Female Labour Supply,

Flexibility of Working Hours, and Job Mobility

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Abstract

Traditional labour supply models do not address to what extent working hours are constrained within jobs, and to what extent working hours can be adjusted by means of changing employer. This paper measures the flexibility of working hours within and between jobs by relating subjective information on individual preferences to adjustments in working hours. Empirical analysis based on a sample of employed women in the Dutch Socio-Economic Panel (1987-1989) shows that the flexibility of working hours within jobs is low.

KEYWORDS: Labour Supply, Hours Restrictions, Job Mobility.

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The empirical literature on labour supply traditionally assumes that workers can choose their working hours freely and without costs, up to a maximum level equal to the time endowment. The potential invalidity of this assumption is acknowledged, but the assumption is still often made for the tractability of the empirical model. In response, several models incorporating restrictions on working hours have been developed. The first generation of these models extended the traditional censored regression model by allowing for censoring due to over- and under-employment and involuntary unemployment (Moffitt, 1982; Ham, 1982; Blundell *et al.*, 1987). The second generation of models extended the structural labour supply model by introducing job offers concerning hours of work (Van Soest *et al.*, 1990; Dickens and Lundberg, 1993). A conclusion stemming from all of these studies is that incorporating restrictions on working hours significantly improves the empirical fit of the model.

A peculiar component of the models discussed above is that they are static. As a result they are not able to distinguish between the "ingredients" required for the existence of hours restrictions within the labour market. First, there needs to be restrictions on the possibilities to adjust working hours with the same employer, e.g. within a job. This alone does not necessarily imply that individuals are not on their labour supply curve, as they might switch to an employer that offers them their preferred working hours. A second necessary ingredient for the existence of hours restrictions witin the labour market are therefore mobility costs.

Although one cannot doubt the existence of hours restrictions in the labour market, an open question is how tight these restrictions actually are. Altonji and Paxson (1986, 1992) study adjustments of working hours over time, and distinguish between those individuals who stay in their job, and those who change job (e.g. change employer). Based on the US Panel Study of Income Dynamics, they conclude that working hours of married women are two to four times more variable across jobs than within jobs. Based on the US National Longitudinal Survey of Youth, Matinez-Granado (1999) draws the same conclusions for prime age men.

The novelty of the current study is that by formulating a latent variable model for preferred working hours, and by using subjective information on these preferences for identification, we are able to get point estimates for the flexibility of working hours within jobs. The empirical application in this study will concentrate on female labour supply in the Netherlands, an interesting country in terms of working hours, as part-time employment is fairly common.

The remainder of the paper is organised as follows. Section 1 discusses the Dutch labour market and the role of part-time employment. Section 2 presents and discusses the questions on working hours in the Dutch Socio-Economic Panel. Section 3 introduces the empirical model for job mobility and hours adjustments within and between jobs. Section 4 presents the data. Section 5 discusses the estimation results and their interpretations. Section 6 concludes.

1. The Dutch Labour Market

If one would want to characterize the Dutch labour market in the seventies and the early eighties, one would typically think of high unemployment figures and low female labour force participation rates. Although part-time employment among women was already fairly common at the time, see table 1, it was relatively unimportant due to the low female labour force participation. Together with the recovery of the Dutch economy, which came through especially strong in the late nineties, the part-time employment rate increased substantially. The table shows that in the nineties more than half of the employed women work part-time, while for men the part-time employment rate is also relatively high. The table also shows that in the time-period under consideration in our analysis – 1987 to 1989 – the rate of part-time employment was already high, so that a relatively free choice of the working hours was already guaranteed at that time, at least in the sense that part-time jobs were available.

[Insert table 1 about here]

2. Measurement

The data for this study are drawn from the Dutch Socio-Economic Panel (DSEP), which is collected by Statistics Netherlands. Although the DSEP exists since 1984, only the waves of the years 1987 to 1989 are suitable for the analysis of actual and desired working hours. For the other years, the desired working hours are only asked to new participants in the panel and to participants who have chanced job, which is not sufficient for our analysis. The questions for employed respondents on the actual and desired hours of work are as follows[2]:

Ia How many hours per week do you work in your job, or jobs?

- *Do not include travelling time to and from your work.*

- *Include overtime only if it is paid.*

Ib Are you satisfied with this number of working hours, or would you prefer to work more or fewer hours per week? Possible answers:

1) I am satisfied with the number of working hours — stop
2) I prefer to work more — question Ic
3) I prefer to work less. — question Ic

Ic If, in the previous question, you were not satisfied with your working hours, how many hours would you then like to work?

