observe 772 occupations and on average 15 women per occupation. While matching well the occupational conditions of every woman included in the sample, the choice of this occupational code has two shortcomings: first, the average of 15 women per occupation may not guarantee the objectivity of the working conditions for every occupation. Second, the 4-digit classification, as mentioned in Section 5.1, is only available for the 1998/99 wave. Thus, possible changes in the occupations with respect to the working conditions are not captured by the 4-digit occupational code.

In order to test the main specification with respect to the possible shortcomings of the 4-digit occupational code, i.e., objectivity and time changes, I re-estimate equation (7) using the average disamenities constructed for each occupation contained in the 3-digit classification of the waves 1991/92 and 1998/99. The 3-digit categorization contains 289 different occupations in which on average 37 women are working. The estimation results and the calculated MWP are shown in Tables 16a and b.

The results for the coefficients of workload and environmental conditions estimated using the average disamenities of the 3-digit occupations gain in absolute size and significance. In contrast, the coefficient of the wage becomes slightly smaller. These results imply a stronger and more significant MWP for a good working environment (4% instead of 2.4%), but conversely to the prediction of the theory as well a more positive significant MWP for the workload (2% instead of 1%).

Besides the occupational code used to construct the average occupational disamenities, the method applied to derive the two disamenity indices might also be subject to criticism. In the main specification, I group the disamenities according to the distinction usually made in the literature of compensating wage differential and create unweighted averages. In order to test if this construction is not subject to any arbitrariness of the author, alternative indices are constructed via a factor analysis (using maximum likelihood and varimax rotation). Similar to the indices of the main specification, the disamenities get reduced to two factors that can be interpreted as "workload" and "environmental hazards". The estimation results of a discrete logistic duration model using the indices created by a factor analysis and the derived MWP, shown in Tables 17a and 17b, do not significantly differ from the ones using unweighted averages. We can conclude that neither the occupational classification nor the method used to construct the indices biases our estimates for the MWP to avoid disamenities.

G. Sample Period: In order to assure that the restriction of the sample to the years 1992-2004 is random and does not influence the decision about the maternal leave length, I re-estimate equation (7) using the sample extended to all years for which mothers are entitled to some, even if shorter, optional parental leave (1986-2004; see Section 3). The results using this longer sample are shown in Table 18a and 18b.

While the coefficients for wage and disamenities lose some size and significance, the impact of certain aspects of the working schedule gets stronger in absolute magnitude and precision. As a consequence, the MWP to reduce environmental hazards decreases, but the one to enjoy a working schedule allowing to arrange childcare, such as work in the evening or rotating shift, increases: taking into consideration all years from 1984 to 2004, the estimation results are telling that women are on average willing to sacrifice more than 60% of their wage if working in the evening, and more than 70% if according to a rotating schedule. Since working arrangements were even less flexible during earlier years, this indicates once more that recent mothers try to overcome inflexible working arrangements by following an unorthodox schedule.

Finally, I control for further aspects of the job (distance to the workplace, stress, pressure or challenges of the job and repetitive tasks).[48] In all cases the estimation results are consistent with those of the main specification.

Additional specifications and robustness checks confirm that the less hazardous the guaranteed job and the more flexible the working schedule, the shorter the maternal leave length. The following section concludes and provides recommendations for a policy designed to increase mothers' LFP.

7. Conclusion

This study is, to my knowledge, the first to directly estimate mothers' MWP to avoid job-related disamenities. The suggested framework contributes to the existing methodologies to measure the MWP to reduce disamenities.

In the line of GR (1994), the MWP is estimated by taking advantage of movements in or out of existing employment. In contrast to GR (1994), who look at job tenure in the U.S., this study focuses on maternal leave length in Germany. There, maternity leave legislation gives a woman the right to return to her former job during the first 36 months after having given birth. This job guarantee is the key to estimating the MWP more accurately than in the previous study since it allows us to overcome the failure to observe the different alternatives available to a worker: in the case of GR (1994), all potential job offers, and in our case, the alternatives of staying on leave or returning to the guaranteed job at some point during the 36 months period. Consequently, the proposed framework enables me to improve on the existing methodologies to estimate the MWP precisely.

Using data from the German Socio-Economic Panel (1992-2005) and the Qualification and Career Survey (1998/99) I estimate the effect of wage and disamenities on

[48] The results including further controls for the type of job are available upon request.

the chosen leave duration. The MWP to avoid disamenities can be inferred through the estimated elasticities of the hazard rate with respect to a certain disamenity and to the wage.

As predicted by the theory, the wage significantly determines mothers' leave decision. The higher the wage and hence, the higher the opportunity cost of staying at home, the shorter the leave. Besides the pecuniary, also some non-pecuniary job features, such as the hazards and the working schedule have a non-negligible impact on mothers' LFP choice; while an unpleasant working environment deters mothers from an early return to work, a working schedule allowing them to arrange for childcare encourages them to do so.

The results of this study reveal that mothers' have a significant aversion towards environmental hazards, such as dust, dirt, extreme temperatures, noise and health risks. Mothers are willing to sacrifice 25% of their wage to improve these environmental conditions by one standard deviation. This difference corresponds to the level of hazards implied in the occupation of a nurse and a secretary, or an electrician and an economist. The analysis of mothers differing in the financial and educational background sheds further light on the high MWP to reduce hazards at the workplace; mainly high-income and high-educated women are willing to cut wages in favor of better working conditions; i.e., women who can either afford to pay for better conditions or who are aware of their consequences. Educational advertising about risks or dangers involved in occupations that imply a huge amount of disamenities, might therefore correct mothers' assessment of the consequences of certain hazards and thus help to protect the health and the life of mother and child.

