EconomiX

http://economix.u-paris10.fr/

Document de Travail
Working Paper
2011-03

Child-related career interruptions and the gender wage gap in France

Dominique Meurs
Ariane Pailhé
Sophie Ponthieux

UMR 7235

Université de Paris Ouest Nanterre La Défense
(bâtiments T et G)
200, Avenue de la République
92001 NANTERRE CEDEX

Tél et Fax : 33.(0)1.40.97.59.07
Email : nasam.zaroualete@u-paris10.fr

Child-related career interruptions and the gender wage gap in France

Dominique Meurs (Université Paris Ouest, EconomiX, Ined)

Ariane Pailhé (Ined)

Sophie Ponthieux (Insee)

Abstract

In this paper, we investigate the extent of the effects of children and child-related time out of the labor market on the gender wage gap in France, with special attention to its impact on the accumulation and composition of human capital. Measuring this impact requires detailed information on the individuals' activity history that is rarely available. The French survey "Families and Employers" (Ined, 2005) provides this information. We first look at men's and women's wage determinants, including the penalties associated with unemployment and time out of the labor market. We find that having controlled for the jobs' characteristics and selection into employment, there is a penalty attached to child-related time out of the labor market, which affects only women. We do not find any direct negative impact of children on women's current hourly wage at the mean. Then for a sub-sample of men and women aged from 39 to 49, we use a decomposition of the gender wage gap into an "interruption" wage gap between women and a gender wage gap between women who have never taken child-related time out and men; we find that the wage gap between men and women who have never interrupted their participation in the labor force is essentially "unexplained", while the wage gap between women who have had child-related interruptions and women who have not is essentially "explained".

Keywords: Wages, Human capital, Children, Family pay gap, Statistical discrimination, Wage gap decomposition.

JEL Classification: J13, J16, J24, J31

Acknowledgements: The authors would like to thank the participants in the LoWER conference (Volos, 2007), the TEPP conference (Evry, 2007), the PAA conference (New-Orleans 2008) and the "Journées de microéconomie appliquée (Saint-Denis de la Réunion, 2008) for their comments, especially Nabanita Datta-Gupta, Miriam Beblo and Catherine Sofer; thanks also to Patrick Puhani for his reading of an earlier version, and to the two anonymous referees for their suggestions.

1. Introduction

In many countries, women's participation in the labor market has dramatically increased in recent decades, women's education level has caught up with (or even overtaken) that of men, and the gender wage gap has tended to narrow. Yet despite these major - and related - changes, the gender wage gap remains substantial in all countries and progress seems to have stopped since the 1990s in some countries (Blau and Kahn, 2007; Datta Gupta and Smith, 2006; Meurs and Ponthieux, 2006). One important difference that remains between genders is that women still spend more time out of the labor market than men, on account of motherhood. The aim of this paper is to examine the effect of children on women's and men's wages and the subsequent impact of child-related career interruption on the gender wage gap in France.

The impact of career interruptions on women's wages has been investigated since a long time (Mincer and Polachek, 1974; Mincer and Ofek, 1982), and has been found to be negatively associated with earnings in various studies (Stratton, 1995; Albrecht *et al*, 1999; Phipps *et al*, 2001; Beblo and Wolf, 2002; Datta Gupta and Smith, 2002). Employment breaks are also likely to contribute to the gender wage differential; for example, Hotchkiss and Pitts (2007) find that a significant part of the explained gender wage gap, about 60%, can be attributed to employment interruptions in the United States. Since women's career interruptions are much more likely than men's to be related to children, investigating the link between the gender wage gap and differences between women's behavior regarding time out is of particular interest.

Since the mid-1990s, the "family pay gap", *i.e.*, the wage differential between women with and without children, has attracted increasing attention. If mothers face specific pay penalties, the "family gap in pay" could actually have a substantial influence on the level and evolution of the gender wage gap. Most of the evidence on the existence and extent of such a family pay gap is based on Anglo-American research (Waldfogel, 1997, 1998; Joshi *et al*, 1999; Lundberg and Rose, 2000; Budig and England, 2001) and a few comparative studies (Harkness and Waldfogel, 1999; Davies and Pierre, 2005). Significant pay penalties associated with motherhood have been found in the United States, the UK and Germany (Waldfogel, 1998; Davies and Pierre, 2005, Gangl and Ziefle, 2009), while in Nordic countries, women seem to escape a specific motherhood pay penalty when human capital accumulation and unobserved heterogeneity are controlled for (Harkness and Waldfogel, 1999; Albrecht *et al*, 1999; Datta Gupta and Smith, 2002). All these studies point at employment interruptions as a key factor behind the family pay gap. However, there are noticeable differences in the estimated penalties across studies; these differences are difficult to interpret because of divergence in methodology, especially whether work experience, child-related time out and part-time work (present and past) and selection in employment are controlled for, and whether the analysis is based on cross section or panel data.

In French studies, the question of a family/motherhood gap in pay has not yet been addressed. The only estimates we were able to find for France are those in Davies and Pierre's comparison of European countries (2005). In this study, France appears as one of the few countries where mothers of one or two children do not seem to face a penalty, and the penalty for three or more children

depends on the estimation strategy. As for the impact of time out, previous French studies on the gender wage gap have provided some contrasted results: Sofer (1990) found no significant impact of time out either for women or for men, and even a positive significant impact for women after controlling for occupational feminization. Bayet (1996) obtained a comparable result for female clerical workers. Colin (1999) found significant negative penalties for unemployment and time out of the labor market, both lower for women than for men, and also that unemployment was more penalized than time out for women while the contrary was true for men. Similar results were obtained by Meurs and Ponthieux (2000) and, more recently, by Moschion and Muller (2010) for the private sector.

The absence of studies explicitly addressing the family pay gap in France is at least partly explained by the relatively high participation of mothers in the labor market and low gender wage gap compared to other European or Anglo-American countries. However, the reform of the parental leave allowance in 1994 has made the issue more relevant. This reform, which has extended the allowance to include the second child (it was only available from the third child before), has resulted in an increased incidence of work interruptions (Piketty, 2005) and in longer employment breaks after birth (Pailhé and Solaz, 2006). As for its impact on subsequent wages, Lequien (2009) finds a negative causal effect of parental leave on women's daily wages of about 10% per year of interruption.

Another reason for the small number of studies on the impact of child-related time out in France could be that it requires data, especially with regard to individuals' work experience and the duration and nature of employment breaks, that only a small number of French datasets can provide. Experience is then often approximated by potential experience measured as the number of years since leaving initial education, which means that any period, whether at work or not, is taken at the same value. Yet studies using detailed work histories (Light and Ureta, 1995; Green and Ferber, 2008) or actual work experience have shown that relying on potential experience may result in misestimating the returns to human capital or to other characteristics (Filer, 1993), while a lack of information on the duration and nature of employment breaks may result in misestimating penalties on time out (Albrecht *et al*, 1999) or skill depreciation (Edin and Gustavsson, 2008).

Datasets providing detailed information on wages, individuals' family characteristics, employment characteristics and activity history all at the same time are quite scarce. Especially, many data sources do not allow to compute actual work experience or to distinguish between various reasons for employment breaks. In France, the "*Enquête Familles et Employeurs"* collected by INED in 2004-05" (EFE after) that we are using in this paper is the most recent to provide this information. On the basis of individuals' activity history since the age of 18, it is possible to measure actual work experience and to distinguish between several different types of employment break. One drawback is that it only provides information on current wages. Consequently, it is not possible to deal with the possibility that children and wages are both linked to some unobservable differences between types of women - for instance, as suggested by Hakim (1998), home-centered women as opposed to work-centered women[1]. If that were the case, a wage penalty could be wrongly attributed to motherhood or employment breaks whereas it actually results from a lower career commitment, and the effect of

[1] However, in Hakim's own estimations, a large majority of women are either "adaptative" or work-centered.

career interruptions could then be overestimated. However, empirical studies suggest that unobserved heterogeneity is not the essential factor behind pay differentials between women: while some studies suggest that women with lower unobserved earning power are more likely to have children (Budig and England, 2001; Datta Gupta and Smith, 2006; Waldfogel, 1997), others do not find a significant heterogeneity bias (Waldfogel, 1998; Albrecht *et al*, 1999; Neumark and Korenman, 1994).

The contribution of this paper is twofold. Firstly, while - contrary to Anglo-Saxon countries - there is no apparent pay differential between mothers and childless women on average in France, we find that time spent out of the labor market to care for children results in a specific pay penalty. This result is based on the estimation of current hourly wages for the population of salaried women aged from 20 to 49, controlling for actual work experience, the composition of activity history, current job characteristics and selection in employment. Comparing women to men, we also find that the pay penalty resulting from past unemployment is higher for men than for women and that children have no significant impact on women's wages, while the impact is positive for men.

Secondly, restricting the analysis to workers aged from 39 to 49, who are considered to have completed their childbearing, we find that the wage differential between women who have never interrupted their career and those who have spent time out on childcare is mainly due to differences in observed characteristics, while the wage gap between men and women who have never interrupted their career is mostly unexplained. These results are based on a decomposition of the gender wage gap into an "interruption" wage gap between women and a gender wage gap between women who have never taken child-related time out and men. Each part is then decomposed following Oaxaca and Ransom (1994).

The paper proceeds as follows: section 2 gives more details on our data and variables of interest and presents some descriptive statistics; section 3 presents estimates of the impact of children and child-related time out on women's and men's wages and section 4 presents the decomposition of the "interruption" wage gap and the gender wage gap. We conclude in section 5.

2. Data, variables and descriptive statistics

2.1 Data and variables

The EFE is a national representative survey conducted from November 2004 to March 2005 on a sample of 9547 individuals (5107 women and 4440 men) aged between 20 and 49. In this population, we retain as employees individuals who were working at least 10 hours per week at the date of interview, in order to minimize occasional participation in employment. We also exclude those whose monthly net wage was less than 260 euros, corresponding to the minimum monthly wage for a ten-hour week[2]. Once restricted to observations with no missing value in any of the variables used in the

[2] The hourly minimum wage was 6.00 € net at the time. Applying this threshold results in the exclusion of only 126 individuals: 32 men (incl. 20 childless) and 94 women (incl. 28 childless, 17 with one child, 32 with 2 children and 17 with 3 and more), and does not bias the analysis.

analysis[3], our sample contains 6232 wage earners (3101 women and 3131 men); 788 of the remaining individuals[4] were unemployed (346 men and 442 women), 717 were out of the labor market for reasons related to children (11 men and 706 women) and 167 individuals for other reasons (83 men and 84 women).

The main independent variables are related to children and activity history[5]. They are all derived from individual retrospective calendars of life events since the age of 18. Activity history was collected utilizing a grid-like format on a yearly basis. Although this retrospective information is less precise than repeated observations (*i.e.*, panel data), the method used (based on a computerized calendar covering family, residential and activity history) facilitates rapid and accurate recollection of life events. Six activity statuses were proposed: employment - distinguishing between part-time and full-time work -, unemployment, studies or training, military service, other economic inactivity. Respondents were asked to indicate the years of occurrence for each activity lasting more than 6 months[6]. An additional "status" was proposed to take into account shorter spells (*i.e.*, less than 6 months) of employment or non-employment. Using this calendar, we construct the following variables:

- potential experience, measured as the number of years since the last year of initial education;
- actual work experience, measured as the number of years actually spent at work since leaving initial education[7];
- tenure, the number of years working with the current employer;
- employment breaks (measured in years), divided into unemployment, training[8], child-related time out and other reasons. Child-related time out corresponds to the time spent out of the labor force starting within 3 years of the birth of each child and not dedicated to training[9]. These periods can last more than 3 years, and thus do not necessarily correspond to formal parental leave.

