Hours Constraints Within and Between Jobs

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Abstract

In the empirical literature on labour supply, several models are developed to incorporate constraints on working hours. These models do not address the question to which extent working hours are constrained within and between jobs. In this paper I investigate the effect of individual changes in labour supply preferences on actual working hours. The availability of subjective information on the individual's preferred working hours gives direct measures on the degree of adjustment of working hours within and between jobs. I take the potential endogeneity of the observed changes in labour supply preferences into account by using instrumental variables techniques. Using the Dutch Socio Economic Panel, I find for women who work in two consecutive years that the degree of adjustment of working hours within jobs is significantly smaller than between jobs. I also find that job mobility does not lead to complete adjustment in working hours, as the realized adjustment is significantly less than 100 percent of the preferred adjustment.

Keywords: labour supply, hours constraints, job mobility, subjective data

JEL Classification: C20,J22,J60

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1. Introduction

A great deal of the literature on labour supply is based on the assumption that workers can freely and without cost choose their working hours, taking their wage as given. There are, however, strong theoretical arguments and empirical evidence that hours cannot be freely varied within jobs, and that workers are restricted in their choice. In a theoretical study, Deardorff and Stafford (1976) show that in the case of cooperating production factors, like capital and labour, differences in desired working hours of the factors lead to payment of premiums to both factors and lead to the establishment of a workday that departs from the standard labour supply model. Oswald and Walker (1993) formulate a labour contract model in which working hours and wages are determined as the result of an efficient bargain between unions and employers. Also in this model the working hours deviate from those in the standard labour supply model.

There are many empirical studies which confirm that workers are constrained in their labour supply. Oswald and Walker (1993) find on the basis of the UK Family Expenditure Survey differences in behaviour between unionized and non-unionized workers which are in line with their efficient bargaining model. Biddle (1988) and Ball (1990) use the U.S. Panel Study of Income Dynamics and conclude that restrictions on working hours are important, as their dynamic model for labour supply is rejected for the full sample of workers, but accepted for the sample of unrestricted workers only. They identify the unrestricted workers on the bases of subjective questions on whether individuals experience restrictions on their working hours. It is, however, unclear whether the individuals consider restrictions in their primary jobs only, or also consider job mobility and second jobs.

More evidence on restrictions on working hours can be found in the empirical literature on labour supply which tries to incorporate the restrictions explicitly. Early studies which incorporate restrictions on labour supply are the articles by Moffitt (1982) and Ham (1982). They both extend the traditional tobit type model for working hours by introducing censoring due to under- or overemployment. Moffitt (1982) identifies the probability of being overemployed by using exclusion restrictions. Using regional demand data for this purpose, Arrelano and Meghir (1990) test and accept this model in favour of the traditional tobit type model on the basis of the UK Family Expenditure Survey. Another strategy is followed by Ham (1982) and O'Leary (1991), who identify over- and underemployment on the bases of the subjective information in the U.S. Panel Study of Income Dynamics, see the previous paragraph. Ham (1982) concludes that incorporation of underemployment is a significant improvement of the standard tobit type model.

The next generation of models which incorporate restrictions on working hours is introduced by Tummers and Woittiez (1991) and Dickens and Lundberg (1993). They extend the structural labour supply model with job offers concerning hours of work. In these models hours restrictions are characterized by the probability of a job offer with certain working hours. The model is identified on the basis of the actual working hours only. The former authors find on the basis of the Dutch Labour Mobility Survey a lack of part-time jobs for women, while the latter authors find on the basis of the Denver Income Maintenance Experiment lack of overtime jobs for men. As the extended tobit type models, these models do not explicitly consider different jobs: restrictions are linked to individuals, not to jobs.

Both of the above described types of models formulate the constraints on working hours in a general way. Neither of them is able to distinguish between the different ingredients needed for the existence of hours constraints in the labour market. First, there has to be lack of possibilities to adjust working hours within a job. But this does not necessarily imply that the individuals are not on their labour supply curve, as they might change to another job with working hours equal to their preferred working hours. So the second ingredient for the existence of hours restrictions are mobility costs. This might particularly be the case when the preferred working week of the individuals deviates from the standard full-time job, as their might be a lack of part-time and overtime jobs.

These two ingredients for the existence of hours constraints in the labour market are studied by Altonji and Paxson (1986, 1992). They look at the adjustment of working hours over time, and distinguish between individuals who stay in their job, and who change job. Based on the U.S. 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. In their second article they take the possible endogeneity of job mobility into account, but this does not change their main finding: hours vary significantly more in the case of job mobility.

In this paper, I will analyze constraints on working hours within and between jobs on the basis of the Dutch Socio Economic Panel. An advantage of this panel is that it contains information on both actual and desired working hours for the same individuals in three consecutive years. With the desired hours I mean the answer to a subjective question on how many hours an individual wants to work. I will combine the dynamic analysis of Altonji and Paxson (1986, 1992) with the use of this subjective information. I model the changes in working hours over time, and relate them to changes in the desired working hours. The desired hours give me the opportunity to analyze the effect of preferences directly. I allow for the fact that the desired hours may not only reflect preferences, but that they also may be affected by the size of the current job. The questions I want to answer are: How flexible are working hours within a job? And to what extent is job mobility a way to adjust working hours?

I restrict the analysis to women. I have two arguments for this. First, there is more cross-section variation in working hours for women than for men. Euwals et al. (1997) show that for the years 1987 and 1988 on average employed men work 41 hours per week with a standard deviation of 10, while employed women work on average 27 hours per week with a standard deviation of 13. An explanation is that relatively many women work part-time in the Netherlands. The second reason for restricting the analysis to women is that I will use labour supply variables, such as the number of children, as instruments for the desired working hours. Several studies show that the labour supply behaviour of women is more sensitive to this kind of variables than the labour supply behaviour of men. Following Altonji and Paxson (1992), I restrict the analysis to employed women. Thus the analysis will be conditional on the fact that the woman does not stop working.

The remainder of the paper is organized as follows. Section 2 presents the subjective questions on the desired working hours and describes the data. As there are different ways to incorporate the subjective data, Section 3 presents various econometric models. Section 4 presents the results, and Section 5 concludes.

2. Data

The data are drawn from the October waves of the years 1987, 1988 and 1989 of the Dutch Socio-Economic Panel (SEP), collected by Statistics Netherlands. As I will look at changes over time, I merge the years 1987 and 1988 to one sample, and I merge the years 1988 and 1989 to one sample.

The questions on actual and desired hours of work which the individuals answer in the October waves of 1987, 1988 and 1989, are as follows:

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.
2) I prefer to work more.
3) I prefer to work less.

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

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. I define satisfaction s_{it} as follows: $s_{it}\equiv 0$ 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 less (answer 3) and $s_{it}\equiv +1$ if the individual wants to work more (answer 2). Respondents only answer question Ic if they are not satisfied with the actual number of working hours reported under Ia. I assume that, for respondents who report to be satisfied with their number of working hours ($s_{it}=0$), desired hours equal actual hours, i.e., $hd^*_{it}=ha_{it}$. Thus the 'observed' desired hours hd_{it} are given by:

$$hd_{it} = I[s_{it}=0]ha_{it} + I[s_{it}\neq 0]hd^*_{it} \tag{1}$$

Here I[A] is the indicator function, with value 1 if A is true and 0 if it is false. Euwals et al. (1997) use the same dataset and show that the 'observed' desired hours of women have a predictive value for the actual working hours of the next year.