The working schedule is pivotal for mothers when deciding how long to stay at home after childbirth. An unorthodox schedule seems to be attractive for recent mothers; they are willing to accept severe wage cuts (more than 50%) to be able to work during the evening or in rotating shifts. However, examining differences between East and West Germany demonstrates that only West German mothers exchange wage for this type of working schedule. This result suggests that the source of the high MWP for a working schedule beyond the usual hours are institutional differences: the lack of child care facilities in West Germany (only 3% of children under the age of three are covered by daycare arrangements), might trigger the high MWP to work according to this unusual schedule. Mothers can only return to work if they either have enough income to pay for formal childcare or if they can coordinate childcare informally with their husband, relatives or friends; i.e. they work when somebody else can take care of the child. Thus, as becomes clear from these results, an increase in the coverage of public childcare is crucial for a policy targeted at an increase in maternal LFP.

The insights gained by this study are of relevance for an efficient design of family policies. In order to achieve a higher LFP among mothers, it is important to know and to improve the conditions which facilitate mothers' return to work. It is, however, not straightforward to pursue adjustments in all dimension shown to be appreciated by mothers. While it is feasible to establish a working schedule compatible with available daycare or provide childcare on a public or company basis, it might not be obvious how to reduce the amount of environmental hazards within a given occupation: e.g. a nurse is always exposed to certain health risks, a baker to heat, a cleaning lady to dust and dirt, etc.. Nevertheless, recent reforms, such as the *Law of Safety at Work* (1996) or *the Law of Part-time* (2001), have shown that some improvements can be achieved by establishing general norms and providing guidelines for employers.

Besides the methodological contribution and the relevance for policy design, I view these results as an encouraging step towards understanding the remaining unexplained part of the wage gap between women with and without children, the so-called child penalty. In a previous study, I put forward the hypothesis that if labor markets reward disamenities, part of the child penalty might be a compensating wage differential. By means of a hedonic wage regression, she estimates the price that mothers pay in order to avoid bad working conditions. The estimated child penalty (20%) can actually be reduced only by a small and insignificant amount. As shown by HMR (1998) the estimated coefficients of a hedonic wage regression, however, may be downward biased so that, the estimated hedonic prices may only provide a lower bound of the price mothers pay in order to avoid exposure to certain disamenities.

The results of this study reveal that mothers care about disamenities when deciding about the return to work after parental leave. Their MWP to reduce certain disamenities is significantly higher than the prices estimated by the hedonic wage regression; 25% of their wage for a decrease in hazards of one standard deviation and even more (around 50%) for a working schedule compatible with available daycare. Thus, mothers might trade income for working conditions allowing for a better combination of family and work, a fact that possibly explains a non-negligible part of the child penalty.

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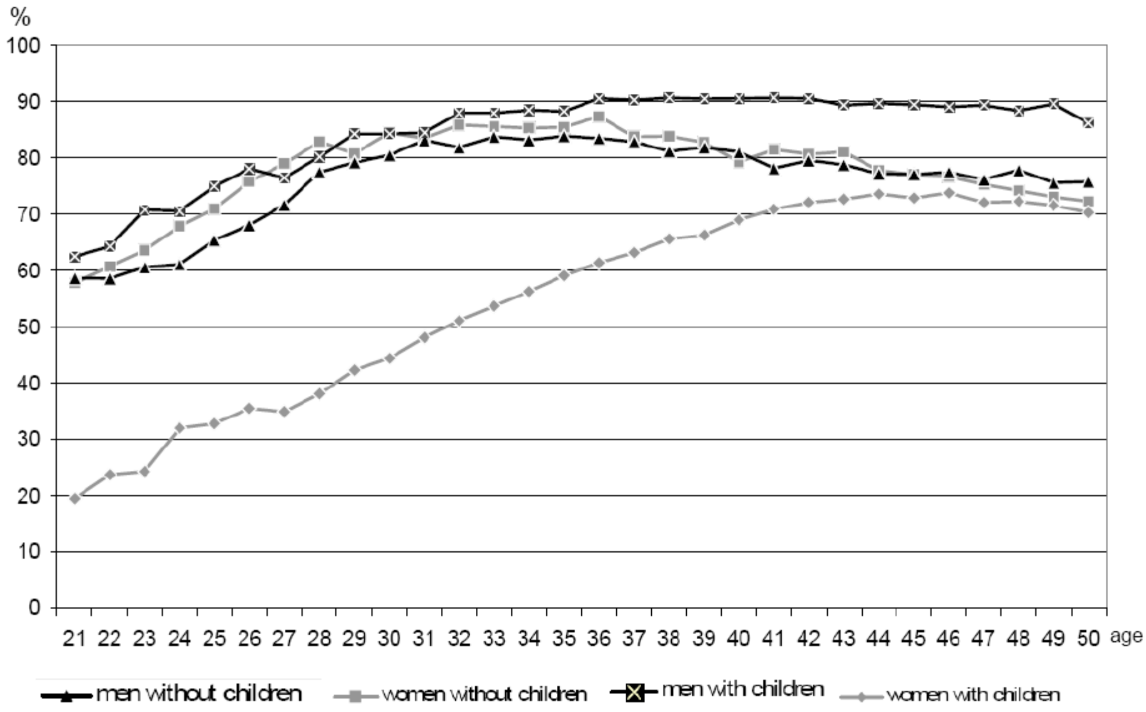
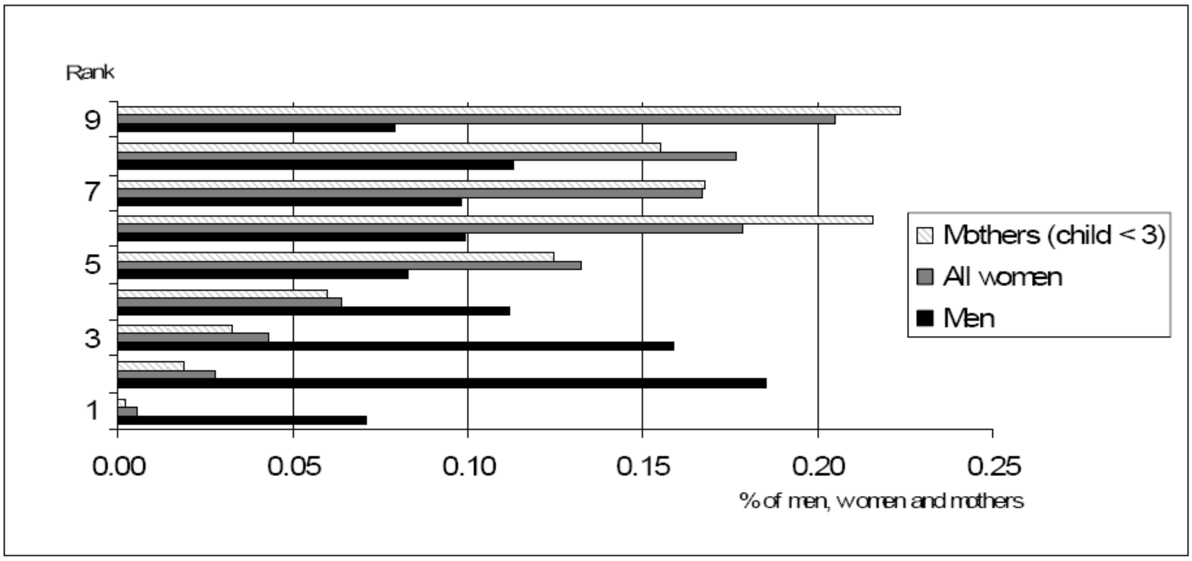
Tables and Figures