[3] This results in the exclusion of 432 observations (245 men, 187 women).
[4] Students, people in retirement and self-employed are not taken into account.
[5] Only 2 other surveys provide this information. An additional module to the LFS 1997 was dedicated to careers ("*Enquête Jeunes et carrières* 1997"), but this is too close to the year of the parental leave reform for its effects to show in wages. The 2004 survey on households' assets ("*Enquête Patrimoine* 2004") is recent enough, but there is no information regarding the number of working hours, the public/private sector or the branch of industry for instance; moreover, one respondent per household answers for himself and his/her partner if any, which alters the quality of the retrospective information on activity history. Few panel data are available in France; the main French panel of employed individuals (the "Déclarations annuelles de données sociales" - DADS), drawn from annual employers' reports, does not give information on the reason for individuals' absence in a given year or period of time; in addition, it does not cover civil servants. The European panel EU-SILC, in which France participates, provides no retrospective information on either activity history or the number of children an individual has had (only the number of children currently living in the household).
[6] More than one situation can be declared for any given year: firstly because some situations are not exclusive (for example, studies + unemployment) and secondly because a 6-month period can start in year t and end in year t+1 (in which case the interviewers were instructed to tick both years). In these cases, we have divided the year by the number of situations identified and imputed to each situation a duration equal to the corresponding fraction of year.
[7] Within short spells, whose average duration is 0.7 year for both men and women, it is not possible to distinguish employment from non-employment, but they definitely include both. These short spells are then included in actual work experience but their effect is isolated in the analysis.
[8] These years of training exclude initial education. Periods of compulsory military service, which was abolished in 1996, are included in training.
[9] To test the robustness of this definition, two other alternative definitions of child-related time out have been used: i) as starting within the year after childbirth; ii) as starting within 6 years of childbirth. The results are only marginally affected by the choice of definition.

The number of children is the total number of children that a person has had, not only - as is the case with many cross-section datasets - the number currently living in the household.

The dataset also provides other standard socio-demographic information (education, household type, region of residence, health status[10], immigrant status) and for those employed at the time of interview, detailed information on the characteristics of the current job (monthly wage, weekly hours, time status, occupation, public/private sector, firm size).

Our dependent variable is the net hourly wage. It is not observed directly but computed on the basis of individuals' current monthly wages (net of social contributions, including overtime payments and monthly bonuses) and contractual weekly hours of work[11].

2.2 Descriptive statistics

We start by looking at how children might affect women's and men's participation in the labor market, working hours, time status, activity history and then wages. The first child-related inequality between men and women lies in the fact that among parents, it is mostly women who withdraw from the labor force (table 1). In the total population aged 20-49 (excluding students and retired people), about 85 % of women participate in the labor force on average, and this percentage decreases with the number of children, falling from 98% among childless women to 69% among mothers of 3 and more children. The fact of having children has absolutely no such effect on men's participation.

Among wage earners, the gender gap in average weekly hours increases with the number of children, because it grows with the number of children for men while decreasing for women. This gap is partly explained by part-time work, the incidence of which increases for women with the number of children: 16 % of childless women work part-time, and respectively 20 %, 34 % and 44 % of mothers of one, two and three or more children; part-time hours are very heterogeneous, but a substantial percentage (50% on average, 60% in the public sector) corresponds to a 4 or 4.5 day-week. Other sample characteristics are detailed in appendix 1.

As for experience and activity history, potential experience shows no difference by gender, while men's actual work experience is longer than women's by 1.4 years on average (table 2). For both men and women, most of this experience has been accumulated with the current employer, as shown by the length of tenure, which represents more than half the total length of actual work experience; this reflects the rather low external mobility in France. However, the ratio of tenure to actual work experience is higher for women than for men (resp. 68% and 64% on average). Women's work history also differs from men's in part-time work experience, almost non-existent for men with any number of children, longer and increasing with the number of children for women.

Gender differences are notable in the length and composition of time out of employment. Firstly, women face longer spells of unemployment than men, on average as well as with any number of children, and among mothers, unemployment duration increases with the number of children.

[10] Health status is proxied by a variable indicating whether the person has suffered from a serious illness in the past or is permanently handicapped.
[11] To obtain hourly wage rates, contractual weekly hours are multiplied by 4.33 (*i.e.*, the average number of weeks in a month).

Secondly, women also spend longer periods out of the labor market than men. Here, the largest difference is in the duration of child-related work interruptions, which fathers do not experience whereas mothers spend on average almost two years out of the labor market. Men's major reason for time out of the labor force is related to training.

Finally, there are substantial differences in raw wages by gender and number of children (table 3). Between genders, the gap in hourly wages is about 13% on average - 10 percentage points lower than the gap in monthly wages. Childless women do rather well with an average hourly (resp. monthly) wage of 95% (resp. 89%) that of men. The gender wage gap increases with the number of children: mothers' hourly pay relative to fathers' varies from 86% with one child to 79% with 3 children, and from 78% to 64% for monthly wages.

Table 1 – Participation, weekly hours and part-time work by gender and number of children (%)

	Women						Men					
	All	Number of children					All	Number of children				
		0	1	2	3+	Total with children		0	1	2	3+	Total with children
% in the labor force[a]	85.1	97.8	90.4	83.7	68.8	81.4	99.7	99.6	99.9	99.9	99.4	99.8
Weekly hours[b]	32.8	34.2	33.7	32.2	30.6	32.3	37.1	36.3	37.4	37.6	37.3	37.5
% working part-time[b]	27.7	16.0	20.3	34.1	43.5	31.8	3.5	5.8	2.1	3	1.7	2.4

Source: EFE, 2004-2005.
[a]: among individuals aged 20-49 excluding students and retired people.
[b]: among wage earners.

Table 2 – Experience and activity history by gender and number of children (average number of years)

	Women						Men					
	All	Number of children					All	Number of children				
		0	1	2	3+	Total with children		0	1	2	3+	Total with children
Potential experience	16.3	8.5	15.8	19.7	22.4	19.1	16.6	9.9	16.9	20.1	22.7	19.8
Actual work experience	13.7	7.7	14.3	16.8	16.1	15.9	15.2	8.9	15.4	18.6	20.8	18.2
Incl. tenure	9.3	5.4	9.6	11.6	10.1	10.7	9.7	5.7	10.0	12.1	13.0	11.7
Incl. part-time work exp.	2.5	0.8	1.7	3.6	4.0	3.1	0.3	0.3	0.3	0.3	0.3	0.3
Unemployment	0.5	0.3	0.5	0.7	0.7	0.6	0.3	0.3	0.3	0.2	0.4	0.3
Time out, total	1.9	0.5	0.9	2.1	5.2	2.4	0.9	0.6	1.0	1.0	1.2	1.1
- on training	0.3	0.3	0.3	0.3	0.3	0.3	0.8	0.6	0.9	1.0	1.0	1.0
- on childcare	1.4	0.0	0.4	1.6	4.6	1.9	0.0	0.0	0.0	0.0	0.1	0.1
- other reasons	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.0
N	3101	807	710	1092	492	2294	3131	1023	617	969	522	2108

Source: EFE, INED, 2004-2005.
Population of employees.

Table 3 – Raw wages and unadjusted gender and family wage gaps

	All	Number of children				
		0	1	2	3+	Total with children
Men						
Monthly wage (€)	1724	1496	1734	1861	1903	1835
Hourly wage (€)	10.8	9.6	10.8	11.5	12.0	11.4
Women						
Monthly wage (€)	1313	1338	1350	1310	1224	1304
Hourly wage (€)	9.4	9.1	9.3	9.5	9.5	9.5
By age group <30[a]	8.2	8.2	8.0	8.2[a]	-	8.1
30 - <39	9.4	10.0	9.4	9.2	9.5	9.3
39 - 49	9.9	11.1	10.0	9.9	9.6	9.8
Gender wage gap (%)						
Monthly wage, all	76.2	89.4	77.9	70.4	64.3	71.1
Hourly wage, all	87.0	94.8	86.1	82.6	79.2	83.3
Family wage gap[b] (%)						
Monthly wage, all			100.9	97.9	91.5	97.5
Hourly wage, all			102.2	104.4	104.4	104.4
By age group <30[a]			98.1	101.5	-	98.8
30 - <39			94.4	96.9	104.1	93.0
39 - 49			89.7	98.6	97.0	88.3

Source: EFE, 2004-2005.
[a] The few observations having 3+ children are included with those having 2 children.
[b] Mothers' mean wage relative to childless women's mean wage.

Between women, mothers' mean monthly pay is lower than that of childless women, but their mean hourly pay is higher. This difference illustrates the impact of part-time work among mothers. However, the higher mean hourly wage of mothers results essentially from the fact that older women are more likely both to earn higher pay and to have more children. Thus, by age group, the average hourly wage of mothers is lower than that of childless women, from only slightly among women in their twenties, to 7% among those in their thirties and about 12% among women in their forties. These differences reflect the fact that children do not have a linear effect over the life cycle. Under the age of 30, a large proportion of women (70%) have not (yet) had children and are in the early stages of their careers. In their thirties, 82% of women have children; they are further advanced in their careers but are also likely to experience difficulties in combining work and childcare and to interrupt their employment – this is the age group in which the percentage not in the labor force is the highest (9.6% *vs*. 7.0% of women under 30 and 7.4% of women in their forties). Women in their forties, of whom only about 10% are childless, are past the early stages of motherhood but may be facing the consequences of past adjustments and interruptions.

3. Estimating the impact of children and child-related time out on individuals' current wages

This section addresses the question of the existence and extent of an impact of children on women's and men's earnings. By "impact of children", we mean either a direct impact, *i.e.*, a significant

coefficient on the number of children in the wage equation, or an indirect impact, *i.e.*, significant coefficients on variables that can reasonably thought to be related to childcare, for example working part-time or having spent time out of the labor force.

We expect to find a "direct" positive effect and few or no "indirect" effects of children on men's wages, and negative effects, either direct or indirect, on women's. In the case of men, positive returns to fatherhood (direct effects of children) would be consistent with the marriage premium regularly found in men's earnings (Korenman and Neumark, 1991; Gray, 1997; Dougherty, 2006); we do not expect indirect effects simply because men do not seem to "adjust" to fatherhood by changing their employment behavior (Pailhé and Solaz, 2006). In the case of women, it is precisely the contrary; motherhood has actually been found to influence women's earnings in two main and essentially "indirect" ways[12] (for a detailed review see *e.g*. Budig and England, 2001). Firstly, working mothers are more likely than men or childless women to have spent time out of the labor market, and consequently to have accumulated less human capital; these employment breaks may result not only in foregone experience but also in an additional penalty resulting from skills atrophy (Mincer and Polachek, 1974). Secondly, having children to care for may also influence mothers' allocation of effort (Becker, 1985); left with less energy than men or childless women, mothers could limit their occupational choices to jobs and positions which are compatible with their family responsibilities - seeking "more convenient and less energy-intensive jobs" in Becker's terms. These adjustments, under the form of working or having worked in part-time jobs or in jobs or firms that are more "family-friendly" (or simply closer to home or school) may result in reduced work opportunities or, according to the theory of compensating differentials, lower pay (Filer, 1985).

Our empirical investigation is conducted by steps, starting with a standard human capital wage equation where the log hourly wage is explained by human capital and personal characteristics. Regressions are conducted separately for women and for men.

Human capital characteristics include a set of 8 dummy variables indicating the highest diploma obtained by the individual (EDUC), work experience (EXP) and the number of years with the same employer (TENURE). For all variables related to experience and for TENURE we adopt a quadratic form. The set of personal characteristics includes the number of children[13] (NBCHILD, that we set apart in the expressions below since it is one of the variables of interest), and dummy variables for living in a couple (either married or not), 3 age groups, immigrant status, health status and area of residence (see Appendix 1 for detailed definitions of the variables and sample means).

In a first step (model 1), experience is implemented as actual work experience (EXP):

$$Lwh = a\,EDUC + b\,EXP + c\,TENURE + i_1\,NBCHILD + i\,CONTROLS + e \qquad (1)$$

where e is the error term.