Like Altonji and Paxson (1992), the analysis will be conditional on the fact the woman does not stop working. For the year 1987 about 11 percent of the working women does not work the next year, while for the year 1988 this is about 9 percent. Table 1 shows the sample statistics for the women who work both years. As I will study the differences in adjustment of working hours for individuals who stay in their job (stayers) and individuals who change job (movers), I give the sample statistics by job mobility. The movers turn out to be younger on average. This relates to their lower probability of being married and their, on average, lower number of children. Other income mainly exists of child allowances. Of the married women, we observe the spouse's employment status, actual working hours and (total) income.

The timing will be as follows: time t-1 refers to the first year of two consecutive years, which are merged on an individual level. So time t-1 can be either 1987 or 1988. Time t refers to the second year, and can be either 1988 or 1989. At time t-1 the average actual hours are larger than the average desired hours, except for the movers. For the stayers the differences between the average actual and desired hours are significant, whereas for the movers they are not.[2] Thus, on average the stayers want to work significantly fewer hours at both time t-1 and t. This is confirmed by the fact that at time t-1 about 20 percent of the stayers wants to work fewer hours, while about 8 percent wants to work more. For the movers, these two groups are more similar in size. The fact that about 30 percent is not satisfied with their working hours suggests that constraints on working hours exist.

At time t-1 the desired working hours are significantly larger for the movers than for the stayers, while in the actual hours there is no significant difference.[3] But at time t both the actual and desired hours are significantly larger for the movers. Comparing the averages over time shows that for the stayers there is no significant change in the actual and desired hours. For the movers there is a significant increase in both. A similar result is found if the changes in actual working hours, $\Delta ha_{it}=ha_{it}-ha_{it-1}$, are considered. For the stayers the majority is equal to zero, while for the movers relatively more changes occur. The average of the changes in working hours shows that the working hours are stable over time for the stayers, but for the movers there is a substantial increase. This indicates that at time t-1 the movers want to work more, and that they indeed increase their working hours. But it appears that at time t they work more than they wanted at time t-1.

[2] Note that for the actual and desired hours the differences in the means and the standard deviations are of the same size (in absolute terms). The main difference is in the number of observations, leading to different conclusions for stayers and movers.

[3] For this I assume that the variances of the working hours are equal for stayers and movers.

Table 1: sample statistics (women employed at time t-1 and t)

	t=1988				t=1989			
	Stayers (1157 obs.)		Movers (115 obs.)		Stayers (1264 obs.)		Movers (155 obs.)	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
<u>individ. (t-1)</u>								
age	34.38	10.33	25.89	7.85	34.65	10.65	27.18	8.52
married	0.72	-.-	0.48	-.-	0.72	-.-	0.55	-.-
child<6	0.13	-.-	0.13	-.-	0.13	-.-	0.10	-.-
#children	0.70	1.00	0.47	0.91	0.70	0.99	0.54	0.96
oth.inc.	30.56	53.68	29.90	48.03	31.59	55.22	26.53	48.38
<u>spouse (t-1)</u>								
employed	0.92	-.-	0.96	-.-	0.92	-.-	0.94	-.-
work hours	38.51	14.70	37.45	12.71	38.48	14.89	38.53	12.02
income	543.79	279.22	509.20	223.27	552.72	304.11	540.65	286.85
<u>hours (t-1)</u>								
desired hd_{it-1}	25.71	11.98	28.29	12.02	25.81	11.90	27.93	12.49
actual ha_{it-1}	26.63	13.27	27.26	13.29	26.95	13.30	27.10	13.75
$hd_{it-1}<ha_{it-1}$	0.19	-.-	0.17	-.-	0.20	-.-	0.18	-.-
$hd_{it-1}=ha_{it-1}$	0.72	-.-	0.66	-.-	0.73	-.-	0.68	-.-
$hd_{it-1}>ha_{it-1}$	0.09	-.-	0.17	-.-	0.07	-.-	0.14	-.-
<u>hours (t)</u>								
desired hd_{it}	25.50	11.69	31.37	10.89	25.82	11.84	29.57	11.20
actual ha_{it}	26.73	13.25	31.50	12.88	26.94	13.14	30.45	12.10
$hd_{it}<ha_{it}$	0.20	-.-	0.17	-.-	0.20	-.-	0.19	-.-
$hd_{it}=ha_{it}$	0.73	-.-	0.72	-.-	0.73	-.-	0.74	-.-
$hd_{it}>ha_{it}$	0.07	-.-	0.10	-.-	0.07	-.-	0.07	-.-
<u>changes</u>								
$\Delta ha_{it}<0$	0.23	-.-	0.29	-.-	0.23	-.-	0.25	-.-
$\Delta ha_{it}=0$	0.54	-.-	0.21	-.-	0.54	-.-	0.26	-.-
$\Delta ha_{it}>0$	0.22	-.-	0.50	-.-	0.23	-.-	0.49	-.-

Note: the stayers are the women who stay in the same job, while the movers are the women who change job. The variable married is a dummy for being married (or cohabiting), child<6 is a dummy for having a child younger than 6 years, #children gives the number of children and oth.inc. gives net other income in Dfl. per week. The variables under the heading spouse are only defined for married women. They give the characteristics of the spouse, like a dummy for being employed and the working hours per week. The variable $\Delta ha_{it}=ha_{it}-ha_{it-1}$ gives the change in the working hours over time.

3. Econometric models

The goal is to get measures for the degree of adjustment in working hours within and between jobs. I will do this by relating changes in working hours to preferred changes and job mobility. In this section I will formulate a unifying model of labour supply and job mobility. As I will use different proxies for the preferred changes, I will have different econometric models.

Define Q_{it} as job mobility, which equals 1 if individual i changes job from time t-1 to t, and 0 otherwise. Define L_{it} as the 'true' desired hours of individual i at time t. This will not necessarily be equal to the 'observed' desired hours hd_{it}, as will be discussed below. Define $\Delta L_{it}=L_{it}-L_{it-1}$ as the first difference in the preferred change in the working hours. The unifying model I consider, is given by:

$$\Delta ha_{it} \quad = \beta_{it}\Delta L_{it} + \varepsilon_{it}^{a} \tag{2}$$

$$\beta_{it} \quad = \beta_0(1-Q_{it}) + \beta_1 Q_{it} \tag{3}$$

The parameters (β_0,β_1) represent the degree of adjustment in the working hours in case of staying in the same job ($\beta_{it}=\beta_0$) and in case of changing job ($\beta_{it}=\beta_1$). If restrictions on working hours within jobs exist, β_0 should be small. The error term ε_{it}^{a} gives the unexplained part of the change in the working hours.

The unifying model given by equations (2) and (3) is not yet an empirical model, as the preferred change ΔL_{it} is not observed. In the subsections I work out the model for different choices to approximate the preferred change. The first proxy I consider, will be based on changes in labour supply variables, like the number of children. A disadvantage of this choice is that I will not get a direct single measure for the degree of adjustment in the working hours, as the different labour supply variables might affect the 'true' desired hours L_{it} differently. As I observe the desired hours hd_{it}, I am also able to construct direct proxies for the preferred change in the working hours. The second proxy I consider, will be the change in the 'observed' desired hours $hd_{it}-hd_{it-1}$, and the third proxy will the 'true' preferred change $hd_{it}-ha_{it-1}$.