Figure 1: LFP of men and women with and without children at the age of 21-50 in 2004 in Germany



Source: Dressel, C; Cornelißen,W.; Wolf, K. (2005); Gender-Datenreport

Figure 2: Distribution of men, women and mothers over jobs with varying level of disamenities



Source: Author's calculations based on the GSOEP (1984-2005)

Table 1: Summary statistics of occupational characteristics

	Obs	Mean	Std. Dev.	Min	Max
Ln real gross wage	1370	2.3062	0.4897	0.0182	3.6162
Working hours (contract)	1370	33.1223	9.6325	4	48
Working hours + overtime	1367	35.2145	11.0773	4	70
Work in the evening	1370	0.2044	0.4034	0	1
Night work	1370	0.0891	0.2849	0	1
Shift work	1370	0.1124	0.3160	0	1
Environmental conditions	1370	10.4739	10.9298	0	100
Workload	1370	39.9248	14.2291	0	95

Note: The sample consists of women who are eligible for maternal leave. It consists of 26,559 observations for 1370 women.

Table 2: Top ten occupations ranked in a descending order according to their level of disamenities

Rank	Environmental conditions	Workload
1	plastic worker	plastic worker
2	agronomist	glass producer
3	chemistry lab worker	agronomist
4	canteen chef	industrial engineer
5	glass producer	animal breeder
6	industrial engineer	nurse (operations)
7	chemistry worker	elderly care assistant
8	ceramicist	horse breeder
9	motorcar engineer	painter/lacquer
10	warehouse worker	car lacquer

Note: Above I rank the occupation in which the women of the sample (women who are eligible for maternal leave) are working in, in a descending order according to their level of disamenities. The job on place 1, the plastic industry, exposes its workers to the highest amount of environmental hazards, while an agronomist is exposed to the second highest amount, etc. In total there are 100 ranks available.

Table 3: Descriptive Statistics of the personal and occupational characteristics

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	1370	30.7175	4.5191	18	46
Partner (in %)	1370	0.9299	0.2554	0	1
Education (in years)	1370	11.9551	3.1582	1	18
West (in %)	1356	0.8149	0.3885	0	1
East (in %)	1356	0.1851	0.3885	0	1
Other income sources	1370	32321	17123	0	219523
Low income	1370	0.260	.4387145	0	1
Intermediate income	1370	0.385	0.4870	0	1
High income	1370	0.355	.47794	0	1
Technology (in %)	1370	0.0518	0.2218	0	1
Service (in %)	1370	0.6212	0.4853	0	1
Manufacturing (in %)	1370	0.1533	0.3604	0	1
Agriculture (in %)	1370	0.0080	0.0893	0	1
Public admin. (in %)	1370	0.0774	0.2673	0	1
Educational sector (%)	1370	0.0723	0.2590	0	1

