



## **WOLIWEB**

*The socio-economic determinants of citizens' work life attitudes, preferences and perceptions, using data from the continuous web-based European Wage Indicator Survey*

### **Research Paper**

#### **Women's Wages and Double Selection Into Motherhood And Less Demanding Job: Analysis of Age Groups in The Netherlands**

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## 1. Introduction

An increasing number of studies analyse labour market consequences of motherhood at the time when the participation rate of women (in particular mothers) has increased in advanced countries. The tenor of these studies is whether working mothers earn lower wages than childless women, expressed as the child gap in pay. Findings of these studies show a wide range of child gap, which is motivated by differences in institutional arrangements across countries and estimation strategies. A frequently mentioned issue in the literature on wages is the selectivity problem that may lead to inconsistent estimations. The selectivity problem may occur when working mothers are not a random sample of potential female population having children or when job-choices of mothers are not a random process. Wetzels (2005) reviews recent papers analyzing wage differentials among women, and notes that some of these studies estimate wage differentials correcting for selection into employment (Datta Gupta and Smith 2002, Harkness and Waldfogel forthcoming, Waldfogel 1995), while others do not (Albrecht et al 1999, Budig and England 2001).<sup>1</sup> However, there are no studies known to us, which consider the selection into motherhood or type of jobs and their effect on women's wages.

This paper examines the child gap in Dutch women's pay focusing on possible selectivity bias with regard to the decision to have a child and the decision to be employed in a less demanding job.<sup>2</sup> The selection process into motherhood involves a quite complicated decision, which relates to human capital theory, motherhood motivation, partnerships (hesitation towards forming and continuing relationships), but also, for example, to the welfare state ideology. It is often argued that the job choices of women are strongly influenced by numerous factors associated with the role of women in the household, alternative household help opportunities and childcare facilities. It is considered not to be unrealistic that certain types of jobs that are easy to combine with other family activities but provide a poor prospect in terms of wage and job promotion (Gronau 1988).

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<sup>1</sup> Datta Gupta and Smith (2003) did find a selection effect. They used occupational categories in the wage function but not in the probit, estimating labor force participation. The probit includes household wealth, household non-wage income and ownership of house or apartment. Experiments with other exclusion restrictions showed that the results are fairly robust with the choice of excluded variables. Harkness & Waldfogel (forthcoming) found the selection correction term only significant, and positive, in United States, and not in the other six industrialized countries (the Netherlands not included) in their analyses. The following variables were used for identification: age structure of children in household, the amount of other family members' earnings, and the amount of other family income. Waldfogel (1995) did not find selection bias due to employment. Probit estimation included marital status and a partner's pay as identifying variables.

<sup>2</sup> We focus on the Netherlands in this paper since in the other countries involved in WOLIWEB data on children, household characteristics and job characteristics were not yet available in the quantities demanded for the detailed analyses we aim at. In future other countries may be included to make the analysis cross country comparative. We also aim in the next paper to include ethnicity, however, this will lead to a paper on the Netherlands since in a comparative perspective the data on ethnicity are not available in the quantities we would need.

In this paper we will develop an indicator for less demanding jobs as compared with more demanding jobs. With this relative concept of type of job we aim to create a job category that covers jobs providing less attractive opportunities for earnings and promotion, and requiring relatively less effort. For this purpose we use a data set collected in 2004 and use information on time spent at work, career effort and flexibility to approximate less demanding jobs. Since recent studies show that part-time jobs do not earn less compared with full time jobs in the Dutch part-time economy<sup>3</sup>, we cannot construct less demanding jobs solely in terms of wage rates and working hours.<sup>4</sup>

We model the double selection into motherhood and employment in a less demanding job explicitly. We perform our analyses for three age categories, since child bearing and labor force participation behavior differ by birth cohort in the Netherlands (Wetzels and Tjeldens 2002). We wish to understand what is a less demanding job in each age category, and what is the likelihood to be employed in a less demanding job within an age category. Thereafter, wage estimations by motherhood are corrected for double selection effects, and wage differentials among women are decomposed into differences in endowments and different reward for given endowments.

The outline is as follows. Section 2 discusses the determinants of selection into motherhood and into less demanding jobs. Section 3 explains the empirical model. Section 4 describes the data. In section 5 we develop a bivariate indicator for less demanding jobs. Section 6 presents and interprets the empirical results. Section 7 ends with a conclusion.

## 2. Theoretical discussion

In previous work on wage differentials among women (Wetzels 2007) the decision whether or not to be a mother is ignored, and it is assumed that women who become mothers make their decision randomly. It is unlikely that such an assumption is true.

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<sup>3</sup> 67.6 per cent of employed women working part-time i.e. less than 35 hours per week. Also with respect to part-time employment among men the Netherlands ranks 1 with 18 per cent (Gustafsson, Kenjoh and Wetzels, forthcoming).

<sup>4</sup> The analyses of employment in part time jobs reveals that the effect of working part-time on hourly wages is small. However, it has been indicated lately that the results on the sign and significance are not unambiguous. This may be related to the measurement of part time work, depending on whether part time work is indicated by a dichotomous variable or a continuous variable, and what is the lowest number of hours included. Using a dichotomous variable measuring part time work Gustafsson, Kenjoh and Wetzels (forthcoming) did not find an effect on wages of working part time based on Dutch household panel data of 1998, whereas an effect of working part time was found in Britain (negative effect), Germany and Sweden (positive effect). Wetzels (2002b) using the data employed in this paper (WI-2001) did also not find an effect of working part time on Dutch women's wages. Zorlu (2002) using Statistics Netherlands data 1999 finds that part time compared to flexible jobs but also compared to full time jobs are better paid for both women and men, controlling for the number of hours worked per week. Dekker et al (2000) using Socio-Economic Panel data found that Dutch women in short part time jobs are paid less when controlling for education and potential employment experience.

Fertility rates in the Netherlands have remained quite stable in the last decade, around 1.5; yet, the timing of children in a woman's life is taking place later.<sup>5</sup> Clearly most Dutch women give birth when they are above 30 (46.5 per cent of all children were born to a mother above thirty of age in 1990; this percentage increased to 62.5 per cent in 2000). The proportion of women remaining childless has also increased, and is not a minor fraction of the female population. Bosveld (1996) estimated that 19.5 per cent of women born in 1958 remained childless.<sup>6</sup>

Women who have children in current welfare states can be distinguished into two groups. The first group is predominantly family and child-oriented, and will have children at a fairly young age (and a higher number of children). This group forms the minority in the Netherlands. In 1990 the percentage of mothers who gave birth under 25 was 14.8 per cent; in 2000 this percentage had decreased to 9.6 per cent. The second group includes women who hesitate to have children to and if, when, since life as a working mother is not appealing due to ... restrictions etc. because they cannot choose between motherhood or career. They make their decisions as they go along, and may be influenced by for example success at work or getting divorced. The percentage of Dutch mothers over 35 giving birth to children in 1990 was 11.9 per cent but almost doubled in 2000 to 20.3 per cent (Statistics Netherlands 2001).

The choice of motherhood is further restricted by biological age limits of fertility. This limit is largely unknown to the decision-making woman, and varies among the female population to a large extent. However, on average women's fertility begins to decline after the age of 30. The number of fertility treatments, which concern mostly women older than 30, increased from 8,895 in 1996 to 9,563 in 2000.<sup>7</sup> In 1996 one out of 77 births occurred to parents with had undergone fertility treatments; in 2000 this figure had increased to 1 out of 55 births. We do not know whether and to what extent the increase in fertility treatments in the last decade have changed women's considerations on growing too old for having children or on when they are too old to have children. However, Wijzen (2002) finds that Dutch women who had a child when they were over 30 in 1993 did not state that the biological limit influenced the timing of birth decision as one would expect. Most of the older mothers in the latter analysis do not consider themselves as 'old'. Rather less than half say they have even consciously

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<sup>5</sup> The mean age at maternity in the Netherlands started to increase in the 1970s from 24.3 years in 1970 to 29.1 years in 1998, where it remains in 2001 (Statistics Netherlands 1994, 2002).