The answers to questions Ia to Ic by individual i in year t are denoted by ha_{it}, s_{it}, and hd_{it}, respectively. Actual hours ha_{it} and desired hours hd_{it} are measured as hours per week. Based upon question Ib, we define the variable s_{it} (satisfied): $s_{it} \equiv 0$ if individual i is satisfied with the number of working hours in period t (answer 1), $s_{it} \equiv 1$ if the individual wants to work more

[2] Until 1986 the DSEP explicitly explained that less (more) working hours leads to less (more) income. This was abolished after 1986.

(answer 2) and s_{it}≡-1 if the individual wants to work less (answer 3). Only for respondents answering question Ic, s_{it} is not equal to zero. For those with s_{it}=0, desired hours hd_{it} are set equal to actual hours ha_{it}. The qualitative information s_{it} is similar to that in, for example, the PSID. Under-employment corresponds to s_{it} =1, over-employment corresponds to s_{it}=-1. The quantitative information in hd_{it} is more detailed: s_{it} can be retrieved from hd_{it} - ha_{it}.

The question whether the subjective data on the desired hours contains relevant information on the preferences is studied in Euwals *et al.* (1998). This study shows that conditional on the actual working hours ha_{it}, the desired hours hd_{it} have a predictive power for the next year's working hours ha_{it+1}. The explicit goal was to test for the predictive value without making additional assumptions, and without having an underlying economic model in mind. Therefore conclusions in a more structural sense, for instance on the adjustments of working hours within jobs, could not be made. That will be the contribution of the current study.

3. Empirical Model

In this section we develop an empirical model to measure the flexibility of working hours within jobs, taking the non-employment and job mobility decision into account. We relate the dissatisfaction with actual working hours, measured by the difference in actual and desired working hours at time t, to non-employment, job-mobility and adjustments in actual working hours from time t to time t+1. The underlying assumption of this approach is that adjustments in working hours are slow, so that the working hours at time t+1 are at least partly determined by the desired working hours at time t.

In the empirical model we refer to the subjectively measured desired hours as the *observed* desired hours hd_{it}, which might be an imperfect measure of the *true* desired hours hd_{it}^{*}. The first part of our model considers whether a woman who is employed at time t, stays employed

or stops working. Non-employment n_{it} depends on a vector of exogenous variables X_{it}, and on dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$:

$$n_{it}^{*} = X_{it}'\alpha + f(hd_{it}^{*} - ha_{it};\ \beta^{pos},\beta^{neg}) + \varepsilon_i^n + \varepsilon_{it}^n \qquad (1)$$

$$n_{it} = 1 \quad if\ n_{it}^{*} \geq 0 \qquad \textit{(stops working from time t to t+1)}$$

$$= 0 \quad if\ n_{it}^{*} < 0 \qquad \textit{(continues working from time t to t+1)}$$

with α, β^{pos}, and β^{neg} parameters, and ε_i^n and ε_{it}^n an individual specific and a remainder error term respectively. In the second part of our model, when the woman stays employed, job mobility q_{it} depends on the vector X_{it}, and on dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$:

$$q_{it}^{*} = X_{it}'\gamma + f(hd_{it}^{*} - ha_{it};\ \delta^{pos},\delta^{neg}) + \varepsilon_i^q + \varepsilon_{it}^q \qquad (2)$$

$$q_{it} = 1 \quad if\ q_{it}^{*} \geq 0 \qquad \textit{(job-movers from time t to t+1)}$$

$$= 0 \quad if\ q_{it}^{*} < 0 \qquad \textit{(job-stayers from time t to t+1)}$$

with γ, δ^{pos}, and δ^{neg} parameters, and ε_i^q and ε_{it}^q an individual specific and a remainder error term respectively. In both equations (1) and (2) the function f concerns the impact of the dissatisfaction with the working hours $hd_{it}^{*} - ha_{it}$; it allows for a different impact for women who want to work more (β^{pos},δ^{pos}), and for women who want to work less (β^{neg},δ^{neg}).

The central issue of this study is the extent to which women are able to adjust their working hours within and between jobs. Therefore the third part of our model concerns the impact of the dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$ on the change in the working hours, which is defined by $\Delta ha_{it}=ha_{it+1} - ha_{it}$. A logical choice to model this relation would be a linear model, which would mean that the change in working hours would be treated as a continuous variable. Although such an approach is used often in the literature explaining working hours[3], it might be questionable for our application as for many observations the working hours might

not change at all. In our data we observe this happening for about 50% of the observations. We address the dominance of this event by taking a two-stage approach: we first model the probability that there is a change in actual working hours, which depends on a vector of exogenous variables Z_{it}, and on the dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$:

$$z_{it}^{*} = Z_{it}'\pi + g(hd_{it}^{*} - ha_{it}, q_{it}; \varphi_s^{pos}, \varphi_s^{neg}, \varphi_m^{pos}, \varphi_m^{neg}) + \varepsilon_i^z + \varepsilon_{it}^z \qquad (3.1)$$

