Willingness to pay for accommodating job attributes when returning to work after cancer treatment:

A discrete choice experiment with Danish breast cancer survivors

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Abstract

We estimate 30-60 year old breast cancer survivors' willingness to pay for accommodating job attributes when they return to work after cancer treatment. We find that breast cancer survivors are willing to accept a wage reduction in return to receive psychological help and to work fewer hours in the first 18 months after returning to work. This clearly emphasizes the relevance of accommodating breast cancer survivors to ease their return to work and to retain the survivors in employment. Further, we identify preference heterogeneity across age groups, income levels and job types, highlighting the importance of communication between employers and employees in order to accommodate individual needs.

Keywords: Preference estimation, Income differentials, Compensation packages

JEL Codes: I1, J31, J33

1 Introduction

As cancer incidence grows and cancer survival rates increase,[1] the importance of supporting cancer survivors to reenter the labour market cannot be neglected. From both an employee and an employer perspective, it is important to accommodate cancer survivors in returning to work after ended cancer treatment. From the employee perspective, several studies have highlighted the importance of offering accommodating attributes to breast cancer survivors to increase the likelihood that they return to work after treatment.[2] In turn, increasing the likelihood of returning to work may help the cancer survivors to avoid long term income losses and personal disappointments. From the employer perspective, it is important to support breast cancer survivors to avoid productivity losses and increased costs related to sick- and unemployment benefits. However, from an employer perspective, it may be difficult to accommodate cancer survivors on certain work conditions without any knowledge about their preferences. On the other hand, it can be difficult for cancer survivors to demand special arrangements and to express needs to their employers as they may fear not to be supported and in worst case to become redundant and laid-off.

In this paper, we contribute with new important knowledge for both employees, employers and policy makers as we give a clear insight into breast cancer survivors' preferences for being accommodated when returning to work after treatment. The findings can be used by employers as a foundation to implement health and well-being strategies in work places to retain breast cancer survivors in work in both the short and the long run. However, as we also find heterogeneity in preferences across cancer survivors, we suggest employers to be aware of individual needs.

We apply a discrete choice experiment (DCE) from 2010, where breast cancer survivors, diagnosed in the period from 2006 to 2008, were asked to choose between their own job situation, when they returned to work, and two alternatives with accommodating attributes. The proposed alternatives included varying attribute levels for work tasks, hours of work, psychological help, accommodation period and wage reduction. The inclusion of a wage reduction allows for estimation of the trade-off between experiencing a wage reduction and receiving an accommodating attribute. Through the unique design, we can estimate the willingness to pay for the accommodating attributes with mixed logit models. First, we

[1] See e.g. Parry et al. (2011), World Health Organization - International Agency for Research on Cancer (2012), and Cancer Research UK (2018).

[2] See e.g. Mehnert (2011), Neumark et al. (2015), Bouknight, Bradley, and Luo (2006), and Hansen et al. (2008).

examine the average preferences of breast cancer survivors and second we explore observable sources of preference heterogeneity through indicators interacted with the attributes. The results show that employers can offer accommodating job attributes and corresponding wage reductions to accommodate breast cancer survivors. In particular, breast cancer survivors are on average willing to accept a wage reduction of 314 to 359 EUR monthly for receiving psychological help and working less hours the first six months after returning to work. For periods of 12 and 18 months after returning to work, this is reduced to 232-265 EUR and 208-238 EUR monthly respectively, suggesting that the individuals are more willing to experience a wage reduction for a shorter period of 6 months than a longer period of 12 to 18 months. When examining observable sources of heterogeneity, we find preference heterogeneity in age, wage and job type. Breast cancer survivors with ages above the median age are willing to experience a larger wage reduction to receive psychological help and to work less hours than survivors with ages below the median age in the sample (54 years). Further, we elicit that breast cancer survivors with a wage above the media wage on average are more willing to experience a wage reduction to reduce their working hours to 15 hours/week than survivors with a wage below the media wage in the sample (46,760 EUR). Breast cancer survivors working in manual - or service jobs have a large disutility associated with experiencing a wage reduction to reduce their number of working hours to 15 hours/week compared to survivors working in non-manual jobs.

2 Background

Treatment procedures involving surgery, radio - or chemotherapy to fight breast cancer can be highly invalidating during and after treatment (Tasmuth, Smitten, and Kalso 1996). Common adverse effects of treatment are fatigue, depression and sleep disturbances (Bower 2008), jobstress, distress (Calvio et al. 2010) and cognitive limitations (Barton et al. 2010). Living with cancer and going through treatment may therefore have an impact on both physical and behavioural capabilities and hence, patients may have to make changes to their work life after treatment. The Danish Cancer Society (2017) recommends that employers and employees set up a meeting to discuss the process on returning to work and potential work adjustments. Some survivors may choose to carry on working full-time due to non-complicated treatments or financial limitations while others may choose to work part-time or to not work at all. Some cancer survivors may need other forms of accommodating aspects to manage their work, such as psychological help, flexible scheduling or easier tasks. After all, work preferences during and after treatment may be very different across patients, and for some it may be easier than for others to return to work. The Danish Cancer Society

(2017) states that for some patients it is a relief to return to work on full time while it for others is too demanding to return on full time.

To our knowledge little is known about cancer survivors' preferences for returning to work and reentering the labour market, while a lot is known about their preferences for treatment and delivery of bad news during treatment.[3] However, as briefly stated, previous studies have highlighted the importance of accommodating breast cancer survivors to increase the probability that they return to work. In a comprehensive literature review Mehnert (2011) identifies current knowledge about employment among cancer survivors. She finds that perceived employer accommodation, flexible working arrangements, counselling, training and rehabilitation services are significantly associated with a greater likelihood of being employed or return to work. Bouknight, Bradley, and Luo (2006) find that workplace accommodations played an important role in returning to work 12 and 18 months after breast cancer diagnosis. With the use of multivariate logistic regression, they find that breast cancer patients who perceived that they would receive employer accommodation when returning to work were associated with a greater likelihood of returning to work. Neumark et al. (2015) investigates the influence of workplace accommodation on employment and hours worked of women newly diagnosed with breast cancer. In particular, their results show that accommodation in the form of assistance with rehabilitative services was positively correlated with employment and number of weekly hours worked. Hansen et al. (2008) compare four year post-diagnosis breast cancer survivors with a control group of non-cancer individuals and find that fatigue was more strongly related to working for the individuals in the breast cancer survivor group. They suggest a pressing need to better understand and manage fatigue in the workplace for employed breast cancer survivors. The mentioned studies emphasize the importance of offering accommodating work aspects to breast cancer survivors, but they also emphasize the need for a better understanding of what employers should offer to help cancer survivors.

[3]See e.g. Fujimori et al. (2006), Caldon et al. (2007), and Tessier, Blanchin, and Sebille (2017).

