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THE CHILD PENALTY
A COMPENSATING WAGE DIFFERENTIAL?

CHRISTINA FELFE

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Abstract

Many studies document that women with children tend to earn lower wages than women without children (a shortfall known as the 'child penalty' or 'family gap'). Despite the existence of several hypotheses about the causes of the child penalty, much about the gap in wages remains unexplained. This study explores the premise that mothers might substitute income for advantageous, non-pecuniary job characteristics. More specifically, the hypothesis to be investigated is that if the labour market rewards working arrangements that involve disamenities, to some extent the child penalty might be a compensating wage differential for the disamenities avoided by mothers.

In order to assess the impact of motherhood on the choice between pecuniary and non-pecuniary job features in Germany, data from the German Socio-Economic Panel (GSOEP) is used. The longitudinal nature of the data allows a comparison of working women before and after the birth of their first child. Furthermore, the GSOEP provides detailed information on personal attributes, job characteristics and job satisfaction, which enables the application of the following three steps to test the hypothesis. First, an event study is used to analyse the changes in the characteristics of a woman's job around the birth of her first child. The features of interest are time, workload and flexibility. Second, job characteristics are included by their utility (proxied by job satisfaction) for a mother. Third, following the approach of hedonic wage regressions, these (dis)amenities are included in the wage regression in order to see whether a trade-off exists between pecuniary and non-pecuniary job characteristics. The results suggest that to some degree the child penalty can be interpreted as a compensating wage differential.

* Christina Felfe is with Fedea, Madrid and Universitat Pompeu Fabra, Barcelona.

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1. Introduction

The fact that working mothers tend to earn less than women without children seems to be well established in the economic literature and is called the 'child penalty' or 'family gap'. Several researchers have found raw wage gaps of almost 20% in the US, 13% in the UK and up to 20% in Germany.[1] They have investigated the following hypotheses about its causes: loss in human capital owing to maternity leave, choice of sector or job type, different working schedules, limited flexibility, employer discrimination, heterogeneity between mothers and non-mothers, etc. Yet so far, not many have explored the hypothesis that the jobs of women with and those without children may differ with respect to certain non-pecuniary characteristics. In other words, mothers might make their decision to participate in the labour market and choose their job according to different criteria than non-mothers. If a better paid job does not offer family-friendly conditions, a mother may decide to stay out of the labour market or to work at a lower paid job with better features. Thus a mother might substitute income for convenient job characteristics, referred to as 'amenities'. The hypothesis to be tested is that if the labour market rewards working arrangements that involve disamenities, to some extent the child penalty might be a compensating wage differential for the disamenities avoided by mothers.

In order to investigate the impact of motherhood on the choice between pecuniary and non-pecuniary job characteristics in Germany, data from the German Socio-Economic Panel (GSOEP) is used (1984-2003). The dataset provides detailed information about personal attributes and job characteristics, with attention given to the pecuniary and particularly the non-pecuniary aspects of jobs. In addition, it provides data on job satisfaction, which is used as a proxy for utility and enables testing based on the theory of hedonic wages that pecuniary and non-pecuniary job characteristics jointly determine the satisfaction of a mother. The longitudinal nature of the data allows the observation of women during their fertile ages (defined as age 16 to 46). As a result, not only can we compare the jobs of mothers and non-mothers, but also the jobs of mothers before and after they have had their first child. Using the information provided by the GSOEP, it is possible to test the hypothesis of the child penalty as a compensating wage differential using the three steps outlined below.

First of all it is necessary to investigate whether jobs change not only with respect to financial aspects but also non-financial ones around the birth of the first child. The methodology used is an event study analysis, which examines the effects of the first birth on a variety of job characteristics. The second step shows whether, and if so how, these job features become utility factors for mothers. According to the theory of compensating wage differentials, the utility a worker gains from his/her job is jointly determined by its pecuniary and non-pecuniary characteristics. In the case where a working mother is willing to give up some of her income in order to have a more family-friendly job, a gain in certain job characteristics has to compensate for this loss in wages and thus raise the utility of the job for the mother. Therefore job satisfaction is regressed (using satisfaction as a proxy for utility) on certain job features. In a last

[1] See Waldfogel (1997), Harkness & Waldfogel (1999) and Kunze & Ejrnaes (2004).

step an attempt is made to measure how much of their wages mothers are willing to give up in exchange for a job with more amenities (and fewer disamenities). A hedonic wage regression is run that includes certain (dis)amenities as control variables. The results of these regressions give evidence that some disamenities raise wages significantly. Furthermore, it can be seen that including (dis)amenities decreases the child penalty, which gives evidence that at least some of the family gap can be explained by a substitution of income with family-friendly job characteristics.

The contribution of this study is to investigate whether mothers substitute income for advantageous, non-pecuniary job characteristics and thus if the child penalty might be a compensating wage differential. The determination of important job features for mothers, which could facilitate a better balance of career and family, and their price in the labour market, may be useful for a better design of family policy.

The study is structured in the following way. In section 2 previous research about the child penalty is briefly presented. Then in section 3 the theory of compensating wage differentials is introduced in order to explain why mothers have to choose between jobs offering different packages of pecuniary and non-pecuniary benefits. Section 4 describes the data and the methodology used to test for compensating wage differentials. Section 5 reports the regression results in detail. Section 6 concludes, with suggested avenues for further research.

2. Literature review

The negative impact of motherhood on individual wages seems to be a well-established empirical fact. The most common approach to analysing the wage effect of having children has been to estimate the child penalty, i.e. by comparing the wages of women with and without children while controlling for observed characteristics. The family gap in the US and UK, according to Waldfogel (1994), is large and persistent. Among young women, mothers' wages lag 20 percentage points behind those of non-mothers. Harkness & Waldfogel (1999) find some evidence of the family gap in several industrialised countries, such as Australia, Canada, Germany, Finland and Sweden. But different institutions in these countries lead to wide variation in the magnitudes of the gap (the UK displayed the largest child penalty). On the one hand, a larger family gap is positively correlated with the gender gap, while on the other hand it is negatively correlated with women's labour market participation.

Several theoretical explanations for the child penalty are offered in the socio-economic literature. The first hypothesis is that maternity leave interrupts the labour market career and leads, like all kinds of career interruptions, to a loss in work experience and thus in a depreciation of human capital (Mincer & Polachek, 1974). For the US and the UK, Waldfogel (1998b) shows that maternity leave leads to the depreciation of human capital and in turn reduces wages, even if maternity leave allows mothers to maintain the relationship with their previous employer. In Germany career interruptions lead to a reduction in wage rates for both men and women (Beblo & Wolf, 2002). Despite the relatively generous German parental leave system, Kunze (2002) found a higher depreciation of human capital as a result of maternity leave than unemployment.

Alongside career interruptions, a second explanation holds that periods of part-time work cause depreciation in human capital. Traditional wage estimations that do not control for depreciation underestimate the return to work experience. A new approach substitutes actual experience by effective experience, taking into account the duration of non-working and part-time spells of employment. For the US and the UK, Waldfogel (1997) shows that periods of part-time work are relevant for explaining the child penalty. In Joshi, Paci & Waldfogel (1999), the child penalty is examined for two cohorts of British women. By using the Oaxaca decomposition they find that part-time employment can explain some of the family gap. Nevertheless, there is still

evidence of the family gap for women who are in full-time employment. Beblo & Wolf (2000) include in their estimations about German mothers not only part-time periods of work but also the timing of career interruptions. Their estimation results suggest that deviations from full-time employment are penalised by significant wage cuts. Additionally, the wage rate falls even more if the period of discontinuity of the career is postponed.

A third explanation refers to the unobserved heterogeneity among women. The underlying idea is that women differ with respect to abilities and preferences, which are usually unobserved and may be correlated with fertility. To deal with this aspect most of the studies apply a fixed-effect methodology, which removes unobserved permanent characteristics. Using this methodology Waldfogel (1997) rejects the hypothesis of unobserved pay-relevant heterogeneity of mothers and non-mothers. Using the Panel Study of Income Dynamics (PSID), however, Lundberg & Rose (2000) find a family gap of 9% even before the first birth. Kunze & Ejrnaes (2004) confirm the dip in wages before the first birth for Germany. This 'unexplained' dip in wages prior to children might indicate heterogeneity between mothers and non-mothers, and could be another explanation of the child penalty: fertility could be endogenous to the wage process, i.e. successful women might postpone having children or choose not to.

Previous studies have also documented a fourth hypothesis, in which the differences in income between women with and without children are related to sectoral or occupational segregation. Sectors or types of jobs held by mothers are, in general, lower paid. This loss in income might be compensated by a more family-friendly working environment, which explains the child penalty to some degree. Nielsen, Simonsen & Verner (2001) addressed the issue of the choice of sector. Using a model where the choice of the private versus the public sector is endogenous, they find only a small wage effect of career interruptions in the public sector and no effects in the private sector. Beblo, Bender & Wolf (2004) have recently developed an interesting approach to differences among sectors and firms by matching mothers and non-mothers with similar characteristics within firms. They also confirm a significant child penalty.

The job choice of mothers, however, is limited according to the hypothesis of their lower job mobility. The fact that mothers may be less mobile or flexible constitutes the fifth hypothesis to explain the child penalty. Owing to higher job-search costs, mothers maintain poor job matches; the quality of their job match improves only slowly and lower earnings follow as a consequence. Conversely, Waldfogel (1998a) and Phipps, Burton & Lethbridge (2001) find that maintaining the same job position after maternity leave actually decreases the child penalty. Staying with the same employer acts as a kind of insurance against income loss.