$$z_{it} = 1 \quad if\ z_{it}^{*} \geq 0 \qquad (Change\ in\ working\ hours,\ \Delta ha_{it} \neq 0)$$

$$= 0 \quad if\ z_{it}^{*} < 0 \qquad (No\ change\ in\ working\ hours,\ \Delta ha_{it} = 0)$$

with π, $\varphi_s^{pos}, \varphi_s^{neg}$, φ_m^{pos} and φ_m^{neg} parameters, and ε_i^z and ε_{it}^z an individual specific and a remainder error term respectively. Then second, in case there is a change in working hours, we apply a linear model in which the change in the working hours depends on a vector of exogenous variables Z_{it}, and on the dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$:

$$\Delta ha_{it} = Z_{it}'\omega + g(hd_{it}^{*} - ha_{it}, q_{it}; \psi_s^{pos}, \psi_s^{neg}, \psi_m^{pos}, \psi_m^{neg}) + \varepsilon_{it}^a \qquad (3.2)$$

with ω, $\psi_s^{pos}, \psi_s^{neg}, \psi_m^{pos}$ and ψ_m^{neg} parameters, and ε_{it}^a an error term. An individual specific error term is not present, as it would imply a constant rise or fall in the working hours. The function g concerns the impact of dissatisfaction with working hours $hd_{it}^{*} - ha_{it}$. It allows for a different impact for stayers and movers who want to work more (ϕ_s^{pos}, $\phi_m^{pos}, \psi_s^{pos}$, ψ_m^{pos}), and for stayers and movers who want to work less (ϕ_s^{neg}, $\phi_m^{neg}, \psi_s^{neg}$, ψ_m^{neg}).

Equations (1) to (3.2) model the impact of the true desired hours hd_{it}^{*} on the realised labour market behaviour. The next step is to model how the true desired hours hd_{it}^{*} relate to the observed desired hours hd_{it}. Besides the fact that we allow for measurement error, we allow for the fact that respondents might be influenced by their actual working hours while they answer such questions. We assume that the observed desired hours are a weighted average:

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[3] There the problem occurs due to the dominance of the working hours of the standard fulltime job, a fact that is ignored by many studies.

$$hd_{it} = \lambda hd_{it}^{*} + (1-\lambda)\, ha_{it} + \varepsilon_i^d + \varepsilon_{it}^d \qquad (4)$$

with λ a parameter, and ε_i^d and ε_{it}^d an individual specific and a remainder error term respectively. The true desired hours hd_{it}^{*} depend on a vector of exogenous variables D_{it}, which will contain typical labour supply variables like the number of children and other income:

$$hd_{it}^{*} = D_{it}'\theta + \xi_i + \xi_{it} \qquad (5)$$

with θ a parameter vector, and ξ_i and ξ_{it} an individual specific and a remainder error term.

It is a key issue of the empirical analysis to identify the coefficients in the latent variable equation, as well as the coefficients in the non-employment, job mobility, hours adjustment and measurement equations. If identification of these coefficients is not possible, the question whether or not there is an indirect influence of socio-economic variables via some latent variable on non-employment, job mobility and hours adjustment cannot be solved. Generally speaking, to be able to identify and estimate the model we will take a random effects – simulated maximum likelihood approach. Appendix 1 presents the details.

4. Stayers, Movers and Non-Employment

From the Dutch Socio-Economic Panel we select women who work at least in 1987 or in 1988, and who are observed in two consecutive years. In total we get 1877 observations, of which 1139 are observed in all three years. Another 375 are only observed in the first two years, and 363 are only observed in the last two years. Table 2 shows that the sample statistics are in line with what could be expected. Many women who change job seem to be moving up the job-ladder: they are on average younger, are less often married, have fewer children, and have a lower hourly wage. The fact that they live more often in the western part of the country is consistent with the idea that this is the most urbanised and economically strongest part of the country. The characteristics of the women who stop working are also in line with what

could be expected: on average they have more often a child that is younger than 6 years, they have a lower education level, and they have more often a job of 12 or less hours.

[Insert tables 2 and 3 about here]

Next, table 3 relates the preferences on working hours to the next year's outcomes. The upper panel shows that in the raw data the probability of becoming non-employed is not related to satisfaction with working hours (formal tests accept the null hypothesis of independence). In contrast to this, the second panel shows that women who want to work more hours are more likely to change job (formal tests reject the null hypothesis of independence). The last two panels of table 3 show a strong dependence between satisfaction with working hours and actual adjustment in working hours over time (again formal tests reject the null hypothesis of independence). It is clear that women who want to work fewer hours more often adjust their working hours downward, and that women who want to work more hours more often adjust their working hours upward. Still these results might be induced by the fact that respondents might be influenced by their actual working hours when they answer questions on their desired hours, an effect that we take into account in our empirical analysis by equation (4).