3.1 Using the change in the labour supply variables

The idea to approximate the preferred change in the working hours by the change in the labour supply variables, originates from Altonji and Paxson (1992). They incorporate this in the model by the formulation of a reduced form labour supply model. Define X_{it} as a vector of labour supply variables related to individual i at time t. Then the reduced form labour supply model is given by:

$$L_{it} = X_{it}\delta_i + \varepsilon_{it}^L \tag{4}$$

$$\delta_i = \delta + \varepsilon_i^\delta \tag{5}$$

The components of the parameter vector δ_i give the individual sensitivity of the 'true' desired hours L_{it} to the labour supply variables X_{it}. By equation (5) I allow for random preferences. Combining equations (2), (3), (4) and (5) gives:

$$\begin{aligned} \Delta ha_{it} &= \beta_{it}\Delta X_{it}\delta + \varepsilon_{it}^a + \beta\Delta\varepsilon_{it}^L + \beta\Delta X_{it}\varepsilon_i^\delta \\ &= \alpha_{it}\Delta X_{it} + \varepsilon_{it} \end{aligned} \tag{6}$$

with $\alpha_{it}=\alpha_0(1-Q_{it})+\alpha_1Q_{it}$, $\alpha_{it}=\beta_{it}\delta$ and $\varepsilon_{it}=\varepsilon_{it}^a+\beta_{it}\Delta\varepsilon_{it}^L+\beta_{it}\Delta X_{it}\varepsilon_i^\delta$

From the parameters (α_0,α_1), the parameters (β_0,β_1) are not identified. Equation (6) is the empirical model Altonji and Paxson (1992) consider. As their goal is to test whether the degree of adjustment is the same for stayers and movers, they assume $\alpha_1=\phi\alpha_0$ and test for H_0: $\phi=1$ versus H_1: $\phi>1$.[4] They first assume that the error terms ε_{it}^a, $\Delta\varepsilon_{it}^L$ and ε_i^δ have mean zero and are independent of $(\Delta X_{it},Q_{it})$. They estimate equation (6) by a nonlinear estimation procedure. They do this on the basis of the U.S. Panel Study of Income Dynamics. Their vector of labour supply variables includes information on the number and age of the children, other income and the spouse's disability and unemployment. For married women they find a parameter estimate for ϕ of about 3, which is significantly

[4] Altonji and Paxson actually define $\alpha=\alpha_0+\alpha_1\psi Q_{it}$ and test H_0: $\psi=0$ versus H_1: $\psi>0$.

different from 1 at a five percent significance level. An interpretation is that there exist hours constraints within jobs. They state, however, that there is an alternative explanation: δ_i, the individual sensitivity to the labour supply variables X_{it}, might be correlated with the probability to change job. This induces correlation between job mobility Q_{it} and the error term ε_i^{δ}. Altonji and Paxson (1992) also formulate a model which takes this endogeneity into account. They do this by modelling the probability of changing job, using employer tenure and the change of state of residence as instruments. However, the correction for the endogeneity hardly affects the estimate and significance level of the parameter ϕ.

3.2 Using the change in the 'observed' desired hours

For the second choice to approximate the preferred change in the working hours, I use the 'observed' desired hours in a compatible way to the previous model. Thus, I now use the change in the 'observed' desired hours, instead of the change in the labour supply variables. To relate the 'observed' desired hours hd_{it} to the 'true' desired hours L_{it}, I make the following assumption:

$$hd_{it} = \lambda L_{it} + (1-\lambda)ha_{it} + \varepsilon_{it}^{d} \tag{7}$$

The idea is that the response of an individual to the subjective question on her optimal number of working hours could be affected by her current number of working hours. If $\lambda=1$, then the 'observed' desired hours are completely determined by the 'true' desired hours. But if $0\leq\lambda<1$, then the 'observed' desired hours are affected by the current number of working hours. The way of constructing the 'observed' desired working hours can cause such a dependence, as for individuals who are satisfied with their working hours, the 'observed' desired hours are by definition equal to the actual hours, see section 2. Combining equations (2), (3) and (7) gives:

$$\Delta ha_{it} = \beta_{it}/\theta_{it}\Delta hd_{it} + \lambda/\theta_{it}\varepsilon_{it}^{a} - \beta_{it}/\theta_{it}\Delta\varepsilon_{it}^{d} \tag{8}$$

$$= \alpha_{it}\Delta hd_{it} + \varepsilon_{it}$$

with $\alpha_{it}=\alpha_0(1-Q_{it})+\alpha_1 Q_{it}$, $\alpha_{it}=\beta_{it}/\theta_{it}$, $\theta_{it}=1-(1-\lambda)(1-\beta_{it})$ and $\varepsilon_{it}=\lambda/\theta_{it}\varepsilon_{it}^{a}-\beta_{it}/\theta_{it}\Delta\varepsilon_{it}^{d}$

Again the parameters (β_0,β_1) are not identified. Since I assume that the parameter λ does not vary with job mobility, I can test whether the degree of adjustment is the same for stayers and movers by testing H_0: $\alpha_0=\alpha_1$. The parameter $\alpha_{it}=\beta_{it}/\theta_{it}$ contains the variable Q_{it} in the denominator. As conditioning on job mobility Q_{it} gives that the parameter $\alpha_0=\beta_0/\theta_0$ only occurs in the estimation problem for the stayers, and the parameter $\alpha_1=\beta_1/\theta_1$ in the estimation problem for the movers, the reduced form model can be estimated separately for the stayers and movers by a linear estimation method.

In the model of the previous subsection, the possible endogeneity of job mobility Q_{it} had to be taken into account, as it could be correlated with the error term ε_i^δ. For the present model, this problem does not arise, as the error term ε_i^δ does not appear in the model. Still, job mobility Q_{it} is a choice variable for the individual. Typically, one would expect job mobility Q_{it} to depend on the change in the desired hours Δhd_{it}, as an individual who has a large change in the preferred hours could be more likely to change job.[5] This induces correlation between the right hand side variables Δhd_{it} and Q_{it}, present in θ_{it}, of equation (8). But this is generally no problem for estimation. So there is no compelling reason why Q_{it} would be correlated with the error term.

For the current model, the endogeneity caused by the correlation between the change in the 'observed' desired hours Δhd_{it} and the error terms ε_{it}^a and $\Delta\varepsilon_{it}^d$ seems more important. Notice that under the assumption $\lambda\neq1$, equations (2) and (7) are a simultaneous equations system possibly causing correlation between Δhd_{it} and ε_{it}^a. Under the assumption that the error terms ε_{it}^a and $\Delta\varepsilon_{it}^d$ are independent of $(\Delta X_{it},Q_{it})$, I can estimate equation (8) separately for stayers and movers by the method of Instrumental Variables, using the changes in the labour supply variables as instruments. The parameter λ is not identified, but still I can test whether $\lambda=1$. The 'observed' desired hours are exogenous if and only if $\lambda=1$ and $V(\Delta\varepsilon_{it}^d)=0$. I test for the exogeneity of the 'observed' desired hours by comparing the IV an OLS estimates, as suggested by, for instance, Godfrey (1988). Under the assumption $\lambda=1$, the parameters (β_0,β_1) are identified. Only in that case I get a direct single measure on the degree of adjustment. Under the assumption $0\leq\lambda<1$, the parameters α_0 and α_1 are strictly larger than the parameters β_0 and β_1, respectively. So in that case the estimates for α_0 and α_1 will be overestimates for the degree of adjustment.