The hypothesis of discrimination is the last one often referred to, but it is hard to prove. Discrimination means that given the same individual attributes, employers treat mothers and non-mothers differently for reasons not related to productivity. Employer prejudices could include the idea that, for example, mothers are less productive since they have less time and effort to invest in their job. Becker (1985) and Hersch & Stratton (1997) have already suggested this hypothesis. Phipps, Burton & Lethbridge (2001) include the numbers of hours spent on unpaid work in their estimation. This approach to testing the discrimination theory reveals that the loss in income declines, but the child penalty remains significant.

Although these earlier studies have tried to include several possible factors underlying the child penalty, so far the possibility that mothers might work in jobs with different characteristics has not been addressed. This study adds to the literature by attempting to determine whether mothers substitute income with pleasant job conditions (amenities) in order to better combine family and career. The goal of this analysis is to find out which job amenities attract mothers and if (to some extent) the child penalty may be a compensating wage differential. Using a longitudinal dataset (the GSOEP), the prevalence of several non-wage job characteristics is estimated for German mothers during their fertile ages, revealing that some changes take place

around the first birth. Regressing satisfaction for several non-wage job features demonstrates that family-friendly conditions raise the job satisfaction of mothers. This gives rise to the hypothesis that mothers might be willing to substitute income with those amenities. Including these (dis)amenities in the wage regression provides evidence for a trade-off between pecuniary and non-pecuniary job characteristics and thus for the hypothesis that to some extent the child penalty may be a compensating wage differential.

Before testing the hypothesis empirically, the theory of compensating wage differentials is briefly introduced in order to make a plausible case as to why a mother may have to give up some of her income for a job offering more amenities.

3. The theory of compensating wage differentials

Economic theory assumes that workers try to maximise their utility. A higher monetary compensation increases the utility of a worker, but it is clear that money is not all that matters. The utility an individual derives from a particular job depends upon an individual's characteristics, the wage s/he can receive on the job, and other non-pecuniary characteristics of the job. The utility of a worker can be defined as the following function:[2]

$$U_{ijt}(w_{ijt}, d_{jt}, a_{it}) = w_{ijt}(d_{jt}) - d_{jt} * a_{it} \quad (1)$$

where w_{ijt} = wage of individual i in job j at time t

d_{jt} = disamenities of job j at time t

a_{it} = aversion of individual i against disamenities at time t

$U_{ijt}'(w_{ijt}) > 0$; $U_{ijt}'(d_{jt}) < 0$; $w_{jt}'(d_{jt}) > 0$ and $w_{jt}''(d_{jt}) < 0$

Under complete information and perfect mobility, a worker is able to 'visit' different markets and choose the job that gives him/her the greatest satisfaction. In other words, the problem of each worker consists of selecting the best combination of pecuniary and non-pecuniary job characteristics in order to maximise the worker's utility. The maximisation problem, taking into consideration the participation constraint (i.e. participating in the labour market has a higher utility than not participating) can be presented as:

$$\max \; U_{ijt}(w_{ijt}, d_{jt}, a_{it}) = w_{ijt}(d_{jt}) - d_{jt} * a_{it} \quad (2)$$

$$\text{s.t. } U_{ijt}(w_{ijt}, d_{jt}, a_{it}) \geq U_{ijt}(0, 0, a_{it})$$

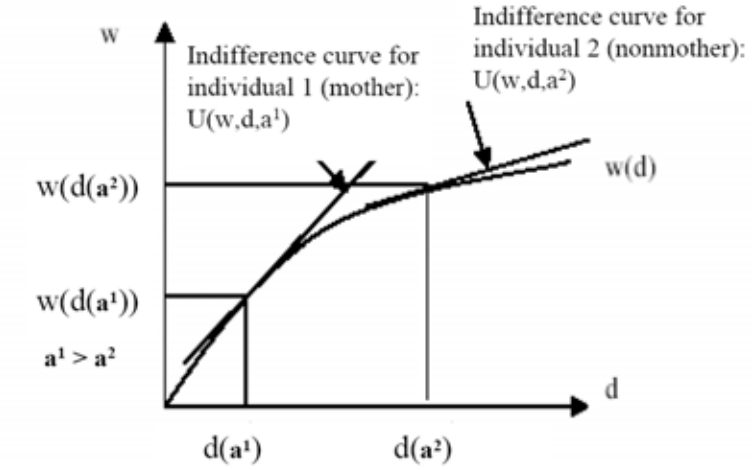
$$\text{FOC: } \delta w_{ijt} / \delta d_{jt} = a_{it}$$

The solution to this problem indicates that a worker chooses the job in which the marginal return to disamenities $\delta w_{ijt}/\delta d_{jt}$ is equal to the aversion a_{it} that it gives rise to. Since the marginal return to disamenities is decreasing with an increasing amount of disamenities, the amount of disamenities d_{jt} a worker can stand diminishes with a_{it} measuring the disutility of disamenities. Figure 1 represents the choice of two workers differing in their aversion against amenities ($a^1 > a^2$, i.e. worker 1 has a stronger aversion against disamenities a^1 than worker 2 with a^2).

Nevertheless, it is not obvious *a priori* how different job characteristics enter the utility function, i.e. if they are amenities or disamenities, and what are the packages of different characteristics that give rise to the same level of utility.

[2] For a summary of the seminal work about compensating wage differentials, see Rosen (1986).

Figure 1. The theory of equalising difference



Source: Rosen (1986).

The following section describes the data and explains the methodology used in order to test how different job characteristics determine the utility of mothers, and whether the child penalty may be a compensating wage differential.

4. Data and methodology

The dataset used is the GSOEP, which is an annually repeated survey of Germans and foreigners in West and East Germany (1984-2003). Since 1984 the GSOEP has followed the members of the panel. In 2003 the GSOEP provided information about more than 12,000 households consisting of more than 24,000 persons.

The longitudinal nature of the data allows the observation of mothers for the years around the birth of their first child. Thus, not only can we compare the jobs of mothers and non-mothers, but also the jobs of women before and after they became a mother. The GSOEP has two other features that make the survey especially suitable to a methodology for testing the hypothesis of the child penalty as a compensating wage differential. First, the GSOEP has detailed annual information on personal attributes and pecuniary job characteristics and for some years several non-pecuniary ones as well. This information is necessary to set up a relation between the pecuniary and non-pecuniary features of a job. Second, the GSOEP provides data about job satisfaction, which is used as a proxy for utility and thus allows the testing of whether certain job characteristics enter the utility function.

The sample of interest includes all women in their fertile period, defined as age 16 to 46. It consists of 2,824 individuals, 1,895 of whom are mothers (defined as all women who have had a baby prior to 2003)[3] and 929 of whom are non-mothers as of 2003. This definition, however, does not exclude the possibility that a woman without children might become a mother after

[3] An alternative dataset includes only those women who gave birth to their first child between 1985 and 2002. Taking attrition into account as well, this dataset guarantees that women are observed (at least one period) before and after the event of the first birth. The decision to use the dataset including all women who first gave birth before 2003 was for the following reasons: first, the possibility that the timing of the first child might be endogenous could not be excluded; second, the larger sample size of the first dataset leads to more significant results. In any case, the results using the dataset including mothers whose first birth was between 1985 and 2002 are available on request.

2003. The interest lies in job characteristics and thus only working women are considered in the analysis. That being said, women are likely to drop out of the labour market when becoming a mother. This trend could lead to a sample selection bias, which is addressed in section 4.1.2. Furthermore, missing observations for non-pecuniary job characteristics reduce the sample a great deal. Still, using information about job changes, some information can be reconstructed (see section 5.2.2).

In order to test the hypothesis of the child penalty as a compensating wage differential, the following methodology, divided into three parts, is applied.

A first step is to investigate whether motherhood really affects non-wage job characteristics, i.e. if not only wage but also non-wage job aspects change after motherhood and consequently the loss of wages may be compensated by an increase in amenities. In order to estimate changes in job characteristics around and after motherhood, an event study analysis is used, which examines the effects of the first birth on a variety of job characteristics. This method is described in section 4.1.1. A second necessary step is to show if and how certain job features enter the utility function of mothers. According to the theory of compensating wage differentials, both pecuniary and non-pecuniary features jointly determine the utility of a worker. In the case where a mother is willing to give up some of her income in order to have a more family-friendly job, a gain in certain job characteristics has to compensate for this loss in wages and raise the job's utility for the mother. In order to test this empirically, a satisfaction regression is used, which is explained in section 4.2. In a last step an attempt is made to measure the compensating wage differential, i.e. how much of their wages mothers are willing to give up for having a job with more amenities (fewer disamenities). Therefore at this stage a hedonic wage regression is run that includes certain (dis)amenities as control variables. This regression is explained in section 4.3.

4.1 Empirical test of changes in job characteristics around the first birth

4.1.1 Event study

As noted above, the first step involved in testing whether the child penalty is a compensating wage differential is to show that the jobs of women before and after the first birth differ not only in wages but also in other non-wage aspects. This comparison is done in the form of an event study analysis, a method used to see if a particular event influences some outcome – here if motherhood influences job characteristics. The basic model is the following:

$$Y_{it} = \beta_1 * Pre1_{it} + \beta_2 * Birth1_{1it} + \beta_3 * Post1_{it} + \delta * X_{it} + a_i + u_{it} \quad (3)$$

Since the goal is to determine the impact of motherhood on job characteristics, the dependent variable Y_{it} represents all pecuniary and non-pecuniary job characteristics, described below.

In order to compare the job characteristics around the first birth, the following three dummies have been introduced: $Birth1_{it}$ represents the year of the first birth; $Pre1_{it}$ represents all years prior; and $Post1_{it}$ represents all years after the first birth.[4] An example illustrates the definition of the three dummies as follows: if a mother gives birth to her first child in 1990 for example, the year 1990 will be defined as the year of birth.[5] According to the definition given above, all

[4] For a non-mother all three dummies (Birth, Pre and Post) take the value of 0.