Then in a second step, we extend our approach to experience by taking into account not only work experience but also the whole activity history, accounting for the duration and type of employment

[12] Aside from unobserved heterogeneity that, as discussed in section 1, we are not able to deal with.
[13] We use the total number of children rather than dummy variables, following Budig and England (2001) who found that the simplification did not affect the analysis.

interruptions (model 2). In addition, the periods of alternation between short spells employed/not employed are taken into account separately (PRECA). It is important to distinguish between different types of employment interruption, because although they all result in lower employment experience, they may not all have the same influence on wages: some are clearly expected to increase the individual's human capital (training), while others (unemployment, time out of the labor force for reasons other than training) are more likely to have a negative impact - either due to skill depreciation or signaling effects. Employment interruptions are then divided into:

- unemployment (UNEMP),
- time-out of the labor force, broken down into child-related (CHILDOUT)[14], training (TRAINING) and other reasons (OTHERO),

and we estimate:

$$Lwh = a\,EDUC + b\,EXP + c\,TENURE + e_1\,PRECA + e_2\,UNEMP + f\,CHILDOUT + g\,TRAINING + h\,OTHERO + i_1\,NBCHILD + i\,CONTROLS + e \quad (2)$$

In the last step, we incorporate a set of covariates related to the current job characteristics into the specification, including especially the time status (PARTIME), public/private sector (PUBLIC) and their interaction (PTPUB)[15], and other controls (JOBSET) for having extra hours paid, working conditions (night or weekend work), a position of responsibility, the size of the firm and the sector:

$$Lwh = a\,EDUC + b\,EXP + c\,TENURE + e_1\,PRECA + e_2\,UNEMP + f\,CHILDOUT + g\,TRAINING + h\,OTHERO + j_1\,PARTIME + j_2\,PUBLIC + j_3\,PTPUB + j\,JOBSET + i_1\,NBCHILD + i\,CONTROLS + e \quad (3)$$

For women, in order to correct for selection in employment, we also estimate models 1', 2' and 3' including an additional regressor IMR (the inverse Mills ratio) following Heckman's two-steps procedure (Heckman, 1979). The IMR is obtained from a probit equation where the dependant variable is "to be employed" (*vs*. "to be inactive"[16]) and the explanatory variables are those in model 1[17], plus a dummy

[14] Time-out of the labor force to care for children is potentially endogenous, i.e. mothers who have spent time out to care for children have the worst prospects on the labor market (Lequien, 2009; Piketty, 2005). This may lead to a biased estimate of the return to time out and the conclusion that children have an indirect impact on female wage which actually comes from women's behavior. The cross-sectional nature of our dataset does not allow to control properly for this bias. However, an instrumental variable (IV) approach was used, with religiosity and family background (number of siblings and a dummy variable equal to one if the respondent's parents have divorced or split up) as instruments. The Hausman test does not lead to a rejection of the exogeneity of time-out from the labor force to care for children, and the OLS method is therefore more efficient.

[15] We pay special attention to working in the public sector for two reasons. Firstly, because its incidence is higher for women than for men. Secondly, because it includes the majority of school teachers, who most often declare only the number of hours spent in the classroom as their contractual working hours. This does not include the time spent on preparation, marking, etc., which is at least partly acknowledged in the monthly pay, resulting in higher apparent hourly wages. We include a crossed-effect of part-time and the public sector to control for the specific regime of part-time work in this sector, where "long" part-time hours (4 days out of five and 4.5 days out of five) are 'overpaid' on the basis of resp. $6/7^{th}$ and $32/35^{th}$ the pay for full-time work, with the result that for a given monthly wage, part time hourly pay is higher than in the private sector.

[16] Participation in employment is estimated among individuals who are neither students nor retired. We also exclude the self-employed and, given involuntary unemployment that we cannot distinguish and since we want to be able to interpret non-participation as 'voluntary', we also exclude the unemployed (*cf.* Beblo *et al*, 2003). Selection into employment is not corrected for in the case of men, because within the population defined above, about 100% of men are employed.

[17] In principle (*cf*. Wooldridge, 2002), the selection equation should include the same set of variables defined on the whole sample as in the wage equation (plus at least one exclusion variable, *i.e*., influencing participation but not the wage). However, we do not completely follow this principle, because when activity history is detailed, including the same set of variables in the participation equation is equivalent to including the current participation status in the explanatory variables. We therefore use potential experience instead.

variable for having at least one child aged under 3 (the age at which children are accepted in public pre-school), an indicator of the woman's own mother's activity history ("always at work" *vs.* "other situations") and the amount of non-work income (measured as the household income minus individual's own earnings); these three last variables are our exclusion variables. The estimation (detailed results in Appendix 2) shows the expected effects of the presence of small children and unearned income (both negative and significant) and mother's employment history (positive and significant: women whose mothers always worked are more likely to be employed).

Table 4 below presents a summary of the results[18], focusing on children and the variables which are most likely to be influenced by children: EXP and TENURE, the length of which can be reduced by interruptions, CHILDOUT, a measure of past adjustments to having children that may have a negative influence, and PARTIME, taken as an indicator of current indirect effects of having children to care for.

For women, the effect of the number of children is never significant, but when the specification is changed the sign of the coefficient changes: it is positive with model 1, negative with model 1' (when selection into employment is controlled for), then positive again when more information about the past influence of children on the activity history (model 2') and the current influence on employment characteristics (model 3') are taken into account[19]. As for the IMR, it is positive and significant in all models; this positive sign is as expected, showing that the unobserved characteristics, which influence participation, are positively correlated with the wage (*i.e*., women who have the highest propensity to participate have the best unobserved productive characteristics – conversely, women who would be the worst off if they were employed are out of the labor force). Considering all these results together suggests omitted variables in model 1, while the negative influence of children in model 1' indicates an effect of factors not accounted for in the human capital variables and other personal characteristics, since they are taken into account at this step, *i.e*., the effect of adjustments to children either in the past (interruptions) or in the current employment characteristics (part-time) that we introduce in models 2' and 3'. This suggests that our careful accounting of activity history and controls for current job characteristics allow to avoid much of the possible endogeneity of the number of children. This endogeneity bias, if any, would probably be smaller than in other European countries since fertility behavior in France is rather homogeneous[20] and social differentials regarding fertility behavior are smaller (Toulemon *et al.*, 2008)[21]. Within this limit, we conclude from this part of our results that children have no direct effect on women's hourly wages, a conclusion which is consistent with the main expected effects of children on wages in the framework of human capital theory ("indirect" effects, cf. Korenman and Neumark 1992).

As for the effects of employment interruptions, the estimation shows firstly that child-related time out has the negative and significant effect that could be expected, *i.e.,* women who have interrupted their

[18] See Appendix 3 for complete regressions.
[19] The effect is the same when the current job characteristics are introduced first and activity history variables second.
[20] There is a large concentration of families with 2 children: among women born in 1950, 10% are childless, 20% have one child, 40% two children, 20% three children, and 10% have four or more children
[21] Women with higher educational attainment have fewer children on average, but when they do have them, they are more likely to have three children than women of medium educational level (Toulemon *et al.*, 2008).

employment for childcare reasons face a specific penalty: one year out on childcare reduces their hourly wage by - 2.5% if estimated with model 2' and by -2.1% with model 3'. This penalty comes in addition to reduced work experience and possible reduced tenure, the missing returns being, respectively, + 1.7% and + 0.9% (+1.6% and +0.6% with model 3'). Other indirect effects of children on women's hourly wages appear through part-time work, the incidence of which is twice as high among mothers as it is among childless women (cf. table 2); however, the negative influence of part-time work is largely offset for those working in the public sector.

None of these effects are observed for men. Firstly, children appear to have a steady positive and significant influence on men's hourly wages. Secondly, the coefficient on child-related time-out is negative but not significant – men just do not interrupt their employment to take charge of childcare. Thirdly, the incidence of part-time work among men is too low for it to have any significant impact on their hourly wage.

Table 4 – Estimations of women's and men's log hourly wage

	Women				Men		
Model	(1)	(1')	(2')	(3')	(1)	(2)	(3)
EXP	0.015***	0.015***	0.016***	0.016***	0.033***	0.035***	0.034***
EXP2*100	-0.024*	-0.022*	-0.038***	-0.035***	-0.076***	-0.087***	-0.082***
TENURE	0.014***	0.013***	0.009***	0.006*	0.004	0.000	-0.003
TENURE2*100	-0.017	-0.016	-0.006	-0.002	0.012	0.020*	0.022**
NBCHILD	0.007	-0.011	0.005	0.001	0.019***	0.017***	0.014***
PRECA	.	.	-0.019***	-0.015**	.	-0.022***	-0.021***
PRECA2*100	.	.	0.145***	0.097*	.	0.104***	0.095**
UNEMP	.	.	-0.044***	-0.038***	.	-0.073***	-0.069***
UNEMP2*100	.	.	0.356***	0.322***	.	0.687***	0.695***
CHILDOUT	.	.	-0.025***	-0.021***	.	-0.018	-0.026
CHILDOUT2*100	.	.	0.110***	0.096***	.	0.222	0.275
TRAINING	.	.	0.025*	0.011	.	0.009	0.005
TRAINING2*100	.	.	-0.214	-0.048	.	0.021	0.095
OTHERO	.	.	-0.023**	-0.017*	.	-0.069***	-0.057**
OTHERO2*100	.	.	0.103*	0.084	.	0.406**	0.368*
PARTIME	.	.	.	-0.027*	.	.	0.026
PUBLIC	.	.	.	0.035**	.	.	0.052**
PTPUB	.	.	.	0.071***	.	.	0.003
PAIDHSUP	.	.	.	0.142***	.	.	0.087***
RESP	.	.	.	0.104***	.	.	0.104***
IMR	.	0.140***	0.119***	0.112***	.	.	.
JOBSET	.	.	.	X	.	.	X
EDUC	X	X	X	X	X	X	X
CONTROLS	X	X	X	X	X	X	X
Intercept	1.579***	1.558***	1.712***	1.778***	1.662***	1.763***	1.771***
R-sq	0.41	0.42	0.43	0.49	0.44	0.45	0.49
Observations	3101	3101	3101	3101	3131	3131	3131

* significant at 10%; ** significant at 5%; *** significant at 1%.
X indicates a variable or set of variables included in the regression.
See detailed results in Appendix 3.

Aside from the influence of children, the other results of the estimations of men's and women's hourly wages are similar to those usually found in the literature (Bayet, 1996; Colin, 1999 for the French case). With any specification, returns to experience appear lower for women than for men (by about one half), reflecting that women's careers are flatter than men's. Returns to tenure are higher for

women; this suggests that staying with the same employer is more rewarding for women than for men, or that mobility is more penalizing for women. However, these returns decrease steadily when activity history then job characteristics are introduced and, all in all, even with the same employer, a year in employment is less rewarding for women than for men.

Among employment interruptions, the most penalizing is unemployment: the fact of having been unemployed has a marked negative impact on women's as well as men's hourly wages, this time more pronounced for men than for women, as found previously by Bayet (1996). Periods of precarious employment also have a negative and significant influence on women's and men's wages. For women, unemployment is more penalizing than child-related time out, suggesting that different types of employment interruption convey different signals[22]. The effect of time spent out of the labor force for reasons other than training or childcare is negative and significant for both women and men, and more penalizing on men's wages; for women, the magnitude of the coefficient is smaller than that on child-related time-out, while for men it is close to that of unemployment[23]. Interestingly, time out on training seems to have no significant impact on men's hourly wages, while it is weakly significant in the case of women with model 2' (i.e. when the current job's characteristics are not taken into account); given that women spend on average less time in training than men, this could be interpreted as a signaling effect or a selection into training.

Adding controls for current employment characteristics (model 3) tends to reduce slightly all the other coefficients, but especially those on children[24] and on time out variables for both women and men (for women, time out on training becomes non-significant). The coefficients on job characteristics are of the expected signs: working part-time is negative for women (not significant for men), working in the public sector has a positive effect for all, and for women working part-time in the public sector has the positive impact that could be expected. The effect of having been paid extra hours or a position of responsibility is positive and significant for all, extra hours yielding higher returns for women than for men – this could be related to the fact that for women extra hours are more likely to happen within a higher occupational status, whereas they are more generalized in the case of men.