Table 4: Duration of the maternal leave – Kaplan-Meier Survival Estimates

Time	Total	Fail	Lost	Function	Error	[95% Conf. Int.]	
2	1370	37	14	0.973	0.0044	0.9629	0.9804
3	1319	34	22	0.9479	0.006	0.9347	0.9585
4	1263	24	18	0.9299	0.0069	0.9150	0.9423
5	1221	19	26	0.9154	0.0076	0.8993	0.9291
6	1176	19	18	0.9006	0.0082	0.8833	0.9155
7	1139	26	23	0.8801	0.0089	0.8613	0.8964
8	1090	25	21	0.8599	0.0096	0.8399	0.8776
9	1044	19	15	0.8442	0.0101	0.8233	0.8629
10	1010	26	14	0.8225	0.0107	0.8005	0.8424
11	970	19	9	0.8064	0.0111	0.7836	0.8271
12	942	41	14	0.7713	0.0119	0.7470	0.7936
13	887	25	11	0.7496	0.0123	0.7244	0.7728
14	851	23	23	0.7293	0.0127	0.7035	0.7533
15	805	24	9	0.7076	0.0131	0.6811	0.7323
16	772	25	17	0.6846	0.0134	0.6575	0.7101
17	730	22	23	0.664	0.0137	0.6363	0.6901
18	685	23	24	0.6417	0.014	0.6135	0.6685
19	638	20	14	0.6216	0.0143	0.5929	0.6489
20	604	16	10	0.6051	0.0145	0.5761	0.6329
21	578	15	15	0.5894	0.0147	0.5601	0.6175
22	548	13	25	0.5755	0.0148	0.5458	0.6039
23	510	10	13	0.5642	0.015	0.5343	0.5929
24	487	16	22	0.5456	0.0152	0.5154	0.5748
25	449	15	22	0.5274	0.0154	0.4968	0.5570
26	412	13	15	0.5108	0.0156	0.4798	0.5408
27	384	12	8	0.4948	0.0157	0.4636	0.5252
28	364	7	8	0.4853	0.0158	0.4539	0.5159
29	349	7	10	0.4756	0.016	0.4440	0.5064
30	332	14	10	0.4555	0.0162	0.4236	0.4868
31	308	6	11	0.4466	0.0162	0.4146	0.4782
32	291	8	8	0.4343	0.0164	0.4021	0.4662
33	275	10	13	0.4186	0.0165	0.3860	0.4507
34	252	7	7	0.4069	0.0166	0.3742	0.4393
35	238	3	16	0.4018	0.0167	0.3690	0.4343
36	219	0	26	0.4018	0.0167	0.3690	0.4343
37	193	0	193	0.4018	0.0167	0.3690	0.4343

Table 5: Binary relation between the disamenities and the total leave length

Leave in months	**<6**	**7-12**	**13-24**	**25-36**
Spells	231	252	438	449
Frequency in %	0.1686	0.1839	0.3197	0.3277
Ln real gross wage	2.3863	2.3850	2.2799	2.2464
Working hours	33.2277	31.9587	33.0491	33.7924
Working hours(+overtime)	35.9104	34.4960	35.1631	35.3111
Work in the evening	0.2338	0.2579	0.2534	0.1114
Night work	0.1126	0.1032	0.1096	0.0490
Shift work	0.0519	0.1548	0.1370	0.0958
Environm. conditions	9.1145	9.2694	11.1478	11.1917
Physical demand	38.0960	39.4969	41.0187	40.0387

Note: The table above shows raw data: for four different leave lengths windows (0-6 months; 7-12 months, 13-24 months and 25-36 months) the mean of job characteristics of the guaranteed job are displayed.

Table 6a: Results for the coefficients of the job characteristics

	Working[1]	Working[2]	Working[3]	Working[4]	Working[5]
Ln real gross wage	**0.421**	**0.472**	**0.568**	**0.586**	**0.566**
	(4.28)**	(3.76)**	(4.14)**	(4.23)**	(4.13)**
	[0.0100]	[0.0108]	[0.0117]	[0.0125]	[0.0121]
Environm. cond.	**-0.015**	**-0.013**	**-0.014**	**-0.013**	**-0.014**
	(3.00)**	(2.53)*	(2.30)*	(2.26)*	(2.29)*
	[-0.0004]	[-0.0003]	[-0.0003]	[-0.0003]	[-0.0003]
Workload	**0.004**	**0.005**	**0.005**	**0.005**	**0.005**
	(1.08)	(1.21)	(1.13)	(1.10)	(1.13)
	[0.0001]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Working hours	**-0.003**	**-0.008**	**-0.006**	**-0.006**	**-0.006**
	(0.89)	(1.87)	(1.38)	(1.42)	(1.35)
	[-0.0001]	[-0.0002]	[-0.0001]	[-0.0001]	[-0.0001]
Work evenings	**0.298**	**0.284**	**0.254**	**0.265**	**0.253**
	(2.62)**	(2.47)*	(2.05)*	(2.12)*	(2.05)*
	[0.0078]	[0.0071]	[0.0057]	[0.0062]	[0.0059]
Night work	**-0.051**	**-0.166**	**-0.193**	**-0.194**	**-0.195**
	(0.31)	(1.00)	(1.11)	(1.10)	(1.12)
	[-0.0012]	[-0.0035]	[-0.0037]	[-0.0039]	[-0.0038]
Shift work	**0.343**	**0.357**	**0.373**	**0.38**	**0.369**
	(2.80)**	(2.89)**	(2.73)**	(2.75)**	(2.69)**
	[0.0093]	[0.0093]	[0.0089]	[0.0094]	[0.0091]
Constant	**-4.619**	**-5.262**	**-5.356**	**-5.06**	**-5.218**
	(13.86)**	(3.33)**	(2.67)**	(2.70)**	(2.78)**
Observations	26559	26559	26559	26559	26559

Note:
The coefficients are from a discrete logistic duration estimation.
Robust z statistics in parentheses: * significant at 5%; ** significant at 1%
Marginal effects are displayed in brackets
[1] Model 1: no further controls are included
[2] Model 2: Controls are partner, age, age squared, education, further births, region and income
[3] Model 3: Additional controls, besides the one in model 2 are sector, month and year dummies
[4] Model 4: I use log(t) for the baseline hazard
[5] Model 5: I include t, t squared and t cubic for the baseline hazard