5. Estimation Results

The estimation results for equation (1) to (5) are displayed in tables 4.1 to 4.4. But before turning to the interpretation of the estimation results, we first discuss the importance of the imposed exclusion restrictions: For the identification of the impact of the *true* desired hours on the observed outcomes (non-employment, job mobility and hours adjustments) exclusion restrictions are necessary. We assume that the family and husband's characteristics affect the observed outcomes only through the desired hours. Note that this implies that we assume that both the husband's behaviour and family planning are exogenous (predetermined).

Furthermore we take a reduced form approach for the desired working hours; we do not model the impact of the gross hourly wage through a budget-constraint. Next, also for the equations on non-employment and job mobility we need exclusion restrictions. In these equations we include job characteristics, education and the hourly wage among the explanatory variables. For both equations the underlying idea is that a woman with a relatively low wage, *given* education and job characteristics, might be more willing to stop working or to change job. Another variable that we would like to include is work experience, but as this is not observed we take age as an approximation. We also include regional characteristics to approximate differences in regional labour demand, as this determines the chances to find another job.

First we discuss the estimation results on non-employment and job mobility, see table 4.1. As could be expected, age plays a significant role: younger women are more likely to change job, and also to stop working. Note that this can only be interpreted as an approximation, as it is clear that from a certain age on women start to retire (and women retiring are included in the data). Attempts to incorporate this by including higher-order terms of age failed as then the impact of age became insignificant. The impact of the regional variables turns out to be insignificant, although for job mobility the signs of the parameters are as could be expected: woman living in the most urbanised part of the country, the west, are more likely to change job, and women living in counties with a high unemployment rate are less likely to change job. The impact of education and job characteristics is also insignificant. For job mobility the hourly wage has a significant impact: a woman with a high wage, *given* job characteristics and education, is less likely to change job. And although insignificant, the impact of education is in line with this interpretation: a woman with a high education, *given* the wage, is more likely to change job. The working hours of the current job do not seem to play a role for job mobility, but it has a substantial impact on the probability of becoming non-employment: women with a small job are more likely to stop working.

[Insert tables 4.1, 4.2, 4.3 and 4.4 about here]

The main variable of interest for non-employment and job mobility is the dissatisfaction with working hours, which we measure in absolute value in table 4.1. The only significant impact we find is that women who want to work (substantially) fewer hours are more likely to stop working. And despite the fact that in the raw data, see table 3, we found that women who want to work more hours are more likely to change job, we find no evidence for such an impact in our estimation results. An explanation for this result is that the women who want to work more hours are the women who are still moving up the job-ladder – so who are young and earn relatively low wages, see table 2 – and that job mobility is mainly driven by wage-considerations, and not by considerations on the working hours.

The central results of the empirical analysis are on the adjustments of working hours within and between jobs, see table 4.2. But before turning to this part of the analysis, we discuss the results on the *true* and *observed* desired hours. Age has a significant negative impact on the desired working hours, younger women want to work more hours (also here including higher-order terms on age make the impact of age insignificant). Some caution on the interpretation is required as age might be correlated with the individual error term, which means that a cohort-effect might still be present in the results. We find a clearly significant impact of being married and having a child younger than six years old. A remarkable result is that for married women the husband's characteristics do not matter. The hourly wage has a clear significantly positive impact: at the average desired hours of about 24 hours per week an increase of the hourly wage by 1% results in an increase in the desired hours by about 0.14%. The effect of the true desired hours hd_{it}^{*} on the observed desired hours hd_{it} is determined by the parameter λ, which is about 0.25 and which is highly significant. The effect of the actual working hours ha_{it} on the observed desired hours hd_{it} seems large. An explanation for this large impact is that besides an anchoring effect, actual working hours also partly represent individual preferences.

Off course we might have modelled this explicitly, but we would have needed additional exclusion restriction for the actual working hours.

We now turn to the purpose of the analysis: the measurement of the flexibility of working hours. The first two columns of table 4.2 shows that job-movers have a larger probability to experience a change in their working hours. We also see that having a job of 40 hours per week gives the lowest probability of changing working hours. And having a job of 38 or 39 hours per week, which is quite normal in the Netherlands due to working time reductions, also gives a relatively small probability of changing working hours. But the main result is that for stayers dissatisfaction with working hours, in absolute terms, has a significant positive impact on the probability to experience a change in the working hours. For the movers we find no evidence for such an impact. Next we discuss the results on the adjustments in working hours, see the third and fourth column of table 4.2. Women who work 13 to 27 hours per week, and who do experience a change in their working hours, increase their working hours by about 3 hours on average, irrespective of their preferences on working hours. Differences between movers and stayers in adjustments in working hours only come through by differences in their preferences, as the dummy for movers is insignificant. The adjustment rates, which are given by the ψ-parameters, are in line with what could be expected: stayers who want to work more have an adjustment rate of about 34%, while stayers who want to work less have an adjustment rate of about 21%. Adjustments rates are substantially larger for movers, about 72% and 64% for movers who want to work more and movers who want to work less, respectively. Note that these results are reasonably in line with Altonji and Paxson (1986, 1992), who find that working hours of married women are two to four times more variable across jobs than within jobs.