3 Data and descriptive statistics

3.1 Data and design

The analyses in this paper are based on a combination of survey data and administrative data from Statistics Denmark where the latter is used to extract demographic and socioeconomic characteristics on the surveyed breast cancer survivors. The survey was conducted in Denmark in 2010 and the respondents include 30 to 60-year-old breast cancer survivors who were diagnosed in the period 2006 to 2008.[4] Hence, the survey is conducted two to four years after diagnosis dependent on the diagnosis year of the individual cancer survivor. The survey consists of a discrete choice experiment (DCE) and some follow-up questions.[5] In this paper we focus on the results from the DCE and then we gradually include the follow-up questions to examine the robustness of our DCE results.

In the DCE, the breast cancer survivors were faced with six choice sets where they in each set were asked to choose which of two alternative accommodation packages and their own job (status quo) they preferred when they returned to work. An example of a choice set can be seen in table 1.

Table 1: Example of a choice set

	Alternative 1	Alternative 2	Own job
Work tasks	Same tasks as before	Easier tasks	
Hours of work	37 hours/week	15 hours/week	
Psychological help	In the hospital	No help	Status quo
Compensation Period	6 months	18 months	
Wage reduction	400 EUR/month	800 EUR/month	
Choice			

Note: In each choice situation, the survivors were asked to choose the preferred alternative: Alternative 1, Alternative 2 or Own job (status quo).

The breast cancer survivors were divided into six groups where each group received six

[4]The survey is developed by former AKF and the department of Public Health at University of Copenhagen. The two data sources are combined through a unique link between personal identification and respondent numbers. The funding is received from the Danish Cancer Society and the Rockwool Foundation.

[5]The survey also consists of questions related to labour market conditions before, during and after cancer diagnosis. Among others, this involves questions related to job dissatisfaction, self-perceived ability to work, general state of health and offered accommodating attributes in own job. Heinesen et al. (2016) use the survey data where they examine the association between pre-cancer job dissatisfaction and return-to-work probability three years after a cancer diagnosis.

choice sets different from the other groups. This results in a total of 72 different alternatives (6*6*2) in addition to the status quo alternative which ensures variation to model the choices. As each breast cancer survivor were asked to choose between three alternatives six times, each survivor is presented with 18 rows (6*3) in the data. Each row contains information about the choice of alternative and the attributes contained in the specific alternative. The dependent variable is a choice indicator taking the value 1 if the alternative is chosen.

The attributes presented in the different alternatives are chosen on behalf of focus group interviews, and the number of attributes are kept rather low in order to keep the choice simple for the survivors to ensure coherent answers. The interviews resulted in five accommodating attributes; work tasks, hours of work, psychological help, accommodation period and absolute wage reduction. The levels of the five attributes are presented in table 2. The wage reduction is coded from 0 to 2000 EUR while the other attributes are coded as dummy variables.

Table 2: Attribute levels

Attribute	Level
Work Tasks	The same tasks (Ref.) Easier tasks
Hours of work	Full time (37 hours/week) (Ref.) 30 hours/week 15 hours/week
Psychological help	No help (Ref.) In the hospital In the workplace
Compensation period	6 months (Ref.) 12 months 18 months
Wage reduction[a]	0 EUR/month (Ref.) 70 EUR/month 130 EUR/month 400 EUR/month 800 EUR/month 2000 EUR/month

Note: Ref. is the reference attribute. Thus, the attribute 15 hours/week is valued relative to 37 hours/week.
[a]The wage reduction given in EUR here is an approximation to the wage reduction given in DKK in the DCE.

In table 3 it is shown that a gradual exclusion of respondents have been done prior to modelling the choices and three mutually exclusive groups have been created to examine demographic differences between included and excluded breast cancer survivors. In the following, we start describing this exclusion process and second descriptive statistics on included and excluded respondents are compared.

From table 3 it is seen that the survey population consisted of 3100 30-60 year old breast cancer diagnosed in 2006-2008, who were employed two years before diagnosis and who survived and were living in Denmark at the time of the survey. From the 3100, 77.7 pct. participated in the survey. After having collected the survey data we have made to more restrictions to the sample and hence excluded survivors not living in Denmark in 2011 and survivors who had a colon or skin cancer diagnosis at the same time as the breast cancer diagnosis. Hence, the survey sample ends up consisting of 2370 respondents. From the survey sample of 2370 respondents, 1699 respondents (71.7 pct.) chose between the two alternatives and the status quo option in at least one choice set and at the same time they were interested in returning to work or tried to return to work. Of the remaining respondents, 149 respondents exhibit protest behavior according to criterion 2 which lowers the response rate to 65.4 pct. Not all respondents chose in all six choice sets, and therefore criterion 3 is an exclusion of observations (not respondents) for choice sets with no choice. Criterion 4 is an exclusion of five male respondents. At last, criterion 5 is an exclusion of respondents who chose the status quo option in all six choice sets. We exclude these respondents to only model the choices of the respondents who are in fact on the market for changes. As seen, a very large share of the respondents chose the status quo option in all six choice sets. This could be explained in two ways; 1) They prefer to return to exactly the same job as they had before treatment. In this case they are not willing to pay for any of the presented accommodating job attributes; 2) They were compensated with attributes when they returned to work, and therefore their own job situation, which in this case is the status quo option, contained accommodating elements. In this case they may have a positive willingness to pay for accommodating attributes but they preferred the combination of attributes and wage reduction they received when they returned to work more than the combinations presented in the alternatives in the DCE. Given 1) and 2) there exist a large group of respondents who chose status quo six times, but where it is unknown whether they value accommodating attributes or not. On behalf of this, we only model the choices among the respondents who are on the market for changes, i.e. the respondents who chose an accommodating alternative instead of status quo at least once.

Table 3: Number of observations and respondents by exclusion criteria

Exclusion criteria		Respondents	Sample size (pct.)
Survey population[a]		3100	
Participated in the survey in 2010		2407	77.7
Living in Denmark in 2011		2405	77.6
Not diagnosed with colon or skin cancer simultaneously with the breast cancer diagnosis		2370	76.5
Exclusion criteria	**Observations**	**Respondents**	**Response rate (pct.)**
Survey Sample	42660	2370	
1: Participated in the DCE and were interested in or trying to return to work	30582	1699	71.7
2: No protest behavior	27900	1550	65.4
3: Chose in specific choice set[b]	26865	1550	65.4
4: Women only	26775	1545	65.2
5: On the market for changes, i.e. not always status quo[c] (Final sample)	12231	704	29.7
Groups presented with descriptive statistics	**Obs.**	**Resp.**	**Sample share (pct.)**
Excluded			
Group 1: Excluded through criteria 1-5	15885	858	36.2
Group 2: Excluded through criterion 6	14544	808	34.1
Included			
Group 3: Final sample	12231	704	29.7

[a]The survey population consists of 30-60 year old breast cancer diagnosed in 2006-2008, who were employed two years before diagnosis and who survived and were living in Denmark at the time of the survey (in the fall of 2010).
[b]In the mixed logit model, choice sets without a choice are left out of the estimation.
[c]The respondent did not choose status quo in each of the six choice sets.