At this point, the main results are 1) that children have no direct impact on women's hourly wage but a positive one on men's, 2) that the reward for a year in employment is higher for men than for women, 3) that for types of time out which are common to women and men, a year out appears more penalizing to men's than to women's wages. But women face additional penalties for part-time work (which can reasonably be taken, at least partly, as an effect of having children) and for time out on childcare; multiplied by the fact that, on average, they work more often in part-time jobs and spend

[22] However in general, the penalty for time out on childcare will be greater because women spend on average more time out on childcare than in unemployment. It cannot be excluded that mothers (especially mothers of younger children) having difficulties in finding jobs may tend to withdraw from the labor market.

[23] Since we do not know the 'other reasons', it is difficult to provide an explanation. However, it cannot be ruled out, especially for women, that time out for 'other reasons' is actually related to care – either for children if the interruption starts later than the three years after childbirth by which we have defined child-related time out, or for parents or relatives. For both sexes, it may also correspond, at least partly, to discouraged workers.

[24] Better controls on job characteristics also have effects on the apparent premium to family life for men: aside from the reduced coefficient on children, living in a couple becomes non-significant (see Appendix 3). This would support the hypothesis of selection of higher wage-earning men into family life (*cf*. Korenman and Neumark, 1991; Gray, 1997).

more years out of the labor force for reasons related to children than men do, this suggests that children are actually a key factor behind the gender wage gap. Moreover, the substantial impact of doing extra hours or having a position of responsibility suggests possible missed opportunities of higher wages for mothers – if children prevent them from working extra hours or reaching positions of responsibility, or if employers consider women as potential mothers and therefore less reliable or committed workers.

4. The gender wage gap and the "interruption gap"

In this last section of the paper, we turn to a decomposition of the gender wage gap in which we seek to isolate the impact of children. As seen above, the main effect of children on women's wages is an indirect negative effect, resulting from the combination of reduced experience and a penalty on time out, while for men there is a direct positive effect. To take this gender asymmetry into account, we consider three subgroups: men, women with continuous participation in the labor force, and women with child-related interruptions. The gender wage gap is then analyzed as resulting from two sorts of pay differentials:

- firstly, an "interruption pay gap" between women with continuous or interrupted workforce participation; here, our approach is in a way based on that of the family pay gap, in that the decomposition includes a comparison between women; but unlike the family gap approach, we do not make a comparison between mothers and childless women, but between women who have and have not taken time out for childcare.

- secondly, a "gender" pay gap between men and the group of women who have continuously participated in the labor force (whether they are mothers or not)[25].

The analysis is conducted on individuals aged between 39 and 49 years. This restriction presents several advantages. Firstly, it provides a more homogeneous group, as these workers have experienced the same labor market conditions and are observed at the same stage of their lifecycle. Secondly, it allows to compare women who are likely to have already completed their fertility[26]. In addition, the rate of activity of women in this age group is high: women who have returned work when their children are grown up are joining those who have had uninterrupted careers (86% of women in this age group are active in the EFE), and so the impact of their activity history on their current wages can be more accurately measured.

4.1. Characteristics of men and women between 39 and 49 years old

[25] In a similar spirit, Manning and Swafffield (2008), for the British case, compared men and women with a continuous full-time employment, no children and no desire to have any.

[26] In 2004, the partial total fertility rate, *i.e.*, the number of births per 100 women during a given age span, was 6.4% for women aged 40 and over, compared to 64.3% for women aged 25-29 and 60.4% for those aged 30-34 [Insee, Bilan démographique].

The subsample of wage earners aged between 39 and 49 is composed of 1360 men and 1356 women, of whom 781 (58%) have never interrupted their activity to care for children and 575 (42%) have taken time out of the labor market for this reason. The interesting point is that, among women in this age group, a large majority (85 %) of those who have never interrupted their activity are mothers and a meaningful proportion of mothers have never interrupted their workforce participation. The big difference between those who have taken time out from the labor market and those who have not is in the number of children they have (Table 5): at one end, only 10% of mothers who have taken child-related time out have only had one child, compared to 32 % of those without interruption; at the other end, 44 % and 14 % respectively have had three children or more.

Table 5 – Children and child-related career interruptions among employed mothers aged 39-49 (%).

	Number of children			
	1	2	3 +	Total
Interruption	10.4	45.2	44.3	575
No interruption	32.4	53.3	14.4	646
Total	269	604	348	1221

Source: EFE, INED, 2004-2005.

The two groups of women also differ in their education level and experience (see Table 6 part a). Women without child-related interruptions are more educated, with 19% having at least 3 years of higher education compared to only 12% of the other women. This gap is consistent with human capital theory, which predicts that less-educated women are more prone to interrupt their participation in employment (Mincer and Polachek, 1974)[27].Quite logically, the length of actual work experience (Table 6, part b.) is longest among women without career interruption (around 23 years) and shortest among those who have taken time out (18 years on average, decreasing steadily with the number of children). Childless women have a shorter actual experience than the average “continuers” (21 years), this being due to late entrance into the labor market related to their longer studies. Not surprisingly, the difference in average actual experience within the group of women is mostly due to time spent out of the labor market caring for children. Tenure represents a large proportion of actual experience for women without career interruption (around 72%). The smaller ratio of tenure to experience for women with career interruption (around 60%) probably stems from those who did not return to their previous employer when returning to work.

As for hourly wages (table 7), the gender differential is, as could be expected, much larger between men and the group of women with interruptions (26%) than between men and the group of women with continuous participation (10%); it is 20% on average between men and all women. The hourly wage of mothers of 3+ children with no interruption is very close to that of men, reflecting their higher level of education, but otherwise the gender wage differential does not vary much with the number of children. Finally, the raw “interruption” gap (between women with and without interruption) amounts to

[27] Among the "continuers”, the most educated group are childless: 28% have at least 3 years of higher education. But the next most educated group is that of women with 3 children or more: 26% have at least 3 years of higher education.

19%, which is consistent with the negative return to time out of the labor market found in the previous section.

Table 6. Education and activity history, population aged 39-49

	Women									Men
	With interruption				Without interruption					
	All	Number of children			All	Number of children				
		1	2	3+		0	1	2	3+	
a. Education										
5 yrs + higher education	4.9	6.7	5.0	4.3	7.2	13.3	4.3	6.1	8.6	8.4
3-4 yrs higher education	7.3	5.0	7.3	7.8	12.4	14.8	8.6	12.5	17.2	7.6
Up to 2 yrs higher education	8.7	6.7	9.6	8.2	12.2	13.3	11.0	12.8	10.8	7.6
Secondary general education	10.4	8.3	11.2	10.2	10.5	12.6	9.6	10.8	8.6	4.6
Secondary professional education	7.7	5.0	7.3	8.6	8.8	5.2	11.0	9.0	8.6	6.1
Vocational diploma	28.5	25.0	33.5	24.3	28.9	23.7	32.5	29.9	24.7	40.2
Primary level	9.6	15.0	10.0	7.8	7.0	4.4	11.0	6.7	3.2	9.0
No diploma	23.0	28.3	16.2	28.6	12.9	12.6	12.0	12.2	18.3	16.5
b. Experience and Activity history										
Actual exp	17.9	20.3	18.8	16.5	23.0	20.9	23.8	23.2	23.4	23.0
Incl. Tenure	10.8	12.0	11.8	9.5	16.6	15.2	16.8	17.1	15.9	14.9
Unemployment	0.9	0.7	1.0	0.8	0.6	0.9	0.6	0.6	0.5	0.4
Time out:										
- on training	0.4	0.4	0.4	0.4	0.4	0.6	0.3	0.4	0.4	1.0
- on childcare	5.4	3.0	4.5	7.0	0	0	0	0	0	0
- other reason	0.5	0.8	0.4	0.4	0.2	0.7	0.2	0.1	0.2	0.1
% tenure in actual exp	0.60	0.59	0.63	0.58	0.72	0.73	0.71	0.74	0.68	0.65
Interruption ratio	0.81	0.86	0.81	0.81						
N	575	60	260	255	781	135	209	344	93	1360

Source: EFE, INED, 2004-2005.

Table 7. Hourly wages (euros) - Population aged 39-49

	Number of children					*Total with*
	All	0	1	2	3+	children
Men	12.6	11.3	11.7	12.4	12.5	12.5
Women with interruption	8.8	-	9.4	8.6	8.8	8.8
Women without interruption	10.8	11.1	10.1	10.8	11.7	10.7
Gender wage gap (%) - Women with interruption (a)	*69.5*		*80.3*	*69.4*	*70.4*	*70.1*
Gender wage gap (%) - Women without interruption (b)	*85.7*	*98.2*	*86.3*	*87.1*	*93.6*	*85.6*
Interruption wage gap (%) (c)	*81.1*	-	*93.1*	*79.6*	*75.2*	*81.9*

(a) ratio of hourly wage of women with career interruption vs. men
(b) ratio of hourly wage of women without career interruption vs. men
(c) ratio of hourly wage of women with career interruption vs. women without career interruption
Source: EFE, INED, 2004-2005.

4.2. Methodology

To investigate the link between children and child-related interruptions and the gender wage gap, we consider that the gender wage gap results from the addition of the interruption gap between women and the gap between men and the group of women who have had no career interruption.

We start by writing the "interruption" wage gap as follows:

$\bar{W}_f = (1\text{-}k)\ \bar{W}_{f1} + k\ \bar{W}_{f2}$ *(i)*

where f_1 and f_2 are respectively the women without and with interruption, and k is the share of women who have interrupted their careers,

then we replace $\bar{W}_f$ in the general expression of the gender wage gap**:**

$\bar{W}_m - \bar{W}_f = \bar{W}_m$ - $[(1\text{-}k)\ \bar{W}_{f1} + k\ \bar{W}_{f2}]$,

which is equivalent to $\bar{W}_m - \bar{W}_f = \bar{W}_m$ - $\bar{W}_{f1}$ + $k\,(\bar{W}_{f1}$ - $\bar{W}_{f2})$ *(ii)*

On this basis, we decompose ($\bar{W}_{f1}$ - $\bar{W}_{f2}$), the "interruption wage gap" and ($\bar{W}_m$ - $\bar{W}_{f1}$) the "gender wage gap" using the standard Oaxaca-Ransom method (Oaxaca & Ransom, 1994). For each differential, the estimated average wage gap is as follows:

$$\bar{W}_{g1} - \bar{W}_{g2} = \bar{X}'_{g1}(\hat{\beta}_{g1} - \hat{\beta}) + \bar{X}'_{g2}(\hat{\beta} - \hat{\beta}_{g2}) + \hat{\beta}(\bar{X}_{g1} - \bar{X}_{g2})' \qquad \textit{(iii)}$$

where $g1$ and $g2$ stand for any pair of groups - their value is respectively (m, $f1$) and ($f1$, $f2$), $\bar{X}_{gi}$ is the average characteristics of each group and $\hat{\beta}_{gi}$ their estimated returns. $\hat{\beta}$ represents the "norm", *i.e.* ideally the return to productive characteristics on a perfect competitive market with no wage discrimination. Following Oaxaca and Ransom (1994), we estimate $\hat{\beta}$ from the wage equation of the pooled sample of men and all women as the more "neutral" measure of returns to variables; for consistency we use the same vector of returns in both parts of the decomposition.

The first two terms in *(iii)* correspond to the so-called "unexplained" gap, that is the differential between $\hat{\beta}_{gi}$ the returns of each group and $\hat{\beta}$ the returns of the "norm". The first term in *(iii)* corresponds to the "advantage" of group 1, the second term to the "disadvantage" of group 2 and their sum total accounts for the "unexplained" part of the wage gap. The last term in *(iii)* is the "explained" part of the gap, which results from differences in the characteristics of the two groups. These differences are valued at the estimated returns of the norm.