Tables 4.3 and 4.4 display the estimation results on the variances and correlations. The individual effects are not well identified, probably due to the small time dimension in our

data. And although the correlations also come through insignificant, the results on the hours adjustment (equation 3.2) are still interesting and not far from being significant. First of all, we find a positive correlation with job mobility, which hints at the presence of unobserved variables leading to both a high probability of changing job and increasing working hours. Second, we find a negative correlation with the *observed* desired hours. An interpretation is that a high number of *observed* desired hours, which cannot be explained by a high number of *true* desired hours, will lead to a downward adjustment of the working hours.

6. Conclusions

This study measures the flexibility of working hours within and between jobs by relating subjective information on individual preferences on working hours to non-employment, to job-mobility, and to adjustments in working hours. Based on a sample of employed women from the Dutch Socio-Economic Panel we find, first, that women who want to work fewer hours are more likely to stop working. Second, we find that job mobility is mainly driven by wage-considerations, and that considerations on working hours play a minor role. Third, women who stay in the same job (e.g. with the same employer) are less likely to experience a change in their working hours, although in the case that they want to work a substantially different number of hours, the probability of changing their working hours increases. Movers are simply more likely to experience a change in their working hours, irrespective of their preferences. Fourth, in the case that the working hours do change, stayers adjust their working hours in the preferred direction by about 34% for stayers who want to work more hours, and by about 21% for stayers who want to work fewer hours. For movers the adjustment-rates are substantially larger: about 72% for movers who want to work more hours, and about 64% for movers who want to work fewer hours.

Appendix 1. Identification and Estimation

A key issue of the empirical analysis is to identify the coefficients of the true desired hours equation, as well as the coefficients of the non-employment, job mobility, hours adjustment and measurement equations. This appendix discusses the assumptions needed to be able to identify and estimate the model. The first assumption we make:

(A.1) The vector of individual specific and remainder error terms $(\varepsilon_i^n, \varepsilon_{it}^n, \varepsilon_i^q, \varepsilon_{it}^q, \varepsilon_i^z, \varepsilon_{it}^z, \varepsilon_{it}^a, \varepsilon_i^d, \varepsilon_{it}^d, \xi_i, \xi_{it})$ *is i.i.d. multivariate normally distributed.*

This assumption means that we take a random effects approach, which implies that we assume that the individual effects are uncorrelated with the exogenous variables. Another approach would be to take a fixed effects approach, which is however beyond the scope of the paper as it is hard to apply, and as the time-dimension of the panel-data is small.

In latent variables models it is often necessary to restrict the variances of some of the error terms to identify the model. For instance, see the discussion in Börsch-Supan *et al.* (1999) for a similar model. For our model, substituting equation (5) in equations (1) to (4) makes clear that the error terms (ξ_i, ξ_{it}) mix up with the error terms of equation (1) to (4) in a rather complicated way. A first thing that becomes apparent is that co-variances between (ξ_i, ξ_{it}) and the other error terms are not identified. Therefore the following assumption is necessary:

(A.2) The error terms ξ_i *and* ξ_{it} *are uncorrelated with the other error terms.*

As we assume that there is no individual effect in the hours adjustment equation, we have nine observed variances (two from non-employment, two from job-mobility, two from changing working hours, one from hours adjustments, and two from observed desired hours) to identify the variances of the eleven error terms $(\varepsilon_i^n, \varepsilon_{it}^n, \varepsilon_i^q, \varepsilon_{it}^q, \varepsilon_i^z, \varepsilon_{it}^z, \varepsilon_{it}^a, \varepsilon_i^d, \varepsilon_{it}^d, \xi_i, \xi_{it})$. We decide to impose the restrictions in terms of $(\varepsilon_i^d, \varepsilon_{it}^d)$. Furthermore, as the events of non-employment, job-mobility and changing working hours are binary choice, also there restrictions are needed:

(A.3) $V(\xi_{it}) = V(\varepsilon_{it}^d)$, $V(\xi_i) = V(\varepsilon_i^d)$, $V(\varepsilon_{it}^n) = 1$, $V(\varepsilon_{it}^q) = 1$ *, and* $V(\varepsilon_{it}^z) = 1$.