To examine whether the sample used in this paper differ significantly from the full survey sample 1) The group of insufficient answers excluded through criterion 1 to 4; 2) The group of always status quo choosers excluded through criterion 5; 3) The final sample. In table 4, the descriptive statistics across the sub samples are shown. When comparing the demographic characteristics of the excluded group 1 and included group 3, it is seen that the excluded respondents in group 1 on average are three years older and have a significantly lower wage. When examining what the groups were offered in their own job situation, the respondents in the final sample, group 3, were not compensated differently than group 1, but the final sample experienced a slightly higher wage reduction of approximately 40 EUR monthly. When comparing group 3 and the respondents excluded due to always choosing status quo, group 2, the respondents in group 2 are on average 1.5 year older, but does not differ on other observables. Again offered compensation does not differ significantly between the two groups, but the final sample (group 3) experience a wage reduction on approximately 100 EUR more monthly than the respondents always choosing status quo. When examining

the ability to work one year after treatment across the groups it is seen that the ability to work for the final sample is significantly lower than the always status quo choosers.

The important take away is that the final sample of breast cancer survivors may have been less sensitive to the proposed wage reductions in the DCE than the excluded survivors, as the excluded survivors on average experienced a lower wage reduction in their status quo job situation while they were not significantly less compensated. Hence, the presented alternatives in the DCE may have been more attractive for the included than the excluded breast cancer survivors.

Table 4: Descriptive statistics

		Group 3 (Final sample)		Group 1 (Excluded)		t-test[a]
Demographics						
Age	Mean	53.34	[6.95][b]	56.59	[6.68]	+
	Median	54		58		
Wage (In 1000 EUR)	Mean	46.76	[18.86]	39.23	[18.13]	-
	Median	44.50		36.49		
Manual job (0/1)	Mean	0.20	[0.40]	0.20	[0.40]	
Education level	Mean	2.45	[0.87]	2.12	[0.87]	-
Ability to work during treatment	Mean	2.36	[2.62]	2.97	[3.26]	+
Ability to work 1 year after treatment	Mean	6.98	[2.65]	6.44	[3.30]	-
Offered compensation in own job[c]						
Easier tasks (0/1)	Mean	0.33	[0.47]	0.29	[0.45]	
Psych. help in hospital (0/1)	Mean	0.36	[0.48]	0.35	[0.48]	
Psych. help at work (0/1)	Mean	0.11	[0.32]	0.09	[0.29]	
Hours of work	Mean	24.20	[9.71]	24.75	[9.41]	
Wage reduction (EUR)	Mean	142.41	[419.67]	102.60	[328.15]	-
Respondents		704		858		

		Group 3 (Final sample)		Group 2 (Excluded)		t-test
Demographics						
Age	Mean	53.34	[6.95]	54.97	[6.61]	+
	Median	54		56		
Wage (In 1000 EUR)	Mean	46.76	[18.86]	48.46	[20.20]	
	Median	44.50		46.01		
Manual job (0/1)	Mean	0.20	[0.40]	0.18	[0.39]	
Education level	Mean	2.45	[0.87]	2.41	[0.86]	
Ability to work during treatment	Mean	2.36	[2.62]	2.99	[3.01]	+
Ability to work 1 year after treatment	Mean	6.98	[2.65]	7.96	[2.37]	+
Offered compensation in own job						
Easier tasks (0/1)	Mean	0.33	[0.47]	0.29	[0.45]	
Psych. help in hospital (0/1)	Mean	0.36	[0.48]	0.33	[0.47]	
Psych. help at work (0/1)	Mean	0.11	[0.32]	0.12	[0.33]	
Hours of work	Mean	24.20	[9.71]	24.61	[8.99]	
Wage reduction (EUR)	Mean	142.41	[419.67]	44.28	[206.26]	-
Respondents		704		808		

[a] T-test for two independent samples. +/-: Significant difference from group 3 (the final sample) at a 95 pct. confidence level.

[b] Standard deviations in brackets.

[c] The mean estimates for offered accommodation in own job are only based on the respondents who answered the questions about own job situation, i.e. missing answers are left out.
Self-perceived ability to work is measured on a scale from 0-10.
Education is measured on a scale from 1-4

4 Econometric framework

To model the choices of the breast cancer survivors, we use the theory of random utility modelling (RUM) where a decision maker faces choices among alternatives each consisting of a vector of measured attributes suggested by Mcfadden (1973). Breast cancer survivor n's true but unobservable utility of alternative i in choice set t can be expressed as

$$U_{nit} = V(S_n, x_{nit}) + \epsilon_{nit} \tag{1}$$

where $V(S_n, x_{nit})$ is the indirect utility function described by characteristics of survivor n, S_n, and the attribute levels, x_{nit}, embodied in the presented alternative i. The term indirect utility function denotes that it is an approximation to the breast cancer survivor's actual utility function. The error term implies that the analysis becomes one of probabilistic choice and hence that in choice set t, respondent n chooses alternative i over all other alternatives $j \neq i$ if the utility of alternative i is larger than the utility of alternative j

$$P_{nit} = Pr(U_{nit} > U_{njt}) \quad \forall \quad i \neq j \tag{2}$$

which is the choice probability for choosing alternative i in choice situation t. To solve for the choice probability, the error terms are assummed IID extreme value resulting in a logistic expression for the choice probability

$$Pr(U_{nit} > U_{njt}) = \frac{exp(V_{nit})}{exp \sum_{j=1}^{J}(V_{njt})} \tag{3}$$

To make the RUM operational, the deterministic indirect utility function, V_{nit}, is assumed linear and additive in the attributes.[6] With the attribute levels, breast cancer survivor $n's$ indirect utility function for alternative i in choice set t is given by

$$\begin{aligned} V_{nit} = {} & \beta_p(wage\_cut)_{nit} + \beta_1(easier\_tasks)_{nit} + \beta_2(30\_hours)_{nit} + \beta_3(15\_hours)_{nit} \\ & + \beta_4(psych\_help\_workplace)_{nit} + \beta_5(psych\_help\_hospital)_{nit} \\ & + \beta_6(12\_months)_{nit} + \beta_7(18\_months)_{nit} + \beta_8(status\_quo)_{nit} \\ & + \beta_9(wage\_cut)_{nit}S_n + ... + \beta_{10}(psych\_help\_hospital)_{nit}S_n + \epsilon_{nit} \end{aligned} \tag{4}$$

where the parameter estimates are the marginal changes in utility derived from an exogenous change in a given attribute. Included parameters must differ over alternatives to be

[6] Under fairly general conditions, any function can be approximated arbitrarily closely by one that is linear in parameters (K. E. Train 2003).

estimated. Hence, S_n will be included through interactions with the attribute levels.