[5] Euwals et al. (1997) show that the 'observed' desired hours have a predictive value for changing job.

3.3 Using the 'true' preferred change

A problem of the two previous models is that a change in the actual working hours is directly related to a change in the preferred working hours. But, if an individual is not on the labour supply curve at time t-1, a change in the preferred working hours can make an individual better of at time t in the current job with unchanged working hours. Thus, instead of looking at the change in 'observed' desired hours, it seems better to look at the adjustment an individual really wants to make. Therefore I replace equation (2) by:

$$\Delta ha_{it} = \beta_{it}(L_{it}-ha_{it-1}) + \varepsilon_{it}^{a} \tag{2'}$$

I refer to this model as the 'true' preferred change. The parameter β_{it} is defined the same way as in equation (3). To eliminate the 'true' desired hours L_{it}, I use equation (7). This gives the following model:

$$\begin{aligned} \Delta ha_{it} &= \beta_{it}/\theta_{it}(hd_{it}-ha_{it-1}) + \lambda/\theta_{it}\varepsilon_{it}^{a} - \beta_{it}/\theta_{it}\Delta\varepsilon_{it}^{d} \\ &= \alpha_{it}(hd_{it}-ha_{it-1}) + \varepsilon_{it} \end{aligned} \tag{9}$$

with $\alpha_{it}=\alpha_0(1-Q_{it})+\alpha_1 Q_{it}$, $\alpha_{it}=\beta_{it}/\theta_{it}$, $\theta_{it}=1-(1-\lambda)(1-\beta_{it})$ and $\varepsilon_{it}=\lambda/\theta_{it}\varepsilon_{it}^{a}-\beta_{it}/\theta_{it}\Delta\varepsilon_{it}^{d}$

The identification problem and estimation procedure remain the same as for the model of the previous subsection. In the model of this subsection the 'observed' desired hours hd_{it} are endogenous. Natural instruments are the labour supply variables X_{it} and X_{it-1}. Under the assumption that the error terms ε_{it}^{a} and $\Delta\varepsilon_{it}^{d}$ are independent of the past, I can use the lagged actual hours ha_{it-1} and the lagged 'observed' desired hours hd_{it-1} as instruments. I will use the overidentifying restrictions test to check whether these instruments are valid.

4. Results

In this section I present the results for the three different specifications of the unifying model, given by equations (2) and (3). The first specification uses the change in the labour supply variables ΔX_{it}, see equation (6). The second specification is based on the change in the ‘observed’ desired hours Δhd_{it}, see equation (8). This model is in some way similar to the first specification, as both are based on the change in the preferred working hours. The final specification is based on the ‘true’ preferred change hd_{it}-ha_{it-1}, see equation (9).

4.1 Using the change in the labour supply variables

As for the first model the structural parameters are not identified, the idea is to test whether the degree of adjustment of working hours within and between jobs is equal. I assume that the error terms are independent of the change in the labour supply variables ΔX_{it} and job mobility Q_{it}. Altonji and Paxson (1992) argue that job mobility Q_{it} might be endogenous, and take this into account in their empirical analysis. As instruments they use employer tenure and the change of state of residence. As I do not observe this kind of instruments, I will not take the endogeneity of job mobility Q_{it} into account. Notice that Altonji and Paxson hardly find any difference by taking the endogeneity into account.

Table 2: changes in the labour supply variables

Mean (Standard Deviation)	t=1988		t=1989	
	Stayers	Movers	Stayers	Movers
individual				
single_married	0.025	0.026	0.021	0.058
married_single	0.009	0.017	0.007	0.013
child0_child6	0.020	0.026	0.021	0.013
child6_child0	0.020	0.052	0.021	0.006
child_plus	0.045	0.035	0.036	0.026
child_minus	0.048	0.043	0.068	0.039
dif_other_inc	-0.342	-8.048	-1.979	-0.840
	(48.459)	(35.602)	(49.533)	(58.600)
spouse				
dif_work_hours	-0.128	1.235	-0.249	0.342
	(5.273)	(6.632)	(5.135)	(3.899)
dif_income	18.491	31.953	20.162	14.359
	(202.694)	(135.870)	(177.976)	(104.086)

Note: the variables refer to changes over time, for instance married_single is a dummy for being married at year t-1 and being single at year t. Child0_child6 is a dummy for having no child younger than six years at year t-1 and having a child younger than six years at year t. Child_plus is a dummy for an increase of the number of children. Dif_other_income gives the first difference over time of other income. The variables under the heading spouse are only defined for women who are married in both years, and give the difference in the working hours and income of the spouse.

For the change in the labour supply variables, I use individual characteristics like marital status, number of children and other (non-labour) income. For married women I also use characteristics of the spouse, like working hours and income. Table 2 shows the changes of these variables over time. For the individual characteristics, like marital status and number of children, there are only a few changes in the sample within a year. But as I have many of these variables, they still might explain a reasonable part of the changes in working hours. Only the change in other income and the characteristics of the spouse are continuous variables. The characteristics of the spouse are only nonzero for women who are married in both years. So, for instance, in the case of marriage the effect of a change in income will be absorbed by the dummies on changes in marital status.

Compared to Altonji and Paxson (1992), my sample also includes unmarried women. Furthermore, I have less detailed information on the children, and different information on the spouse. Altonji and Paxson additionally correct for age, education and race. In Dutch labour market studies correction for race is not very common. In the analysis I also tried higher order terms for age and dummies for education, but they were insignificant. Altonji and Paxson do not correct for the lagged actual working hours, because they might be endogenous. But on the other side, jobs with many working hours might have a large probability to have a decrease in working hours, and vice versa for jobs with few working hours. So correction for the lagged actual working hours might make a difference. Euwals et al. (1997) show that the actual working hours have a significantly negative impact on the change in the working hours. In this paper I will carry out the analysis both excluding and including the lagged actual working hours.

As I impose the restriction $\alpha_1=\phi\alpha_0$, the model is nonlinear in the parameters. I estimate equation (6) by a two stage method. The first stage is Ordinary Least Squares applied to the model without imposing $\alpha_1=\phi\alpha_0$, and the second stage is Asymptotic Least-Squares imposing the restriction with the optimal weighting matrix, see, for instance, Kodde et al. (1990). Table 3 shows the results for the model including the actual working hours. For both years homoskedasticity is strongly rejected in the first stage by White's test on homoskedasticity (White, 1980). Therefore, I use the Eicker-White covariance matrix for the second stage.

Of the conditioning variables, only the dummy for changing job Q_{it} is significant. Changing job gives an increase of the working hours of about 4 hours per week. Of the changes in the labour supply variables, only the dummies for children are significant for both years. The effect of children looks different for the two years, but one has to take into account that the dummy for the change from not having a child younger than six years to having such a child is strongly correlated with the dummy for an extra child in the family. Adding these two effects gives a similar result for the two samples. For t=1989 other income is also significant. The parameter of interest is ϕ, and for both samples it turns out to be insignificantly different from 1. Unfortunately, the test on overidentifying restrictions rejects for t=1989. A comparison to Altonji and Paxson (1992) is not possible, as they do not report tests on overidentifying restrictions.