As in the previous section, women's wage equations are corrected for selection into employment, following the Heckman two-step procedure. The selection equation is estimated on the sub-sample of women aged 39-49 years, using the same specification as previously, except that we replace the variable "at least one child under 3 years old" by "at least one child under 6 years old", to take into account the fact that women in this age group are more likely to have "older" children[28]. The results of the probit equation are given in Appendix 2.

[28] In this age group, only 47 women, of which 19 are employed, have at least one child under 3 years old, whereas 135, of which 95 are employed, have at least one child under 6 years old.

This correction results in an additional term, (λ_{g1} IMR_{g1} - λ_{g2} IMR_{g2}), in expression (*iii*), where IMR_{gi} is the Inverse Mills Ratio and λ_{gi} the estimated coefficients (Neuman and Oaxaca, 1998). For men, the IMR is equal to zero.

The decomposition is performed on the wage gap adjusted for selection, *i.e.*, the estimated wage differential minus the average selection component for women. Each adjusted "sub-gap" can be written as follows:

$$AW_{g1} - AW_{g2} = (W_{g1} - W_{g2}) - (\lambda_{g1} IMR_{g1} - \lambda_{g2} IMR_{g2}) \qquad (iv)$$

We use four sets of covariates in the wage equations. The specifications are the same as in section 3, with an additional specification (model 4) in which we introduce the occupational status, since it may be correlated with past interruptions. Table 8 below summarizes the specifications; the detailed results of the regressions are presented in Appendices 5a and 5b.

Table 8 – Specifications used in decompositions

Set of variables	Model 1	Model 2	Model 3	Model 4
Human capital	X	X	X	X
Personal characteristics	X	X	X	X
Activity History		X	X	X
Current Job Characteristics			X	X
Occupations				X
Correction for selection bias	X	X	X	X

4.3. Results

We look firstly at the "interruption" wage gap, defined here as the hourly wage gap between women who have not (f_1) / who have (f_2) interrupted their careers to care for children (table 9). This gap amounts to 0.202 (log points). The selectivity component is negative with any specification and approximately equal to 0.05 (log points). The estimated coefficient of the IMR is higher for women with career interruptions than for "continuers", which suggests that women who interrupted and went back in employment are probably more productive than those who remain out of the labor market. But the selectivity effect is of limited size and the standard errors are large.

The explained part of the "interruption" gap equals 0.130 (log), *i.e.*, more than half (52%) the estimated wage differential (adjusted for selection effect) in model 1 and rises to more than 84% when the activity history is introduced (model 2)[29]. Conversely, the unexplained part is small (48% with model 1 and 16% 20% with model 2) and significant only in model 1. In other words, the interruption gap is mostly due to differences in the observed characteristics, especially once work history is taken into

[29] These results hold with alternative norms: when the norm is defined as the group of women with career interruptions, the explained part is equal to 72% in model 1, 87% in model 2, 88% in model 3 and 96% in model 4; when the norm is defined as all the women, the explained part is equal to 70%, 84%, 85% and 87% respectively. Note that the norm based on the group of women without interruptions cannot be used here, because we need to be able to compute the return to child-related time out of the labor market.

account. There is a rather small additional penalty for interrupted careers in terms of differences of returns to productive characteristics[30].

Table 9 – Decomposition of the "interruption" wage gap

	Model 1		Model 2		Model 3		Model 4	
Raw differential (Lwh)	0.202		0.202		0.202		0.202	
Differential due								
to the selection variable	-0.046		-0.034		-0.046		-0.040	
Standard error	*0.036*		*0.036*		*0.034*		*0.034*	
Differential adjusted for selection	0.248		0.236		0.248		0.242	
Standard error	*0.042*		*0.054*		0.041		0.041	
a. Components								
of the adjusted wage gap		%		%		%		%
Explained	0.130	*52.4*	0.199	*84.3*	0.207	*83.5*	0.205	*84.5*
Standard error	*0.018*		*0.021*		*0.021*		*0.021*	
Unexplained	0.118	*47.6*	0.037	*15.6*	0.041	*16.5*	0.037	*15.4*
Standard error	*0.038*		*0.045*		*0.036*		*0.036*	
b. Composition		*%*		*%*		*%*		*%*
of the explained part		*expl. part*		*expl. part*		*expl. part*		*expl. part*
Education	0.066	50.8	0.059	29.7	0.055	26.6	0.031	15.2
Standard error	*0.013*		*0.012*		*0.012*		*0.007*	
Experience, tenure	0.083	63.8	0.045	22.6	0.038	18.4	0.037	18.1
Standard error	*0.009*		*0.012*		*0.011*		*0.010*	
Children	-0.023	-17.7	-0.023	-11.6	-0.015	-7.2	-0.012	-5.9
Standard error	*0.006*		*0.006*		*0.006*		*0.005*	
Personal characteristics	0.004	3.1	0.006	3.0	0.005	2.4	0.004	1.7
Standard error	*0.004*		*0.003*		*0.003*		*0.002*	
Interruptions due to children			0.084	42.2	0.064	30.9	0.049	24.0
Standard error			*0.017*		*0.017*		*0.015*	
Other interruptions			0.028	14.1	0.022	10.5	0.017	8.3
Standard error			*0.005*		*0.005*		*0.004*	
Current Job characteristics					0.038	18.4	0.026	12.7
Standard error					*0.007*		*0.007*	
Occupations							0.053	25.9
Standard error							*0.008*	
Nobs	1356	100.0	1356	100.1	1356	99.9	1356	100.0

Standard errors are estimated by bootstraps (1000 replications)

More precisely, the largest part of the explained component corresponds to differences in the length and composition of activity history. Child-related time out of the labor market constitutes almost half of the explained gap (42%). The two other largest components are the differences in the level of

[30] The return to time spent out of the labor market to raise children in the pooled sample is close to the return estimated for the group of women with career interruptions, because very few men (36 individuals) have taken time out for children. So the difference in returns between the norm and the estimated return is close to zero and the effect of this dimension in the unexplained part of the wage decomposition within women is negligible.

education (30%) and work experience (23%). The wage gap between the two groups of women is then due not only to the reduced length of work experience but also to the negative return to time spent out of labor market to care for children. These two factors (work experience and interruptions for children) taken together represent two thirds of the "interruption" wage gap.

The explained part of the gap does not vary much when the current job characteristics are controlled for (model 3). Differences in job characteristics account for 18% of the explained component. The difference due to time out of the labor market is reduced to 31% of the explained gap, but the part due to experience and time out of the labor market still represents about one half of the raw wage differential. Finally, the average difference in occupations represents 26% of the interruption gap (model 4); this suggests that women without interruption have reached on average better occupational status than women with career breaks. But the share explained by time out of the labor market remains close to the level in model 3 (24%) and the total of differences in time out and work experience amounts to 42% of the wage differential in this last specification.

The explained part of the wage differential due to the number of children is small (- .01 log points in model 4). It is negative and significant in all models, because the return to children is positive when estimated at the norm and women taking time out have on average more children.

Secondly, using the same four specifications, we decompose the gender wage gap between men and women without labor force interruption; this gap is equal to 10.2 (log points). The results are reported in table 10. Here the component due to selectivity is even smaller than in the previous decomposition (-0.02 log points in model 1, negligible in model 4) and never significant.

In models 1 and 2, the unexplained part is higher than the estimated differential (resp. 136% and 112%). In other words, women who have never taken child-related time out of the labor force would be paid more than men if they were getting the same returns to their productive characteristics. When current job characteristics are taken into account in the wage equations (model 3), the unexplained part falls to 76% and the explained part of the wage differential becomes positive. This shows that a substantial share of the hourly wage differential between these two groups results from differences in employment characteristics. Some of them, related to differences in industry sector or firm size can be interpreted as reflecting horizontal gender segregation; others such as working conditions, part-time work or overtime hours can be viewed as reflecting an unequal commitment to work – whether or not related to children. But all these factors together explain only a quarter of the wage differential and controlling for occupations does not substantially change the picture: the explained part rises to 31%, and 68% of the wage gap remains unexplained by the differences in observable characteristics[31].

[31] Here again, we have tested the robustness of these results using alternative norms. Taking women without career interruption as the norm, the unexplained part is equal to 153% in model 1, 129% in model 2, 93% in model 3 and 106% in model 4; taking men and women without career interruption as the norm, the unexplained part is equal to 137%, 113%, 75% and 67% respectively.

Table 10 - Decomposition of the gender wage gap
between men and women with no child-related interruption

	Model 1		Model 2		Model 3		Model 4	
Total wage differential								
between men and women	0.102		0.102		0.102		0.102	
Differential								
due to the selection variable	-0.024		-0.021		-0.009		0.000	
Standard error	*0.022*		*0.022*		*0.020*		*0.017*	
Differential								
Adjusted for selection	0.127		0.123		0.111		0.102	
Standard error	*0.029*		*0.028*		*0.027*		*0.026*	
Explained	-0.045	*-35.5*	-0.015	*-12.1*	0.027	*24.5*	0.032	*31.4*
Standard error	*0.013*		*0.014*		*0.015*		*0.016*	
inc. Children	0.010		0.010		0.006		0.005	
Standard error	*0.003*		*0.003*		*0.002*		*0.002*	
inc. Occupations							0.004	
Standard error							*0.009*	
Unexplained	0.172	*135.5*	0.138	*112.1*	0.0839	*75.5*	0.070	*68.5*
Standard error	*0.027*		*0.025*		*0.024*		*0.021*	
Nobs	2141		2141		2141		2141	

Standard errors are estimated by bootstraps (1000 replications)

It is interesting to note that the explained part due to the number of children is positive and significant – salaried men have on average more children than women without time out and are rewarded for it – but it represents only a very limited part of the gender wage gap (0.009 log points in model 1, 0.005 log points in model 4).

To sum up, most of the gender wage gap between men and women continuously in the labor force is unexplained. This result is consistent with Moschion and Muller (2010) who, applying our approach to data restricted to the private sector, find that two-thirds of the hourly wage gap between men and women without career interruptions remain unexplained by differences in productive characteristics.

Finally, the total gender wage gap, equal to 0.188, is composed of an “interruption” gap (weighted by the proportion of women with career interruptions, equal to 0.424), a “gender” wage gap between men and women without child-related employment interruptions and a selection effect which is negligible in all models (see table 11). With the most parsimonious model (model 1), the total unexplained part is nearly equal to the adjusted wage gap (96%). It then falls to 69% with model 2, when the activity history is taken into account. It is only when job characteristics are introduced in model 3 that it drops to less than half the total adjusted gender wage gap (47% with model 3 and 42% with model 4). The part due to interruptions for children accounts for about 10% (model 1) and 6% (model 4) of the overall gender wage gap, which is rather small.

Table 11 - Components of the total gender gap

	Model 1		Model 2		Model 3		Model 4	
Observed wage differential	0,188		0,188		0,188		0,188	
selection effect	-0,044		-0,035		-0,029		-0,017	
Differential adjusted for selection								
Components:	*0,232*		*0,223*		*0,216*		*0,205*	%
unexplained	0,222	95,6	0,153	68,8	0,101	46,8	0,086	53.2
explained	0,010	4,4	0,069	31,2	0,115	53,2	0,119	46.8
Incl. child-related interruptions	0,000	-0,02	0,035	15,9	0,027	12,6	0,020	8.2
Nobs	2716		2716		2716		2716	

More importantly, this decomposition shows that, even though women who have never interrupted their activity are very close to men in their productive characteristics, they get lower returns to these characteristics than men. This suggests that women with continuous participation in the labor force cannot convey a credible signal to employers of their long-term commitment to work, or that employers are not ready to decipher the signal. Consequently, their wages are determined “as if” they were likely to interrupt their careers. This supports an interpretation of the gender wage gap in terms of statistical discrimination (Phelps, 1972).

5. Conclusion

Children and resulting career interruptions have long been cited as one of the major causes of the gender wage gap. Time spent out of the labor market to care for children may result not only in women accumulating less professional experience than men on average, but also in a specific pay penalty. By using the new French survey “Families and Employers” (Ined, 2005), we have been able to measure the impact on current wages of the different components of activity history.