The breast cancer survivors participating in the DCE are forced to do trade-offs and therefore a reduction in hours of work from 37 to 30 hours will yield a WtP equal to the maximum amount of wage that an individual is willing to give up for working 7 hours less without being worse off. Defining individual n's expected maximum utility of alternative i with logsums, the WtP for an exogenous attribute change in alternative i is the difference in logsums between working 37 and 30 hours in respectively state V^0 and V^1

$$\begin{aligned} WtP &= -\frac{1}{\beta_p}\left[ln\sum_i exp(V_{ni}^0) - ln\sum_i exp(V_{ni}^1)\right] \\ &= -\frac{1}{\beta_p} ln\left[\frac{\sum_i exp(V_{ni}^0)}{\sum_i exp(V_{ni}^1)}\right] \\ &= -\frac{1}{\hat{\beta}_{\mathrm{p}}}\hat{\beta}_{\text{30 hours}} \end{aligned} \tag{5}$$

which holds when $\epsilon_{in}^0 = \epsilon_{in}^1$ and the marginal utility of money is constant [7] (Zhao, Kockelman, and Karlstrom 2012).

To estimate the utility parameters used to calculate the WtP, we will apply the MIXL model as it obviates the limitations of the conditional logit model by allowing for random taste variation and substitution over alternatives[8] (K. E. Train 2003). In the MIXL model, the individual utility that individual n derives from choosing alternative i in choice situation t is given by

$$\begin{aligned} U_{nit} &= V_{nit}(x_{nit}) + \epsilon_{nit} \\ &= \beta_n' x_{nit} + \epsilon_{nit} \\ &= (\beta + \eta_n)' x_{nit} + \epsilon_{nit} \qquad \epsilon_{nit} \sim \textit{IID extreme value} \end{aligned} \tag{6}$$

where β is the mean attribute preference while η_n is respondent n's deviation from the mean. The probability that respondent n chooses alternative i over all other alternatives in choice

[7] We added a minus in front of $\frac{1}{\beta_p}$ to reflect that the WtP is measured as a positive value for a negative wage reduction coefficient, β_p. We multiply with 500 because the wage reduction were divided with 500 to ease the computational burden in Stata and we divide with 7.45 to convert from DKK to EUR. The standard errors of the WtP estimates are calculated with the Delta Method.

[8] In the conditional logit model, homogeneous attribute preferences are assumed and the IIA assumption restricts substitution patterns over alternatives.

set t then follows from

$$L_{nit}(\beta_n) = P(i|x_{nt}, \beta_n) = \frac{exp(\beta_n' x_{nit})}{\sum_{j=1}^{J} exp(\beta_n' x_{njt})} \tag{7}$$

The MIXL unconditional choice probability is the integral of the conditional probability over all possible values of β_n from the distribution θ

$$Q_{nit}(\theta^*) = \int L_{nit}(\beta_n) f(\beta_n|\theta^*) d\beta_n \tag{8}$$

Allowing for examination of otherwise unobserved preference heterogeneity implies that the MIXL model allows for η_n to be random in addition to ϵ_{nit}. This implies that η_n is unknown by the researcher and therefore a shape of the underlying distribution has to be assumed. In this paper, we assume that the wage reduction parameter is fixed while the other attributes are assumed random normal distributed to capture that the preferences can be both positive and negative for a given attribute[9]. As the log-likelihood in the MIXL model is too complex to solve analytically, maximum simulated likelihood estimation (MSLE) is used to approximate the log-likelihood function using 1000 Halton draws from the mixed distribution[10].

[9]When fixing the wage reduction coefficient (unrealistic) homogeneous preferences for experiencing a wage reduction are assumed. Relaxing the assumption of preference homogeneity in the wage reduction coefficient is neither unproblematic as it may lead to implausibly dispersed distributions of ratios of coefficients. The log normal distribution for instance allows for very small values which may produce unrealistic skewed estimates of the wage reduction coefficient and too large WtPs (Small 2012; Hole and Kolstad 2012). For this reason, the fixed coefficient is often preferred to avoid these skewed distributions even if a statistical test suggests the model with a log-normal coefficient to be better (Small 2012). Further, when examining sources of preference heterogeneity later, we address the fact that the survivors' wage may affect their willingness to pay.

[10]In the estimated models, faster convergence is reached by dividing the wage reduction variable with 500 to ease the computational burden. Further, starting values from the estimated mean and standard deviations from a model without correlation have been used when adding correlations between the attributes to ensure convergence.

5 Results

5.1 Main results

In table 11, the parameter estimates for the four different models are shown. Model (1) is a conditional logit (CL) model where homogeneous attribute preferences are assumed. In model (2), heterogeneity is allowed and thus standard deviations are estimated for the random normal distributed attributes. A likelihood ratio test between model (1) and (2) results in a likelihood ratio value of 540.6 and a corresponding p-value *p<0.001* (8 d.f.), and thus a significant improvement in the model fit is obtained when allowing for heterogeneity. This is also confirmed by examining the parameter adjusted Pseudo R^2 which suggest a considerably greater explanatory power in the MIXL model compared to the CL model. In model (2), the estimated standard deviations are significant, indicating that parameters do indeed vary in the sample. The mean coefficients are higher in model (2) than model (1) as the variance of the error terms are normalized to set the scale of utility.[11]

Model (3) is an extension of model (2), with interactions between length of accommodation period and wage reduction to examine whether the wage reduction sensitivity depends on the length of the accommodation period. It is seen that the included interaction terms are significantly negative and therefore that the survivors are less willing to experience a wage reduction for a longer than a shorter period of time. A likelihood ratio test between model (2) and (3) again suggest a significant improvement in the model fit with a likelihood ratio value of 23.2 and a corresponding p-value at *p<0.001* (2 d.f.).

In model (4), correlation between the random normal distributed parameters is allowed. Allowing for correlation involves estimation of 28 extra parameters as we estimate the lower triangular covariance matrix between the random normal attributes. A likelihood ratio test between model (3) and (4) suggest a significant improvement with a likelihood ratio value of 137.6 and a corresponding p-value of *p<0.001* (28 d.f.). When examining the parameter adjusted Pseudo R^2, the explanatory power is also slightly higher for model (4) than model (3). Thus, it is model (4) that the following willingness to pay estimates will be calculated

[11] Scale is inversely related to the error variance and cannot be separately identified. The solution is therefore to normalise for scale by normalising the variance of the error term. In the mixed logit model parameter variance is treated as a separate component of the error, i.e. $\eta_n' x_{nit}$ in $U_{nit} = \beta' x_{nit} + \eta_n' x_{nit} + \epsilon_{nit}$. Hence ϵ_{nit} is net of parameter variance in the mixed logit model and will therefore be lower than in the conditional logit model. The parameters β are normalized such that ϵ_{nit} has the appropriate variance for an extreme value error. In the conditional logit model where $U_{nit} = \beta' x_{nit} + \epsilon_{nit}$, β are normalized such that ϵ_{nit} has the variance of an extreme value deviate and the extreme value term will here incorporate any variance in the parameters (Revelt and K. Train 1998).

from and it is also model (4) we will extend with indicator interactions to examine sources of preference heterogeneity later. The higher log-likelihood value in model (4) reflects that significant correlations between the attributes are present. Thus, when allowing for correlation, the parameter estimates for attributes which are highly correlated with other attributes increase as more of the variance is captured. When examining the difference in parameter estimates from model (3) to model (4), it is not possible to determine what portion of the correlation is due to scale heterogeneity (smaller variance of the error term) and what portion is due to survivors preferring for instance both psychological help in the workplace and in the hospital (higher total indirect utility). However, as we will calculate WtP estimates and as we will not make any parameter comparisons across samples (with potentially different scales) the scale factor is irrelevant to examine further [12].