Table 3: estimation results for choice of changes in labour supply variables

Parameter estimates (standard errors) Test statistics (degrees of freedom)	**t=1988**		**t=1989**	
constant	0.183	(0.629)	-0.877	(0.646)
job mobility Q_{it}	4.341*	(1.181)	3.556*	(0.592)
age	0.002	(0.017)	0.028	(0.018)
<u>individual</u>				
single_married	0.287	(0.880)	0.495	(1.059)
married_single	0.643	(1.428)	0.054	(1.886)
child0_child6	-4.051*	(1.928)	-8.758*	(1.815)
child6_child0	-0.220	(0.902)	1.409	(1.287)
child_plus	-3.091*	(1.025)	-0.653	(1.363)
child_minus	0.990	(0.665)	0.831	(0.730)
dif_other_inc	-0.0049	(0.0034)	-0.0114*	(0.0035)
<u>spouse</u>				
dif_work_hours	0.0350	(0.0426)	-0.0122	(0.0348)
dif_income	-0.0001	(0.0009)	-0.0012	(0.0010)
ϕ	2.520*	(1.188)	1.395*	(0.437)
<u>tests</u>				
HOMT	162.53*	(78)	83.93	(73)
$PE_{st}=PE_{mv}$	1.64	(1)	0.82	(1)
$PE_{88}=PE_{89}$	10.49	(13)	10.49	(13)
$ORT(\alpha_1=\phi\alpha_0)$	8.36	(8)	16.96*	(8)

Note: the first variables are conditioning variables. The tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection, the second stage uses the Eicker-White covariance matrix. $PE_{st}=PE_{mv}$ tests for H_0: $\phi=1$. $PE_{88}=PE_{89}$ tests for the equality of the parameters for the two years. $ORT(\alpha_1=\phi\alpha_0)$ tests for Overidentifying Restrictions. Parameters and test statistics marked with * are significant at a five percent level.

Until now I considered the two samples separately. In order to investigate the effect of combining the two samples, I pool them under the assumptions that the two sample are independent and that the parameters for the two years are equal to each other. This procedure yields about the same results as those reported in Table 3. The same variables are significant, and the estimation result for ϕ becomes 1.716 with a standard error of 0.735. So also pooling gives a result for ϕ which is not significantly different from 1. The second stage uses the Eicker-White covariance matrix as homoskedasticity is rejected, and the overidentifying restrictions test does not reject.

Results with additional correction for the lagged actual working hours are presented in Table A.1 of appendix A. The lagged actual working hours are strongly significant, and confirm the idea that jobs with many working hours have a larger expected decrease in the working hours. The results on the labour supply variables stay about the same. An important difference shows up in the result for the parameter ϕ: for t=1988 it turns out to be significantly different from 1. For t=1989 the overidentifying restrictions test rejects. Under the same assumptions as above, pooling gives a parameter estimate for ϕ of 2.556 with a standard error of 0.710. The second stage uses the Eicker-White covariance matrix as homoskedasticity is rejected. The overidentifying restrictions test does not reject. Thus additional correction for the lagged working hours gives a result which is similar to the result of Altonji and Paxson.

The conclusion is that using a similar model to Altonji and Paxson (1992) gives an insignificant result for ϕ, while they have a significant result of about 3. Remarkable is that additional correction for the actual working hours does give a significant result for ϕ of about 2.5.

4.2 Using the change in the 'observed' desired hours

In some sense the model yielding equation (8) is similar to the model yielding equation (6), as the change in the actual hours is modelled as a function of the change in preferred working hours. For the model of this subsection, the 'observed' desired hours may be endogenous. Therefore for estimation I use the method of Instrumental Variables. Natural instruments are the changes in the labour supply variables ΔX_{it}, which are already presented in Table 2.

Table 4: cross tabulation for the change in the 'observed' desired hours

STAYERS	t=1988			t=1989		
	$\Delta hd_{it}<0$	$\Delta hd_{it}=0$	$\Delta hd_{it}>0$	$\Delta hd_{it}<0$	$\Delta hd_{it}=0$	$\Delta hd_{it}>0$
$\Delta ha_{it}<0$	60.0%	5.8%	12.8%	63.0%	7.7%	11.6%
$\Delta ha_{it}=0$	28.1%	88.0%	23.3%	26.4%	86.5%	18.4%
$\Delta ha_{it}>0$	11.9%	6.2%	64.1%	10.6%	5.9%	70.0%
# observations	320	517	320	330	614	320
LR test	724.5* (4)			859.6* (4)		

MOVERS	t=1988			t=1989		
	$\Delta hd_{it}<0$	$\Delta hd_{it}=0$	$\Delta hd_{it}>0$	$\Delta hd_{it}<0$	$\Delta hd_{it}=0$	$\Delta hd_{it}>0$
$\Delta ha_{it}<0$	80.7%	11.1%	8.3%	62.2%	15.2%	4.7%
$\Delta ha_{it}=0$	3.2%	55.6%	6.3%	13.3%	63.0%	9.4%
$\Delta ha_{it}>0$	16.1%	33.3%	85.4%	24.4%	21.8%	83.9%
# observations	31	36	48	45	46	64
LR test	84.2* (4)			95.4* (4)		

Note: the LR test is a Likelihood Ratio test on independence of row and column events. Under the null hypothesis of independence they follow a χ^2 distribution. Outcomes marked with * are significant at a five percent significance level.

Before turning to the analysis, Table 4 shows the cross tabulation between the changes in the 'observed' desired and actual working hours. It reveals a strong dependence between the two, for both stayers and movers. For instance, the cell with unchanged actual and desired hours contains many observations. This can be a consequence of the fact that for individuals who answer to be satisfied with their working hours, the actual and desired hours are equal by definition. But it is remarkable that of the individuals whose 'observed' desired hours decrease (increase), a huge percentage indeed experiences a decrease (increase) in their actual working hours. This effect seems strong, and I consider two possible explanations. First, there might be a high degree of freedom to choose working hours within a job. But second, it might also be caused by the fact that the 'observed' desired hours are affected by the actual hours, leading to endogeneity of the 'observed' desired hours. Or, in terms of equation (7), the parameter λ might be small. In that case taking the endogeneity of the 'observed' desired hours into account will be important. By comparing the results for Ordinary Least Squares (OLS) and Instrumental Variables (IV), I will test for the exogeneity of the desired hours.

Table 5: estimation results for choice of changes in 'observed' desired hours

Parameter estimates (standard errors)
Test statistics (degrees of freedom)

	t=1988				t=1989			
	STAYERS		MOVERS		STAYERS		MOVERS	
OLS								
const.	0.20	(0.15)	1.39	(0.88)	-0.02	(0.14)	1.99^*	(0.67)
Δhd_{it}	0.51^*	(0.05)	0.93^*	(0.08)	0.58^*	(0.05)	0.83^*	(0.07)
HOMT	16.28^*	(2)	2.24	(2)	16.68^*	(2)	1.69	(2)
$PE_{st}=PE_{mv}$	19.82^*	(2)	19.82^*	(2)	8.45^*	(2)	8.45^*	(2)
$PE_{88}=PE_{89}$	2.41	(2)	1.04	(2)	2.41	(2)	1.04	(2)
IV								
const.	0.25	(0.16)	1.43	(1.13)	-0.03	(0.23)	2.34^*	(0.76)
Δhd_{it}	0.73^*	(0.11)	0.91^*	(0.24)	1.54^*	(0.22)	0.61^*	(0.22)
HOMT	45.04	(33)	25.49^*	(27)	39.57	(33)	21.77^*	(22)
$PE_{st}=PE_{mv}$	0.46	(1)	0.46	(1)	8.93^*	(1)	8.93	(1)
$PE_{88}=PE_{89}$	11.42^*	(2)	0.49	(2)	11.42^*	(2)	0.49	(2)
$PE_{iv}=PE_{ols}$	2.47	(2)	0.04	(2)	9.96^*	(2)	8.51^*	(2)
HORT	27.86^*	(8)	15.05	(8)	5.21	(8)	8.26	(8)

Note: the tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection, the standard errors and tests are corrected for heteroskedasticity. $PE_{st}=PE_{mv}$ is a test on the equality of the parameters for Δhd_{it} for movers and stayers. $PE_{88}=PE_{89}$ and $PE_{iv}=PE_{ols}$ are tests on both parameters. HORT refers to Hansen's Overidentifying Restrictions Test. Parameters and test statistics marked with * are significant at a five percent significance level.