Table 6b: Results for the coefficients of personal variables

	Working[2]	Working[3]	Working[4]	Working[5]
Partner	-0.149 (0.90)	-0.182 (1.05)	-0.188 (1.09)	-0.195 (1.13)
Age	0.13 (1.37)	0.061 (0.59)	0.061 (0.58)	0.063 (0.61)
Age squared	-0.002 (1.47)	-0.001 (0.86)	-0.001 (0.88)	-0.001 (0.88)
Education	0.056 (3.27)**	0.061 (3.27)**	0.061 (3.27)**	0.06 (3.24)**
West	-0.723 (1.34)	-1.054 (1.90)	-1.047 (1.87)	-1.055 (1.87)
East	-0.406 (0.73)	-0.79 (1.39)	-0.761 (1.33)	-0.79 (1.37)
Second Birth	-0.578 (4.07)**	-0.288 (1.97)*	-0.319 (2.19)*	-0.278 (1.89)
Inter. income	-0.971 (1.78)	-1.993 (1.93)	-1.961 (1.91)	-1.958 (1.89)
High income	-1.026 (1.87)	-2.103 (2.02)*	-2.076 (2.01)*	-2.07 (1.99)*
Month dum.	no	yes	no	no
Log(t)	-	-	0.312 (5.83)**	-
T	-	-	-	0.144 (3.61)**
t squared	-	-	-	-0.006 (2.17)*
Year dum.	no	yes	yes	yes
Sector dum.	no	yes	yes	yes
Constant	-5.262 (3.33)**	-5.356 (2.67)**	-5.06 (2.70)**	-5.218 (2.78)**
Observations	26559	26559	26559	26559

Note: The results stem from a discrete logistic duration estimation
[2, 3, 4, 5]These specifications refer to the same as in table 6a.The coefficients are from a discrete logistic duration estimation including furthermore wage, working hours, work evenings, night, in shifts, workload and environmental conditions. Robust z statistics in parentheses: * significant at 5%; ** significant at 1%

Table 7a: Marginal willingness to pay for certain disamenities derived from the main specification

	MWP	Std. Err.	Z	P>z	[95% Conf. Interv.]	
Environm. cond.	-0.0239	0.0122	-1.96	0.05	-0.0478	-.0000
Workload	0.0090	0.0082	1.1	0.272	-0.0071	.0250
Working hours	-0.0103	0.0079	-1.31	0.189	-0.0258	.0005
Work evenings	0.4471	0.2502	1.79	0.074	-0.0433	.9374
Night work	-0.3397	0.3142	-1.08	0.28	-0.9554	.2761
Shift work	0.6564	0.2864	2.29	0.022	0.0950	1.2178

Note: The above displayed coefficients for the MWP to pay to avoid certain disamenities are calculated using equation (8).

Table 7b: Hedonic prices for certain disamenities derived from a hedonic wage regression

	Coeff.	Std. Err.	Z	P>z	[95% Conf. Interv.]	
Environm. cond.	-0.0024	0.0012	-1.93	0.054	-0.0049	.0000
Workload	0.0007	0.0010	0.69	0.491	-0.0013	.0026
Working hours	0.0005	0.0010	0.47	0.635	-0.0015	.0024
Work evenings	0.0675	0.0310	2.18	0.029	0.0067	.1282
Night work	-0.0023	0.0432	-0.05	0.958	-0.0870	.0824
Shift work	0.0322	0.0351	0.92	0.359	-0.0366	.1010

Note: The results displayed in this table stem from a hedonic wage regression using only a cross-section of the women eligible for maternal leave. Beside the characteristics of the previous job, I control additionally for partner, age, age squared, education, further births, region, income, sector and year dummies.

Table 8a: MWP derived from a logistic model incl. interactions between job features and region

	MWP	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Environm. cond. (west)	-0.0238	0.0125	-1.9000	0.057	-0.0484	0.0007
Environm. cond. (east)	-0.0393	0.0258	-1.5200	0.128	-0.0898	0.0113
Working hours (west)	-0.0162	0.0079	-2.0500	0.040	-0.0317	-0.0007
Working hours (east)	0.0221	0.0178	1.2400	0.214	-0.0127	0.0568
Work evenings (west)	0.6855	0.2898	2.3700	0.018	0.1176	1.2535
Work evenings (east)	-0.4310	0.3894	-1.1100	0.268	-1.1943	0.3323
Shift work (west)	0.7221	0.3190	2.2600	0.024	0.0968	1.3474
Shift work (east)	0.3398	0.4450	0.7600	0.445	-0.5324	1.2121

Note: Using the results of a discrete duration estimation of equation (7) including interaction terms for the region, I can calculate the displayed MWP to avoid certain disamenities according to equation (8).

Table 8b: MWP derived from a logistic model incl. interactions of job features & income groups

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environm. cond. (low income)	-0.0144	0.0190	-0.7600	0.448	-0.052	0.023
Environm. cond. (intermed. income)	-0.0332	0.0299	-1.1100	0.266	-0.092	0.025
Environm. cond. (high income)	-0.0460	0.0261	-1.7600	0.078	-0.097	0.005
Working hours (low income)	-0.0139	0.0106	-1.3000	0.192	-0.035	0.007
Working hours (intermed. income)	-0.0086	0.0152	-0.5700	0.572	-0.038	0.021
Working hours (high income)	-0.0044	0.0151	-0.2900	0.773	-0.034	0.025
Work evenings (low income)	-0.1940	0.4393	-0.4400	0.659	-1.055	0.667
Work evenings (intermed. income)	0.8288	0.6487	1.2800	0.201	-0.443	2.100
Work evenings (high income)	0.9094	0.5226	1.7400	0.082	-0.115	1.934
Shift work (low income)	0.4620	0.3926	1.1800	0.239	-0.307	1.231
Shift work (intermed. income)	2.0841	1.0767	1.9400	0.053	-0.026	4.194
Shift work (high income)	0.2290	0.4938	0.4600	0.643	-0.739	1.197

Note: Using the results of a discrete duration estimation of equation (7) including interaction terms for the income, I can calculate the displayed MWP to avoid certain disamenities according to equation (8).