In figure 1, the wage reduction estimates over the length of accommodation period from model (4) are plotted, and it is seen that the sensitivity towards experiencing a wage reduction to be accommodated increases over the three periods; 6, 12 and 18 months. This illustrates that the survivors are more willing to pay for the presented attributes for a shorter than a longer period. With Wald tests for parameter equality, it is identified that the wage reduction sensitivity increases 35 pct. between 6 and 12 months, which is significant at a 95 pct. confidence level, while there is no significant difference between 12 and 18 months.

[12] In calculation of WtP, the issue of scale heterogeneity disappears because of division, e.g. $\frac{\beta_1^*}{\beta_1^*} = \frac{\lambda\beta_1}{\lambda\beta_2} = \frac{\beta_1}{\beta_2}$

Table 5: Mixed logit estimation results

	(1) CL	(2) MIXL	(3) MIXL	(4) MIXL Corr.[a]
Mean				
Wage reduction	-0.197***[0.008]	-0.272***[0.012]	-0.227***[0.014]	-0.261***[0.020]
12 months	-0.162** [0.074]	-0.181* [0.104]	0.046 [0.127]	0.052 [0.168]
18 months	-0.008 [0.073]	-0.129 [0.101]	0.191 [0.126]	0.265 [0.165]
15 hours/week	0.784***[0.076]	0.789***[0.141]	0.794***[0.143]	1.283***[0.211]
30 hours/week	0.652***[0.078]	0.948***[0.110]	0.921***[0.112]	1.394***[0.167]
Easier tasks	0.126** [0.058]	0.147 [0.092]	0.174* [0.095]	0.183 [0.129]
Psych. help at work	0.663***[0.076]	0.871***[0.106]	0.888***[0.108]	1.220***[0.165]
Psych. help in hospital	0.657***[0.074]	0.994***[0.102]	0.927***[0.104]	1.245***[0.164]
Status quo	0.904***[0.087]	1.049***[0.128]	1.156***[0.132]	1.899***[0.223]
wage reduction · 12 months			-0.097***[0.028]	-0.092***[0.032]
wage reduction · 18 months			-0.105***[0.025]	-0.132***[0.032]
SD				
12 months		0.549** [0.247]	0.656***[0.231]	1.470***[0.247]
18 months		0.232 [0.437]	0.319 [0.390]	1.447***[0.260]
15 hours/week		2.255***[0.184]	2.281***[0.184]	3.594***[0.292]
30 hours/week		-0.871***[0.193]	-0.862***[0.200]	1.686***[0.242]
Easier tasks		1.013***[0.154]	1.087***[0.155]	1.502***[0.206]
Psych. help at work		0.005 [0.223]	-0.029 [0.223]	0.920***[0.278]
Psych. help in hospital		0.056 [0.466]	0.074 [0.399]	1.350***[0.253]
Status quo		1.548***[0.107]	1.562***[0.109]	2.994***[0.282]
Final log-likelihood	-3294.0	-3023.7	-3012.1	-2943.3
R^2_{McFadden}	0.26	0.32	0.33	0.34
$R^2_{\text{McFadden}_{\text{adj}}}$	0.26	0.32	0.32	0.33
Observations	12231	12231	12231	12231

Standard errors in brackets
* p<0.10, ** p<0.05, *** p<0.01
[a]Correlation between random normal attributes is allowed

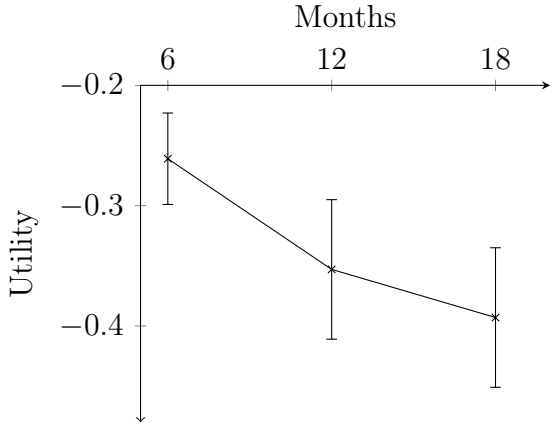

Figure 1: wage reduction sensitivity over length of accommodation period

In table 6, the WtP calculations are shown.[13] It is seen that the survivors exhibit significant positive willingness to pay for working less hours and for receiving psychological help. Willingness to pay estimates for these attributes lie between 314 EUR and 359 EUR monthly for a period of 6 months. However, the survivors do not exhibit a significant WtP for working on easier tasks. The significant WtP for the status quo option illustrates a strong preference for the status quo option rather than being a useful WtP estimate. Wald tests for parameter equality show that the willingness to pay for working 15 vs 30 hours are not significantly different from each other, and the same is true when comparing psychological help in the workplace vs the hospital. However, we will keep the attributes apart, as the standard deviations around the mean estimates differ.

Table 6: WtP (EUR) based on model (4)

	WtP[a]	S.E.	95 pct.	CF
6 months				
15 hours/week	330***	[57]	219	441
30 hours/week	359***	[45]	270	447
Easier tasks	47	[34]	-19	113
Psych. help at work	314***	[47]	222	406
Psych. help in hospital	320***	[46]	230	410
Status quo	488***	[67]	356	620
12 months				
15 hours/week	244***	[43]	159	329
30 hours/week	265***	[36]	194	336
Easier tasks	35	[25]	-13	83
Psych. help in workplace	232***	[36]	161	303
Psych. help in hospital	236***	[36]	167	307
Status quo	361***	[49]	265	458
18 months				
15 hours/week	219***	[38]	144	294
30 hours/week	238***	[32]	176	300
Easier tasks	31	[22]	-12	75
Psych. help in workplace	208***	[30]	150	267
Psych. help in hospital	213***	[32]	150	275
Status quo	324***	[43]	240	408

Standard errors in brackets
* p<0.10, ** p<0.05, *** p<0.01
WtP calculations are based on the coefficients from model (4) in table 11.
First 6 months: WtP for working 30 hours relative to 37 hours/week $\frac{1.394}{-(-0.261)} \cdot \frac{500}{7.45} = 359$ euro.
First 12 months: WtP for working 30 hours relative to 37 hours/week $\frac{1.394}{-(-0.261-0.092)} \cdot \frac{500}{7.45} = 265$ euro.