Strictly speaking the model is identified on the basis of the normality assumption *(A.1)* and the restrictions on the variances *(A.2, A.3)*. But as identification on the basis of distributional assumptions only is quite weak, we additionally impose the following exclusion restrictions:

(A.4) There will be at least two exogenous variables specific to the equations on non-employment and job-mobility, and at least one to the latent variable equation.

We impose no separate exclusion restrictions for the equations on non-employment and job-mobility, as in our view the determinants for the two events are likely to be the same. This also occurs for the two equations on the adjustment of working hours, where equation (3.1) is introduced to pick up the dominant event of no change in working hours.

The model is estimated by the method of Simulated Maximum Likelihood, see for instance Gourieroux and Monfort (1993). For the empirical application we took 50 random draws per observation for the simulated error terms. As a full structural approach would be very burdensome, we assume that the remainder error terms of the non-employment equation (1) and the change in working hours equation (3.1) are independent of the rest of the model. We tried to establish a correlation structure between equations (1), (2) and (3.1) through the individual error terms, but these turned out to be insignificant. A detailed characterisation of the simulated likelihood is available upon request with the author.

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Table 1

Labour force participation, unemployment, and part-time employment (%)

	Men				Women			
labour force participation	NL	GER	UK	USA	NL	GER	UK	USA
1973	85.5	89.6	93.0	86.2	29.2	50.3	53.2	51.1
1983	77.3	82.6	87.5	84.6	40.3	52.5	57.2	61.8
1990	79.6	80.1	88.3	85.8	53.0	57.0	67.2	67.8
1994	79.8	80.1	85.2	84.3	57.4	61.1	67.1	69.4
1996	80.0	79.7	84.6	84.3	59.6	61.5	67.5	70.1
Part-time employment	NL	GER	UK	USA	NL	GER	UK	USA
1983	5.6	-.-	3.3	9.1	44.7	-.-	40.1	22.9
1990	13.3	1.8	5.3	8.3	50.8	29.6	39.5	20.0
1994	10.7	2.7	6.9	8.0	53.5	27.9	41.0	19.5
1996	10.8	3.3	5.2	7.7	55.2	29.8	38.9	19.1

Note: OECD Employment Outlook, various issues. Part-time employment refers to persons who usually work less than 30 hours per week.

Table 4.3

Estimation results for the variances

		Remainder error term		Individual error term	
Equation		variance	(s.e)	variance	(s.e.)
(1)	Non-employment	1.000	§(0.000)	0.000	$(0.000)
(2)	Job mobility	1.000	§(0.000)	0.000	$(0.000)
(3.1)	Change in hours	1.000	§(0.000)	0.000	$(0.000)
(3.2)	Hours adjustment	8.008	(0.276)	0.000	&(0.000)
(4)	Desired hours	4.943	(0.149)	0.153	(0.098)

Note: Variances marked with § are restricted to their parameter values for identification (which is, for instance, necessary for probit equations), variances market with $ are restricted to their parameter values because within the maximum likelihood procedure they converged to these values, and variances marked with & are restricted to these values for convenience.

Table 4.4

Estimation results for the correlation coefficients of the remainder error terms

		(2) Job mobility		(3.1) Change in hours		(3.2) Hours adjustment		(4) Desired hours	
Equation		corr.	(s.e)	corr.	(s.e.)	corr.	(s.e.)	corr.	(s.e.)
(1)	Non-employment	0.000	&(0.000)	0.000	&(0.000)	0.000	&(0.000)	0.000	&(0.000)
(2)	Job mobility			0.000	&(0.000)	0.091	(0.058)	-0.457	(1.185)
(3.1)	Change in hours	0.000	& (0.000)			0.000	&(0.000)	0.000	&(0.000)
(3.2)	Hours adjustment	0.091	(0.058)	0.000	&(0.000)			-0.068	(0.043)
(4)	Desired hours	-0.457	(1.185)	0.000	&(0.000)	-0.068	(0.043)		

Note: Correlations marked with & are restricted to these values for convenience, as a full structural approach would be very burdensome. We tried to establish a correlation structure between equations (1), (2) and (3.1) through the individual error terms, but these turned out to be insignificant as can be seen in table 4.3.