Table 5 shows the estimation results. Under the assumption of exogeneity of the 'observed' desired hours, the OLS-results show for the stayers an effect of the change in the 'observed' desired hours of 50 to 60 percent of the preferred change. For the movers this is 80 to 95 percent. As I want to test whether the reaction towards changes in 'observed' desired hours is the same for both movers and stayers, I test for the equality of the parameters of Δhd_{it}. For both years this difference is significant. For the test on the equality of the parameter for the two years, I test on both parameters. This test accepts for both movers and stayers.

For IV, the results are very different for the two years. For t=1988 the adjustment of the stayers is about 70 percent, but there is no significant difference with the OLS result. Unfortunately, the overidentifying restrictions test rejects. For the movers the result is not significantly different from the OLS result. For t=1989, the result is significantly different from the OLS result for both the movers and stayers. For the stayers there seems to be a kind of overshooting, as the effect of the change in the 'observed' desired hours is significantly larger than 100 percent. This result is curious, as it corresponds to a value for β which is larger than one, or to a value for λ which is negative. As the overidentifying restrictions test does not reject, the instruments seem valid. Although the results of the two years are very different for both groups, only for the stayers the hypothesis of equality of the parameters for the two years is rejected.

I also carry out the analysis with correction for the lagged actual working hours, see Table A.2 of appendix A. For OLS the lagged actual hours have a significant negative impact, and this impact is also significantly different between the stayers and the movers. The degree of adjustment of the stayers is 50 to 60 percent of the preferred change, and for the movers this is 65 to 80 percent. The parameter estimates and tests lead to the same conclusions as for the model without correction for the lagged actual working hours. This also holds for IV: for the stayers of 1988 the overshooting remains. So the results do not seem very sensitive to the correction for the actual working hours.

Overall, the conclusion seems to be that this is not a good model. For the stayers of t=1989 the degree of adjustment is significantly larger than 100 percent, while of t=1988 this is significantly smaller that 100 percent. This implausible result is insensitive to the additional correction for the lagged actual working hours.

4.3 Using the 'true' preferred change

For the final model I look at the 'true' preferred change, see equation (9). As instruments I use the labour supply variables X_{it} and X_{it-1}. Under the assumption that the error terms are independent of the past, I can also use the lagged actual working hours ha_{it-1} and the lagged 'observed' desired hours hd_{it-1} as instruments. I calculate the IV results for different sets of instruments

Before turning to the analysis, Table 6 shows the cross tabulation between the actual and the 'true' preferred change in the working hours. The dependence seems even stronger than in the previous subsection. Again I consider two possible explanations in the analysis: the free choice of the working hours within jobs, and the endogeneity of the 'observed' desired hours.

Table 6: cross tabulation for the 'true' preferred change

STAYERS	t=1988			t=1989		
	$B_{it}<0$	$B_{it}=0$	$B_{it}>0$	$B_{it}<0$	$B_{it}=0$	$B_{it}>0$
$\Delta ha_{it}<0$	58.6%	0.7%	5.3%	58.0%	0.4%	8.5%
$\Delta ha_{it}=0$	30.9%	97.8%	15.9%	30.9%	97.7%	11.9%
$\Delta ha_{it}>0$	10.5%	1.5%	78.9%	11.2%	2.0%	79.6%
# observations	418	455	284	457	513	294
LR test	1111.9^* (4)			1211.8^* (4)		

MOVERS	t=1988			t=1989		
	$B_{it}<0$	$B_{it}=0$	$B_{it}>0$	$B_{it}<0$	$B_{it}=0$	$B_{it}>0$
$\Delta ha_{it}<0$	81.1%	4.2%	3.7%	71.7%	0.0%	0.0%
$\Delta ha_{it}=0$	10.8%	79.2%	1.9%	13.2%	89.2%	1.5%
$\Delta ha_{it}>0$	8.1%	16.7%	94.4%	15.1%	10.8%	98.5%
# observations	37	24	54	53	37	65
LR test	135.0^* (4)			204.7^* (4)		

Note: $B_{it}=hd_{it}-ha_{it-1}$. The LR test is a Likelihood Ratio test on independence of row and column events. Under the null hypothesis of independence they follow a χ^2 distribution. Outcomes marked with * are significant at a five percent significance level.

Table 7 gives the estimation results for OLS and IV. For the latter method I use three sets of instruments: (X_{it},X_{it-1}), (X_{it-1},ha_{it-1}) and $(X_{it-1},hd_{it-1},ha_{it-1})$. The assumption underlying the second and third set of instruments is that with respect to the 'true' preferred change $hd_{it}-ha_{it-1}$, the lagged actual hours ha_{it-1} are exogenous. In that case the lagged actual hours are a valid instrument, so that I only need to instrument for the 'observed' desired hours hd_{it}. In that case the labour supply variables X_{it} are the natural instruments, but it turns out that the lagged labour supply variables X_{it-1} perform slightly better on the overidentifying restrictions test. As the estimation results are almost the same, I only report the results using X_{it-1}.

Under the assumption of exogeneity of the 'observed' desired hours, the OLS results indicate for the stayers an adjustment of about 55 percent, while the movers have an adjustment of about 85 percent. The difference in adjustment between movers and stayers is strongly significant for both years. The equality of the parameters for both years is accepted for both movers and stayers.

For the first set of instruments, the IV results are not significantly different from the OLS results. So the hypothesis of exogeneity of the ‘observed’ desired hours is not rejected. The difference in adjustment between movers and stayers remains significant. A problem is that the overidentifying restrictions test rejects in three out of four cases. Unfortunately, the regressions of the instruments on the residuals give significant results for different instruments. So there is no clear conclusion on which instruments cause the rejection of the overidentifying restrictions tests.

For the second set of instruments the estimation results for the stayers are significantly different from OLS. A reason might be that the that the condition $\lambda=1$ does not hold. Under the assumption $0\leq\lambda<1$, the parameter α gives an overestimate for the degree of adjustment. But al least I can conclude that the degree of adjustment for movers and stayers is significantly different. And as the parameter estimates give overestimates, the adjustment of the movers is significantly smaller than 100 percent. For this set of instruments the overidentifying restrictions test only rejects for the stayers of t=1989. Again the regression of the instruments on the residuals does not lead to a clear conclusion on which instruments lead to overidentification, as for the four cases different instruments turn out to be significant. The results of the third set of instruments are not very different from the results of the second set. The conclusions stay the same, the only difference being that the test on the exogeneity rejects more strongly.