[13] Over time the WtP are calculated by including the interaction between wage reduction and period: $\overline{WtP}_{\text{30 hours}} = -\frac{\hat{\beta}_{\text{30 hours}}}{\hat{\beta}_{\text{p}}+\hat{\beta}_{\text{p*12 months}}} \cdot \frac{500}{7.45}$

The estimated standard deviations provide important information about the distribution of preferences. In figure 2, the preference distributions are shown for receiving psychological help, working less hours and working on easier tasks. It is seen that the breast cancer survivors agree more on their preferences for psychological help than working hours as the estimated standard deviations are larger for working less hours. When examining psychological help, the two mean estimates for receiving psychological help in the workplace and in the hospital are very close but we observe slightly more preference heterogeneity for psychological help in the hospital. The distributions for working respectively 15 and 30 hours/week relative to 37 hours/week also yields interesting results. Here, it is seen that survivors agree more on the valuation of working 30 hours/week than 15 hours/week. In particular, the standard deviation for working 15 hours/week is remarkably large. This suggest that some survivors have a very high willingness to pay for working 15 hours/week while other survivors experience a large disutility with working 15 hours/week compared to 37 hours/week. As we can observe heterogeneity among the breast cancer survivors through these significant standard deviations it is relevant to examine whether we can come closer at identifying the sources to the observed preference heterogeneity. This is done in the following by the inclusion of interaction terms between the random normal attributes and three important indicators.

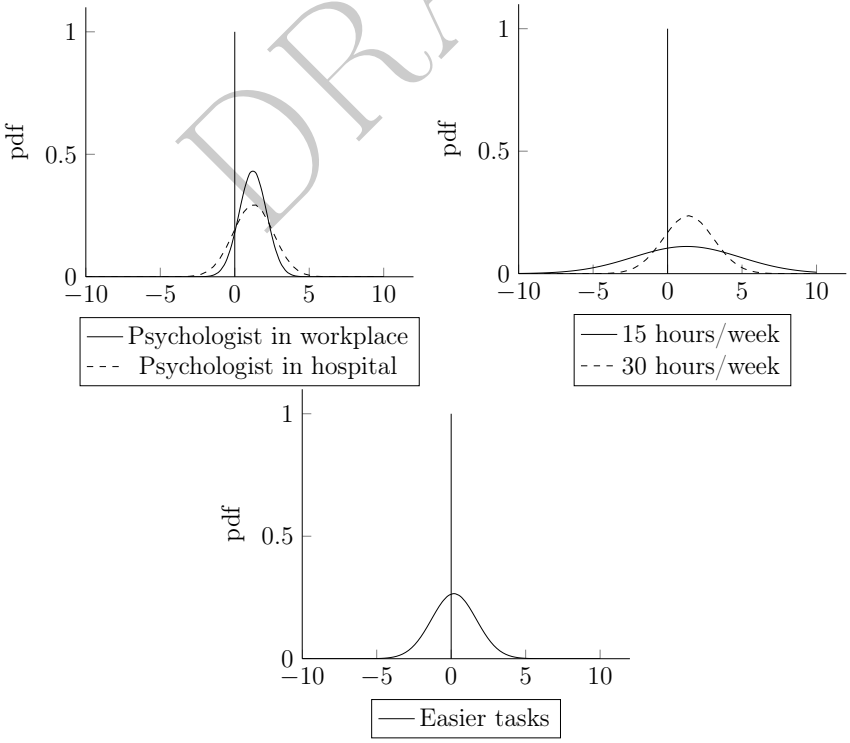

Figure 2: Probability density functions, based on model (4)

5.2 Examining preference heterogeneity

Within the MIXL literature, preference heterogeneity has previously been accounted for in one of three ways; via random parameter estimates to reveal the presence of heterogeneity but without explaining the source (Revelt and K. Train 1998); via the inclusion of interaction effects to systematically explain sources of heterogeneity (Small and Lam 2001); via a combination of both interaction effects and random parameters (Hensher and Greene 2003). In this paper, we apply the last of the three approaches, as we both allow the main attributes to be random normal distributed and as we include indicator interactions to examine observable sources of preference heterogeneity. The interaction terms are kept fixed as the opposite would require a lot of variation within the indicator groups and as random normal distributed interaction terms also increase the computational burden in Stata.

In the following, the reference case is young, low wage breast cancer survivors working in non-manual jobs are compared with each of the three comparison groups; 1) age above the sample median, 2) wage above the sample median and 3) having a manual- or service job. The MIXL and WtP results[14] are shown in table 7, while ΔWtP is shown in table 8. The results in table 8 show that preference heterogeneity in age is elicited, where breast cancer survivors with ages above the median age in the sample on average are more willing to experience a wage reduction to receive psychological help and to work less hours than survivors with ages below the median age (54 years). This could suggest that older breast cancer survivors have different needs than younger survivors due to specific age-dependent complications such as slower recovery.

[14] Mean WtP for working 30 hours/week compared to 37 hours/week for the reference group of young, low wage breast cancer survivors working in non-manual jobs can be calculated by the simple measure

$$\overline{WtP}_{30hours} = \frac{\hat{\beta}_{30\text{hours}}}{-\hat{\beta}_{\text{p}}} \cdot \frac{500}{7.45} \tag{9}$$

When examining preference differences across wage, this will be compared with mean WtP for young, *high wage* breast cancer survivors working in non-manual jobs

$$\overline{WtP}_{30\text{hours}\cdot\text{wage}} = \frac{\hat{\beta}_{30\text{hours}} + \hat{\beta}_{30\text{hours}\cdot\text{wage}}}{-(\hat{\beta}_{\text{p}} + \hat{\beta}_{\text{p}\cdot\text{wage}})} \cdot \frac{500}{7.45} \tag{10}$$

The mean difference in WtP between the reference group and the comparison group can then be calculated as

$$\Delta WtP = \overline{WtP}_{30\text{hours}\cdot\text{wage}} - \overline{WtP}_{30\text{hours}} \tag{11}$$

which is interpreted as the extra WtP high wage breast cancer survivors exhibit compared to low wage breast cancer survivors to obtain a working week of 30 hours compared to 37 hours/week, all else equal. Standard errors for ΔWtP are as for the WtP estimates also estimated with the Delta Method and are calculated directly from the MIXL coefficients to avoid approximate standard errors two times.