<sup>6</sup> A similar percentage, roughly 20%, is found to remain childless by choice in rich modern societies. Work centered women are most likely to remain voluntarily childfree. About 50 per cent of women in top managerial positions in Britain today remain childless (Hakim 2000).

<sup>7</sup> See <http://www.freya.nl/slagingntvg.htm>.

postponed having children. For these women, having children at an earlier stage had simply never been a topic worthy of serious consideration.

The average educational level of the fertile birth cohorts has increased. Education plays its role in many choices, marriage market, career and postponement of maternity and childlessness.<sup>8</sup> Higher education contributes to the development of tastes that probably favor women's desire to have their own professional career and develop their personal talents, mostly as a professional but also as a mother. Higher education also stimulates the development of more modern norms concerning the combination of paid labour and unpaid care. The higher a woman's education, her income foregone will also be higher when she does not participate in the labor market. Indeed studies show that a greater proportion of highly educated women is still childless at age 35 compared with women of lower education levels (Gustafsson, Kenjoh and Wetzels 2001).<sup>9</sup>

Another influencing factor is related to the increased number of partnerships in a person's life. This change is probably related to the broader socio-economic and cultural development sometimes characterised by the open future ideology<sup>10</sup>. Although separation rates are high and still growing, we nevertheless assume that a stable relationship is a condition for having a child.

In sum, 20 per cent of women are expected to remain childless. We expect the probability of maternity and the timing of maternity to be dependent on age, education level, having a partner, and experience in the labor market.

Whether women do have opportunities to combine a career with children and which opportunities, is dependent on the view of a mother's and a father's proper role in society. This view differs historically between clusters of welfare states according to the typology created by Esping-Andersen (1990), and according to the "breadwinner view" in social policies (Sainsbury 1996). In Wetzels (2001) the Dutch welfare state was characterized as a Christian democratic welfare state since its policies are organized to induce women to care full-time at home for young children. However, from 1990 onwards, social policies in the Netherlands have changed, and now include measures to facilitate the combination of work

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<sup>8</sup> We focus on maternity without specifying the number of children. However, Blossfeld and Rohwer (1994) find that education and enrolment are responsible for postponement without necessarily causing a decline in the ultimate number of women entering parenthood.

<sup>9</sup> Gustafsson, Kenjoh and Wetzels (2001) use Kaplan Meier estimates of timing of first birth from age 15 and alternatively from leaving school age in Britain, Germany, the Netherlands and Sweden. Clearly more than 25 per cent of highly educated women in Britain and West Germany ultimately end up childless, whereas for the Netherlands the corresponding estimate is below the 25 per cent line. In Sweden and East Germany the percentage childlessness is around 10 per cent with very small differences between educational groups.

<sup>10</sup> In the open future ideology, individuals leave options for the future open as far as possible (Lesthaeghe & Verleye 1992).

and family, which is more similar to the social democratic model (as in Sweden).<sup>11</sup> This leaves the breadwinner regime of the 1960s quite strongly in the past. The proportion of mothers with children below the age of six among employees increased tremendously from 26 per cent in 1988 to 57 percent in 1996 (Kunnen et al. 1997).<sup>12</sup> In addition, the proportion of “re-entrants” with a long career break increased in the last decade (Allaart and De Voogd 1994, Wetzels and Tijdens 2002).

We would expect to find more mothers in less demanding jobs than childless women in the Netherlands given that passive fathering styles are still the dominant pattern, childcare is highly rationed, and school hours do not fit fulltime career schedules or even long part time career schedules. Additionally, Dutch parents tend to only put their children in paid childcare for a maximum of 3 days per week and to care for their own children for the rest of week. Therefore, more employed mothers will seek part-time jobs that require less commuting, with fixed hours for work, with possibilities to take leave easily for reasons of care in case of illness and other unexpected events. Furthermore, we expect more mothers in jobs that are less stressful since mothers may already experience more stress from their child-related responsibilities compared to childless women and men.

We analyze the decision whether or not to be a mother, and whether or not to be employed in a less demanding job considering three birth cohorts at the time of data collection in 2004. (1) Women born in 1955 or before; these women are older than 46 of age and have made their ultimate choice on fertility. It is very likely that childless women in this birth cohort have refrained from children and put their energy towards a labour market career. Mothers who were the first after World War II to have a paid labor market career have many years of employment experience and are very likely employed in demanding jobs; these mothers are expected to have high investments in human capital.<sup>13</sup> On the other hand most mothers in this age category will be employed in less demanding jobs since we expect that most of them returned to the labor market after a long career break. (2) Women born between 1955 and 1965; these women are between 36 and 46 years of age, and most probably have made their

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<sup>11</sup> In contrast to Sweden, the underlying policy model in the Netherlands emphasizes the sharing of costs between employer, parents and government. (see, Dobbelsteen, Gustafsson and Wetzels 2000). Dutch parents pay a higher proportion of the childcare costs than Swedish parents do.

<sup>12</sup> The labor force participation rate of married women with children aged 0-3 doubled from 12.4 per cent in 1975 to 24.8 per cent in 1985. For mothers with children aged 4-5 the figures were 20.9 per cent in 1975 and increased to 30.0 per cent in 1985. When their children were aged 6 or older the participation rate for mothers increased from 21.0 per cent to 32.1%. Difference in participation rates between women with and women without children have decreased in s become smaller during the nineties, with the exception of France (Vlasblom & Schippers 2002). More recent cohorts have on average higher participation rates. This holds true for women with and women without children and for every age category reached by these recent cohorts.

<sup>13</sup> For example it was forbidden to employ a married teacher until 1957 and women were fired on their wedding day. Only in 1973 did Dutch women obtained legal protection against these practices.

choice on maternity, although a low percentage of the childless women still may become mothers. Most probably the distinction between less demanding job and demanding job is less strict than in category (1) because of the change in policies regarding the combination of paid work and family for both women and men; (3) Women born from 1965 till 1975; these women are between 26 and 36 years of age, and it is quite likely that these women will still have children.

Mothers who had children during the 1990s could make use of childcare facilities<sup>14</sup> and had the right to reduce and expand working hours.

We expect that for all age categories career orientation and domestic situation will be the main explanatory factors for employment in a less demanding job. More specifically we expect that the highest obtained education level, years of employment experience, a partner who has a long part time job and domestic help will affect the likelihood for women and especially mothers to be employed in a less demanding job.

### 3. Empirical model with double sample selection

We model the underlying decision process of motherhood and employment in a less demanding job, assuming simultaneity of the decisions. The pair of decision rules may be presented in a single standard bivariate probit model (Heckman 1979; Poirier 1979; Van de Ven and Van Praag 1981; Abowd and Farber 1982, Maddala 1983, Tunali 1986), as illustrated in Figure 1:

Figure 1

$$y_i = \begin{cases} y_{1i} = 1 & \begin{cases} y_{2i} = 1 \\ y_{2i} = 0 \end{cases} \\ y_{1i} = 0 & \begin{cases} y_{2i} = 1 \\ y_{2i} = 0 \end{cases} \end{cases}$$

Where  $y_{1i}$  and  $y_{2i}$  take a one when a woman is a mother and is employed in a less demanding job) respectively, and  $y_{1i}$  and  $y_{2i}$  take a zero when a woman is childless, and is employed in a less demanding job. The decisions may be written as reduced form equations

$$y_{1i}^* = x_{1i}\beta_1 + \varepsilon_{1i} \quad (1)$$

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<sup>14</sup> The Childcare Stimulation Act of 1990 is the first government action, which explicitly caters to the needs of the working mother rather than assigning priority to educational considerations for children. In the 1990s childcare spaces have become available but they are still in short supply. In international comparison paid leave arrangements to combine work and children are limited. In 1990 maternity leave was extended to 16 weeks and employees became eligible to an additional, parental leave of 6 months part time for each parent. However, 90 percent of employees face a Collective Labor Agreement in which parental leave is not paid. Only the (CLA of the) public sector offers 75 percent replacement of earnings.