We first look at men’s and women’s returns to observable characteristics. The cross-sectional results are essentially consistent with studies in other countries, pointing at adjustments related to unequally shared family responsibilities. Children do not influence women’s hourly wages directly, but may have various indirect effects on hourly wages if they cause their mothers to work part-time, interrupt their careers or adjust by not working extra hours or by avoiding (or being excluded from) positions of responsibility. The main difference from other studies, especially those on Anglo-American countries, is that we do not find any direct negative impact of children on women’s mean hourly wage when time out of employment and job characteristics are taken into account. Our data do not allow to go much farther into the reasons for this difference, but we can at least mention some institutional features that might account for it: the minimum wage, which is higher in France than the average hourly wage in many countries and which covers all occupations and sectors of industry; public pre-schools that accept almost all children from 3 years old (97% in 2002), the substantial (though insufficient) supply of all-day childcare and advantageous tax schemes for using personal childcare services.

We then decompose the gender wage over a sample of men and women aged 39-49 in order to focus on a homogeneous group. Our results indicate that the wage gap between women who have never interrupted their participation in the labor market and women who have taken time out for childcare is almost entirely "explained" by their observable characteristics, while the wage gap between men and women who have never interrupted their participation in the labor market is mostly "unexplained". In other words, the wage penalty associated with the "interruption" gap between women corresponds to differences in human capital, length of work experience and time out to care for children. Conversely, women who have remained in the labor force, whether they have children or not, are disadvantaged in term of returns to their productive characteristics when compared with men. These results are compatible with an explanation of the gender wage gap in terms of statistical discrimination, *i.e.*, employers are unable to make a correct assessment of women's commitment to work.

References

ALBRECHT, J.W., P-E. EDIN, M. SUNDSTRÖM and S.B. VROMAN (1999): "Career interruptions and subsequent earnings: A reexamination using Swedish data", *Journal of Human Resources*, Vol. 34, No. 2, pp. 294-311. [2,3,4]

BAYET, A. (1996): "Carrières continues, carrières incomplètes et salaires, *Economie et Statistique* No. 299, pp. 21-36. [3,12,13]

BEBLO, M. and E. WOLF (2002): "Wage penalties for career interruptions - An empirical analysis for West-Germany", ZEW Discussion paper n°02-45. [2]

BEBLO, M., D. BENINGER, A. HEINZE and F. LAISNEY (2003): "Methodological issues related to the analysis of gender gaps in employment, earnings and career progression", Final Report to European Commission - DG Employment and Social Affairs. [10]

BECKER, G. (1985): "Human capital, effort and the sexual division of labor", *Journal of Labor Economics,* Vol. 3, No. 1, pp. S33-S58. [9]

BLAU, F.D. and L. KAHN (2007): "The US gender pay gap in the 1990s: slowing convergence", *Industrial and Labor Relations Review*, Vol. 60, No. 1, pp. 45-66. [2]

BUDIG, M.T. and P. ENGLAND (2001): "The wage penalty for motherhood", *American Sociological Review*, Vol. 66, No. 2, pp. 204-225. [2,4,9]

COLIN, C. (1999): "Carrières et salaires, une comparaison hommes/femmes", *in* Conseil d'Analyse Economique "*Egalité entre femmes et hommes - Aspects économiques*" Rapport n°15, Paris: La documentation française, pp. 161-168. [3,12]

DATTA GUPTA, N. and N. SMITH (2002): "Children and career interruptions: the family gap in Denmark", *Economica*, Vol. 69, No. 276, pp. 609-629. [2]

DATTA GUPTA, N., R.L. Oaxaca and N. Smith (2006): "Swimming upstream, floating downstream: Comparing women's relative wage progress in the United States and Denmark", *Industrial and Labor Relations Review*, Vol. 59, No. 2, pp. 243-266. [2,4]

DAVIES, R. and G. PIERRE (2005): "The family gap in pay in Europe: a cross-country study", *Labour Economics,* Vol. 12, No. 4, pp. 469-86. [2]

DOUGHERTY, C. (2006): "The marriage earnings premium as a distributed effect", *Journal of Human Resources*, Vol. 41, No. 2, pp. 433-443. [9]

EDIN, P-E and M. GUSTAVSSON (2008): "Time out of work and skill depreciation", *Industrial Labor and Relations Review* Vol. 61, No. 2, pp. 163-180. [3]

FILER, R.K. (1993), "The usefulness of predicted values for prior work experience in analyzing labor market outcomes for women", *The Journal of Human Resources*, Vol. 28, No. 3, pp. 519-537. [3,9]

GANGL, M. and A. ZIEFLE (2009): "Motherhood, labor force behavior and women's careers: an empirical assessment of the wage penalty for motherhood in Britain, Germany and the United-States", *Demography*, Vol. 46, No. 2, pp. 341-369. [2]

GRAY, J. (1997): "The fall in men's return to marriage: declining productivity effects or changing selection?", *Journal of Human Resources*, Vol. 32, No. 3, pp. 481-504. [9,13]

GREEN, C.A. and M.A. FERBER (2005): "Do detailed work histories help to explain gender and race/ethnic wage differentials?" *Review of Social Economy*, Vol. 113, No. 1, pp. 55-85. [3]

HAKIM, C (1998): "Developing a sociology for the 21st century: preference theory", *British Journal of Sociology,* Vol. 49, No. 1, pp. 150-62. [3]

HARKNESS, S. and J. WALDFOLGEL (1999): "The family gap in pay: Evidence from seven industrialized countries", L.S.E., CASE paper 29. [2]

HECKMAN, J. (1979): "Sample selection bias as a specification error", *Econometrica*, Vol. 47, No. 1, pp. 153-161. [10]

HOTCHKISS, J.L. and M.M. PITTS (2007): "The role of labor market intermittency in explaining gender wage differentials", *American Economic Review*, Vol. 97, No. 2, pp.417-21. [2]

JOSHI, H., P. PACI and J. WALDFOGEL (1999): "The wages of motherhood: better or worse?", *Cambridge Journal of Economics*, Vol. 23, pp. 543-564. [2]

KORENMAN, S and D. NEUMARK (1991): "Does Marriage Really Make Men More Productive?", *Journal of Human Resources*, Vol. 26, No. 2, pp. 281-307. [9,13]

KORENMAN, S and D. NEUMARK (1992): "Marriage, motherhood and wages", *Journal of Human Resources,* Vol. 27, No. 2, pp. 233-55. [11]

LEQUIEN, L. (2009): L'impact sur les salaires de la durée d'une interruption de carrière suite à une naissance, Paris: colloque de l'AFSE,
http://www.crest.fr/ckfinder/userfiles/files/Pageperso/llequien/Lequien_ape_did_10.pdf. [3,10]

LIGHT, A. and M. URETA (1995): "Early-career work experience and gender wage differentials", *Journal of Labor Economics*, Vol. 13, No. 1, pp. 121-54. [3]

LUNDBERG, S. and E. ROSE (2000): "Parenthood and the earnings of married men and women", *Labor Economics*, Vol. 7, No. 6, pp. 689-710. [2]

MANNING, A. and J. K. SWAFFIELD (2008): "The gender gap in early-career wage growth", *The Economic Journal*, Vol. 118, No. 530, pp 983-1024. [14]

MINCER J. and S. POLACHEK (1974): "Family investments in human capital: earnings of women", *Journal of Political Economy* Vol. 82, No. 2 Part II, pp.S76-S108. [2,9,15]

MINCER J. and H. OFEK (1982), Interrupted work careers: depreciation and restoration of human capital, *Journal of Human Resources*, Vol. 17, No. 1, pp. 3-24. [2]

MEURS, D. and S. PONTHIEUX (2000): "Une mesure de la discrimination dans l'écart de salaire entre hommes et femmes", *Économie et Statistique* No. 337-338, pp. 135-158. [3]

MEURS, D. and S. PONTHIEUX (2006): "L'écart des salaires entre les femmes et les hommes peut-il encore baisser ?", *Économie et Statistique* No. 398-399, pp. 99-129. [2]

MOSHION, J and L. MULLER (2010): "Interruptions de carrière professionnelle et salaires des hommes et des femmes en 2006"*, Premières Synthèses* n°011. [3,21]

NEUMAN, S. and R.L. OAXACA (1998): "Estimating labour market discrimination with selectivity corrected wage equations: methodological considerations and an illustration from Israel", *CEPR Discussion Paper Series* n°1915. [17]

NEUMARK, D. and S. KORENMAN (1994): "Sources of Bias in Women's Wage Equations: Results Using Sibling Data", *Journal of Human Resources*, Vol. 29, No. 2, pp. 379-405. [4]

OAXACA, R.L. and M.R. RANSOM (1994): “On discrimination and the decomposition of wage differentials”, *Journal of Econometrics*, Vol. 61, No. 1, pp. 5-21. [4,17]

PAILHÉ, A. and A. SOLAZ (2006): “Employment and childbearing: women bear the burden of the work-family balance”, *Population & Societies* n°426. [3,9]

PHIPPS, S., P. BURTON and L. LETHBRIDGE (2001): “In and out of the labour market: Long-term income consequences of child-related interruptions to women’s paid work”, *The Canadian Journal of Economics*, Vol. 34, No. 2, pp. 411-29. [2]

PHELPS, E. S (1972): “The Statistical Theory of Racism and Sexism”, *The American Economic Review*, Vol. 62, No. 4, pp. 659-61. [22]

PIKETTY, T. (2005): “L'impact de l'allocation parentale d'éducation sur l'activité féminine et la fécondité en France 1982-2002”, *in* LEFÈVRE C., FILHON A. (dir), *Histoires de familles, histoires familiales*, Cahiers de l'Ined, No. 156, pp. 79-109. [3,10]

SOFER, C. (1990): “La répartition des emplois par sexe : capital humain ou discrimination ?”, *Économie et prévision*, No. 92-93, pp. 77-85. [3]

STRATTON, L. (1995): “The effect interruptions in work experience have on wages”, *Southern Economic Journal*, Vol. 61, No. 4, pp. 955-70. [2]

TOULEMON, L., A. PAILHÉ and C. ROSSIER (2008): “France: High and stable fertility”, *Demographic Research,* Vol. 19, No. 16, pp. 503-556. [11]

WALDFOGEL, J. (1997): “The effect of children on women’s wages”, *American Sociological Review*, Vol. 62, No. 2, pp. 209-17. [2,4]

WALDFOGEL, J. (1998): “Understanding the “family gap” in pay for women with children”, *The Journal of Economic Perspectives*, Vol. 12, No. 1, pp. 137-56. [2,4]

WOOLDRIDGE, J. (2002), *Econometric Analysis of Cross Section and Panel Data*, Cambridge, Ma.: The MIT Press. [10]