Table 7: Mixed logit estimation results, model (5), and WtP (EUR)

	Reference group[a]		Age above median		wage above median		Manual job	
Mean								
wage reduction	-0.328***	[0.027]	0.057**	[0.023]	0.049**	[0.024]	0.064**	[0.025]
12 months	-0.239	[0.226]	0.125	[0.230]	0.368	[0.248]	-0.199	[0.289]
18 months	-0.114	[0.241]	0.122	[0.243]	0.669***	[0.258]	-0.640**	[0.299]
15 hours/week	0.461	[0.352]	0.813**	[0.370]	1.374***	[0.391]	-1.642***	[0.465]
30 hours/week	1.537***	[0.261]	0.217	[0.274]	-0.391	[0.288]	-0.441	[0.348]
Easier tasks	0.110	[0.213]	-0.267	[0.230]	0.320	[0.239]	0.321	[0.297]
Psychologist in workplace	1.095***	[0.246]	0.364	[0.254]	-0.187	[0.270]	-0.079	[0.316]
Psychologist in hospital	0.941***	[0.249]	0.735***	[0.258]	-0.028	[0.269]	-0.163	[0.319]
Status quo	1.088***	[0.330]	1.215***	[0.352]	0.589	[0.367]	-1.158***	[0.435]
Wage reduction · 12 months	-0.096***	[0.031]						
Wage reduction · 18 months	-0.125***	[0.030]						
SD								
12 months	0.453*	[0.269]						
18 months	0.947***	[0.249]						
15 hours/week	3.317***	[0.272]						
30 hours/week	1.541***	[0.239]						
Easier tasks	1.444***	[0.198]						
Psychologist in workplace	0.839***	[0.259]						
Psychologist in hospital	1.311***	[0.260]						
Status quo	2.665***	[0.276]						
Final log-likelihood							-2904.2	
R^2_{McFadden}							0.35	
$R^2_{\text{McFadden}_{\text{adj}}}$							0.34	
Observations							12231	
	Reference group		Age above median		Wage above median		Manual job	
WtP, 6 months (EUR)								
15 hours/week	94	[72]	316***	[82]	442***	[86]	-300**	[151]
30 hours/week	315***	[56]	435***	[66]	276***	[67]	279**	[109]
Easier tasks	23	[44]	-39	[49]	104**	[52]	110	[91]
Psychologist in workplace	224***	[52]	362***	[63]	220 ***	[62]	258**	[101]
Psychologist in hospital	192***	[53]	415***	[65]	220***	[61]	198**	[101]
Status quo	223***	[72]	571***	[95]	404***	[91]	-18	[133]

Standard errors in brackets
* p<0.10, ** p<0.05, *** p<0.01
[a]Correlation between random normal attributes is allowed

For the 15 hours/week attribute, two sources of heterogeneity have been elicited. Breast cancer survivors with a wage above the median wage have a significantly higher willingness to pay for working 15 hours/week than survivors with a wage below the median (46,760 EUR). Further, breast cancer survivors working in manual jobs have a significantly lower willingness to pay for working 15 hours/week than survivors working in non-manual jobs. In regards to the higher willingness to pay among high wage survivors, the result is likely to illustrate that high wage survivors have the financial possibility of experiencing a large wage

reduction to work part time. For breast cancer survivors with manual versus non-manual jobs, the result could suggest that breast cancer survivors in manual jobs and non-manual jobs have different work tasks and therefore may be more or less exposed to fatigue when at work.

Table 8: ΔWtP based on model (5), 6 months

	ΔWtP[a]	S.E.	95 pct. CF	
Age above median				
15 hours/week	221**	[84]	56	387
30 hours/week	120*	[68]	-12	253
Easier tasks	-61	[52]	-163	40
Psychologist in workplace	138**	[61]	17	258
Psychologist in hospital	223***	[64]	97	349
Status quo	349***	[93]	166	531
Wage above median				
15 hours/week	347***	[90]	172	523
30 hours/week	-39	[68]	-172	94
Easier tasks	81	[54]	-25	187
Psychologist in workplace	-5	[62]	-126	115
Psychologist in hospital	27	[62]	-94	149
Status quo	181**	[91]	3	359
Manual job				
15 hours/week	-395***	[128]	-645	-144
30 hours/week	-36	[91]	-214	143
Easier tasks	87	[77]	-63	238
Psychologist in workplace	34	[83]	-128	197
Psychologist in hospital	5	[83]	-157	167
Status quo	-240**	[111]	-458	-22

* p<0.10, ** p<0.05, *** p<0.01

[a] ΔWtP is the difference from the group "young, low-wage, non-manual" and calculations are based on the coefficients in model (5). Standard errors are obtained with the Delta-method.

5.3 Examining the preferences conditional on the individual preferences for easier tasks

The coefficient for easier tasks is insignificant in model (4), table 11, but the standard deviation is significant at a 1 pct. significance level. This suggest that a large degree of preference heterogeneity exists and therefore the mean estimate turns out to be close to zero. Hence, it is relevant to divide the breast cancer survivors in two groups; 1) One group with the 50 pct. lowest individual utility parameters for experiencing a wage reduction to work on easier tasks. This group does on average have disutility associated with working on easier tasks. 2) One group with the 50 pct. highest individual utility parameters. This group does on average have a positive utility with easier tasks. The preferences differences between these

two groups will be examined in the following.

First, we compare descriptive statistics across the two groups. From table 9 it is seen that the group which prefer easier tasks and the group which does not are similar on age, job type, educational level and ability to work during treatment. They differ on wage level where the survivors who have disutility associated with easier tasks on average earn 4000 EUR more annually. They also differ slightly on self-perceived ability to work during treatment, where the survivors who on average would like to work on easier tasks rate their ability to work slightly lower. This could explain why this is also the group preferring easier tasks.

Table 9: Descriptive statistics across individual preferences for easier task

	Disutility for easier tasks		Positive utility for easier tasks		t-test
Age	53.14	[6.86]	53.55	[7.02]	
Annual wage (1000 EUR)	48.76	[18.92]	44.76	[18.59]	***
Manual job (0/1)	0.19	[0.39]	0.21	[0.41]	
Education	2.46	[0.91]	2.43	[0.84]	
Ability to work during treatment	2.46	[2.55]	2.27	[2.69]	
Ability to work 1 year after end of treatment	7.36	[2.51]	6.61	[2.72]	***
Observations	6108		6123		
Respondents	354		350		

* p<0.10, ** p<0.05, *** p<0.01
Standard deviations in brackets
Self-perceived ability to work is measured on a scale from 0-10.
Education is measured on a scale from 1-4

In table 10 the WtP results are presented while the utility parameters are left to the appendix. The results show that the group with disutility for easier tasks on average would prefer a work week on 30 hours/week and psychological help in the hospital. The group who would like to work on easier tasks prefer to work 15 hours/week and to receive psychological help at work. From the estimated utility parameters shown in the appendix, it is seen that the group who dislikes easier tasks have strong negative preferences for being accommodated in 18 months compared to 6 months while the other group have strong preferences towards an accommodation period of 18 months compared to 6 months. From figure 3, it is further seen that the group which do not want to be accommodated with easier tasks are not wage sensitive to the length of the accommodation period. The breast cancer survivors who are willing to experience a wage reduction to work on easier tasks have a significantly higher willingness to pay in the first six months than in 12 and 18 months respectively. Thus, the group which prefer easier tasks prefer a long period over a short period but they are sensitive

towards experiencing a wage reduction in a long period.