[5] In order to distinguish between births, which are early and late in the year, year t is defined as the birth year if the child is born before September of year t, and respectively year t+1 as the birth year if the birth takes place between September and December of year t.

years from 1984 to 1989 are summarised in the Pre1 period and all the following years of 1991 to 2003 are summarised in the Post1 period. The dummy Pre1 is introduced in order to capture the heterogeneity between mothers and non-mothers that may already exist before the first birth. The child penalty can be measured as β_3-β_1, i.e. it compares how the job of a woman changes after the first birth in comparison to before.

The event study (represented by equation (3)) documents changes in job characteristics for mothers around the time of their first birth. First, the effect of motherhood on wages is estimated to have a measure of the family gap. Second, the effect on several non-pecuniary job characteristics is estimated. An overview of all job characteristics, their definition and how they are constructed can be found in Table A1 in the appendix.[6]

For the estimation of the wage gap the *logarithm of the gross* and *net wage rate* is calculated taking into account contracted working hours.[7] The advantage of taking agreed hours instead of actual working hours is that they are an objective measure and do not have many outliers. The selection of job amenities, for which a mother may be willing to substitute income, follows the literature on compensating wage differentials for disamenities as shown in Rosen (1986), Usui (2003) and Villanueva (2004). They distinguish among different disamenities such as the regulation of working hours, workload and job security. Thus the aspects of *time, workload* and *flexibility* are considered here.

Time is a scarce resource for a mother since she has to allocate it to both job and family. Therefore it can be assumed that the marginal utility of time increases when a woman becomes a mother. This may lead to a reallocation of the hours spent on the job and on housework. *Weekly working hours* are considered first, in fact controlling for the amount of hours a woman is actually working, i.e. the contracted working hours plus overtime. Furthermore, different aspects of the schedule are taken into consideration such as *work in the evening* or at *night* and *shift work*. Also investigated is whether the job of a woman allows for a certain degree of *flexibility*. Different aspects of flexibility are important for a mother since this allows her to better combine career and family. One aspect is a *flexible working schedule*, i.e. if a woman can set her working hours as she likes. Another feature determining the flexibility of a job is the possibility to *work from home*. For the job decision the fixed costs of travelling to work play a role as well; thus, the *distance to the job*, measured in kilometres, is evaluated. Jobs additionally differ in the level of *workload* measured by *stress* and *physical demand*. Workload may be relevant for a mother since she has to face a double load of work on the job and at home. It is clear that these variables are highly subjective and may be evaluated differently by everyone – including by mothers and non-mothers. Lastly, a job might offer some *undesirable working conditions* such as heat and gases, which a woman may wish to avoid when becoming a mother.

Each of the above-described job characteristics is regressed (separately) on the dummies Pre, Birth and Post as well as on a set of control variables, including personal attributes such as marital status, age, age squared, education and origin, represented by the variable X_{it}. Marital status is described by a dummy called 'partner', which is 1 for all women who are either married or who have a permanent partner; otherwise it is 0. Both age and age squared are included in order to capture the decreasing positive returns to experience. Education is measured in years. A woman may be West or East German, or a foreigner. Finally, a set of dummies for the years from 1984 to 2003 is included.

[6] For reasons of simplicity several variables have been made binary. For the construction, see Table A1 in the appendix.

[7] Hourly wages are calculated by dividing monthly income by the contracted working hours per month. Since only weekly working hours are available, these are adjusted to a monthly measure by multiplying everything by 31/7 (days per month/days per week).

Taking the basic event analysis model and the specification of variables described above allows the impact of motherhood on certain job characteristics to be measured. Linear fixed-effect models are applied in order to account for unobserved heterogeneity, such as preferences for job characteristics and family life.

It is important for this analysis to have in mind that women, especially mothers, often do not continuously participate in the labour market. This leads to the fact that women, particularly after motherhood, drop out of the sample, which may give rise to sample selection and biased estimates. Therefore a test of sample selection bias is applied, and where necessary the correction suggested by Wooldridge (1995), both of which are explained in the next section.

4.1.2 Sample selection and labour force participation

As empirical evidence and past research confirm, there is still a strong negative impact of motherhood on labour force participation. We can observe this impact from looking at our sample, which includes all women aged between 16 and 46, who are observed to be employed at least at some point between 1984 and 2003 and who have either had a baby before 2003 or not had a baby as of 2003. An overview of labour force participation around the first birth can be found in Table A2 in the appendix.

A high percentage of women drop out of the labour force when having a child. Although before the first birth participation in the labour market rises continuously (79.4% of women worked five years before the first child, 84.4% two years before and 83.35% one year before), it falls dramatically in the year of the first birth (35.60%) and even more so the year after (26.43%). Some of mothers decide to return to work, but this return is only observed gradually: after two years 37% of the mothers are employed; after three years more than 40% are employed and after six years it rises to more than 50%. Yet even if some mothers return to the labour market, others may never return after having children – even after the first child is an adult less than 65% of the mothers work, while prior to the first child more than 80% work.

As previously mentioned, the fact that women drop out of the labour force (especially when becoming a mother) constitutes a self-selection of mothers and thus possibly leads to a sample selection problem. It is well known that failure to account for sample selection can lead to inconsistent estimates. Linear panel data models, which take care of unobserved, individual permanent heterogeneity, cannot eliminate the sample selection bias by simply applying a fixed-effect model. This is because the sample-selection effect, which is determined by the selection equation and is entered additively to the main equation, is generally an unknown nonlinear function of both the observed time-varying regressors and the unobservable individual effects of the selection equation, and is therefore not constant over time.

The problem of sample selection in panel data has been a topic of recent econometric investigation. One of the first approaches to assessing for endogeneity and sample selection was suggested by Wooldridge (1995). He proposed a test and correction procedure that allows for correlation between the unobserved effects of both the selection and primary equations. His model specifies a distributional assumption only for the error terms in the selection equation, but not for those in the primary equation. It furthermore allows the idiosyncratic errors to be serially correlated and heterogeneously distributed in both equations.[8]

[8] Further estimators correcting for sample selection have been proposed by Kyriazidou (1997) and Rochina-Barrachina (1999). Dustmann & Rochina-Barrachina (2000) reconsider and extend the above-mentioned estimators. They allow for additive, individual-specific effects in both the (binary) selection equation and the equation of interest, and at the same time, for the equation of interest being defined for a non-random sub-population. Wooldridge & Semikyna (2005) contribute further to the existing discussion of sample selection in panel data models, taking into account the problem of endogeneity as well.

Since the decision to stay out of the labour force might be correlated with motherhood, a problem of endogenous sample selection could arise. The test for endogeneity of self-selection is carried out and if necessary, the correction method by Wooldridge (1995) is applied as below.[9]

1) First, the probability of participating in the labour force is estimated separately for each year, i.e. for each year labour force participation is regressed by age, age squared, education, year dummies and the number of children using a probit estimator:[10]

$$P_{it}\,(Working_{it}=1) = \gamma^{*}\, Z_{it} + v_{it} \qquad (4)$$

Using the results of the probit estimation the inverse mills ratio $\lambda(\delta^{*}X_{it})$ can be calculated for every individual in every year.

2) The fixed-effect estimation is applied including the inverse mills ratio $\lambda\ (\delta^{*}Xit)$ as a further control and using only those observations in which the woman is working:

$$Yit = \beta 1^{*}Pre1it+\beta 2^{*}Birth11it+\beta 3^{*}Post1it + \rho^{*}\ \lambda\ (\delta^{*}Xit) + \delta^{*}Xit + ai + uit \qquad (5)$$

Using a t-statistic, a test can be run for the null hypothesis of no sample selection, i.e. if the coefficient of the inverse mills ratio is not significantly different from 0 (H_0: $\rho = 0$). In the case where the null hypothesis can be rejected, a correction procedure is used, which maintains the estimated inverse mills ratio in the regression equation (equation (5)).[11]

4.2 Determination of amenities and disamenities: Satisfaction regressions

After having shown that pecuniary as well as non-pecuniary job characteristics change after motherhood, it has to be tested whether both, as the theory of compensating wage differentials predicts, jointly determine the utility of a worker. In cases where a mother may be willing to sacrifice some of her income for obtaining better job features, these have to raise the utility for her to compensate the loss of income. Whether (and if so how) certain job characteristics enter the utility function of mothers is tested by estimating satisfaction regressions. Job satisfaction will serve as a proxy for utility. It is measured on a scale from 0 (not satisfied) to 10 (very satisfied). Information about job satisfaction is gained from the following question in the GSOEP: "How satisfied are you today with the following areas of your life? Please answer by using the following scale, in which 0 means totally unhappy and 10 means totally happy. How satisfied are you with your job?"

The question is completely subjective, an issue that raises a big discussion about the use of satisfaction measures in scientific research. Nevertheless, the way of measuring job satisfaction accurately has been investigated a good deal in the literature.

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[9] See Wooldridge (1995), procedure 3.2.

[10] Regressions have been carried out for two different specifications of the reduced form: on the one hand, as proposed by Wooldridge, the above-mentioned control variables have been introduced for all years. This increases the explanative power of the probit regression but leads to a reduction of the sample since we do not have observations of many individuals for all years. On the other hand, control variables have been used only for the same years, an approach that has the opposite advantage. The results are similar, so for simplicity, the results of the second specification are presented; however, the results of the first specification are available upon request.

[11] The standard error correction (i.e. calculating variance covariance matrix) is still pending.

The first point of discussion has been the category of the variable: psychologists and sociologists have usually interpreted satisfaction scores as cardinal and comparable across respondents. Therefore, in order to identify the determinants of satisfaction they usually apply ordinary least squares estimation. Economists, however, have considered satisfaction as an ordinal variable, which has prompted them to use ordered latent-response models. The second problem is the subjectivity of satisfaction as well as self-reported job characteristics, because it is problematic to compare subjectively biased variables across individuals. Ferrer-i-Carbonell & Frijters (2004) argue that the first issue – whether ordinality or cardinality should be applied – does not matter, but unobserved individual heterogeneity does. Taking advantage of longitudinal datasets and applying panel data methods can solve this problem.