Table 8c: MWP derived from a logistic model incl. interaction terms of job features & education

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environm. cond. (low education)	0.0257	0.0180	1.4300	0.153	-0.010	0.061
Environm. cond. (intermed. education)	-0.0415	0.0225	-1.8400	0.065	-0.086	0.003
Environm. cond. (high education)	-0.0676	0.0481	-1.4000	0.160	-0.162	0.027
Working hours (low education)	-0.0038	0.0108	-0.3500	0.728	-0.025	0.017
Working hours (intermed. education)	-0.0122	0.0125	-0.9700	0.330	-0.037	0.012
Working hours (high education)	-0.0099	0.0173	-0.5700	0.565	-0.044	0.024
Work evenings (low education)	0.5888	0.4441	1.3300	0.185	-0.282	1.459
Work evenings (intermed. education)	0.3687	0.3949	0.9300	0.350	-0.405	1.143
Work evenings (high education)	0.9725	0.6983	1.3900	0.164	-0.396	2.341
Shift work (low education)	0.0232	0.4160	0.0600	0.956	-0.792	0.839
Shift work (intermed. education)	0.9819	0.5122	1.9200	0.055	-0.022	1.986
Shift work (high education)	0.8002	0.5997	1.3300	0.182	-0.375	1.976
Workload (low education)	-0.0288	0.0118	-2.4400	0.015	-0.052	-0.006
Workload (intermed. education)	0.0192	0.0147	1.3000	0.193	-0.010	0.048
Workload (high education)	0.0245	0.0226	1.0800	0.278	-0.020	0.069

Note: Using the results of a discrete duration estimation of equation (7) including interaction terms for the education, I can calculate the displayed MWP to avoid certain disamenities according to equation (8).

Table 9: MWP derived from a competing risk model of mothers after first birth

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environ. Cond. (first birth)	-0.0344	0.0175	-1.97	0.049	-0.0688	-0.0001
Environ. Cond. (all births)	-0.0239	0.0122	-1.96	0.05	-0.0478	-.00000
Workload (first birth)	0.0091	0.0100	0.92	0.359	-0.0104	0.0287
Workload (all births)	0.0090	0.0082	1.1	0.272	-0.0071	0.0250
Work evenings (first birth)	0.6170	0.3362	1.84	0.067	-0.0420	1.2759
Work evenings (all births)	0.4471	0.2502	1.79	0.074	-0.0433	0.9374
Shift work (first birth)	0.5464	0.3288	1.66	0.097	-0.0981	1.1908
Shift work (all births)	0.6564	0.2864	2.29	0.022	0.0950	1.2178

Note: Using the sample of only mother giving birth for the first time, I calculate a competing risk model for the options of a mothers to stay at home, return to work or have another child. I can calculate the displayed MWP to avoid certain disamenities according to equation (8).

Table 10: Estimation results using the sample selection correction method by Wooldridge (1995)

	working	working
Ln real gross wage	0.551	0.551
	(4.33)**	(4.33)**
Environmental conditions	-0.014	-0.014
	(2.29)*	(2.29)*
Workload	0.005	0.005
	(1.20)	(1.21)
Working hours	-0.006	-0.006
	(1.43)	(1.43)
Work in the evening	0.259	0.259
	(2.09)*	(2.09)*
Night work	-0.189	-0.189
	(1.08)	(1.08)
Shift work	0.37	0.37
	(2.71)**	(2.70)**
Mills ratio	-	0.037
	-	(0.58)
Constant	-6.983	-7.071
	(3.73)**	(3.75)**
Observations	26560	26560

Note: The estimation is a two step estimation correcting for possible sample selection (Wooldridge (1995). At the first stage I estimate the probability to have a baby at every year between 1992 and 2005, given the characteristics of the job a mother is working in and control additionally for the siblings of the mothers (exclusion restriction). Calculating the inverse mills ratio and including it in equation (7) I can estimate the discrete duration model as before, but now accounting for possible sample selection.

Table 11a: Estimation results using the estimation method suggested by Heckman and Singer (1984)

	Logistic hazard	Complementary log log	Heckman and Singer
	Working	**Working**	**Hazard rate**
Ln real gross wage	**0.551**	**0.564**	**0.620**
	(4.33)**	(4.55)**	(4.53)**
Environm. cond.	**-0.014**	**-0.013**	**-0.013**
	(2.29)*	(2.45)*	(2.26)*
Workload	**0.005**	**0.005**	**0.004**
	(1.20)	(1.22)	(1.01)
Working hours	**-0.006**	**-0.005**	**-0.004**
	(1.43)	(1.43)	(0.88)
Work evenings	**0.259**	**0.255**	**0.268**
	(2.09)*	(2.2)*	(2.12)*
Night work	**-0.189**	**-0.186**	**-0.181**
	(1.08)	(1.13)	(1.02)
Shift work	**0.37**	**0.365**	**0.389**
	(2.71)**	(2.91)**	(2.86)**
Constant	**-6.289**	**-5.294**	**-5.348**
	(3.51)**	(2.64)	(2.50)
Observations	26559	26559	26559

Note: The coefficients are from discrete duration models assuming different hazard functions.
Robust z statistics in parentheses: * significant at 5%; ** significant at 1%
Further controls are partner, age, age squared, education, further births, region, income, sector, month, year and reform dummies.