$$y_{2i}^* = x_{2i}\beta_2 + \varepsilon_{2i} \quad (2)$$

where  $y_{1i}^*$  denotes the preference function of a woman which is measured by the difference between the woman's expected benefit from motherhood and opportunity costs of motherhood. The woman becomes a mother if the expected benefit of motherhood exceeds the opportunity costs ( $y_{1i}^* > 0$ ). The  $y_{2i}^*$  is the difference between the woman's expected market wage and reservation wage when employment in a less demanding job is considered compared with employment in a demanding job. If the market wage is higher than the reservation wage, the woman will participate in a less demanding job ( $y_{2i}^* > 0$ ). In equations (1) and (2),  $x_{1i}$  and  $x_{2i}$  denote a vector of characteristics that affect motherhood and the decision for employment in a less demanding job,  $\beta_1$  and  $\beta_2$  are the corresponding coefficients, and  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  are disturbance terms that are assumed to follow a bivariate standard normal distribution  $E[\varepsilon_{1i}] = E[\varepsilon_{2i}] = 0$ ,  $Var[\varepsilon_{1i}] = Var[\varepsilon_{2i}] = 1$  and the disturbance terms in the two equations are correlated:  $Cov[\varepsilon_{1i}, \varepsilon_{2i}] = \rho$ .

The dependent variables  $y_{1i}^*$  and  $y_{2i}^*$  are unobserved and latent. We observe only a dichotomous variable indicating whether or not a woman is a mother ( $y_{1i}$ ), and whether or not a woman is employed in a less demanding job ( $y_{2i}$ ).<sup>15</sup>

Ordinary least squares estimates for wages will generate inconsistent parameter estimates if the expected value of the disturbance term is not necessarily zero. This occurs due to individual self-selection (Lee 1978; Heckman 1979). The possible outcomes of the selection

$$\begin{aligned} {}_{15} y_{1i} &= 1 \text{ if } y_{1i}^* > 0 \\ &= 0, \text{ otherwise} \end{aligned} \quad (3)$$

$$\begin{aligned} y_{2i} &= 1 \text{ if } y_{2i}^* > 0 \\ &= 0, \text{ otherwise} \end{aligned} \quad (4)$$

$$\text{The log likelihood function is given by (Greene, 1997, p907-908): } \ln L = \sum_{i=1}^n \ln \Phi_2(q_{1i}(x_{1i}\beta_1), q_{2i}(x_{2i}\beta_2), \rho_i^*) \quad (5)$$

where  $\Phi_2(\quad)$  is the cumulative normal bivariate distribution function,

$$q_{1i} = \begin{cases} 1 & \text{if } y_{1i} \neq 0 \\ -1 & \text{otherwise} \end{cases}, \quad q_{2i} = \begin{cases} 1 & \text{if } y_{2i} \neq 0 \\ -1 & \text{otherwise} \end{cases} \quad \text{and} \quad \rho_i^* = q_{1i}q_{2i}\rho$$

process which we analyze are given in Figure 2 where  $S_j$  denotes the set of individuals falling into the  $j$ th sub sample:  $j=1,2,3,4$ .  $S_1$  represents the state that a woman has given birth to at least one child and is employed in a less demanding job,  $S_2$  gives the state that a woman is childless and employed in a less demanding job,  $S_3$  represents the state that a mother is employed in a demanding job and  $S_4$  shows the state that a childless woman is employed in a demanding job.

Figure 2. Possible outcomes of the selection process

		Employment in a less demanding job ( $y_{2i}$ )	
		1	0
Motherhood ( $y_{1i}$ )	1	$S_1$	$S_2$
	0	$S_3$	$S_4$

The probabilities of these sub-samples can be formally written as:

$$S_1 = \Pr(y_{1i} = 1, y_{2i} = 1) = \Pr(y_{1i}^* > 0, y_{2i}^* > 0) = \Pr(\varepsilon_{1i} > -C_1, \varepsilon_{2i} > -C_2) \quad (6)$$

$$= \Phi_2(C_1, C_2; \rho)$$

$$S_2 = \Pr(y_{1i} = 1, y_{2i} = 0) = \Pr(y_{1i}^* > 0, y_{2i}^* \leq 0) = \Pr(\varepsilon_{1i} > -C_1, \varepsilon_{2i} \leq -C_2) \quad (7)$$

$$= \Phi_2(C_1, -C_2; -\rho)$$

$$S_3 = \Pr(y_{1i} = 0, y_{2i} = 1) = \Pr(y_{1i}^* \leq 0, y_{2i}^* > 0) = \Pr(\varepsilon_{1i} \leq -C_1, \varepsilon_{2i} > -C_2) \quad (8)$$

$$= \Phi_2(-C_1, C_2; -\rho)$$

$$S_4 = \Pr(y_{1i} = 0, y_{2i} = 0) = \Pr(y_{1i}^* \leq 0, y_{2i}^* \leq 0) = \Pr(\varepsilon_{1i} \leq -C_1, \varepsilon_{2i} \leq -C_2) \quad (9)$$

$$= \Phi_2(-C_1, -C_2; \rho)$$

where  $C_t = x_{it}\beta_t$ ,  $t = 1, 2$ . These probabilities will determine the structure of earnings equations. We include two selectivity variables in the earnings equation to correct for double selectivity bias (Tunali 1986):

$$\ln w_{1i} = \psi_1 z_{1i} + \delta_{11} \lambda_{11i} + \delta_{12} \lambda_{12i} + u_{1i} \quad (10)$$

$$\ln w_{2i} = \psi_2 z_{2i} + \delta_{21} \lambda_{21i} + \delta_{22} \lambda_{22i} + u_{2i} \quad (11)$$

$$\ln w_{3i} = \psi_3 z_{3i} + \delta_{31} \lambda_{31i} + \delta_{32} \lambda_{32i} + u_{3i} \quad (12)$$

$$\ln w_{4i} = \psi_4 z_{4i} + \delta_{41} \lambda_{41i} + \delta_{42} \lambda_{42i} + u_{4i} \quad (13)$$

in which  $\ln w_i$  denotes the natural logarithm of  $i$ th worker's wage,  $z_i$  denotes of the vector of exogenous variables that explain the worker's wage,  $\psi_i$  denotes the coefficients of the vector of exogenous variables, and  $\varepsilon_{wi}$  denotes the normally distributed disturbance term with zero mean,  $E(\varepsilon_{wi}) = 0$  and  $Var(\varepsilon_{wi}) = \sigma_w^2$ ,  $\delta_{11}$  to  $\delta_{42}$  denote the coefficients of selectivity variables  $\lambda_{11i}$  to  $\lambda_{42i}$  that are defined as:

$$\lambda_{11} = \frac{\phi(C_1)\Phi(M_2)}{S_1}; \lambda_{12} = \frac{\phi(C_2)\Phi(M_1)}{S_1}; \lambda_{21} = \frac{\phi(C_1)\Phi(-M_2)}{S_2}; \lambda_{22} = -\frac{\phi(C_2)\Phi(M_1)}{S_2}$$

$$\lambda_{31} = -\frac{\phi(C_1)\Phi(-M_2)}{S_3}; \lambda_{32} = -\frac{\phi(C_2)\Phi(-M_1)}{S_3}; \lambda_{41} = -\frac{\phi(C_1)\Phi(-M_2)}{S_4}; \lambda_{42} = -\frac{\phi(C_2)\Phi(-M_1)}{S_4}$$

where  $M_1 = \frac{C_1 - \rho C_2}{\sqrt{1 - \rho^2}}$ ;  $M_2 = \frac{C_2 - \rho C_1}{\sqrt{1 - \rho^2}}$

$\phi$  is the univariate standard normal density function,  $\Phi$  is the cumulative standard normal distribution, and  $\Phi_2$  is the bivariate standard normal distribution function.