Table 10: WtP based on model (6) and (7) (EUR)

	Disutility for easier tasks		Positive utility for easier tasks		t-test
6 months					
15 hours/week	346***	[90]	380***	[75]	
30 hours/week	609***	[83]	207***	[52]	***
Easier tasks	-478***	[50]	709***	[75]	***
Psych. help at work	255***	[61]	438***	[61]	**
Psych. help in hospital	462***	[67]	244***	[58]	**
Status quo	471***	[97]	710***	[116]	
12 months					
15 hours/week	277***	[76]	265***	[57]	
30 hours/week	489***	[79]	144***	[37]	***
Easier tasks	-383***	[55]	494***	[59]	***
Psych. help at work	205***	[54]	305***	[49]	
Psych. help in hospital	370***	[65]	170***	[44]	**
Status quo	378***	[82]	495***	[80]	
18 months					
15 hours/week	310***	[88]	226***	[45]	
30 hours/week	546***	[98]	123***	[32]	***
Easier tasks	-428***	[66]	421***	[42]	***
Psych. help at work	228***	[61]	260***	[35]	
Psych. help in hospital	414***	[83]	145***	[35]	***
Status quo	422***	[98]	422***	[62]	
Observations	6108		6123		

* p<0.10, ** p<0.05, *** p<0.01
Standard errors in brackets

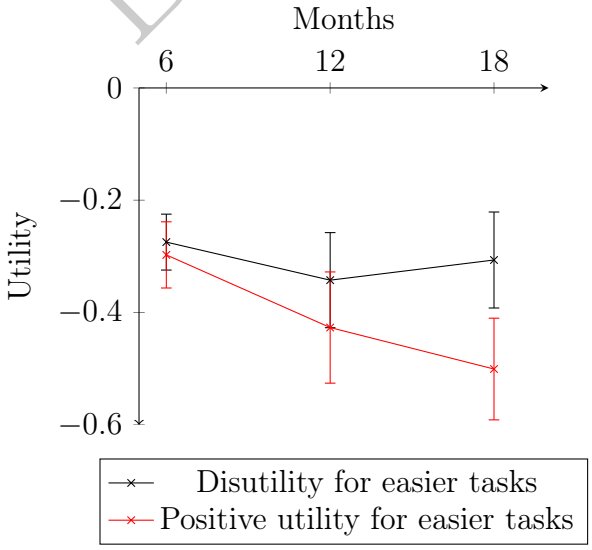

Figure 3: Wage reduction sensitivity over time

6 Discussion [To be continued]

In Denmark a consultation with a psychologist costs approximately 55 EUR if you get a medical referral through your doctor and approximately 150 EUR without. Cancer patients in Denmark have the right to receive a medical referral up to 12 months after diagnosis where the maximum number of consultations with reimbursement is 12. If patients receive 1 to 4 consultations a month the first six months after treatment, this will on average result in individual expenses in the range 55 - 410 EUR for the patient monthly. We estimated a willingness to pay for psychological help on 314 EUR monthly if received in the work place and 320 EUR if received in the hospital the first 6 months.

In our sample the average annual wage is 46,700 suggesting an average monthly wage at 3,891 EUR. Hence, a reduction in working hours of 7 hours a week will approximately cost 737 EUR monthly. As the breast cancer survivors were willing to pay on average 359 EUR for working 30 hours weekly instead of 37 they are not willing to pay as much as the actual cost for the employer, but they are willing to take on approximately half of the cost.

7 Conclusion

We have estimated breast cancer survivors' willingness to pay for accommodating attributes. On average psychological help (in the workplace or the hospital) and a shorter working week (15 or 30 hours/week) is highly valued with willingness to pay estimates ranging from 314 to 359 EUR monthly the first six months after returning to work after treatment. The survivors agree highly on the valuation of psychological help while they a more dispersed in their preferences for working hours. When examining the sources of preference heterogeneity in the valuation of working hours, it is seen that breast cancer survivors with ages above the median age are relatively more willing to pay for receiving psychological help and working less hours than survivors with ages below the median age suggesting different needs for older breast cancer survivors. Two other sources of preference heterogeneity have been elicited for the 15 hours/week attribute. Breast cancer survivors with an income above the median income have a significantly higher willingness to pay for working 15 hours/week than survivors with an income below the median. Breast cancer survivors working in manual- or service jobs have a significantly lower willingness to pay for working 15 hours/week than survivors working in non-manual jobs. Where the first source suggest the financial possibility of experiencing a large wage reduction to work part time when having a high income, the latter could suggest that breast cancer survivors in manual jobs and non-manual jobs have different work tasks and therefore may be more or less exposed to fatigue when at work.

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Appendix A

Table 11: Mixed logit estimation results, model (6) and (7)

	(6) MIXL	(7) MIXL
Mean		
Wage reduction	-0.297***[0.030]	-0.275***[0.025]
12 months	0.260 [0.302]	-0.248 [0.212]
18 months	1.046***[0.282]	-0.955***[0.267]
15 hours/week	1.682***[0.327]	1.415***[0.370]
30 hours/week	0.916***[0.235]	2.493***[0.335]
Easier tasks	3.141***[0.291]	-1.955***[0.191]
Psych. help at work	1.941***[0.252]	1.043***[0.253]
Psych. help in hospital	1.081***[0.247]	1.888***[0.272]
Status quo	3.146***[0.437]	1.929***[0.384]
Wage reduction · 12 months	-0.129***[0.050]	-0.068 [0.046]
Wage reduction · 18 months	-0.203***[0.043]	-0.032 [0.047]
SD		
12 months	1.471***[0.504]	1.384***[0.362]
18 months	1.861***[0.360]	1.570***[0.319]
15 hours/week	4.283***[0.459]	3.590***[0.505]
30 hours/week	1.422***[0.448]	2.182***[0.423]
Easier tasks	1.518***[0.279]	0.350 [0.236]
Psych. help at work	1.311***[0.350]	1.105***[0.380]
Psych. help in hospital	1.476***[0.351]	1.609***[0.398]
Status quo	4.963***[0.498]	2.724***[0.460]
Final log-likelihood	-1294.6	-1289.9
R^2_{McFadden}	0.42	0.42
$R^2_{\text{McFadden}_{\text{adj}}}$	0.39	0.39
Observations	6123	6108

Standard errors in brackets
* p<0.10, ** p<0.05, *** p<0.01
[a]Correlation between random normal attributes is allowed