Table 11b: MWP derived from estimation results using the method by Heckman and Singer (1984)

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environm. cond. (logistic)	-0.0245	0.0124	-1.97	0.05	-0.0489	-0.0002
Environm. cond. (hshaz)	-0.0217	0.0109	-1.99	0.05	-0.0430	-0.0004
Work evenings (logistic)	0.4708	0.2572	1.83	0.07	-0.0333	0.9748
Work evenings (hshaz)	0.4317	0.2321	1.86	0.06	-0.0231	0.8866
Shift work (logistic)	0.6719	0.2920	2.30	0.02	0.0996	1.2441
Shift work (hshaz)	0.6274	0.2610	2.40	0.02	0.1158	1.1389

Note: The displayed MWP are calculated using the results of the Heckman and singer (1984) estimation method and applying equation (8).

Table 12: Comparison of job characteristics previous and posterior to maternal leave

	Job characteristics previous to leave	Job characteristics posterior to leave
Ln real gross wage	2.3062	2.271
Working hours	33.1223	24.1039
Actual working hours	35.2145	22.9607
Work in the evening	0.2044	0.2044
Night work	0.0891	0.0755
Shift work	0.1124	0.1237
Environm. conditions	10.4739	10.9962
Workload	39.9248	41.0542

Note: Column 1 shows the characteristics reported by a woman before going on leave and column 2 the ones reported by a mother conditional on having come back to work. Thus the sample sizes differ, column two excludes all censored spells

Table 13: MWP for disamenities in the different years of maternity leave

	MWP	Std. Err.	z	P>z	[95% Conf	Interval]
Environm. cond. (year 1)	-0.0219	0.0139	-1.57	0.115	-0.049	0.005
Environm. cond. (year 2)	-0.0273	0.0184	-1.48	0.138	-0.063	0.009
Environm. cond. (year 3)	-0.0259	0.0255	-1.01	0.311	-0.076	0.024
Work evenings (year 1)	0.4192	0.2785	1.51	0.132	-0.127	0.965
Work evenings (year 2)	0.5229	0.3659	1.43	0.153	-0.194	1.240
Work evenings (year 3)	0.4953	0.5053	0.98	0.327	-0.495	1.486
Shift work (year 1)	0.5979	0.3410	1.75	0.080	-0.070	1.266
Shift work (year 2)	0.7458	0.4659	1.60	0.109	-0.167	1.659
Shift work (year 3)	0.7064	0.6816	1.04	0.300	-0.629	2.042

Note: The table above is based on the results of a discrete duration estimation of equation (7) including interaction terms of the wage with dummies for each of the three years of maternal leave. Using equation (8) I can calculate the MWP for each disamenity but depending on the year after giving birth.

Table 14: Estimation results of a discrete logistic model accounting for part-time

	Working	Working	Working	Working
Ln real gross wage	**0.568**	**0.534**	**0.573**	**0.553**
	(4.14)**	(4.22)**	(4.46)**	(4.33)**
Environm. cond.	**-0.014**	**-0.013**	**-0.012**	**-0.012**
	(2.30)*	(2.20)*	(2.12)*	(2.03)*
Workload	**0.005**	**0.005**	**0.004**	**0.003**
	(1.13)	(1.08)	(0.91)	(0.78)
Working hours	**-0.006**	**0.004**	**-0.007**	**0.004**
	(1.38)	(0.67)	(1.65)	(0.60)
Work evenings	**0.254**	**0.243**	**0.332**	**0.315**
	(2.05)*	(1.95)	(2.70)**	(2.57)*
Night work	**-0.193**	**-0.176**	**-0.177**	**-0.164**
	(1.11)	(1.01)	(1.01)	(0.94)
Shift work	**0.373**	**0.378**	**0.385**	**0.393**
	(2.73)**	(2.76)**	(2.94)**	(3.02)**
Part-time	**-**	**0.316**	**-**	**0.328**
	-	(2.28)*	-	(2.38)*
Reform 01	**-**	**-**	**0.053**	**0.069**
	-	-	(0.36)	(0.47)
Constant	**-5.356**	**-6.595**	**-5.836**	**-7.041**
	(2.67)**	(3.68)**	(3.44)**	(3.97)**
Observations	26559	26559	26559	26559

Note:
Robust z statistics in parentheses: * significant at 5%; ** at 1%
Furthermore I include the following controls: age, age squared, partner, domicile, number of kids, education, sector, year, months and reform dummies.

Table 15: Robustness check for Panel attrition using a discrete logistic model

	Working	Ever[1] Working	Never[2] Working
Ln real gross wage	**0.568**	**0.547**	**0.551**
	(4.14)**	(4.30)**	(4.33)**
Environmental conditions	**-0.014**	**-0.015**	**-0.014**
	(2.30)*	(2.39)*	(2.31)*
Workload	**0.005**	**0.007**	**0.006**
	(1.13)	(1.40)	(1.23)
Working hours	**-0.006**	**-0.007**	**-0.006**
	(1.38)	(1.59)	(1.46)
Evening work	**0.254**	**0.233**	**0.257**
	(2.05)*	(1.81)	(2.08)*
Night work	**-0.193**	**-0.186**	**-0.19**
	(1.11)	(1.02)	(1.09)
Shift work	**0.373**	**0.405**	**0.372**
	(2.73)**	(2.87)**	(2.72)**
Constant	**-5.356**	**-7.294**	**-8.623**
	(2.67)**	(4.17)**	(4.84)**
Observations	26599	37511	27359

Note:
Robust z statistics in parentheses: * significant at 5%; ** significant at 1%
Furthermore I include the following control variables: age, age squared, partner, number of kids, years of education, domicile, sector, year, months and reform dummies.
[1]Ever: Assumption that women come directly back to work once they are dropped from the dataset
[2]Never: Assumption that women who are dropped from the dataset never come back to work