Next, we decompose the mean log wage differentials between mothers and childless women following the standard method (Blinder 1973, Oaxaca 1973):

$$\overline{\ln W_N} - \overline{\ln W_M} = \hat{\beta}_N (\bar{X}_N - \bar{X}_M) + \bar{X}_M (\hat{\beta}_N - \hat{\beta}_M) \quad (14)$$

in which subscripts  $N$  and  $M$  refer to childless women and mothers respectively, beta-hat's denote estimated coefficients, and X-bar's denote the mean of characteristics. The first term at the right hand side measures wage differentials due to worker characteristics, and the second term on the right hand side measures the unexplained part of wage differentials between childless women and mothers.

#### 4. Data

We use a data set that derives from the *Wage Indicator Survey* (WI-2004). The data set is comprised of 9,337 women born between 1940 and 1979 for which the whole questionnaire was completed. The data WI-2004 do not come from a random sample, and great caution should be exercised in extrapolating the conclusions presented to the general population.

To ascertain the representative ness of the WI-2004 data, the distribution across areas of industry, number of hours worked, age and education for the women in employment for at least 12 hours per week were compared with results from women in the Labor Force Survey (LFS) conducted by the CBS (Tijdens 2004).

A major advantage of the data is the rich information on actual labor market experience and tenure. Most research on Dutch women's wages lacks this important information.<sup>16</sup> The questionnaire addresses the calendar year of first employment, the calendar year in which the first exit from the labor market for at least one year occurred, the calendar year for first re-entry after the first exit, the calendar years of last exit for more than one year and corresponding re-entry, and the calendar years of exit and re-entry for the longest period of non-employment if the duration was at least one year. These data have been used to construct actual experience in calendar years (*expcal* in Table 2).

A second advantage of the data is that the sample size allows conducting our analyses on mothers and childless women for separate age categories. This is important because women from various birth cohorts have different childbearing and participation behavior as stated in section 2. The different behavior among age categories may have an effect on the sample selection bias that we analyze.

Table 2 summarizes the variable definitions. Most of the variables are commonly used in this type of research, except one of the dependent variables: the less demanding job. This binary clustered group variable separates demanding jobs from less demanding jobs by partition cluster analysis<sup>17</sup> in defined age groups, since women from various birth cohorts have different child bearing and participation behavior. Section 5 explains more on this variable.

Furthermore, the questionnaire addresses the calendar year of first employment, the calendar year in which first exit from the labor market for at least one year, the calendar year of first re-entry after the first exit, the calendar years of last exit for more than one year and corresponding re-entry, and the calendar years of exit and re-entry of the longest period of non-employment if at least one year or longer. Therefore we may construct actual experience in calendar years (*expcal* in Table 2).

Descriptive statistics for the aggregate sample, mothers and workers in less demanding jobs<sup>18</sup> are presented separately in Table A1 in the Appendix. Mothers compose 55.9 per cent of the

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<sup>16</sup> See Dekker, Muffels and Stancianelli (2000), Gustafsson, Kenjoh and Wetzels (2003), and Zorlu (2002).

<sup>17</sup> STATA 9.2 clusters jobs into less demanding en demanding using means and the Jaccard similarity index.

<sup>18</sup> In appendix Table A1 less demanding jobs are defined on the whole sample. As will be explained in Section 5 we work in the analysis with less demanding jobs that are defined within age categories (see Table 3).

sample and 55.1 per cent of women employed in less demanding jobs. Mothers are relatively older, lower educated but they have more years of tenure and years of experience, and their average wage rate is closer to the sample mean. As expected mothers have a large share of time out and a little higher share in paid domestic help. Furthermore the distribution across industries is different for mothers. Separation of the sample in age categories shows the increase in education level: the youngest cohort having obtained the highest level of education. Also the proportion of mothers is still quite low in the youngest age group. The wage rate of women in the second age category is relatively high compared with the oldest age group. There is very little difference between the wage levels in these categories but the experience and tenure are much higher in the oldest age group.

Table 2 *Variable definitions*

Variable	Definition
<b>Dependent variables</b>	
Motherhood	1 if given birth to (a) child(ren), zero otherwise.
Less demanding job	1 if “clustered group variable” indicates less demanding job, zero otherwise. See <b>A</b> for the variables used and Section 5 for the clustering method.
Ln wage	The natural log of hourly wage from current job in NLG of 2001, excludes overtime pay, shift premium, bonus, commission, or allowances, but includes 8 per cent holiday premium in case such a premium is reported. <sup>19</sup>
<b>Explanatory variables</b>	
Age, Age2	Age in years, Age squared.
Agecat1	1 if age $\geq$ 26 and age $\leq$ 36, zero otherwise.
Agecat2	1 if age $>$ 36 and age $\leq$ 46, zero otherwise.
Agecat3	1 if age $>$ 46 and age $\leq$ 64, zero otherwise.
Yrseduc	Years of education (constructed from highest level of education completed.)
Expcal, expcal <sup>2</sup>	Years of employment experience in number of calendar years in which employed.
Tenure	Years worked for current employer.
Tenure_job	Years worked in current job.
Time-out	1 if a career break taken of at least one year, zero otherwise.
Partner	1 if married/cohabiting, zero otherwise.
Partnernw	1 if partner works $\geq$ 30 hours pw, zero otherwise (incl no partner).
Paiddomhelp	1 if paid domestic help, zero otherwise.
City	First number of code of regional residence; 1= Amsterdam, ...,9=Groningen.
<b>Control variables</b>	
Fsize10	1 if number of employees less or equal to 10, zero otherwise.
Fsize100	1 if number of employees less or equal to 100, but more than 10, zero otherwise.
NACE <sup>20</sup> 1	1 if works in Industry “goods” (Dutch coding SBI a-f and i: agriculture, mining, transport.), zero otherwise.
NACE 2	1 if works in “market services” (Dutch coding SBI g+h+j: retail, hotels, repair, financial services), zero otherwise.
NACE 3	1 if works in “non-market services excluding health care”, (Dutch coding SBI l-m:

<sup>19</sup> In order to compare wages, the wages have been converted into hourly rates based on the number of hours per week and corrected for the period covered by the payment which is usually one month, but could be four weeks or one week. If the reported contractual hours per week were (close to) zero, we use the actual worked hours. We exclude self-employed and freelancers.

<sup>20</sup> NACE: European Community Classification of Economic Activities [http:// www.europa.eu.int/comm/eurostat/ramon](http://www.europa.eu.int/comm/eurostat/ramon)

NACE 4	education, public sector); zero otherwise. 1 if works in “non market services health care” (Dutch coding SBI: n-p: health care, culture); zero otherwise.
Amsterdam	1 if lives in Amsterdam; zero otherwise.
The Hague	1 if lives in the Hague; zero otherwise.

**A Clustered group variable is based on the following variables**

1. Hours	1 if <28 hrs pw, zero otherwise.
2. Temp	1 if temporary contract <sup>21</sup> , zero otherwise.
3. No-supjob	1 if not employed in managerial job, zero otherwise.
4. Fem75	1 if 75% of employees in establishment are female, zero otherwise.
5. No-jobnxtyr	1 if expects not (sure) to be employed next year, zero otherwise.
6. No-overtimekly	1 if not working more than contractual hours on a weekly basis, zero otherwise.
7. No-stress	1 if can do my work in the time planned for it, zero otherwise.
8. No-wish for other job	1 if not looking/available for another job, zero otherwise.

**Selection variables** (S<sub>1</sub>-S<sub>4</sub> correspond with Figure 2)

$\lambda_{11}$ (S <sub>1</sub> )	Measures the possible selection bias from the employment in a less demanding job decision for mothers.
$\lambda_{12}$ (S <sub>1</sub> )	Measures the possible selection bias from the motherhood decision for mothers.
$\lambda_{21}$ (S <sub>2</sub> )	Measures the possible selection bias from the employment in a less demanding job decision for childless women.
$\lambda_{22}$ (S <sub>2</sub> )	Measures the possible selection bias from the motherhood decision for childless women.
$\lambda_{31}$ (S <sub>3</sub> )	Measures the possible selection bias from employment in a demanding job decision for mothers.
$\lambda_{32}$ (S <sub>3</sub> )	Measures the possible selection bias from the motherhood decision for mothers.
$\lambda_{41}$ (S <sub>4</sub> )	Measures the possible selection bias from employment in a demanding job decision for childless women.
$\lambda_{42}$ (S <sub>4</sub> )	Measures the possible selection bias from the motherhood decision for childless women.