Appendix 1. Descriptive statistics

Variable	Definition	Women		Men	
		Mean	Std. D.	Mean	Std. D.
WAGEM	Monthly wage (net)	1312.8	634.3	1723.9	991.7
WAGEH	Hourly wage	9.37	4.40	10.83	6.00
NBH	Number of worked hours by week	32.82	7.56	37.07	6.49
DIPL1	5 yrs + higher education	0.09	0.28	0.10	0.30
DIPL2	3-4 yrs higher education	0.15	0.35	0.09	0.28
DIPL3	Up to 2 yrs higher education	0.16	0.36	0.11	0.31
DIPL4	Secondary general education	0.08	0.27	0.05	0.21
DIPL5	Secondary professional education	0.11	0.32	0.11	0.32
DIPL6	Vocational diploma	0.24	0.43	0.35	0.48
DIPL7	Primary level	0.06	0.24	0.07	0.26
DIPL8	No diploma	0.11	0.32	0.12	0.33
EXPP	Potential experience	16.31	9.15	16.57	9.11
EXP	Actual experience	13.74	8.34	15.17	8.59
TENURE	Tenure	9.73	8.11	9.28	7.98
PRECA	# years short spells job or unemployment	0.66	1.74	0.68	1.92
UNEMP	# years of unemployment	0.55	1.37	0.30	0.87
CHILDOUT	# years OLF related to childcare	1.39	3.26	0.04	0.40
TRAINING	# years OLF for training	0.30	0.76	0.83	1.08
OTHERO	# years OLF for other reasons	0.19	0.98	0.06	0.43
NBCHILD	Number of children	1.45	1.13	1.37	1.20
COUPLE	Living in couple (either married or not)	0.77	0.42	0.78	0.42
AGE1	<30 years	0.22	0.42	0.23	0.42
AGE2	30 – <39 years	0.34	0.47	0.34	0.47
AGE3	39-49	0.44	0.50	0.43	0.50
IMMI	Immigrant	0.06	0.24	0.07	0.25
HEALTH	Health problem	0.13	0.33	0.12	0.33
IDF	Parisian Region	0.19	0.39	0.18	0.39
PARTIME	Part-time	0.27	0.45	0.04	0.18
PUBLIC	Public sector	0.33	0.47	0.21	0.41
PTPUB	Part time in public sector	0.09	0.28	0.01	0.09
PAIDHSUP	Paid extra working hours	0.04	0.20	0.09	0.28
RESP	Supervision	0.17	0.37	0.32	0.47
FIRM1	Firm size: 0-19	0.35	0.48	0.28	0.45
FIRM2	Firm size: 20-49	0.15	0.36	0.14	0.35
FIRM3	Firm size:50-199	0.22	0.41	0.24	0.43
FIRM4	Firm size: 200-499	0.13	0.33	0.14	0.35
FIRM5	Firm size: 500-999	0.06	0.24	0.07	0.26
FRIM6	Firm size : 1000 & +	0.10	0.30	0.12	0.33
SECT1	Agriculture, industry, building	0.15	0.35	0.39	0.49
SECT2	Transportation. energy	0.03	0.16	0.09	0.28
SECT3	Trade. Private services	0.27	0.44	0.18	0.39
SECT4	Finance, real estate, corporate services	0.13	0.33	0.12	0.32
SECT5	Education, Health, Administration	0.43	0.49	0.22	0.41
EVENING	Regular work on evenings	0.15	0.35	0.20	0.40
SUNDAYR	Regular work on Sundays	0.13	0.33	0.12	0.32
SUNDAYO	Occasional work on Sundays	0.15	0.36	0.22	0.41
NIGHT	Regular night work	0.04	0.21	0.12	0.32
OCC1	Managers and professionals	0.12	0.32	0.18	0.38
OCC2	Middle management and	0.28	0.45	0.27	0.44

	technicians				
OCC3	Clerks	0.50	0.50	0.14	0.35
OCC4	Workers	0.10	0.30	0.41	0.49
CHILD3	Children aged under 3	0.13	0.34	0.17	0.38
MOTHEXP	Own mother always in employment	0.40	0.49	0.39	0.49
OTHINC	Other income of the household	1605.5	2425.9	1178.6	2336.3
N Obs		3101		3131	

Appendix 2: Selection equation (employed vs. inactive)

Dept var.	All women	Std E	Women aged 39-49	Std E
DIPL1	1.381***	(0.17)	0.877***	(3.68)
DIPL2	1.264***	(0.133)	0.827***	(4.56)
DIPL3	1.169***	(0.121)	0.954***	(5.26)
DIPL4	0.790***	(0.129)	0.697***	(4.18)
DIPL5	0.776***	(0.114)	1.002***	(4.86)
DIPL6	0.524***	(0.083)	0.632***	(5.28)
DIPL7	0.157	(0.112)	0.099	(0.70)
EXPP	-0.041*	(0.022)	-0.151*	(1.75)
EXPP2	0.001***	(0.001)	0.003*	(1.92)
NBCHILD	-0.354***	(0.032)	-0.235***	(6.07)
CHILD3	-0.888***	(0.074)		
CHILD6			-0.471***	(3.44)
COUPLE	0.039	(0.088)	-0.075	(0.56)
AGE1	-0.421**	(0.179)		
AGE2	-0.019	(0.106)		
IMMI	-0.516***	(0.098)	-0.398***	(2.93)
HEALTH	-0.193**	(0.081)	-0.211**	(2.00)
IDF	0.267***	(0.081)	0.192	(1.64)
ACTM	0.170***	(0.06)	0.144	(1.58)
O_INCO	-0.000***	(0.00)	-0.000***	(7.16)
O_INCO2	0.000***	(0.00)	0.000***	(6.14)
CONSTANT	1.932***	-0.294	3.288***	(2.97)
Observations	3787		1625	
Pseudo R2	0.28		0.17	

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix 3: OLS Regressions

	Women				*Men*		
	(1)	(1')	(2')	(3')	(1)	(2)	(3)
DEPT VAR	lwh	lwh	lwh	lwh	lwh	lwh	lwh
DIPL1	0.713***	0.752***	0.682***	0.597***	0.792***	0.743***	0.684***
	(0.028)	(0.031)	(0.034)	(0.032)	(0.030)	(0.030)	(0.031)
DIPL2	0.589***	0.629***	0.562***	0.486***	0.546***	0.508***	0.486***
	(0.023)	(0.027)	(0.030)	(0.028)	(0.030)	(0.031)	(0.031)
DIPL3	0.404***	0.446***	0.389***	0.341***	0.383***	0.344***	0.319***
	(0.020)	(0.026)	(0.028)	(0.026)	(0.023)	(0.024)	(0.023)
DIPL4	0.273***	0.302***	0.268***	0.237***	0.286***	0.266***	0.248***
	(0.024)	(0.026)	(0.027)	(0.025)	(0.031)	(0.031)	(0.031)
DIPL5	0.223***	0.256***	0.215***	0.193***	0.275***	0.243***	0.219***
	(0.020)	(0.024)	(0.026)	(0.025)	(0.022)	(0.023)	(0.022)
DIPL6	0.127***	0.151***	0.133***	0.116***	0.101***	0.087***	0.077***
	(0.017)	(0.019)	(0.020)	(0.019)	(0.017)	(0.018)	(0.017)
DIPL7	0.082***	0.090***	0.091***	0.087***	0.132***	0.120***	0.101***
	(0.024)	(0.025)	(0.025)	(0.024)	(0.023)	(0.023)	(0.022)
EXP	0.015***	0.015***	0.016***	0.016***	0.033***	0.035***	0.034***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
EXP2 (*100)	-0.024*	-0.022*	-0.038***	-0.035***	-0.076***	-0.087***	-0.082***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.011)
TENURE	0.014***	0.013***	0.009***	0.006*	0.004	-0.000	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
TENURE2	-0.017	-0.016	-0.006	-0.002	0.012	0.020*	0.022**
	0.713***	(0.011)	(0.011)	(0.11)	(0.011)	(0.011)	(0.010)
NBCHILD	0.007	-0.011	0.005	0.001	0.019***	0.017***	0.014***
	(0.006)	(0.008)	(0.008)	(0.008)	(0.006)	(0.006)	(0.005)
PRECA			-0.019***	-0.015**		-0.022***	-0.021***
			(0.007)	(0.007)		(0.006)	(0.006)
PRECA2 (*100)			0.145***	0.097*		0.104***	0.095**
			(0.053)	(0.057)		(0.036)	-0.021***
UNEMP			-0.044***	-0.038***		-0.073***	-0.069***
			(0.008)	(0.008)		(0.011)	(0.010)
UNEMP2 (*100)			0.356***	0.322***		0.687***	0.695***
			(0.074)	(0.072)		(0.149)	(0.140)
CHILDOUT			-0.025***	-0.021***		-0.018	-0.026
			(0.005)	(0.004)		(0.031)	(0.028)
CHILDOUT2 (*100)			0.110***	0.096***		0.222	0.275
			(0.022)	(0.022)		(0.369)	(0.338)
TRAINING			0.025*	0.011		0.009	0.005
			(0.015)	(0.015)		(0.009)	(0.009)
TRAINING2 (*100)			-0.214	-0.048		0.021	0.095
			(0.403)	(0.393)		(0.123)	(0.115)
OTHERO			-0.023**	-0.017*		-0.069***	-0.057**
			(0.010)	(0.010)		(0.023)	(0.022)
OTHERO2 (*100)			0.103*	0.084		0.406**	0.368*
			(0.077)	(0.075)		(0.204)	(0.201)
PARTIME				-0.027*			0.026
				(0.014)			(0.038)

PUBLIC				0.035**			0.052**
				(0.017)			(0.025)
PTPUB2				0.071***			0.003
				(026)			(0.087)
PAIDHSUP				0.142***			0.087***
				(026)			(0.019)
RESP				0.104***			0.104***
				(0.014)			(0.012)
AGE1	-0.010	-0.031	-0.113***	-0.103***	-0.040	-0.090**	-0.081**
	(0.028)	(0.030)	(0.036)	(0.034)	(0.035)	(0.036)	(0.035)
AGE2	0.001	-0.008	-0.057***	-0.048**	-0.039*	-0.067***	-0.060***
	(0.017)	(0.017)	(0.021)	(0.020)	(0.021)	(0.022)	(0.021)
COUPLE	0.011	0.000	-0.003	0.001	0.043***	0.037**	0.021
	(0.013)	(0.013)	(0.012)	(0.012)	(0.015)	(0.015)	(0.014)
IMMI	-0.019	-0.041	-0.041	-0.023	-0.090***	-0.067***	-0.054**
	(0.030)	(0.031)	(0.031)	(0.029)	(0.026)	(0.026)	(0.025)
HEALTH	-0.034**	-0.041**	-0.039**	-0.036**	-0.039**	-0.030*	-0.037**
	(0.016)	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)
IDF	0.123***	0.127***	0.119***	0.109***	0.124***	0.125***	0.115***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
FIRM1				-0.085***			-0.126***
				(0.020)			(0.020)
FIRM2				-0.078***			-0.065***
				(0.022)			(0.021)
FIRM3				-0.050**			-0.042**
				(0.021)			(0.020)
FIRM4				-0.073***			-0.052**
				(0.022)			(0.021)
FIRM5				-0.070***			-0.018
				(0.026)			(0.025)
SECT1				-0.011			0.061**
				(0.019)			(0.025)
SECT2				0.069**			0.101***
				(0.035)			(0.028)
SECT3				-0.079***			-0.007
				(0.017)			(0.029)
SECT4				0.061***			0.078***
				(0.019)			(0.026)
EVENING				0.039**			0.005
				(0.019)			(0.020)
SUNDAYR				0.048***			0.037*
				(0.017)			(0.022)
SUNDAYO				0.093***			0.042***
				(0.016)			(0.013)
NIGHT				0.011			0.029
				(0.028)			(0.025)
IMR		0.140***	0.119***	0.112***			
		(0.037)	(0.037)	(0.034)			
Constant	1.579***	1.558***	1.712***	1.778***	1.662***	1.763***	1.771***
	(0.038)	(0.040)	(0.054)	(0.055)	(0.051)	(0.053)	(0.060)
Observations	3101	3101	3101	3101	3131	3131	3131
R-squared	0.41	0.42	0.43	0.49	0.44	0.45	0.49

Robust standard errors in parentheses (White's method)
(1'), (2'), (3'): Standard errors are estimated by bootstraps (1000 replications)
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix 4: OLS regressions (men and women aged 39-49) dependent var = lwh