The fact that the GSOEP provides annual information on job satisfaction as well as on a range of job characteristics allows a fairly accurate measurement to be made of the determinants of a mother's utility function. Job satisfaction is determined as the function below:

$$\Pr(\text{job satisfaction} = n) = \beta_1 * Z_{ijt} + \beta_2 * X_{it} + c_i + u_{it} \quad (6)$$

where $n = (0, 10)$

Z_{ijt} = individual job characteristics

X_{it} = individual personal attributes

c_i = individual unobserved effect

u_{it} = individual time-varying error

In order to take into account the unobserved heterogeneity, following Ferrer-i-Cabonell & Frijters (2004) a fixed-effect estimation method is applied.[12] Job satisfaction is regressed on the set of amenities that changes around the first birth and a set of other controls (such as age, age squared, years of education, origin, partner, Pre and Post period dummy and a set of year dummies). The results are reported in section 5.2.2.

4.3 Compensating wage differentials: Hedonic wage regressions

Once the job characteristics that mothers consider as amenities have been determined, the last step is to measure the actual compensating wage differential for amenities, i.e. how much income a mother is willing to sacrifice to have pleasant working conditions. This is done by regressing the logarithm of wage on the same set of control variables, but this time it is also performed on all the amenities that change around the first birth and explain satisfaction with the job. These augmented wage regressions – hedonic wage regressions – represent the basic approach to estimating compensating wage differentials.

The measurement of compensating wage differentials has likewise been discussed in the economic literature and several methods for addressing different problems of the estimation have been suggested. Brown (1981) and Duncan & Holmlund (1983) applied different methodologies, such as the within- or first-difference estimator, in order to take into account the subjectivity of self-reported job characteristics and omitted variables revealing workers' attributes. A further issue is the abstraction from job search and labour market imperfections. Hwang, Mortensen & Reed (1998) developed a model including job search. Their analysis shows that the estimates resulting from a standard hedonic wage model may be biased and that the size of the bias is substantially determined by labour market parameters such as the probability of finding a job or the heterogeneity between firms with respect to cost efficiency.

[12] The ordered logit fixed-effect estimator suggested by Ferrer-i-Cabonell & Frijters (2004) has also been applied; however, the log likelihood maximisation did not converge.

For this reason, Villanueva (2004) took only the sample of job leavers into account. Owing to the small sample size, however, it is not possible to estimate compensating wage differentials after the first birth when looking only at the women who change their job.

As a first approach, a hedonic wage regression is estimated, which takes unobserved individual heterogeneity into consideration by applying the fixed-effect method. Sample selection bias is tested for by applying the test suggested by Wooldridge (1995). The estimated function is the following:

$$Y_{it} = \beta_1 * Pre1_{it} + \beta_2 * Birth1_{1it} + \beta_3 * Post1_{it} + \gamma * Amenities_{it} + \delta * X_{it} + a_i + u_{it} \qquad (7)$$

The independent variable, as the name hedonic wage regression clearly indicates, is the logarithm of the gross wage rate. The Pre1, Birth1 and Post1 variables again represent dummies for the periods around first birth. The remaining set of controls X_{it} consists of the same variables as before (marital status, years of education, age, age squared, origin and a set of year dummies for 1985-2003). As amenities, the job characteristics that change around the first birth are included (see section 5.2.1).

The next section reports the description of the sample and the results of all three steps for testing the hypothesis that the child penalty might be a compensating wage differential.

5. Results

5.1 Summary statistics

The sample[13] consists of 2,824 women (11,855 observations) of which 1,895 are mothers. Table A3 in the appendix gives an overview of the summary statistics of the sample.

The first major difference between mothers and non-mothers is the percentage of women who have a partner. While more than 70% of mothers have a partner, almost 50% of the non-mothers are single. The non-mothers are also younger (age 30) than the mothers (age 35). This reflects a shortcoming of the sample, as previously noted, in that non-mothers could still choose to become mothers after 2003. The mean age given at the first birth is 27.8 years, which is quite young compared with the current average in Germany (of 29.4 years for married and 27.7 years for unmarried women in 2004).[14] This can be explained by the fact that the mean age at the first birth in our sample is an average of the last 20 years, whereas age at the first birth has risen substantially. The sample also closely reflects the true composition of 'nationalities' in Germany: around 65% of the women are West German and around 21% are East German. The fact that 21% of the mothers are East German reflects that for a long time, East Germany had a high birth rate. During the last decade, however, it has declined dramatically. The rest of the women are foreigners. On average women went to school for 11 years, which corresponds to an intermediate educational level that allows for professional formation. Little difference is observed between women with and without children with respect to education.

[13] Since women who are not working drop out of the sample, the descriptive statistics only include working women.

[14] All data for comparison purposes are taken from the website http://www.destatis.de.

5.2 Regression results

5.2.1 Event study

The first step to testing whether mothers may substitute income for certain job amenities is to estimate whether job characteristics change with motherhood. A summary of statistics for all job characteristics can be found in Table A4 in the appendix.

Before looking at non-pecuniary job characteristics it is necessary to determine the child penalty for the sample of working women between ages 16 and 45. The ln of real gross and net wage[15] rates are estimated, taking into consideration contracted hours.[16] Using agreed hours has the advantage that there are no extreme outliers,[17] but it may not reflect the true amount of hours worked. The logarithm of real gross wage for mothers is 2.84 (net 2.42), while for non-mothers it is 2.81 (net 2.38).

The effect of motherhood on wages applying fixed effects to equation (3) is estimated, which includes control variables for individual attributes such as age, age squared, marital status, years of education, origin and a set of year dummies. The resulting effect (β_3-β_1) represents the child penalty. Also conducted is a significance test for the child penalty. In addition, equation (5) is estimated in order to see whether the results are biased due to sample selection. As we can see in Table 1, where the regression results are shown (including and not including the inverse mills ratio), the t-statistic of the inverse mills ratio is significantly less than 2 for both gross and net wage rates. Thus, the hypothesis of there being no sample selection cannot be rejected. More detailed results can be found in Table A5 in the appendix.

The empirical evidence of the child penalty is once again confirmed. After the first birth mothers face a loss in gross wage rates of 20% (which is the difference between the coefficients of the Post1 and the Pre1 variable in the first column of Table 1) with respect to their pre-birth wage rates. In net terms the child penalty is milder but still significant (the child penalty in the third column is 9%). This is clearly the result of tax reductions and family subsidies.

Recent findings by Kunze & Ejrnaes (2004) of a wage dip even before the first birth can be confirmed. In a regression where the years around the first birth are split (from five years prior to six years after the first birth)[18] we can see that gross wages start to fall two years before the first birth. In addition, the child penalty grows stronger over the years, even if, as we have seen before, labour force participation rises over the years after the first birth. So it seems that only women for whom the opportunity costs of not working would be high continue to work around the first birth. Furthermore, the women who later come back to work are penalised even more so because of the loss in human capital associated with a longer career interruption.

As previously mentioned, three different categories of (dis)amenities suggested by the literature on compensating wage differentials are of specific interest: working schedule, workload and flexibility of the job.[19] Before reporting the regression results a short overview is given of the average characteristics of the jobs held by mothers and non-mothers.

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[15] Net wages are defined as gross wages (the wage rate agreed with the employer) minus ancillary wages (Lohnnebenkosten), such as social security and insurance, minus taxes (income and payroll taxes, etc.).

[16] The descriptive statistics for ln of real gross and net wage rates can be found in Table A4 in the appendix.

[17] Nevertheless, the observations of real wage rates are limited to the values above the 0.5 percentile and below the 99.5 percentile.

[18] Results for this regression are shown in Table A6 in the appendix.

[19] The summary statistics of the job characteristics can be found in Table A4 in the appendix.

Table 1. Results of fixed-effect estimation for ln of real gross and net wage rate

	Ln of real gross wage rate	**Ln of real gross wage rate**	**Ln of real net wage rate**	**Ln of real net wage rate**
Pre1	0.007	0.009	0.002	0.001
	(0.33)	(0.43)	(0.09)	(0.07)
Post1	-0.196	-0.196	-0.09	-0.09
	(8.63)**	(8.64)**	(4.40)**	(4.40)**
Child penalty	**-0.203****	**-0.205****	**-0.092****	**-0.091****
Inverse mills ratio	–	0.055	–	-0.009
	–	(1.1)	–	(0.19)
Constant	0.208	0.112	0.324	0.339
	(2.61)**	(0.96)	(4.48)**	(3.19)**
Observations	11,855	11,855	11,718	11,718
# of individuals	2,824	2,824	2,824	2,824
R-squared	0.49	0.49	0.52	0.52

Notes: T-statistics are reported in brackets below every coefficient; * indicates that the coefficient is significant at a 5% level and ** at a 1% level. A set of control variables are also included – age, age squared, partner, years of education, origin and set of year dummies for 1985-2003.

Source: Author's calculations based on the GSOEP (1984-2003).

In general, the contract of non-mothers includes more hours per week than that of mothers (37 hours vs. 32 hours). The actual working hours (agreed hours plus overtime) of non-mothers exceed those of mothers even more (by more than 6 hours per week). Women with children are also less likely to work during inconvenient hours such as in the evening (after 6 p.m.) or at night (10 p.m. to 6 a.m.). They are, however, more likely to engage in shift work, which might possibly allow for more flexibility and thus a better combination of career and family. Almost none of them enjoy flexible working hours (not even 1%). This reflects how regulated the German labour market is, or put more precisely, has been over the last 20 years. Nevertheless, more than 11% of the mothers and almost 8% of the non-mothers work from home. Mothers also live closer to their job (11.4 km vs. 14.7 km), which allows them to save time. This could be important, since time is a scarce resource for mothers who have to combine a family and job. With respect to workload there are no great differences between mothers and non-mothers: around 70% of the women (70% of non-mothers vs. 68% of the mothers) consider their work as stressful, while only 34% of mothers and 26% of non-mothers see it as physically demanding. Mothers may judge their work as more physically demanding owing to the double load of work and domestic activities. Mothers are also slightly more likely to report bad working conditions (25 vs. 23.6%).