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## 5. Determining less demanding jobs

We distinguish between employment in less demanding and other jobs by use of cluster analysis. The variables used are defined in Table 2. Since all variables are binary, a simple Jaccard binary similarity index may be an appropriate measurement for less demanding jobs.<sup>22</sup> This index, like many other indexes, is based on the four values from the cross tabulation of the two observations, *i* and *j*.

		obs. <i>j</i>	
		1	0
obs. <i>i</i>	1	a	b
	0	c	d

<sup>21</sup> The category ‘temporary contract’ excludes contracts that usually precede a permanent contract in the Netherlands. A person hired in a permanent position will dependent on negotiation, start with a temporary contract with a formal intention of changing it into a permanent contract after one or two years.

<sup>22</sup> The choice of the Jaccard similarity index is arbitrary since there are many similarity measures.

Every cell represents the number of variables where observations  $i$  and  $j$  have a combination of one or zero values. The Jaccard index is defined as

$$\frac{a}{a+b+c}$$

which is the proportion of matches when at least one of the observations has a one. When both observations have a zero (cell  $d$ ), this index is undefined. In this case, the index takes a one, which is a perfect match.

Using this similarity index, we split the aggregate sample of employed workers into two categories: those who have a demanding job and those who have a less demanding job. The first variable we use is the dummy variable (part-time) that takes a value one if women work less than 28 hours in a week, and takes a value zero if they work more than 28 hours. This critical point of working hours is in effect not arbitrary. It is determined by a policy in the 1990s to give the right to parents to reduce and expand working hours especially for parents with young children. If both women and men remain employed in relatively long part time jobs when they have to care for young children, both employment rates and careers will benefit. The definition of less demanding jobs is extended by additional variables (numbers 2-8 in Table 2). These additional variables are intuitively chosen on the basis of their expected unambiguous negative effect on career prospects. Temporary jobs do not provide a stable labor market career, and will not be desired by career-oriented employees. Jobs without any supervisory tasks may also be less demanding than jobs with supervisory tasks. Jobs in a female dominated workplace are known as less promising jobs with respect to promotion and earnings profile. Expectation on employment continuity given by “no job in the next year” is taken as an indication for a weak commitment to have a continuous labor market career. Similarly we interpret limiting the work effort by contractual hours. Jobs that can be done in the time allotted are categorised to be routine jobs demanding no additional hours out of working time or no additional effort per hour during working time. Jobholders indicating that they do not consider searching for another job (not when another is offered and not when they have to search for it) are regarded as not being keen on working on new options in the labor market.

Table 3 presents a summary of statistics for (less) demanding jobs resulting from the cluster analysis. It is clear that working less than 28 hours is quite a widely chosen option for women over 36. Although the means of the variables is similar for women from 36 to 46 years of age and for women from 47 to 64 years of age (column 1 in Table 3), the distinction between less demanding jobs and demanding jobs is as expected much more strict especially in the proportion of working less than 28 hours per week. Notable is the high percentage of workers

with a temporary contract in demanding jobs in the oldest age group, as compared with women in less demanding jobs and women between 36-46 years of age in demanding jobs.

Less demanding jobs in the youngest age category are to a larger extent temporary, do not have supervisory tasks, require less overtime and less stress than demanding jobs. There is no difference between the proportion of part-time work in demanding or less demanding jobs and the proportion working less than 28 hours is around 18 per cent compared with approximately 36 per cent for jobs held by women older than 36.

Table 3: *Type of employment: summary of statistics for (less) demanding jobs*

26≤Age≤36		Employment		Less demanding jobs		Demanding jobs	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Std. Dev.
1. Hours	.178	.38	.178	.38	.179	.38	
2. Temp	.289	.45	.313	.46	.151	.36	
3. No-supjob	.759	.43	.780	.41	.641	.48	
4. Fem75	.186	.39	.188	.39	.171	.38	
5. No-jobnextyr	.007	.08	.007	.08	.007	.08	
6. No-overtime	.596	.49	.702	.46	0	0	
7. No-stress	.723	.45	.851	.36	0	0	
8. No-wish for other job	.886	.32	.882	.32	.909	.29	
N	3,977		3,381		596		
37≤Age≤46		Employment		Less demanding jobs		Demanding jobs	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Std. Dev.
1. Hours	.370	.48	.608	.49	0	0	
2. Temp	.276	.45	.453	.50	0	0	
3. No-supjob	.747	.44	.796	.40	.670	.47	
4. Fem75	.271	.44	.311	.46	.207	.41	
5. No-jobnextyr	.013	.11	.017	.13	.007	.08	
6. No-overtime	.635	.48	.693	.46	.544	.50	
7. No-stress	.656	.48	.665	.47	.642	.48	
8. No-wish for other job	.901	.30	.900	.30	.902	.29	
N	2,760		1,632		1,128		
47≤Age≤64		Employment		Less demanding jobs		Demanding jobs	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Std. Dev.
1. Hours	.364	.48	.855	.35	0	0	
2. Temp	.268	.44	.096	.29	.396	.49	
3. No-supjob	.739	.44	.804	.40	.691	.46	
4. Fem75	.331	.47	.486	.50	.216	.41	
5. No-jobnextyr	.015	.12	.015	.12	.015	.12	
6. No-overtime	.628	.48	.497	.50	.725	.45	
7. No-stress	.683	.47	.696	.46	.674	.47	
8. No-wish for other job	.929	.26	.924	.27	.933	.25	
N	2,600		1,106		1,493		

Data: WI 2004, Variable definitions in Table 2. Mean parameter values for employment are equal to the weighted average of mean values for demanding and less demanding jobs.

## 6. Results and interpretation

Table 4 presents the estimated coefficients of the bivariate probit model for the simultaneous decisions for motherhood and employment in a less demanding job (as explained in section 3) by age categories. The parameter vectors in the first and second equation are identified since

at least one variable is included in one of the variable vectors ( $X$  or  $Z$ ) but not in the other (Abowd and Farber 1982). The correlation between the disturbances of the employment decision and the motherhood decision in the simultaneous bivariate probit model, given by ( $\rho$ ), is significant which implies that the bivariate probit model provides efficient results, and an estimation procedure relying on a binomial probit model would have left the sample selection problem unsolved. The positive sign of the estimated correlation of  $\rho$ , indicates that mothers are more likely employed in less demanding jobs compared to childless women. Since we use a relative concept of less demanding jobs constructed by age group, the results should be interpreted accordingly (for definitions see Table 3).

The comparison of age categories indicates that the estimated correlation differs in magnitude and significance. The estimated correlation is very strong for women between 36 and 46 years of age, almost equally strong but lower for the age category 26-36, and those older than 46, with the later estimated coefficient more significant than the former.

The accumulation of human capital, represented by education and experience, has a negative effect on the probability of employment in a less demanding job and a negative effect on motherhood. This latter result confirms earlier studies (Blossfeld and Rower 1995, Gustafsson, Kenjoh and Wetzels 2002, Wetzels 2002). The effect of human capital on employment in a less demanding job is larger than the effect of human capital on maternity in absolute terms in the age categories older than 36, which suggests a relatively strong labor market orientation of well-educated women. Women who are between 26 and 36 of age exhibit an equal effect of schooling on motherhood and on employment in a less demanding job, which is in these age categories determined by a job with less overtime and stress.

The employment inclination in a less demanding job by women who are older than 36 is strongly affected by whether or not they are in a relationship in which their partner works more than 30 hours per week. For women who are between 26 and 36 years old no such significant effect is found. It is obvious that in all age categories the presence of a partner has the largest impact on the probability of being a mother. Living in residential areas with a low degree of urbanization increases the probability of being a mother, except for women between 26 and 36 years old. This supports the assumption that people prefer to live in less urbanized residential areas when they have or wish to have a child.