Table 16a: Results of estimating a discrete logistic model using a 3-digit occupational code

	4-digit occupational code Working	3-digit occupational code Working
ln real gross wage	**0.568**	**0.549**
	(4.14)**	(4.27)**
Environm. cond.	**-0.014**	**-0.022**
	(2.30)*	(2.93)**
Workload	**0.005**	**0.011**
	(1.13)	(2.23)*
Working hours	**-0.006**	**-0.007**
	(1.38)	(1.72)
Work evenings	**0.254**	**0.257**
	(2.05)*	(2.06)*
Night work	**-0.193**	**-0.198**
	(1.11)	(1.11)
Shift work	**0.373**	**0.342**
	(2.73)**	(2.48)*
Constant	**-5.356**	**-8.172**
	(2.67)**	(4.54)**
Observations	26599	26218

Note: Robust z statistics in parentheses: * significant at 5%; ** at 1%
Furthermore I include the following controls: age, age squared, partner, domicile, number of kids, education, sector, year, months & reform dummies.

Table 16b: Comparison of the MWP derived from an estimation using 3- and a 4-digit occupations

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environm. cond. (4-digit)	-0.0239	0.0122	-1.96	0.05	-0.0478	-0.0239
Environm. cond. (3-digit)	-0.0403	0.0174	-2.31	0.02	-0.0744	-0.0061
Workload (4-digit)	0.0098	0.0084	1.17	0.24	-0.0066	0.0262
Workload (3-digit)	0.0195	0.0098	1.99	0.05	0.0003	0.0387
Workload (4-digit)	0.0098	0.0084	1.17	0.24	-0.0066	0.0262
Workload (3-digit)	0.0195	0.0098	1.99	0.05	0.0003	0.0387

Note: The MWP are calculated according to equation (8) using the coefficients estimated on the one hand using the 3digit and on the other hand the 4-digit occupational code to construct the average occupational disamenities

Table 17a: Results of a discrete logistic duration model using factors constructed by a factor analysis

	Working	Working
Ln real gross wage	0.551	0.55
	(4.33)**	(4.32)**
Environm. conditions	-0.014	-
	(2.29)*	-
Workload	0.005	-
	(1.20)	-
Factor hazards	-	-0.089
	-	(2.72)**
Factor workload	-	0.057
	-	(1.96)
Working hours	-0.006	-0.006
	(1.43)	(1.30)
Work in the evening	0.259	0.257
	(2.09)*	(2.07)*
Night work	-0.189	-0.176
	(1.08)	(1.02)
Shift work	0.37	0.359
	(2.71)**	(2.61)**
Constant	-6.289	-6.246
	(3.51)**	(3.54)**
Observations	26559	26559

Note:
Robust z statistics in parentheses: * significant at 5%; ** at 1%
Furthermore I include the following controls: age, age squared, partner, domicile, number of kids, education, sector, year, months and reform dummies.

Table 17b: MWP derived from the results of a discrete logistic duration estimation using factors

	MWP	Std. Err.	z	P>z	[95% Conf.	Interval]
Environm. cond.	-0.0245	0.0124	-1.97	0.05	-0.0489	-0.0002
Environm. cond. (factor)	-0.1618	0.0714	-2.27	0.02	-0.3017	-0.0220
Workload	0.0098	0.0084	1.17	0.24	-0.0066	0.0262
Workload (factor)	0.1038	0.0574	1.81	0.07	-0.0088	0.2164

Note: The MWP are calculated according to equation (8) using the coefficients estimated by a discrete duration estimation of equation (7) that includes as controls disamenities measures constructed on the one hand as an unweighted averages and on the other hand by a factor analysis.

Table 18a: Results of a discrete logistic duration estimation using all years 1986-2004

	1992-2004 Working	1986-2004 Working
Ln real gross wage	**0.568**	**0.444**
	(4.14)**	(4.03)**
Environm. cond.	**-0.014**	**-0.008**
	(2.30)*	(1.63)
Workload	**0.005**	**0.003**
	(1.13)	(0.71)
Working hours	**-0.006**	**-0.006**
	(1.38)	(1.59)
Work evenings	**0.254**	**0.28**
	(2.05)*	(2.24)*
Night work	**-0.193**	**-0.133**
	(1.11)	(0.78)
Shift work	**0.373**	**0.323**
	(2.73)**	(2.80)**
Constant	**-5.356**	**-4.212**
	(2.67)**	(2.97)**
Observations	26599	31637

Note:
Robust z statistics in parentheses: * significant at 5%; ** at 1%
Furthermore I include the following controls: age, age squared, partner, domicile, number of kids, education, sector, year, months & reform dummies.

Table 18b: Comparison of the MWP derived from estimations using years 1992-2004 and 1986-2004

	MWP	Std. Err.	z	P>z	[95% Conf	Interval]
Environm. cond. (92-04)	-0.0239	0.0122	-1.96	0.05	-0.0478	-0.0239
Environm. cond. (84-04)	-0.0180	0.0122	-1.48	0.14	-0.0418	0.0059
Work evenings (92-04)	0.4471	0.2502	1.79	0.074	-0.0433	0.4471
Work evenings (84-04)	0.6310	0.3313	1.90	0.06	-0.0183	1.2803
Shift work (92-04)	0.6564	0.2864	2.29	0.022	0.0950	0.6564
Shift work (84-04)	0.7283	0.3162	2.30	0.02	0.1086	1.3480

Note: The MWP are calculated according to equation (8) using the coefficients estimated by a discrete duration estimation of equation (7) that uses on the one hand a sample including all year 1984-2004 and then only the years during which the maternal leave has remained unchanged 36 months long.