Before analysing the results of the event study analysis, it has to be noted that most of the job characteristics are only observed for a few years. Shift work and the variables for workload (stress, physical demand and bad working conditions) are observed for the years 1985, 1987, 1989, 1995 and 2001, and work in the evening and during night only for the years 1990, 1995 and 2000. Only in three years (1997, 1999 and 2002) were women asked if they work from home. In order to maximise the sample size, the following technique has been applied to impute these job characteristics.[20] A new variable, called 'job change' has been created, which enables

[20] See Villanueva (2004).

the determination of the years in which a woman holds the same job. Using this variable, the job characteristics reported for only certain years can be extended to all the years in which a woman retains the same job.

In order to see how motherhood affects these job characteristics, a fixed-effect method is applied to equation (3) regressing all (dis)amenities on the same set of control variables as before (age, age squared, marital status, years of education, origin and a set of year dummies). Furthermore, equation (5) is used, which includes the inverse mills ratio, in order to test and correct for a possible sample selection bias. Results for the characteristics that significantly change around the first birth are shown in Table 2. The table only presents the regression results that have been corrected for possible sample selection (if correction was necessary), i.e. if the null hypothesis of no sample selection could not be rejected without the inverse mills ratio, and in the case of rejection with the inverse mills ratio included.[21] The results for all job characteristics are listed in Table A7 (a-c) in the appendix.

Table 2. Results of fixed-effect estimation for (dis)amenities

	Actual hours	**Night work**	**Evening work**	**Stress**	**Bad conditions**	**Distance**
Pre1	1.616	0.033	0.03	0.028	0.015	-0.075
	(2.99)**	(2.49)*	(1.4)	(1.07)	(0.58)	(0.1)
Post1	-12.606	-0.029	-0.041	-0.092	-0.034	-1.157
	(22.64)**	(2.12)*	(1.88)	(3.44)**	(1.3)	(1.54)
Change in job characteristics	**-14.222****	**-0.062****	**-0.071****	**-0.12****	**-0.049****	**-1.082****
Inv. mills ratio	-4.058	0.122	–	–	–	–
	(3.34)**	(4.10)**	–	–	–	–
Constant	50.037	-0.334	-0.62	1.52	0.817	18.774
	(17.35)**	(4.73)**	(8.10)**	(16.18)**	(8.98)**	(7.10)**
Observations	11,855	11,855	11,855	11,855	11,855	11,855
No. of individuals	2,824	2,824	2,824	2,824	2,824	2,824
R-squared	0.18	0.06	0.14	0.43	0.1	0.04

Notes: T-statistics are reported in brackets below every coefficient; * indicates that the coefficient is significant at a 5% level and ** at a 1% level. The set of control variables also includes age, age squared, partner, years of education, origin and a set of year dummies for 1985-2003.

This table only presents the results for variables that change significantly around the first birth. Also estimated are the changes around the first birth for shift work, physical demand, work from home and flexible working schedule. The signs of the coefficients are as expected (negative for the variables representing workload and positive for the ones on flexibility), but not significant. The results can be seen in Table A7 (a-c) in the appendix.

Source: Author's calculations based on the GSOEP (1984-2003).

The results of the event study show significant changes around the first birth for the characteristics of all three categories.

As already seen in the descriptive statistics, women tend to work less after having a child. We can observe a strong and significant decrease in working hours after the first birth. In addition, mothers seem to avoid a working schedule outside the usual working hours (8 a.m. to 6 p.m.). In other words, they work less during the evening and at night. Mothers also seem to avoid a heavy

[21] The standard error correction is still pending.

workload. Once becoming a mother, their work tends to be significantly less stressful and offer better working conditions. The result for physical demand is only significant at the 15% level, but indicates that a mother sees her work as a greater burden than a non-mother. The double workload of job and domestic activities may explain this finding.

Mothers seem to appreciate jobs that allow for a certain degree of flexibility as well. The possibility of working from home seems to be attractive for women once they have a child. The result is only significant at the 15% level, but has a positive sign. (A further indication for trying to decrease the time spent at work is the fact that the distance to the workplace decreases once a woman gives birth to her first child.) The result for flexible hours is not significant. The reason for this finding may be that not many women enjoy flexible working hours. Flexible working hours have only recently become common, which reflects the general inflexibility of the German labour market.

These results show that job characteristics change around the first birth. Given the significant changes in job features around that time, it is reasonable to think that mothers may substitute the loss of income with more amenities. Furthermore, looking at regressions where the years around the time of the first birth are more split (into five years before and six years after the first birth), the change in mothers' job characteristics around the arrival of their first child seem strategic. Several non-wage job characteristics, such as actual working hours, stress and bad working conditions begin to change as early as the year before the first birth. This provides an intuitive contradiction against the possible endogeneity of fertility, i.e. against the concern that wage and career opportunities might determine the decision to have a baby. It seems that mothers plan the first birth rather than a negative shock in wages leading to a decision to have children.

Having determined which job characteristics change after motherhood, it is still necessary to show how these characteristics affect mothers' utility. The next section presents the results of the satisfaction regression. These estimates show which job features are viewed as amenities and thus might compensate for a loss in income.

5.2.2 Satisfaction regression

In order to determine how certain job characteristics contribute to the utility of women, especially when becoming a mother, satisfaction regressions are estimated. As previously mentioned, the fact that the GSOEP provides annual information on job satisfaction as well as on a range of job characteristics means that it allows a fairly accurate measurement of the determinants of a mother's utility function. Assuming ordinality of the error terms, a fixed-effect estimation is applied using equation (7). The results can be found in Table 3.[22]

As expected, wage has a strong impact on job satisfaction. Yet, some non-wage aspects also have a strong effect on the happiness of mothers with their job and thus mothers may be willing to sacrifice some of their income for them. Looking at the results of the fixed-effect regressions, certain job characteristics are clearly determined as disamenities. A heavy workload, as assessed by stress and bad working conditions, is held to be significantly dissatisfactory (at a 1% and a 10% significance level) by mothers. The rest of the estimates are not significant, but the signs of certain variables indicate that mothers try to avoid these job aspects. Work during the night and a long commuting time decrease the utility function of a mother. Working in the evening seems to be favoured by mothers as well as more working hours, which is not as expected, but the result is not significant either.

[22] Here again, the ordered logit fixed-effect estimator suggested by Ferrer-i-Cabonell & Frijters (2004) has been applied; however, the log likelihood maximisation did not converge.

Table 3. Satisfaction regression

	Job satisfaction
Ln of real gross wage	0.3454
	(4.58)**
Actual working hours/week	0.0002
	(0.06)
Night work	-0.0020
	(-0.01)
Work in the evening	0.1342
	(1.61)
Stressful job	-0.1271
	(-2.03)**
Bad working conditions	-0.1120
	(-1.73)
Distance to workplace	-0.0013
	(-0.59)
Observations	11,855
Number of individuals	2,824
PseudoR2	0.0099

Notes: Also included are age, age squared, marital status, years of education, origin and a set of year dummies. T-statistics are reported in brackets; * indicates that the coefficient is significant at a 5% level and ** at a 1% level.

Source: Author's calculations based on the GSOEP (1984-2003).

Summarising the results, mothers seem to have a strong preference for convenient, family-friendly job characteristics. The significant results have shown that mothers dislike heavy workloads. Furthermore, time seems to be a scarce and thus valuable resource for mothers.

Since we now know which characteristics are more frequently sought after motherhood, those that seem to be amenities and those that are disamenities, how much mothers are willing to sacrifice their income in order to have a pleasant job can be measured. Afterwards, the results of the hedonic wage regressions are presented.

5.2.3 Hedonic wage regression

The last step in order to test the hypothesis of the child penalty as a compensating wage differential is to measure the price that mothers are willing to pay for certain amenities and to estimate the child penalty taking into account these amenities. Therefore a hedonic wage regression is estimated, taking into consideration unobserved individual heterogeneity by applying the fixed-effect method to equation (7). As amenities, the variables for all job characteristics that change significantly around the first birth are included, which are, as determined in section 5.2.2, actual hours worked per week, dummies for night work, work in the evening, stress and bad working conditions and lastly a variable for the distance to the workplace. Sample selection bias is tested for by applying the technique suggested by Wooldridge (1995). Since the null hypothesis of no sample selection bias cannot be rejected, a correction is not necessary. Table 4 shows the results for the variables of most interest (further details can be found in Table A8 in the appendix).

Table 4. Hedonic wage regression including disamenities

	Ln of real gross wage rate	Ln of real gross wage rate
Pre1	0.007	0.005
	(0.33)	(0.24)
Post1	-0.196	-0.177
	(8.63)**	(7.61)**
Child penalty	-0.203**	-0.182**
Actual hours worked	–	0.001
	–	(2.74)**
Night work	–	-0.038
	–	(1.62)
Work in the evening	–	-0.006
	–	(0.48)
Stressful job	–	0.033
	–	(3.74)**
Bad conditions	–	0.014
	–	(1.52)
Distance to workplace	–	0.001
	–	(4.22)**
Constant	0.208	0.062
	(2.61)**	(0.74)
Observations	11,855	11,855
No. of individuals	2,824	2,824
R-squared	0.49	0.5

Notes: T-statistics are reported in brackets; * indicates that the coefficient is significant at a 5% level and ** at a 1% level. Further control variables are age, age squared, partner, years of education, origin and a set of year dummies (1985-2003).