Table 2

Sample statistics

	Stayers		Movers		Non-employment	
Year 1987	1164 obs.		115 obs.		159 obs.	
Year 1988	1271 obs.		155 obs.		143 obs.	
	mean	(s.d.)	Mean	(s.d.)	mean	(s.d.)
Age	34.47	(10.47)	26.63	(7.85)	33.00	(11.30)
Married	0.72		0.52		0.73	
Dummy child<6 yrs.	0.13		0.11		0.22	
Number of children	0.70	(1.00)	0.51	(0.94)	0.75	(1.08)
Other income (DFL p. week)	31.25	(54.72)	27.97	(48.17)	36.20	(61.28)
Spouse (only if married=1)						
Age	38.43	(9.74)	32.97	(7.99)	37.34	(10.40)
Employed	0.92		0.95		0.89	
Working hours per week	38.58	(14.85)	38.11	(12.27)	37.60	(16.86)
Income (DFL per week)	547.92	(292.60)	528.29	(263.30)	503.23	(336.89)
Region						
North	0.09		0.08		0.12	
East	0.22		0.18		0.20	
South	0.25		0.23		0.27	
West	0.44		0.50		0.41	
Regional unemployment	11.89	(2.92)	11.57	(2.89)	12.05	(2.99)
Education						
None	0.16		0.19		0.21	
Lower vocational	0.29		0.25		0.34	
Medium vocational	0.39		0.40		0.33	
Higher vocational	0.14		0.15		0.11	
University	0.02		0.01		0.01	
Job characteristics						
Civil servant	0.16		0.10		0.07	
Flex. number of hours	0.16		0.17		0.26	
Unregular working time	0.22		0.21		0.20	
Gross hourly wage (DFL)	18.78	(14.94)	14.74	(10.43)	17.03	(12.77)
Working hours per week						
1 - 12 hours	0.19		0.26		0.33	
13 - 27 hours	0.30		0.17		0.29	
28 - 37 hours	0.18		0.16		0.17	
38 - 39 hours	0.12		0.13		0.06	
40 hours	0.16		0.24		0.11	
41 - 90 hours	0.05		0.04		0.04	

Note: the data for the years 1987 and 1988 are pooled, for all observations the individual is employed at time t. Stayers are women who stay with their employer from time t to time t+1, movers are women who change employer from time t to time t+1, and non-employment refers to women who stop working from time t to time t+1. Regional unemployment is measured in percentage at the county level.

Table 3

Satisfaction with working hours, mobility, and changes in working hours

	Total sample			
	$s_{it} = -1$	$s_{it} = 0$	$s_{it} = 1$	
Wants to work:	fewer hours	same hours	more hours	#obs.
Not employed at time t+1	10.4%	9.7%	12.0%	302
Employed at time t+1	89.6%	90.3%	88.1%	2705
	100.0%	100.0%	100.0%	
#observations	576	2163	267	3007

	Employed at t+1			
	$s_{it} = -1$	$s_{it} = 0$	$s_{it} = 1$	
Wants to work:	fewer hours	same hours	more hours	#obs.
Stayers (same employer at time t+1)	90.8%	90.7%	82.6%	2435
Movers (other employer at time t+1)	9.1%	9.3%	17.4%	270
	100.0%	100.0%	100.0%	
#observations	516	1954	194	2705

	Stayers			
	$s_{it} = -1$	$s_{it} = 0$	$s_{it} = 1$	
Wants to work:	fewer hours	same hours	more hours	#obs.
$ha_{it+1} - ha_{it} < 0$ (works fewer hours)	33.7%	21.0%	16.0%	561
$ha_{it+1} - ha_{it} = 0$ (works same hours)	47.1%	56.5%	39.2%	1300
$ha_{it+1} - ha_{it} > 0$ (works more hours)	19.2%	22.4%	44.8%	574
	100.0%	100.0%	100.0%	
#observations	469	1772	194	2435

	Movers			
	$s_{it} = -1$	$s_{it} = 0$	$s_{it} = 1$	
Wants to work:	fewer hours	same hours	more hours	#obs.
$ha_{it+1} - ha_{it} < 0$ (works fewer hours)	53.2%	24.7%	2.4%	71
$ha_{it+1} - ha_{it} = 0$ (works same hours)	27.7%	26.9%	7.3%	65
$ha_{it+1} - ha_{it} > 0$ (works more hours)	19.1%	48.4%	90.2%	134
	100.0%	100.0%	100.0%	
#observations	47	182	41	270

Note: the data for the years 1987 and 1988 are pooled, for all observations the individual is employed at time t. For the definition and measurement of the variable s_{it}, see section 2.