VARIABLES	Model 1			Model 2			Model 3			Model 4		
	Women			Women			Women			Women		
	without child-related interruptions	with child-related interruptions	Men	without child-related interruptions	with child-related interruptions	Men	without child- related interruptions	with child-related interruptions	Men	without child- related interruptions	with child-related interruptions	Me
DIPL1	0.840***	0.842***	0.948***	0.787***	0.765***	0.889***	0.663***	0.689***	0.815***	0.357***	0.350***	0.518
	(14.15)	(12.81)	(22.64)	(12.56)	(10.40)	(20.75)	(10.39)	(9.51)	(19.07)	(5.44)	(4.26)	(11.5
DIPL2	0.746***	0.657***	0.631***	0.695***	0.598***	0.586***	0.604***	0.507***	0.554***	0.390***	0.300***	0.309
	(14.70)	(11.64)	(15.02)	(13.11)	(9.49)	(13.80)	(11.19)	(8.05)	(13.16)	(7.14)	(4.57)	(7.25
DIPL3	0.542***	0.492***	0.424***	0.505***	0.434***	0.388***	0.424***	0.411***	0.347***	0.252***	0.263***	0.163
	(10.36)	(8.91)	(10.65)	(9.44)	(7.10)	(9.70)	(7.83)	(6.78)	(8.88)	(4.63)	(4.27)	(4.23
DIPL4	0.397***	0.270***	0.385***	0.375***	0.240***	0.374***	0.319***	0.207***	0.349***	0.208***	0.127**	0.183
	(7.79)	(5.30)	(8.26)	(7.34)	(4.50)	(7.98)	(6.19)	(3.98)	(7.57)	(4.16)	(2.46)	(4.11
DIPL5	0.332***	0.317***	0.344***	0.318***	0.291***	0.317***	0.256***	0.273***	0.273***	0.158***	0.212***	0.156
	(6.01)	(5.46)	(8.17)	(5.77)	(4.79)	(7.51)	(4.61)	(4.58)	(6.67)	(2.96)	(3.65)	(3.95
DIPL6	0.196***	0.181***	0.116***	0.192***	0.167***	0.109***	0.144***	0.163***	0.093***	0.093**	0.125***	0.072
	(4.69)	(4.60)	(4.47)	(4.58)	(4.09)	(4.21)	(3.43)	(4.12)	(3.72)	(2.32)	(3.28)	(3.08
DIPL7	0.125**	0.108**	0.176***	0.121**	0.120**	0.162***	0.097*	0.130***	0.123***	0.055	0.118**	0.074
	(2.43)	(2.23)	(4.83)	(2.37)	(2.44)	(4.45)	(1.94)	(2.70)	(3.50)	(1.16)	(2.58)	(2.21
EXP	0.000	-0.002	0.034**	0.002	0.006	0.031**	0.002	-0.002	0.031**	0.002	-0.000	0.033
	(0.01)	(0.17)	(2.46)	(0.10)	(0.49)	(2.21)	(0.14)	(0.17)	(2.29)	(0.13)	(0.00)	(2.65
EXP2 (*100)	0.008	0.030	-0.066**	-0.002	-0.005	-0.067**	-0.002	0.022	-0.064**	-0.001	0.019	-0.07
	(0.23)	(0.99)	(2.15)	(0.05)	(0.13)	(2.13)	(0.06)	(0.65)	(2.13)	(0.03)	(0.60)	(2.61
TENURE	0.008	0.014**	0.005	0.003	0.012*	0.002	-0.001	0.013**	-0.000	0.001	0.010*	0.000
	(1.44)	(2.23)	(1.08)	(0.45)	(1.79)	(0.50)	(0.16)	(2.11)	(0.02)	(0.17)	(1.74)	(0.05
TENURE2 (*100)	-0.188	-2.212	0.719	0.981	-1.696	1.122	1.610	-3.443	1.028	1.130	-2.349	1.054
	(0.10)	(0.91)	(0.49)	(0.54)	(0.69)	(0.75)	(0.92)	(1.45)	(0.72)	(0.69)	(1.04)	(0.79
NBCHILD	0.012	-0.001	0.013	0.013	-0.006	0.008	0.015	-0.008	0.006	0.011	-0.014	0.005
	(0.91)	(0.08)	(1.58)	(1.01)	(0.34)	(1.04)	(1.24)	(0.49)	(0.80)	(0.95)	(0.87)	(0.64
COUPLE	0.017	-0.054	0.071***	0.010	-0.061*	0.056**	0.019	-0.032	0.039	0.015	-0.030	0.023
	(0.60)	(1.50)	(2.71)	(0.37)	(1.71)	(2.15)	(0.72)	(0.93)	(1.51)	(0.59)	(0.89)	(0.95
IMMI	-0.031	-0.162***	-0.107***	-0.039	-0.159***	-0.079**	-0.012	-0.106**	-0.071**	-0.000	-0.100**	-0.04
	(0.62)	(3.26)	(3.09)	(0.76)	(3.15)	(2.26)	(0.24)	(2.13)	(2.11)	(0.01)	(2.10)	(1.49
HEALTH	-0.032	-0.026	-0.038	-0.025	-0.031	-0.026	-0.020	-0.034	-0.041*	-0.017	-0.016	-0.02
	(1.04)	(0.74)	(1.55)	(0.83)	(0.89)	(1.05)	(0.69)	(1.01)	(1.73)	(0.60)	(0.50)	(1.02

IDF	0.128***	0.121***	0.105***	0.129***	0.116***	0.108***	0.103***	0.082**	0.091***	0.059**	0.076**	0.066
	(4.55)	(3.22)	(4.41)	(4.59)	(3.12)	(4.59)	(3.69)	(2.19)	(3.94)	(2.25)	(2.13)	(3.05
PRECA				0.019	-0.019	-0.017*	0.022	-0.013	-0.016*	0.027*	-0.004	-0.01
				(1.19)	(1.60)	(1.73)	(1.38)	(1.10)	(1.72)	(1.82)	(0.33)	(1.64
PRECA2				-0.001	0.001*	0.001	-0.002	0.001	0.001	-0.002	0.000	0.001
				(1.02)	(1.65)	(1.33)	(1.27)	(0.79)	(1.01)	(1.52)	(0.15)	(1.06
UNEMP				-0.070***	-0.047***	-0.080***	-0.058***	-0.039**	-0.071***	-0.048***	-0.039**	-0.05
				(4.14)	(2.61)	(4.19)	(3.52)	(2.26)	(3.84)	(3.13)	(2.35)	(3.00
UNEMP2				0.005***	0.005**	0.008**	0.004***	0.005**	0.007**	0.003**	0.005**	0.005
				(2.97)	(2.12)	(2.51)	(2.61)	(1.98)	(2.37)	(2.36)	(2.29)	(1.79
CHILDOUT				0.000	-0.019**	0.008	0.000	-0.018**	0.009	0.000	-0.014*	0.026
				(.)	(2.38)	(0.16)	(.)	(2.39)	(0.18)	(.)	(1.91)	(0.57
CHILDOUT2				0.000	0.001**	0.002	0.000	0.001**	0.001	0.000	0.001**	-0.00
				(.)	(2.48)	(0.31)	(.)	(2.40)	(0.19)	(.)	(2.12)	(0.17
TRANING				0.020	0.013	0.006	-0.005	-0.004	-0.000	-0.011	-0.009	-0.00
				(0.80)	(0.45)	(0.47)	(0.22)	(0.15)	(0.03)	(0.47)	(0.33)	(0.18
TRAINING2				0.001	0.002	0.001	0.005	0.002	0.002	0.006	0.001	0.001
				(0.26)	(0.28)	(0.52)	(0.98)	(0.33)	(1.17)	(1.24)	(0.26)	(1.00
OTHERO				-0.026	-0.021	-0.079**	-0.015	-0.016	-0.069**	-0.012	-0.002	-0.06
				(1.25)	(1.06)	(2.24)	(0.74)	(0.86)	(2.02)	(0.63)	(0.12)	(2.16
OTHERO2				0.001	-0.000	0.004	0.001	-0.000	0.004	0.001	-0.001	0.005
				(1.15)	(0.20)	(1.04)	(0.80)	(0.23)	(1.03)	(0.81)	(0.82)	(1.38
PARTIME							-0.068**	0.038	0.077	-0.047	0.041	0.071
							(1.99)	(1.26)	(1.28)	(1.50)	(1.41)	(1.26
PTPUB2							0.050	-0.099*	0.094	0.058	-0.057	0.012
							(0.94)	(1.82)	(0.84)	(1.16)	(1.11)	(0.11
PUBLIC							0.047	0.105***	0.081**	0.042	0.076**	0.088
							(1.35)	(2.63)	(2.44)	(1.29)	(2.00)	(2.84
FIRM1							-0.124***	-0.119**	-0.143***	-0.122***	-0.077	-0.10
							(3.13)	(2.27)	(4.70)	(3.32)	(1.54)	(3.51
FIRM2							-0.106**	-0.124**	-0.041	-0.099**	-0.058	-0.02
							(2.48)	(2.20)	(1.23)	(2.48)	(1.08)	(0.75
FIRM3							-0.096**	-0.048	-0.031	-0.098***	-0.013	-0.02
							(2.47)	(0.90)	(1.07)	(2.70)	(0.26)	(0.75
FIRM4							-0.086**	-0.026	-0.035	-0.080**	0.006	-0.03
							(2.02)	(0.45)	(1.11)	(2.01)	(0.11)	(1.11
FIRM5							-0.085*	-0.127*	0.000	-0.058	-0.077	0.011

							(1.73)	(1.84)	(0.00)	(1.25)	(1.18)	(0.33
SECT1							-0.016	-0.032	0.062*	0.017	0.020	0.063
							(0.40)	(0.70)	(1.76)	(0.44)	(0.42)	(1.88
SECT2							0.118*	-0.035	0.122***	0.112*	-0.087	0.115
							(1.90)	(0.33)	(2.98)	(1.93)	(0.86)	(2.99
SECT3							-0.066*	-0.081**	0.029	-0.050	-0.070**	0.002
							(1.80)	(2.15)	(0.75)	(1.46)	(1.98)	(0.07
SECT4							0.071*	0.088*	0.092**	0.040	0.064	0.068
							(1.76)	(1.83)	(2.34)	(1.05)	(1.38)	(1.86
paidhsup							0.121**	0.128**	0.107***	0.135***	0.149***	0.114
							(2.25)	(2.29)	(3.50)	(2.68)	(2.81)	(4.04
EVENING							-0.008	0.105**	-0.002	-0.003	0.113**	0.007
							(0.21)	(2.22)	(0.08)	(0.09)	(2.52)	(0.27
SUNDAYR							0.036	0.010	0.044	0.021	0.035	0.062
							(0.89)	(0.25)	(1.41)	(0.56)	(0.90)	(2.12
SUNDAYO							0.118***	0.052	0.064***	0.093***	0.041	0.049
							(3.68)	(1.41)	(2.97)	(3.13)	(1.16)	(2.43
NIGHT							0.023	-0.034	0.036	0.063	0.011	0.067
							(0.39)	(0.41)	(1.02)	(1.14)	(0.14)	(2.03
RESP							0.106***	0.100***	0.120***	0.034	0.047	0.048
							(3.93)	(2.59)	(6.73)	(1.31)	(1.23)	(2.78
OCCUP2										0.518***	0.591***	0.439
										(9.62)	(7.38)	(14.1
OCCUP3										0.273***	0.280***	0.190
										(5.92)	(5.41)	(8.53
OCCUP4										0.116***	0.101**	0.038
										(2.86)	(2.39)	(1.30
IMR	0.126	0.219**	0.000	0.107	0.188**	0.000	0.046	0.168*	0.000	0.000	0.123	0.000
	(1.39)	(2.45)	(.)	(1.19)	(2.08)	(.)	(0.52)	(1.91)	(.)	(0.00)	(1.47)	(.)
Constant	1.691***	1.630***	1.535***	1.799***	1.767***	1.687***	1.917***	1.868***	1.663***	1.829***	1.719***	1.619
	(10.98)	(17.41)	(9.83)	(8.90)	(11.77)	(10.42)	(9.42)	(11.94)	(10.30)	(9.54)	(11.26)	(10.7
Observations	781	575	1360	781	575	1360	781	575	1360	781	575	1
R-squared	0.44	0.43	0.43	0.46	0.46	0.45	0.52	0.52	0.51	0.58	0.57	0.58

Standard errors in parentheses are estimated by bootstraps for women (1000 replications) *** p<0.01, ** p<0.05, * p<0.1