Source: Author's calculations based on the GSOEP (1984-2003).

Comparing the first and second columns shows that including the disamenities that change significantly around the first birth diminishes the child penalty by almost 10% (from -0.203 to -0.182). This may indicate the willingness of mothers to sacrifice some income for amenities.

It can be confirmed that mothers seem to avoid heavy workloads – having a stressful job raises the wage rate by more than 3% and bad working conditions lead to an increase by more than 1%. The results of the event study with respect to time are also reflected by the results of the hedonic wage regression: time seems to be a scarce and valuable resource for a woman when becoming a mother. One more hour of work per week requires a wage increase of 0.1% and one kilometre of distance to the workplace also has to be compensated by an increase of 0.1% in the wage rate. The results for an inconvenient working schedule are not consistent with the theory of compensating wage differentials. The coefficients of night work and work in the evening are both negative, which would mean that a woman who works during these late hours would be paid less. That being said, neither of the coefficients of these disamenities is significant.

Looking at these results, we can see that taking into account several disamenities decreases the child penalty by almost 10%. Yet, the difference between the child penalty estimated for the

'raw' child penalty and the one accounting for amenities is not significant at a 90% confidence interval.[23] Still, the results of the hedonic wage regression support the hypothesis of the child penalty as a compensating wage differential. Mothers seem to be willing to sacrifice some of their income for amenities and thus the gap in wages between women with and without children shrinks and their wages are more similar.

The results of hedonic wage regressions, as mentioned in section 4.3, have to be interpreted carefully. As Hwang, Mortensen & Reed (1998) pointed out, hedonic wage regressions assume a static labour market in which workers make a decision when accepting a job that is both one-time and forever. In reality, the labour market is pretty dynamic: workers search for better jobs and firms for more productive workers, such that there is a constant turnover. This may give rise to incentives for firms to offer jobs differing in wages or amenities (or both). But firms may differ in their cost efficiency in producing certain amenities. Thus, a more cost-efficient firm could offer jobs that are better paid and have more amenities as well. Since the standard hedonic wage regression omits the heterogeneity between firms with respect to the cost-efficiency factors that may in turn positively influence the wage, the estimated price of the amenities could be underestimated or even wrongly signed. This could explain why it seems that mothers value amenities (or dislike disamenities) only very little or not at all as in the case of evening and night work.

Finally, it may be useful to know how much the hypothesis of the child penalty as a compensating wage differential contributes to explaining the remaining family gap after controlling for existing explanations. As previously noted, the following hypotheses have already been investigated: reduced work experience, less effort owing to the dual workload of job and home activities, sector segregation and having further children. The results of the regressions including these alternative hypotheses in detail are not reported here since that is beyond the scope of this work.[24] The contribution of the new hypothesis is notable, however, taking into account other previously documented explanations. The existing hypotheses, especially the depreciation of human capital, decrease the child penalty by more than 40%. Inclusion of the amenities adds even more to knowledge about the unexplained gap between mothers and non-mothers. The child penalty is further reduced by 20% and women suffer only a loss in wages of less than 7% as a result of motherhood. Taking into account all the hypotheses so far documented shows that mothers seem to be willing to sacrifice income for a more pleasant job.

6. Conclusions

The balance of career and family life is a topic on the current political agenda. One indication of the fact that mothers still encounter barriers to success in the labour market is the child penalty – i.e. mothers earn lower wages than women without children. Even if there are several hypotheses about its causes, much remains unexplained. Yet few researchers have studied the characteristics of the jobs held by mothers and non-mothers and thus have not investigated the idea that mothers might prefer jobs that differ with respect to certain job aspects. Knowledge about the job characteristics that are advantageous for mothers and for which they may be willing to sacrifice some of their income would be useful for better specifying the causes of the child penalty and for designing effective family policies.

The contribution of this study is to determine whether mothers might substitute income for non-pecuniary job characteristics that they deem advantageous. An attempt has been make to test the

[23] The 90% confidence interval for specification (1) is [-0.234; -0.172]; the same interval for specification (9), including the amenities, is [-0.215; -0.149].

[24] Detailed results of the regressions, including alternative hypotheses, are available upon request.

hypothesis that if the labour market rewards disamenities, some degree of the child penalty may be a compensating wage differential for those disamenities that mothers wish to avoid.

In order to test this hypothesis, data from the German Socio-Economic Panel has been used, which provides detailed information about personal attributes and job characteristics, with attention given to the wage and non-wage features of jobs as well as job satisfaction. Its longitudinal nature allows the comparison of women before and after the birth of their first child.

Using a sample of women aged 16 to 46, an event study has been undertaken to analyse the changes in wages and several other non-wage job aspects around the first birth. The child penalty in this sample reaches 20% when comparing the gross wage rates of women before and after the first birth. Several job characteristics seem to change as well around the first birth. A sharp decline can be observed in working hours after the first birth, which can be explained by reduced overtime and more part-time contracts. Mothers also work less at inconvenient working hours (i.e. after 6 p.m. or at night). This result could indicate that during these hours it is difficult to arrange childcare. Furthermore, when becoming a mother a woman is more likely to have a job that is close to her home. This enables her to save some time, which must be divided between job and family responsibilities. Finally, the results suggest that mothers may tend to avoid a stressful job and bad working conditions.

The results of the satisfaction regression give insight into how a mother might evaluate certain job characteristics. Significant results, however, can only be found for wage and workload. Mothers gain satisfaction from jobs associated with less stress and better working conditions. The coefficients for all other job characteristics are not significant, but point in the expected direction: working during inconvenient hours decreases satisfaction, as does a longer commuting time. Even if these results are in many cases insignificant, they are useful in supporting the hypothesis of a compensating wage differential for disamenities.

The last step of the work has been to estimate the trade-off between pecuniary and non-pecuniary job characteristics. Including disamenities in the wage regression decreases the child penalty by 10%. These results show that mothers are willing to sacrifice some of their wages for certain amenities such as fewer working hours, less stress and a shorter commuting time to work. They further indicate that some of the wage penalty may be a compensating wage differential for more amenities in the jobs held by mothers.

A future aim is to take the dynamic feature of the labour market into account when measuring the compensating wage differential. One method might be to consider only job changers in order to capture the turnover in the labour market. Yet since the sample size of mothers who are observed around the first birth and at the same time as they switch jobs is quite small, it would be reasonable to extend the sample to all mothers or even to all women switching jobs and to apply the methodology proposed by Villanueva (2004). He derives bounds on the monetary returns to job disamenities for workers who switch jobs voluntarily. In case a worker chooses a job with more (fewer) disamenities, his wage change gives an upper (lower) bound of the market return for the disamenity.

An alternative method to estimating workers' marginal willingness to pay for certain job features in a dynamic environment is to look at duration data. Gronberg & Reed (1994), for instance, derive the impact of wage and amenities on job tenure. Using the marginal effect of wage and amenities on the probability of quitting a job, they can calculate workers' marginal willingness to pay for job characteristics. In order to analyse whether a mother may be willing to substitute some wages for amenities, it would be useful to look at how the amenities associated with a woman's job before the start of maternity leave influences the duration of the

time spent out of the labour force. The hypothesis to be tested would be as follows: the more amenities offered by a mother's job,[25] the shorter will be the leave period taken.

One further extension could be to introduce some dynamic factors into the equation accounting for the fact that a woman might plan her career according to her future family aspirations. The econometric method accounting for this autocorrelation would be a dynamic panel estimation such as the Arellano–Bond estimator (1991).

The addition this study makes to the current literature is its investigation of the child penalty as a compensating wage differential. Among the research about the child penalty this study takes (dis)amenities into consideration for the first time. The knowledge gained about the preferences of mothers with respect to job amenities and the price they are willing to pay for them shows that when becoming mothers women might be willing to substitute some of their income for amenities – thus to some degree the child penalty may be a compensating wage differential. This insight provides a basis for designing an effective family policy that should allow mothers a better combination of career and family life.

[25] What is referred to here is the job a mother is holding, or more specifically the job that a mother has guaranteed when starting maternity leave.

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Appendix Tables

Table A1. Definition and construction of variables

Name of variable	Definition & construction
Pecuniary aspects	
Ln of real gross wage rate	Ln of ((monthly gross income/weekly contracted working hours)*31/7)
Ln of real net wage rate	Ln of ((monthly net income/weekly contracted working hours)*31/7)
Non-pecuniary aspects	
1) Time	
Actual hours worked	Weekly working hours including overtime, but not illness or holidays
Work in the evening	Binary variable indicating if worked between 6 p.m. and 10 p.m.; variable has been made binary – before there were three categories (never, occasionally and frequently)
Night work	Binary variable indicating if worked after 10 p.m.; variable has been made binary – before there were three categories (never, occasionally and frequently)
Shift work	Binary variable indicating if shift work; variable has been made binary – before there were three categories (never, occasionally and frequently)
2) Workload	
Stress at work	Binary variable indicating if job is stressful; variable has been made binary – before there were three categories (not at all, partly and fully)
Physical demand of job	Binary variable indicating if job is physically demanding; variable has been made binary – before there were three categories (not at all, partly and fully)
Bad working conditions	Binary variable indicating if worker is exposed to bad working conditions like heat, gases, etc.; variable has been made binary – before there were three categories (not at all, partly and fully)
3) Flexibility	
Flexible working hours	Binary variable indicating if schedule can be set freely or if hours are set
Work from home	Binary variable indicating if work from home is possible; variable has been made binary – before there were three categories (not possible, occasionally and frequently)
Distance to workplace	Distance to workplace in kilometres

Source: Author's compilation.