Table 4.1

Estimation results for non-employment and job mobility

	Non-employment (equation 1: probit)		Job mobility (equation 2: probit)	
	par.	(s.e.)	par.	(s.e.)
Constant	-1.473	**(0.450)	1.463	**(0.459)
Age	-0.012	*(0.007)	-0.037	**(0.010)
Region (reference is West)				
North	-0.391	(0.486)	-0.180	(0.527)
East	-0.154	(0.178)	-0.268	(0.188)
South	0.136	(0.174)	-0.317	(0.197)
Regional unemployment	-0.072	(0.138)	-0.120	(0.148)
Education (reference is None)				
Lower vocational	-0.001	(0.156)	-0.117	(0.181)
Medium vocational	-0.109	(0.157)	0.160	(0.174)
Higher vocational / University	-0.166	(0.204)	0.337	(0.218)
Job characteristics				
Civil servant	0.012	(0.019)	-0.161	(0.226)
Flex. number of hours	0.032	(0.144)	-0.162	(0.155)
Unregular working time	0.062	(0.136)	-0.212	(0.145)
Ln(gross hourly wage)	-0.084	(0.128)	-0.445	**(0.151)
Working hours (reference = 40)				
1 - 12 hours	0.878	**(0.348)	-0.132	(0.349)
13 - 27 hours	0.634	**(0.272)	-0.341	(0.253)
28 - 37 hours	0.399	*(0.209)	-0.226	(0.195)
38 - 39 hours	0.055	(0.233)	-0.041	(0.194)
41 - 90 hours	-0.212	(0.380)	-0.146	(0.355)
Structural parameters	β		δ	
$\lvert hd_{it}^{*}-ha_{it}\rvert$ (positive)	0.007	(0.012)	0.014	(0.014)
$\lvert hd_{it}^{*}-ha_{it}\rvert$ (negative)	0.031	**(0.013)	-0.008	(0.013)

Note: The first two columns concern a probit for becoming non-employed, while the last two columns concern a probit for job-mobility. Parameters marked with * and ** are significant at a 10 and 5 percent significance level, respectively. The variable age is only included linearly as the variable age squared turned out to be insignificant. Regional unemployment is measured in percentage at the county level. The structural parameters concern the impact of the absolute value of the difference between the true desired hours and the actual hours for women who want to work more hours ($hd_{it}^{*}-ha_{it}$ positive) and for women who want to work fewer hours ($hd_{it}^{*}-ha_{it}$ negative).

Table 4.2

Estimation results for hours adjustment and desired hours

	Change in working hours (eq. 3.1: probit)		Hours adjustment (eq. 3.2: linear model)		Desired hours (eq. 4,5: linear model)	
	par.	(s.e.)	Par.	(s.e.)	(par.)	(s.e.)
Constant	-0.627	**(0.143)	-1.196	(1.448)	37.125	**(3.949)
Mover	0.947	**(0.302)	-0.490	(4.487)		
Age					-0.479	**(0.091)
Married					-14.547	**(5.011)
Dummy child<6 yrs.					-6.386	**(1.937)
Number of children					-0.419	(0.825)
Other income (DFL per week)					0.013	(0.011)
Spouse (only if married=1)						
Age					-0.006	(0.013)
Employed					0.001	(0.003)
Working hours					-1.937	(4.042)
Income (DFL per week)					0.007	(0.008)
Job characteristics						
Ln(gross hourly wage)					3.418	**(1.322)
Working hours (reference = 40)						
1 - 12 hours	0.293	(0.205)	1.245	(2.015)		
13 - 27 hours	0.410	**(0.153)	3.404	**(1.548)		
28 - 37 hours	0.349	**(0.139)	2.350	*(1.355)		
38 - 39 hours	0.243	*(0.145)	2.533	*(1.414)		
41 - 90 hours	0.933	**(0.266)	1.605	(1.918)		
Structural parameters	φ		ψ		λ	
Lambda					0.254	**(0.015)
$\lvert hd_{it}^*-ha_{it}\rvert$ (stayers, positive)	0.022	**(0.011)				
$\lvert hd_{it}^*-ha_{it}\rvert$ (stayers, negative)	0.021	**(0.009)				
$\lvert hd_{it}^*-ha_{it}\rvert$ (movers, positive)	0.075	(0.043)				
$\lvert hd_{it}^*-ha_{it}\rvert$ (movers, negative)	-0.011	(0.025)				
$hd_{it}^*-ha_{it}$ (stayers, positive)			0.343	**(0.090)		
$hd_{it}^*-ha_{it}$ (stayers, negative)			0.206	**(0.083)		
$hd_{it}^*-ha_{it}$ (movers, positive)			0.720	**(0.112)		
$hd_{it}^*-ha_{it}$ (movers, negative)			0.642	**(0.187)		

Note: The first two columns concern a probit for the event of a change in the working hours, the second two columns concern a linear model for the change in the working bours, and the last two columns concern a linear model for the desired working hours. Parameters marked with * and ** are significant at a 10 and 5 percent significance level, respectively. The variable age is only included linearly as the variable age squared turned out to be insignificant. The structural parameters concern the impact of the absolute value of the difference between the true desired hours and the actual hours for women who want to work more hours ($hd_{it}^*-ha_{it}$ positive) and for women who want to work fewer hours ($hd_{it}^*-ha_{it}$ negative).