I also carry out the analysis with additional correction for the lagged actual working hours, see Table A.3 of appendix A. For this I assume that the lagged actual working hours are exogenous, which means that I can also use them as an instrument. So in Table A.3 I only report the results for the second and third set of instruments. The lagged actual hours turn out to have a moderate impact on the change in the working hours, and only in a few occasions this impact is significant. The parameter estimate for the ‘true’ preferred change turns out to be hardly affected by the additional correction. So the conclusions are not affected: the degree of adjustment stays significantly smaller for the stayers than for the movers. And for the movers the degree of adjustment stays significantly smaller than 100 percent.

All specifications of this model lead to the conclusion that the degree of adjustment of working hours within jobs is at most 55 percent, and always significantly smaller than the degree of adjustment between jobs. Except for the first set of instruments, which is rejected by the overidentifying restrictions test, all specifications lead to the conclusion that the degree of adjustment between jobs is significantly less than 100 percent.

Table 7: estimation results for choice of the 'true' preferred change

Parameter estimates (standard errors)
Test statistics (degrees of freedom)

	t=1988				t=1989			
	STAYERS		MOVERS		STAYERS		MOVERS	
OLS								
const.	0.70*	(0.13)	0.79	(0.73)	0.61*	(0.12)	1.21*	(0.45)
$hd_{it}-ha_{it-1}$	0.53*	(0.05)	0.84*	(0.05)	0.55*	(0.04)	0.86*	(0.04)
HOMT	18.55*	(2)	3.60	(2)	35.11*	(2)	4.36	(2)
$PE_{st}=PE_{mv}$	19.22*	(1)	19.22*	(1)	30.03*	(1)	30.03*	(1)
$PE_{88}=PE_{89}$	0.41*	(2)	0.52	(2)	0.41	(2)	0.52	(2)
IV(1)								
const.	0.65*	(0.16)	0.75	(0.85)	0.63*	(0.14)	1.30*	(0.50)
$hd_{it}-ha_{it-1}$	0.49*	(0.07)	0.85*	(0.12)	0.56*	(0.06)	0.82*	(0.10)
HOMT	71.82	(85)	44.11	(68)	80.10	(85)	45.03	(71)
$PE_{st}=PE_{mv}$	6.72*	(1)	6.72*	(1)	4.97*	(1)	4.97*	(1)
$PE_{88}=PE_{89}$	0.01	(2)	0.30	(2)	0.01	(2)	0.30	(2)
$PE_{iv}=PE_{ols}$	5.84	(2)	0.04	(2)	0.39	(2)	1.00	(2)
HORT	24.59*	(11)	27.84*	(11)	40.13*	(11)	15.13	(11)
IV(2)								
const.	0.55*	(0.14)	0.97	(0.74)	0.48*	(0.12)	1.18*	(0.45)
$hd_{it}-ha_{it-1}$	0.40*	(0.03)	0.80*	(0.06)	0.43*	(0.05)	0.87*	(0.06)
HOMT	53.51	(40)	40.95	(39)	72.29*	(40)	24.41	(39)
$PE_{st}=PE_{mv}$	35.56*	(1)	35.56*	(1)	31.74*	(1)	31.74*	(1)
$PE_{88}=PE_{89}$	0.63	(2)	1.20	(2)	0.63	(2)	1.20	(2)
$PE_{iv}=PE_{ols}$	7.20*	(2)	0.71	(2)	8.16*	(2)	0.00	(2)
HORT	6.50	(7)	6.60	(7)	14.92*	(7)	8.27	(7)
IV(3)								
const.	0.50*	(0.14)	1.07	(0.74)	0.40*	(0.13)	1.21*	(0.46)
$hd_{it}-ha_{it-1}$	0.36*	(0.03)	0.77*	(0.06)	0.36*	(0.04)	0.86*	(0.05)
HOMT	65.29	(50)	39.88	(49)	98.14*	(50)	29.32	(49)
$PE_{st}=PE_{mv}$	37.36*	(1)	37.36*	(1)	60.98*	(1)	60.98*	(1)
$PE_{88}=PE_{89}$	0.32	(2)	1.59	(2)	0.32	(2)	1.59	(2)
$PE_{iv}=PE_{ols}$	22.51*	(2)	1.80	(2)	29.59*	(2)	0.00	(2)
HORT	12.88	(8)	11.30	(8)	27.66*	(8)	8.57	(8)

Note: IV(1) uses (X_{it},X_{it-1}) as instruments, IV(2) uses (X_{it-1},ha_{it-1}) and IV(3) uses $(X_{it-1},ha_{it-1},hd_{it-1})$. The tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection, the standard errors and tests are corrected for heteroskedasticity. $PE_{st}=PE_{mv}$ is a test on the equality of the parameters for Δhd_{it} for movers and stayers. $PE_{88}=PE_{89}$ and $PE_{iv}=PE_{ols}$ are tests on both parameters. HORT refers to Hansen's Overidentifying Restrictions Test. Parameters and tests marked * are significant at a five percent significance level.

5. Summary and conclusions

In the empirical literature on labour supply, several models are developed to incorporate constraints on working hours. These models formulate the constraints in a general way, and they do not distinguish between the different ingredients needed for the existence of hours constraints in the labour market. Besides the lack of possibilities to adjust working hours within a job, there also have to be mobility costs. In this paper I estimate how flexible working hours are within jobs, and to what extent job mobility is a way to adjust working hours. I do this by measuring the effect of changes in preferred working hours on the realized adjustment of working hours for individuals who stay in their job (stayers) and individuals who change job (movers).

As a proxy for the change in preferred working hours, Altonji and Paxson (1992) use changes in labour supply variables. On the basis of the U.S. Panel Study of Income Dynamics, they find for married women who work in two or more consecutive years, a significantly larger change in working hours for movers compared to stayers. Repeating this analysis on the bases of the Dutch Socio Economic Panel for women who work in two consecutive years, I find no significant difference in the adjustment of working hours between movers and stayers. Additional correction for the lagged actual working hours gives a significant result, which is similar to the result of Altonji and Paxson.

The Dutch Socio Economic Panel also contains information on the desired working hours of the respondents. This information allows me to construct direct proxies for the preferred changes in working hours. The first idea is to approximate the preferred change in the working hours by the change in the ‘observed’ desired working hours. As the ‘observed’ desired working hours might be endogenous, I use the method of Instrumental Variables to estimate the degree of adjustment within and between jobs. This leads, however, to implausible results, and I conclude that this is not a good model.

The second idea is to look at the effect of the ‘real’ preferred adjustment, which I define as the difference between the ‘observed’ desired working hours and the lagged actual working hours. Using the method of Instrumental Variables, and trying different sets of instruments, the overall conclusion is that the degree of adjustment of working hours within jobs is at most 55 percent, and in any case significantly smaller that the degree of adjustment between jobs. Most specifications lead to the conclusion that the degree of adjustment between jobs is less than 100 percent.