Table A2. Labour force participation

Year	Mean labour force participation (%)
Yr5 pre-birth	79.41
Yr4 pre-birth	83.51
Yr3 pre-birth	84.69
Yr2 pre-birth	84.44
Yr1 pre-birth	83.35
Birth1	35.60
Yr1 post-birth	26.43
Yr2 post-birth	37.67
Yr3 post-birth	40.62
Yr4 post-birth	45.76
Yr5 post-birth	48.30
Yr6 post-birth	53.43
Yr18 post-birth	64.21

Note: The set of control variables also includes age, age squared, origin, years of education, marital status and a set of year dummies.

Source: Author's calculations based on the GSOEP (1984-2003).

Table A3. Summary statistics of the sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Age	11,855	33.4351	7.3250	16	46
Partner	11,855	0.7259	0.4461	0	1
Years of education	11,855	11.1082	3.7764	0	18
West	11,855	0.6517	0.4764	0	1
East	11,855	0.2152	0.4110	0	1
Foreigner	11,855	0.1005	0.3007	0	1
Immigrant	11,855	0.0326	0.1775	0	1
Pre	11,855	0.1232	0.3287	0	1
Birth	11,855	0.0137	0.1165	0	1
Post	11,855	0.5289	0.4992	0	1

	Non-mothers	Mothers	Pre1	Birth1	Post1
Age	30.1740	35.0715	25.2676	27.7607	37.5459
Partner	0.5110	0.8337	0.6557	0.8650	0.8743
Years of education	11.1184	11.1031	10.4689	10.8160	11.2584
West	0.7518	0.6015	0.7618	0.7117	0.5612
East	0.1134	0.2663	0.1034	0.1595	0.3070
Foreigner	0.1070	0.0973	0.1246	0.1104	0.0906
Immigrant	0.0278	0.0350	0.0103	0.0184	0.0411

Source: Author's calculations based on the GSOEP (1984-2003).

Table A4. Descriptive dependent variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Ln of real gross wage rate	11,855	2.8302	0.5020	0.6495	4.3317
Ln of real net wage rate	11,855	2.4038	0.4639	0.6495	3.9700
Actual working hours/week	11,855	35.6368	10.0400	3	70
Agreed working hours/week	11,855	33.4523	8.7909	4	48
Shift work	11,855	0.1559	0.3628	0	1
Night work	11,855	0.0972	0.2962	0	1
Work in the evening	11,855	0.2393	0.4267	0	1
Stressful job	11,855	0.6920	0.4617	0	1
Physically demanding job	11846	0.3125	0.4635	0	1
Bad working conditions	11,855	0.2463	0.4309	0	1
Flexible hours	11821	0.0047	0.0681	0	1
Work from home	11,855	0.1007	0.3010	0	1
Distance to workplace	11,855	12.5246	13.3521	0	120

	Non-mothers	Mothers	Pre1	Birth1	Post1
Ln of real gross wage rate	2.812	2.838	2.813	2.883	2.843
Ln of real net wage rate	2.376	2.417	2.407	2.4398	2.4194
Actual working hours/week	39.797	33.549	39.682	37.570	32.015
Agreed working hours/week	37.143	31.606	37.983	35.661	30.017
Shift work	0.135	0.166	0.145	0.214	0.169
Night work	0.106	0.092	0.059	0.092	0.100
Work in the evening	0.262	0.227	0.138	0.177	0.249
Stressful job	0.700	0.687	0.789	0.791	0.661
Physically demanding job	0.263	0.337	0.357	0.374	0.331
Bad working conditions	0.236	0.251	0.314	0.288	0.235
Flexible hours	0.006	0.003	0.008	0.006	0.002
Work from home	0.078	0.112	0.123	0.134	0.108
Distance to workplace	14.741	11.412	13.685	14.478	10.802

Source: Author's calculations based on the GSOEP (1984-2003).

Table A5. Child penalty – Results of fixed-effect regressions

	Ln real gross wage rate	**Ln real gross wage rate**	**Ln real net wage rate**	**Ln real net wage rate**
Pre1	0.007	0.009	0.002	0.001
	-0.33	-0.43	-0.09	-0.07
Post1	-0.196	-0.196	-0.09	-0.09
	(8.63)**	(8.64)**	(4.40)**	(4.40)**
Child penalty	**-0.203**	**-0.205**	**-0.092**	**-0.091**
	significant	**significant**	**significant**	**significant**
Mills ratio	–	0.055	–	-0.009
	–	-1.1	–	-0.19
Partner	0.018	0.014	-0.007	-0.006
	-1.83	-1.36	-0.78	-0.67
Years of education	0.01	0.011	0.005	0.005
	(3.37)**	(3.53)**	(2.02)*	-1.79
Age	0.138	0.141	0.114	0.114
	(31.37)**	(28.89)**	(28.66)**	(25.90)**
Age sq.	-0.002	-0.002	-0.002	-0.002
	(30.62)**	(29.99)**	(29.98)**	(29.04)**
Yr 85	0.042	0.044	0.048	0.048
	(2.09)*	(2.18)*	(2.64)**	(2.61)**
Yr 86	0.123	0.125	0.12	0.12
	(6.08)**	(6.15)**	(6.55)**	(6.51)**
Yr 87	0.183	0.186	0.174	0.174
	(9.27)**	(9.34)**	(9.79)**	(9.71)**
Yr 88	0.197	0.2	0.196	0.195
	(9.71)**	(9.77)**	(10.68)**	(10.59)**
Yr 89	0.242	0.247	0.247	0.246
	(12.67)**	(12.63)**	(14.33)**	(14.01)**
Yr 90	0.277	0.286	0.313	0.312
	(16.75)**	(15.49)**	(20.96)**	(18.72)**
Yr 91	0.286	0.293	0.334	0.333
	(17.54)**	(16.82)**	(22.70)**	(21.21)**
Yr 92	0.334	0.337	0.358	0.357
	(20.87)**	(20.73)**	(24.80)**	(24.37)**
Yr 93	0.369	0.372	0.402	0.402
	(24.01)**	(23.88)**	(29.03)**	(28.65)**
Yr 94	0.385	0.385	0.406	0.406
	(24.32)**	(24.34)**	(28.34)**	(28.31)**
Yr 95	0.375	0.376	0.386	0.386
	(32.77)**	(32.70)**	(37.36)**	(37.14)**
Yr 96	0.437	0.438	0.43	0.43
	(38.01)**	(37.98)**	(41.51)**	(41.37)**
Yr 97	0.461	0.462	0.446	0.446
	(34.40)**	(34.41)**	(36.86)**	(36.79)**
Yr 98	0.501	0.501	0.479	0.479
	(44.93)**	(44.93)**	(47.60)**	(47.59)**
Yr 99	0.507	0.509	0.497	0.496
	(38.49)**	(38.26)**	(41.75)**	(41.30)**
Yr 00	0.541	0.54	0.528	0.528
	(41.33)**	(41.29)**	(44.72)**	(44.70)**
Yr 01	0.556	0.557	0.573	0.573
	(52.99)**	(52.95)**	(60.75)**	(60.59)**

Table A5. Continued

Yr 02	-0.052	-0.051	-0.037	-0.037
	(5.68)**	(5.58)**	(4.52)**	(4.52)**
Constant	0.208	0.112	0.324	0.339
	(2.61)**	-0.96	(4.48)**	(3.19)**
Observations	11,855	11,855	11,855	11,855
Number fixed ID	2,824	2,824	2,824	2,824
R-squared	0.49	0.49	0.52	0.52

Notes: T-statistics are reported in brackets below every coefficient; a set of control variables are also included – age, age squared, years of education, origin and set of year dummies for 1985-2003.

Source: Author's calculations based on the GSOEP (1984-2003).

Table A6. Child penalty over the years – Results of fixed-effect regressions

	Ln of real gross wage rate
Yr 5 pre-birth	0.027
	(1.11)
Yr 4 pre-birth	0.049
	(2.02)*
Yr 3 pre-birth	0.074
	(2.99)**
Yr 2 pre-birth	0.052
	(1.97)*
Yr 1 pre-birth	0.053
	(1.97)*
Birth1	0.038
	(1.21)
Yr 1 post-birth	-0.03
	(0.81)
Yr 2 post-birth	-0.075
	(2.07)*
Yr 3 post-birth	-0.089
	(2.47)*
Yr 4 post-birth	-0.127
	(3.51)**
Yr 5 post-birth	-0.164
	(4.37)**
Yr 6 post-birth	-0.176
	(4.57)**
Post 6	-0.28
	(7.20)**
Constant	0.472
	(3.71)**
Observations	7894
Number of fixed ID	1895
R-squared	0.48

Notes: T-statistics are reported in brackets below every coefficient; a set of control variables are also included – age, age squared, years of education, origin and set of year dummies for 1985-2003.

Source: Author's calculations based on the GSOEP (1984-2003).