Table 4 *Selectivity corrected probit estimations, motherhood and less demanding job by age group. Coeff. (z-value)*

	26≤Age≤36		37≤Age≤46		47≤Age≤64	
	Motherhood decision	Less dem. job decision	Motherhood decision	Less dem. job decision	Motherhood decision	Less dem. Job decision
Age	.151 (15.44)	.010 (0.98)	.104 (8.68)	.0166 (1.66)	.083 (9.10)	.030 (4.49)
Partner experience	1.090 (15.75)	.298 (2.79)	1.109 (17.53)	.316 (3.54)	.784 (11.34)	.500 (6.06)
Years of Educ	.022 (2.91)	-0.0195 (-2.41)	-0.050 (-7.60)	-0.025 (-4.52)	-0.053 (-4.33)	-0.016 (-1.55)
Partner works >=30 hours per week	-0.076 (-7.72)	-0.079 (-7.37)	-0.082 (-7.46)	-0.042 (-4.12)	-0.071 (-12.75)	-0.012 (-3.70)
City	-77.38e-06 (-0.80)	-0.107 (-1.07)	.000 (2.33)	.333 (4.32)	.000 (1.93)	.152 (12.20)
Paid domestic help		-.327 (-5.12)		-.273 (-4.86)		-.231 (-3.91)
Constant	-5.175 (-18.75)	1.837 (6.66)	-2.562 (-5.87)	.161 (0.42)	-1.265 (-2.89)	1.569 (4.49)
N	3,977		2,760		2,600	
Rho	.090 (2.45)		.423 (11.77)		.198 (4.69)	
Prob > chi2	.000		.000		0.000	
Wald chi2(11)	865.34		518.60		413.54	

*Definition of less demanding job decision corresponds to Table 3. Estimations of the models excluding partner or excluding paid domestic help remain very similar.*

Also paid domestic help significantly lowers the likelihood of having a less demanding job. However, this relationship might also work the other way around: women employed in less demanding jobs may less frequently hire paid domestic help, a relationship we do not verify here. However, it is notable that the magnitude of the effect of paid domestic help on the probability of employment in a less demanding job decreases by age group.

Table 5 shows predicted probabilities of selection into employment in a less demanding job and motherhood. The predictions are all within the estimation sample. It is obvious that the probability for motherhood increases with age group. The inclination in a less demanding job for mothers also increases by age group. However, the motherhood inclination conditional on employment in a less demanding job indicates that in the youngest age category this is very likely. But women in less demanding jobs who are between 36 and 46 years of age are the least likely to be mothers.

Table 5 *Predicted probabilities of selection by age categories: motherhood and employment in a less demanding job*

	26≤Age≤36	37≤Age≤46	47≤Age≤64
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1	Motherhood probability conditional on employment in a less demanding job	.877	.312	.444
	Employment in a less demanding job probability conditional on motherhood	.302	.598	.878
2	Pr ( $I^{\text{moth}}=1$ and $I^{\text{lessdjb}}=1$ )	.261	.504	.383
3	Pr ( $I^{\text{moth}}=1$ and $I^{\text{lessdjb}}=0$ )	.035	.214	.454
4	Pr ( $I^{\text{moth}}=0$ and $I^{\text{lessdjb}}=1$ )	.589	.109	.042
5	Pr ( $I^{\text{moth}}=0$ and $I^{\text{lessdjb}}=0$ )	.115	.173	.120
	N	3,977	2,760	2,600
	1. $\frac{\Phi_2(X_i\beta, Z_i\delta, \rho)}{\Phi(Z_i\delta)}$		4. $\Phi_2(-X_i\beta, Z_i\delta, -\rho)$ (=S <sub>3</sub> )	
	2. $\Phi_2(X_i\beta, Z_i\delta, \rho)$ (=S <sub>1</sub> )		5. $\Phi_2(-X_i\beta, -Z_i\delta, -\rho)$ (=S <sub>4</sub> )	
	3. $\Phi_2(X_i\beta, -Z_i\delta, -\rho)$ (=S <sub>2</sub> )			

Where  $\Phi(\cdot)$ ,  $\Phi_2(\cdot)$  are the standard normal distribution function and the bivariate normal distribution function respectively.  $X_i$  and  $Z_i$  are vectors of explanatory variables for the underlying latent variable for the probit function and the selection function, and  $\beta$  and  $\delta$  are corresponding parameters.  $\rho$  is the correlation coefficient. S1 to S4 correspond to Figure 2 and equations (6)-(9). Definition of less demanding job decision corresponds to Table 3.

Table 6 presents the estimates of the wage equations (equations 10-13) for mothers and childless women in (less) demanding jobs by age group. Our wage equations control for main city, for industry and size of the firm. We report on our main interest: selection terms and human capital variables. At least one of the two selectivity variables are significant at 10 and 5 percent levels respectively in each wage regression. We expect selection effects for mothers in less demanding jobs, and for childless women in demanding jobs; the effects are expected to be stronger in older age categories.

The first correction, which is the correction for selection of job type, is significantly positive for mothers who are between 26-46 years old in less demanding jobs, with a much higher coefficient of the first selection term in the ages 26-36. From this follows that mothers' wages are expected to be higher than without correcting for the selection into less demanding job. This suggests that women in this age category employed in less demanding jobs are selected by women who do not invest in their careers as much as other women do.

The second selection, which is the selection into motherhood, is significantly and highly negative for mothers in the age category 47-64, which suggests that mothers between 47-64 years of age have better characteristics than childless women in less demanding jobs.

The first selection terms affect wages in demanding jobs negatively significantly for childless women and mothers in all age categories (except childless women who are between 26-36 years of age). This is in line with human capital theory. The selection correction effect is especially strong for childless women between 36 and 46 years of age and for mothers older than 46 and to a lesser extent for childless women older than 46. This indicates that career

choice, measured by job choice, is stricter, after the age of 36 for both childless women and mothers.

The second correction is significantly positive, and strong, for childless women who are between 36 and 46 years of age. Thus, mothers who are between 36-46 have a higher probability of earning higher wages in demanding jobs compared with similar childless women.

The control and human capital variables in the wage estimations reveal that the highest obtained level of education has a larger effect on childless women's gross hourly wage than on mothers' wages, both in demanding and in less demanding jobs, except for women in age category 37-46 in demanding jobs than in less demanding jobs. As expected the effect of schooling is stronger in demanding jobs. Especially the effect of schooling for mothers in demanding jobs who are between 36 and 46 years of age is high at 6.4 per cent.

Years of experience is important in wages for mothers above 36 of age in demanding jobs, for childless women under 36 of age and for mothers over 46 in less demanding jobs. Years of experience squared is only significant for women older than 46 of age in less demanding jobs; and for mothers over 36 years of age in demanding jobs and childless women between 26-36 of age in demanding jobs.

Years of tenure with employer is important in wages for all groups except for childless women over 36 years of age in less demanding jobs. A negative effect of job tenure occurs in wage estimations for childless women younger than 46, which suggest investments in career by the employer for childless women but not for mothers in these age categories. However, there is also a negative significant effect of job tenure found for both mothers and childless women between 26-36 of age in less demanding jobs.

Having a career disruption of more than one year affects mothers' wages strongly both in demanding and less demanding jobs, except for mothers between 26 and 36 of age in demanding jobs. Surprisingly the magnitude of the effect is rather equally strong in demanding and less demanding jobs. Mother's wages are affected by time out the strongest in the age 37-46 with 13%.