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A: Estimation results without correction for actual hours ha_{it}

Table A.1: estimation results using the change in the labour supply variables

Parameter estimates (standard errors) Test statistics (degrees of freedom)	**t=1988**		**t=1989**	
constant	7.097*	(1.195)	5.438*	(1.082)
job mobility Q_{it}	4.414*	(1.070)	2.252*	(0.750)
actual hours ha_{it-1}	-0.178*	(0.021)	-0.152*	(0.019)
age	-0.068*	(0.021)	-0.033	(0.020)
<u>individual</u>				
single_married	0.614	(0.810)	0.816	(1.046)
married_single	-0.219	(0.641)	-0.232	(1.826)
child0_child6	-2.910	(1.503)	-3.975*	(1.419)
child6_child0	-1.597	(0.914)	-.---	(-.---)
child_plus	-4.010*	(0.959)	-2.620*	(0.716)
child_minus	0.571	(0.644)	0.515	(0.695)
dif_other_inc	-0.0037	(0.0035)	-0.0093*	(0.0043)
<u>spouse</u>				
dif_work_hours	0.0175	(0.0367)	0.0065	(0.0441)
dif_income	-0.0001	(0.0010)	-0.0009	(0.0009)
ϕ	2.862*	(0.996)	2.332*	(0.598)
<u>tests</u>				
HOMT	138.83*	(94)	155.30*	(90)
$PE_{st}=PE_{mv}$	3.49	(1)	4.96*	(1)
$PE_{88}=PE_{89}$	8.57	(13)	8.57	(13)
ORT ($\alpha_1=\phi\alpha_0$)	6.95	(8)	16.59*	(8)

Note: the first variables are conditioning variables. The tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection, the second stage uses the Eicker-White covariance matrix. $PE_{st}=PE_{mv}$ tests for H_0: ϕ=1. $PE_{88}=PE_{89}$ tests for the equality of the parameters for the two years. ORT($\alpha_1=\phi\alpha_0$) tests for Overidentifying Restrictions. Parameters and test statistics marked with * are significant at a five percent level.

Table A.2: estimation using the change in the 'observed' desired hours

Parameter estimates (standard errors)
Test statistics (degrees of freedom)

	t=1988				t=1989			
	STAYERS		MOVERS		STAYERS		MOVERS	
OLS								
const.	1.85*	(0.36)	8.27*	(2.50)	2.06*	(0.40)	9.24*	(1.84)
ha_{it-1}	-0.06*	(0.01)	-0.24*	(0.08)	-0.08*	(0.02)	-0.25*	(0.05)
Δhd_{it}	0.49*	(0.05)	0.79*	(0.10)	0.56*	(0.05)	0.67*	(0.07)
HOMT	21.38*	(5)	4.98	(5)	35.35*	(5)	14.92*	(5)
$PE_{st}=PE_{mv}$	7.20*	(1)	7.20*	(1)	1.95	(1)	1.95	(1)
$PE_{88}=PE_{89}$	2.51	(3)	1.32	(3)	2.51	(3)	1.32	(3)
IV								
const.	1.25*	(0.46)	2.83	(4.55)	0.06	(0.72)	10.00*	(2.62)
ha_{it-1}	-0.04*	(0.02)	-0.08	(0.14)	-0.00	(0.03)	-0.28*	(0.08)
Δhd_{it}	0.72*	(0.12)	1.18*	(0.32)	1.49*	(0.24)	0.58*	(0.23)
HOMT	49.59	(44)	61.73*	(44)	50.71	(44)	51.67*	(29)
$PE_{st}=PE_{mv}$	1.81	(1)	1.81	(1)	7.49*	(1)	7.49*	(1)
$PE_{88}=PE_{89}$	11.40*	(3)	2.49	(3)	11.40*	(3)	2.49	(3)
$PE_{iv}=PE_{ols}$	2.40	(3)	20.92*	(3)	9.30*	(3)	0.11	(3)
HORT	29.27*	(8)	16.81*	(8)	5.57	(8)	13.36	(8)

Note: the tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection of homoskedasticity, the standard errors and tests are corrected for heteroskedasticity. $PE_{st}=PE_{mv}$ is a test on the equality of the parameters for Δhd_{it} for movers and stayers. $PE_{88}=PE_{89}$ and $PE_{iv}=PE_{ols}$ are tests on all the three parameters. HORT refers to Hansen's Overidentifying Restrictions Test. Parameters and test statistics marked with * are significant at a five percent significance level.

Table A.3: estimation results using the 'true' preferred change

Parameter estimates (standard errors)
Test statistics (degrees of freedom)

	t=1988				t=1989			
	STAYERS		MOVERS		STAYERS		MOVERS	
<u>OLS</u>								
const.	-0.84*	(0.29)	-0.43	(2.24)	-0.50*	(0.25)	1.53	(0.93)
ha_{it-1}	0.06*	(0.01)	0.04	(0.07)	0.04*	(0.01)	-0.01	(0.03)
$hd_{it}-ha_{it-1}$	0.58*	(0.04)	0.87*	(0.07)	0.59*	(0.04)	0.86*	(0.05)
HOMT	32.15*	(5)	4.23	(5)	58.08*	(5)	14.91*	(5)
$PE_{st}=PE_{mv}$	12.94*	(1)	12.94*	(1)	17.78*	(1)	17.78*	(1)
$PE_{88}=PE_{89}$	1.47	(3)	0.91	(3)	1.47	(3)	0.91	(3)
<u>IV(1)</u>								
const.	-0.21	(0.59)	1.58	(2.82)	0.57	(0.53)	1.47	(2.22)
ha_{it-1}	0.03	(0.02)	-0.02	(0.09)	0.00	(0.02)	-0.01	(0.07)
$hd_{it}-ha_{it-1}$	0.48*	(0.08)	0.78*	(0.10)	0.42*	(0.09)	0.86*	(0.12)
HOMT	54.08	(40)	39.73	(39)	72.10*	(40)	24.69	(39)
$PE_{st}=PE_{mv}$	5.48*	(1)	5.49*	(1)	8.60*	(1)	8.60*	(1)
$PE_{88}=PE_{89}$	2.07	(3)	0.76	(3)	2.07	(3)	0.76	(3)
$PE_{iv}=PE_{ols}$	0.31	(3)	1.63	(3)	2.81	(3)	0.01	(3)
HORT	5.17	(6)	6.45	(6)	14.74*	(6)	8.20	(6)
<u>IV(2)</u>								
const.	0.90	(0.48)	3.04	(2.77)	1.51*	(0.49)	1.94	(1.72)
ha_{it-1}	-0.02	(0.02)	-0.06	(0.09)	-0.04*	(0.02)	-0.02	(0.05)
$hd_{it}-ha_{it-1}$	0.32*	(0.05)	0.71*	(0.10)	0.27*	(0.06)	0.83*	(0.09)
HOMT	64.36	(50)	40.58	(49)	94.78*	(50)	30.83	(49)
$PE_{st}=PE_{mv}$	12.17*	(1)	12.17*	(1)	26.80*	(1)	26.80*	(1)
$PE_{88}=PE_{89}$	1.33	(3)	1.16	(3)	1.33	(3)	1.16	(3)
$PE_{iv}=PE_{ols}$	8.35*	(3)	4.82	(3)	22.49*	(3)	0.04	(3)
HORT	11.62	(7)	10.40	(7)	16.88*	(7)	8.31	(7)

Note: IV(2) uses (X_{it-1},ha_{it-1}) as instruments, while IV(3) uses (X_{it-1},hd_{it-1},ha_{it-1}). The tests follow a χ^2-distribution. HOMT refers to White's test on homoskedasticity. In case of rejection of homoskedasticity, the standard errors and tests are corrected for heteroskedasticity. $PE_{st}=PE_{mv}$ is a test on the equality of the parameters for Δhd_{it} for movers and stayers. $PE_{88}=PE_{89}$ and $PE_{iv}=PE_{ols}$ are tests on all the three parameters. HORT refers to Hansen's Overidentifying Restrictions Test. Parameters and test statistics marked with * are significant at a five percent significance level.