Table A7(a). Effect of motherhood on (dis)amenities – Work schedule

	Actual hours	**Shift work**	**Night work**	**Work in the evening**
Pre1	1.616	-0.026	0.033	0.03
	(2.99)**	-1.25	(2.49)*	-1.4
Post1	-12.606	-0.028	-0.029	-0.041
	(22.64)**	-1.29	(2.12)*	-1.88
Child penalty	-14.222	-0.002	-0.062	-0.071
	significant	not significant	significant	significant
Mills ratio	-4.058	–	0.122	–
	(3.34)**	–	(4.10)**	–
Partner	-0.968	0.018	0.013	0.019
	(3.74)**	-1.91	(2.05)*	-1.94
Years of education	-0.054	0.005	0.007	0.002
	-0.69	-1.73	(3.48)**	-0.82
Age	-0.179	-0.008	0.008	0.035
	-1.5	(1.96)*	(2.80)**	(8.27)**
Age sq.	0.002	0	0	0
	-0.96	-0.36	-0.57	(4.52)**
Yr 85	-1.134	-0.006	-0.003	-0.018
	(2.28)*	-0.29	-0.25	-0.93
Yr 86	-0.722	0.012	-0.004	-0.031
	-1.44	-0.64	-0.34	-1.57
Yr 87	-1.222	0.014	-0.008	-0.047
	(2.50)*	-0.75	-0.68	(2.45)*
Yr 88	-1.448	0.024	-0.014	-0.068
	(2.89)**	-1.28	-1.12	(3.47)**
Yr 89	-1.094	0.04	-0.004	-0.077
	(2.28)*	(2.24)*	-0.33	(4.21)**
Yr 90	-2.332	0.053	-0.01	-0.097
	(5.14)**	(3.41)**	-0.86	(6.08)**
Yr 91	-1.886	0.046	-0.015	-0.086
	(4.41)**	(3.00)**	-1.41	(5.49)**
Yr 92	-1.224	0.06	-0.02	-0.089
	(3.07)**	(4.00)**	(2.03)*	(5.80)**
Yr 93	-0.862	0.08	-0.031	-0.118
	(2.26)*	(5.55)**	(3.32)**	(7.97)**
Yr 94	-1.255	0.07	-0.048	-0.147
	(3.23)**	(4.67)**	(5.01)**	(9.64)**

Table A7(a). Continued

Yr 95	-0.902	0.113	0.017	0.056
	(3.19)**	(10.49)**	(2.51)*	(5.09)**
Yr 96	-0.875	0.129	0.015	0.045
	(3.09)**	(11.89)**	(2.11)*	(4.03)**
Yr 97	-0.223	0.146	0.011	0.041
	-0.67	(11.53)**	-1.35	(3.15)**
Yr 98	-0.196	0.144	-0.007	0.014
	-0.72	(13.71)**	-1.02	-1.31
Yr 99	-0.842	0.15	-0.003	-0.011
	(2.58)**	(12.08)**	-0.34	-0.89
Yr 00	0.541	0.169	0.022	0.032
	-1.68	(13.71)**	(2.75)**	(2.51)*
Yr 01	0.107	0.2	0.011	0.021
	-0.41	(20.22)**	-1.81	(2.13)*
Yr 02	0.011	0.214	0.006	0.017
	-0.05	(24.98)**	-1.03	-1.89
Constant	50.037	0.297	-0.334	-0.62
	(17.35)**	(3.96)**	(4.73)**	(8.10)**
Observations	11,855	11,855	11,855	11,855
# of Individuals	2,824	2,824	2,824	2,824
R-squared	0.18	0.08	0.06	0.14

Note: T-statistics are reported in brackets below every coefficient

Source: Author's calculations based on the GSOEP (1984-2003).

Table A7(b). Effect of motherhood on (dis)amenities – Results of fixed-effect regressions concerning workload

	Stressful job	**Physical demand**	**Bad conditions**
Pre1	0.028	0.016	0.015
	-1.07	-0.66	-0.58
Post1	-0.092	0.045	-0.034
	(3.44)**	-1.75	-1.3
Child penalty	-0.12	0.029	-0.049
	significant	significant at 15%	significant
Partner	0.03	0.004	-0.015
	(2.55)*	-0.38	-1.3
Years of education	0.007	0.004	-0.009
	-1.94	-1.22	(2.64)**
Age	-0.043	-0.024	-0.02
	(8.26)**	(4.73)**	(3.96)**
Age sq.	0	0	0

Table A7(b). Continued

	-1.35	-0.64	-0.82
Yr 85	0.025	0.024	0.024
	-1.04	-1.03	-1.02
Yr 86	0.066	0.019	0.017
	(2.75)**	-0.84	-0.74
Yr 87	0.122	0.051	0.061
	(5.24)**	(2.28)*	(2.68)**
Yr 88	0.144	0.083	0.04
	(6.00)**	(3.64)**	-1.73
Yr 89	0.209	0.098	0.062
	(9.26)**	(4.56)**	(2.84)**
Yr 90	0.27	0.098	0.074
	(13.81)**	(5.26)**	(3.90)**
Yr 91	0.303	0.113	0.088
	(15.77)**	(6.11)**	(4.74)**
Yr 92	0.351	0.136	0.11
	(18.59)**	(7.55)**	(6.04)**
Yr 93	0.37	0.148	0.13
	(20.41)**	(8.54)**	(7.38)**
Yr 94	0.404	0.181	0.15
	(21.63)**	(10.14)**	(8.30)**
Yr 95	0.472	0.176	0.163
	(34.95)**	(13.61)**	(12.46)**
Yr 96	0.512	0.196	0.173
	(37.76)**	(15.06)**	(13.14)**
Yr 97	0.542	0.212	0.184
	(34.24)**	(14.01)**	(12.03)**
Yr 98	0.58	0.239	0.208
	(44.08)**	(18.98)**	(16.33)**
Yr 99	0.623	0.246	0.216
	(40.10)**	(16.50)**	(14.33)**
Yr 00	0.655	0.268	0.248
	(42.43)**	(18.15)**	(16.59)**
Yr 01	0.721	0.34	0.246
	(58.29)**	(28.71)**	(20.52)**
Yr 02	0.746	0.358	0.262
	(69.39)**	(34.77)**	(25.18)**
Constant	1.52	0.786	0.817
	(16.18)**	(8.74)**	(8.98)**
Observations	11,855	11846	11,855
# of Individuals	2,824	2822	2,824
R-squared	0.43	0.16	0.1

Note: T-statistics are reported in brackets below every coefficient

Source: Author's calculations based on the GSOEP (1984-2003).

Table A7(c). Effect of motherhood on (dis)amenities – Results of fixed-effect regressions concerning flexibility

	Flexible schedule	**Work from home**	**Distance to job**
Pre1	-0.001	-0.007	-0.075
	(0.21)	(0.5)	(0.1)
Post1	0.004	0.009	-1.157
	(0.53)	(0.6)	(1.54)
Child penalty	0.005	0.016	-1.082
	not significant	significant at 14%	significant at 5%
Mills ratio	-0.037	–	–
	(2.45)*	–	–
Partner	0.009	0.008	1.043
	(2.83)**	(1.22)	(3.15)**
Years of education	-0.004	-0.006	-0.027
	(3.92)**	(3.02)**	(0.28)
Age	-0.002	0.007	-0.572
	(1.09)	(2.67)**	(3.91)**
Age sq.	0	0	0.011
	(0.56)	(2.97)**	(5.10)**
Yr 85	-0.002	0.003	-0.437
	(0.36)	(0.25)	(0.65)
Yr 86	-0.002	0.008	-0.641
	(0.34)	(0.61)	(0.95)
Yr 87	0.076	0.004	-0.524
	(12.52)**	(0.32)	(0.8)
Yr 88	0.057	0.007	-0.459
	(9.21)**	(0.57)	(0.68)
Yr 89	0.081	0.008	0.141
	(13.67)**	(0.66)	(0.22)
Yr 90	-0.007	0.013	-0.944
	(1.17)	(1.25)	(1.72)
Yr 91	-0.007	0.01	-1.179
	(1.26)	(0.98)	(2.18)*
Yr 92	-0.003	0.01	-0.815
	(0.69)	(0.99)	(1.53)
Yr 93	-0.003	0.011	0.208
	(0.61)	(1.18)	(0.41)
Yr 94	-0.002	0.011	-0.142
	(0.35)	(1.08)	(0.27)
Yr 95	-0.001	0.019	-0.104
	(0.4)	(2.61)**	(0.27)

Table A7(c). Continued

Yr 96	-0.001	0.023	-0.429
	(0.26)	(3.20)**	(1.12)
Yr 97	-0.001	0.022	2.93
	(0.15)	(2.58)**	(6.58)**
Yr 98	-0.001	0.019	0.024
	(0.16)	(2.66)**	(0.06)
Yr 99	-0.003	0.01	3.189
	(0.63)	(1.23)	(7.29)**
Yr 00	0	0.009	2.943
	(0.04)	(1.07)	(6.77)**
Yr 01	0	0.024	0.293
	(0.11)	(3.63)**	(0.84)
Yr 02	0	-0.001	0.134
	(0.16)	)0.12)	(0.44)
Constant	0.094	0.036	18.774
	(2.63)**	(0.72)	(7.10)**
Observations	11821	11,855	11,855
# of Individuals	2821	2,824	2,824
R-squared	0.07	0.01	0.04

Note: T-statistics are reported in brackets below every coefficient

Source: Author's calculations based on the GSOEP (1984-2003).

Table A8. Hedonic wage regressions including disamenities – Results of fixed-effect model

	Ln of real wage rate	**Ln of real wage rate**
Pre1	0.007	-0.012
	(0.33)	(0.54)
Post1	-0.196	-0.185
	(8.63)**	(7.97)**
Child penalty	-0.203	-0.173
	significant	significant
Actual hours worked	–	0.001
	–	(2.18)*
Night work	–	-0.03
	–	-1.62
Work in the evening	–	-0.002
	–	-0.19
Stressful job	–	0.034
	–	(3.86)**

Table A8. Continued

Bad conditions	–	0.017
	–	-1.84
Distance to workplace	–	0.001
	–	(4.54)**
Partner	0.018	0.018
	-1.83	-1.84
Years of education	0.01	0.011
	(3.37)**	(3.82)**
Age	0.138	0.141
	(31.37)**	(32.28)**
Age sq.	-0.002	-0.002
	(30.62)**	(31.31)**
Constant	0.208	0.012
	(2.61)**	-0.14
Observations	11,855	11,855
# of Individuals	2,824	2814
R-squared	0.49	0.5

Source: Author's calculations based on the GSOEP (1984-2003).

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European Network of Economic Policy Research Institutes
c/o Centre for European Policy Studies
Place du Congrès 1 ▪ 1000 Brussels ▪ Tel: 32(0) 229.39.11 ▪ Fax: 32(0) 219.41.51
Website: http//:www.enepri.org ▪ E-mail: info@enepri.org