Table 6: Wage regressions by age group, motherhood & (less) demanding job, Coeff (t)

	26≤Age≤36	26≤Age≤36	37≤Age≤46	37≤Age≤46	47≤Age≤64	47≤Age≤64
Less demanding job*						
	M	C	M	C	M	C
	Eq.10	Eq.12	Eq.10	Eq.12	Eq.10	Eq.12
yrseeduc	.035 (8.99)	.042 (16.95)	.033 (8.70)	.035 (4.24)	.046 (11.40)	.047 (4.11)
expcal	.017 (1.70)	.019 (4.23)	.012 (1.84)	0.37 (1.87)	.024 (3.69)	.042 (3.03)
expcal2	-.001 (-1.83)	-.001 (-1.82)	-.000 (-1.59)	-.001 (-1.61)	-.004 (-3.11)	-.001 (-2.36)
tenure	.008 (2.94)	.009 (4.77)	.004 (2.45)	-.001 (-0.18)	.007 (3.80)	.002 (0.68)
tenure-job	-.009 (-3.10)	-.010 (-3.89)	.000 (0.12)	.001 (0.31)	-.002 (-1.02)	-.001 (-0.38)
timeout	-.104 (-4.67)	-.061 (-3.98)	-.130 (-7.19)	-.050 (-1.12)	-.072 (-3.16)	.013 (0.17)
Amsterdam	-.010 (-0.48)	.046 (3.64)	.036 (1.95)	.057 (1.27)	.035 (1.63)	.177 (2.67)
The Hague	.058 (2.50)	.036 (2.76)	.057 (2.30)	.130 (2.24)	.049 (1.76)	.012 (0.18)
nace1	-.035 (-1.21)	-.018 (-1.38)	-.134 (-6.33)	-.005 (-0.08)	-.116 (-3.53)	-.181 (-2.51)
nace2	-.038 (-1.90)	-.018 (-1.49)	-.090 (-5.01)	-.063 (-1.38)	-.119 (-4.85)	-.215 (-2.81)
nace3	.055 (1.96)	.032 (1.93)	-.022 (-1.04)	-.018 (-0.37)	.030 (1.43)	.093 (1.23)
fsize10	-.085 (-2.88)	-.094 (-5.92)	-.104 (-4.24)	-.155 (-1.87)	-.006 (-0.21)	-.073 (-1.09)
fsize100	-.055 (-3.12)	-.044 (-4.39)	-.025 (-1.63)	-.065 (-1.76)	-.026 (-1.38)	-.054 (-0.99)
lambda11	.396 (2.96)		.197 (2.31)		.015 (0.54)	
lambda12	.006 (0.81)		-.068 (-0.83)		-.579 (-2.14)	
lambda21		-.000 (-0.05)		.052 (0.47)		-.149 (-0.69)
lambda22		.000 (5.22)		.007 (0.14)		.192 (0.72)
constant	2.680 (32.00)	2.59 (54.80)	2.840 (38.75)	2.66 (10.68)	2.692 (25.57)	2.24 (8.55)
N	985	2,206	1,289	261	921	99
R2	.242	.259	.317	.170	.356	.592

	26≤Age≤36	26≤Age≤36	37≤Age≤46	37≤Age≤46	47≤Age≤64	47≤Age≤64
<b>Demanding job*</b>						
	M	C	M	C	M	C
	Eq.12	Eq.13	Eq.12	Eq.13	Eq.12	Eq.13
yrsecul	.015 (0.88)	.051 (10.08)	.064 (13.63)	.047 (8.64)	.051 (14.45)	.058 (8.22)
Expcal	.018 (0.60)	.030 (2.79)	.031 (4.07)	-.019 (-1.06)	.028 (5.72)	.003 (0.29)
Expcal <sup>2</sup>	-.002 (-1.48)	-.002 (-2.44)	-.001 (-4.07)	.001 (1.26)	-.000 (-4.21)	-.000 (-0.20)
Tenure	.020 (2.58)	.013 (3.06)	.007 (3.08)	.005 (2.51)	.007 (4.80)	.005 (2.67)
tenure-job	-.008 (-0.81)	-.020 (-3.06)	-.004 (-1.21)	-.007 (-2.82)	-.002 (-1.26)	-.001 (-0.73)
Timeout	-.088 (-1.57)	-.054 (-1.13)	-.135 (-5.24)	-.056 (-1.83)	-.093 (-3.96)	-.135 (-2.81)
Amsterdam	.020 (0.30)	.031 (1.06)	.030 (1.01)	.047 (1.79)	.052 (2.63)	.024 (0.58)
The Hague	-.009 (-0.15)	-.001 (-0.02)	0.51 (1.47)	.043 (1.16)	.070 (2.85)	.008 (2.99)
nace1	.107 (1.45)	.017 (0.53)	.010 (0.30)	.023 (0.76)	-.041 (-1.63)	.018 (0.40)
nace2	.027 (0.55)	.016 (0.58)	.043 (1.36)	.010 (0.36)	-.248 (-1.13)	-.026 (-0.56)
nace3	.137 (2.04)	.021 (0.56)	.003 (0.09)	.048 (1.62)	.015 (0.77)	.021 (0.55)
fsize10	-.032 (-0.34)	-.063 (-1.54)	-.208 (-5.21)	.003 (0.06)	-.106 (-3.53)	-.134 (-2.43)
Fsize100	-.058 (-1.11)	-.030 (-1.38)	-.124 (-4.99)	-.047 (-1.88)	-.068 (-4.01)	-.075 (-2.31)
Lambda31	.035 (0.13)		-.001 (-2.51)		-.337 (-5.36)	
Lambda32	-.705 (-1.67)		-.001 (-0.49)		.000 (0.95)	
Lambda41		-.026 (-2.58)		-.185 (-3.11)		-.064 (-2.11)
lambda42		-.000 (-1.82)		.214 (3.18)		.011 (1.76)
constant	2.877 (12.89)	2.490 (26.07)	2.349 (22.42)	2.986 (14.98)	2.136 (20.78)	2.541 (11.12)
N	137	450	559	473	1,072	294
R <sup>2</sup>	.323	.246	.468	.319	.369	.354

*Data: WI 2004, Variable definitions in Table 2. Demanding job and less demanding job are defined as in Table 3. M=mothers; C=Childless women. Lambdas are estimated from the bivariate probit models presented in Table 4.*

Table 7 presents estimations of equation (14): the Oaxaca decomposition of motherhood wage differentials by employment in a (less) demanding job in three age categories. Table 7 shows that endowment with education is always higher for childless women than for mothers; whereas the endowment in on-the-job training (measured by employment experience and tenure with employer and with the job) is almost similar among childless women and mothers of all age groups in demanding jobs. In less demanding jobs, mothers have more employment

experience than childless women when they are between 26-36 and less when they are over 46. Furthermore the childless women above 46 in demanding jobs show less time-out.

However, apart from the selection effects, the main contributions to motherhood wage differentials in all age groups by employment in (less) demanding jobs is reflected in different coefficients for given endowments. Mothers are much more rewarded for years of experience in demanding jobs compared with childless women, whereas childless women in the oldest age category are more rewarded for years of experience in less demanding jobs. Mothers are always more rewarded for tenure with their employer than childless women except for the youngest category of women in less demanding jobs.

Taking all effects together, mothers earn higher wages than childless women in less demanding and demanding jobs when they are between 26 and 36 years old. As regards less demanding jobs this is explained by the selection into less demanding job and more years of employment experience than childless women in these jobs. As regards demanding jobs mother's better payment follows from higher reward for given experience and a higher effect of selecting into demanding jobs for mothers. Among women older than 36 in (less) demanding jobs childless women earn higher wages than mothers.

Furthermore, for women between 46 and 64 years of age, there is a large unexplained constant in the wage models both in less demanding and demanding jobs.

Table 7 Decomposition of wage differentials between childless women and mothers in percentages (equation 14)

	26≤Age≤36		37≤Age≤46		47≤Age≤64							
	Less demanding	Demanding										
Total attributable (A+B)	-5.0	-8.3	4.8	2.9	8.4	13.9						
A. Due to endowments	-40.4	116.5	6.0	46.4	6.1	6.8						
B. Due to "discrimination"	35.4	-124.8	-1.2	-43.5	2.3	7.1						
B.1 coefficients	55.9	-120.2	33.7	-49.0	47.8	-33.4						
B.2 unexplained (constant)	-20.5	-4.6	-34.9	5.5	-45.6	40.5						
	Endow. Coeff.	Endow. Coeff.										
Yrseduc	4.5	5.3	2.9	10.6	3.4	1.4	1.4	-17.3	-3	0.7	4.0	8.9
Expcal	-8.6	3.1	0.3	-27.1	-0.5	46	-0.6	-70.5	18.9	44.0	1.7	-61.6
Expcal <sup>2</sup>	6.2	-0.2	-0.5	17.1	0.3	-22.3	0.6	43.4	-16.3	-17.3	-1.0	23.8
Tenure	-1.8	0.4	-2.1	-4.8	0	-3.1	0.8	-0.6	1.3	-4.6	3.0	-1.9
Tenure_job	1.2	-0.4	1.3	-3.4	0	0.6	-0.6	-2.1	-0.3	0.5	-0.3	0.4
Timeout	0.9	0.9	0.8	-0.2	1.2	4.1	1.7	3.8	-0.7	6.7	8.3	-3.3
Amsterdam	0	1.2	0.2	0.7	0.1	0.4	0.1	0.2	-0.1	2.8	0.1	-0.6
The Hague	0.1	-0.3	0	0.4	0.5	1	0	-0.1	0.1	-0.4	0.9	0.6
nace1	-0.1	0.3	0.1	-1.2	0	2	0.1	0.2	0.0	-0.6	0.0	0.8
nace2	0	0.9	0	0.2	0.1	0.8	0	-1	0.9	-2.0	0.1	-0.0
nace3	0	-0.3	0	-2	0	0	-0.1	0.9	0.5	1.3	0.0	0.1
Fsize10	0	-0.1	-0.1	-0.5	1.1	-0.6	0	1.9	-0.0	-0.8	0.4	-0.3
Fsize100	0	0.4	-0.2	0.7	-0.1	-1.3	-0.1	2	0.1	-0.9	0.3	-0.2
Lambda1*	-42.8	44.9	114.7	-108.8	0.3	0.9	60.3	-28.4	13.4	-7.1	-25.8	16.4
Lambda2*	0.2	-0.2	-1.1	-1.9	-0.3	3.9	-17.3	18.6	-11.6	25.6	15.1	-16.5
SUB-total	-40.4	55.9	116.5	-120.2	6	33.7	46.4	-49	6.1	47.8	6.8	-33.4

Data: WI 2004, Variable definitions in Table 2. Demanding job and less demanding job are defined as in Table 3. \* Corresponds with the relevant selection correction terms in Table 6.

## 7. Conclusions

Academic debate focuses on the question to what extent wage differentials between childless women and mothers can be explained strictly by human capital depreciation due to timeout during childbearing and caring, and what other factors play a role. This paper analyzes this so-called child gap in pay correcting for bias from selection into motherhood and into employment in a less demanding job in the Netherlands. We categorize less demanding jobs by cluster analysis defining relative categories of (less) demanding jobs using binary information on hours of work and variables that are intuitively chosen on their expected unambiguous negative effort on career prospects. We analyze the selection into motherhood and less demanding jobs and its effect on wage differentials between mothers and childless women in three age groups, since fertility and labor market behavior is expected to be different for these age groups. We show that motherhood is significantly positively correlated with employment in a less demanding job in the three distinguished age groups: 26-36, 37-46 and 47-64.

The selection into less demanding jobs affects wages of mothers younger than 46 significantly negatively all else equal, whereas wages of mothers older than 46 are not affected by the selection into less demanding jobs. As expected we find that selection into demanding jobs affect childless women's wages positively, and the effect is the strongest in the age category 26-46. However, we also find a very strong positive effect of selection into demanding jobs for mothers 46 of age or older.

Decomposing wage differentials between women according to motherhood by employment in (less) demanding jobs indicates that childless women have higher educational levels. There is almost no difference in years of experience for women of age 36 to 46 in (less) demanding jobs, but the difference in years of employment experience is large between childless women and mothers older than 46 especially in less demanding jobs with childless women having more years of experience. In the youngest age category mothers have more tenure than childless women, in the oldest age category we find the reverse. Mothers in demanding jobs are also higher rewarded for years of tenure (on the job) than childless women with equal years of tenure in demanding jobs.

Although raw data do not reveal large differences in mean gross hourly wages among women according to motherhood in the Netherlands, we find selection effects from motherhood and employment in less demanding jobs, and differences in endowment and reward for given endowments for mothers and childless women in the distinguished age categories. Our results

suggest that estimation of the wage gap should take into account the selectivity bias that arises from double selection rules.

## 8. References

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	All		Mothers		In less demanding job*		26≤Age≤36		37≤Age≤46		47≤Age≤64	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.Dev.
	N=9,337		N=5,219		N=6,611		N=3,977		N=2,760		N=2,600	
child	0.559	0.50	1.000	0.50	0.551	0.49	0.294	0.46	0.716	0.45	0.831	0.37
Less demanding job*	0.708	0.45	0.696	.45	1.00	0.00	0.736	0.44	0.608	0.47	0.686	0.47
Age	37.398	9.23	41.74	9.33	37.228	8.89	29.474	3.21	38.963	2.71	49.323	4.24
agecat1	0.405	0.49	0.216	0.49	0.413	0.48	1.000	0.00	0.000	0.00	0.000	0.00
agecat2	0.278	0.45	0.362	0.45	0.263	0.46	0.000	0.00	1.000	0.00	0.000	0.00
agecat3	0.280	0.46	0.420	0.46	0.2807	0.47	0.000	0.00	0.000	0.00	1.000	0.00
Yrseduc	12.153	2.61	11.751	2.61	11.862	2.60	12.499	2.62	12.059	2.57	11.656	2.56
Exp	15.462	9.03	18.731	9.10	15.296	8.88	8.764	4.23	17.266	5.12	25.043	7.81
Tenure_empl	6.774	7.01	8.120	7.07	6.617	7.29	3.888	3.83	7.604	6.83	11.145	8.50
tenure_jb	4.836	5.12	5.617	5.13	5.112	5.22	3.155	2.87	5.020	5.01	7.442	6.64
Timeout	0.353	0.48	0.562	0.48	0.360	0.48	0.125	0.33	0.401	0.49	0.684	0.47
Domhlp-paid	0.212	0.41	0.237	0.41	0.276	0.45	0.156	0.36	0.253	0.43	0.264	0.44
Partner	0.771	0.42	0.872	0.42	0.772	0.42	0.757	0.43	0.803	0.40	0.785	0.41
Partnerworks>30	0.661	0.35	0.845	0.35	0.663	0.35	0.900	0.30	0.868	0.34	0.792	0.41
Amsterdam	0.194	0.40	0.190	0.40	0.187	0.41	0.195	0.40	0.190	0.39	0.199	0.40
Thehague	0.141	0.35	0.131	0.35	0.143	0.35	0.146	0.35	0.138	0.35	0.138	0.34
v01nace1	0.167	0.37	0.133	0.37	0.137	0.34	0.212	0.41	0.154	0.36	0.108	0.31
v01nace2	0.343	0.47	0.294	0.47	0.276	0.45	0.421	0.49	0.312	0.46	0.232	0.42
v01nace3	0.159	0.37	0.180	0.37	0.219	0.41	0.116	0.32	0.169	0.38	0.219	0.41
fsize10	0.117	0.32	0.123	0.32	0.127	0.33	0.114	0.32	0.114	0.32	0.118	0.32
Fsize100'	0.346	0.48	0.333	0.48	0.341	0.48	0.371	0.48	0.321	0.47	0.324	0.47
N	8,745		5,203		6,407		3,778		2,582		2,385	
Log gross hrly wage	3.286	0.30	3.310	0.30	3.261	0.30	3.238	0.26	3.346	0.31	3.339	0.31

Appendix Table A1: Descriptive Statistics: Motherhood & Employment in less demanding job. Variable definitions in Table 2. \*Less demanding job is based on all observations and corresponds to the first panel of Table 3. Data: WI 2001/200.

