

# Long-Term Illness as an Occupational-Career Interruption: Gender Differences in the Determinants and Outcomes in Sweden

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**ABSTRACT** *This paper examines one particular type of occupational-career interruption; long-term illness. Event history analysis is used to uncover gender differences in the factors that influence illness work absenteeism and regression for the consequences of this type of interruption in Sweden, a country with a generous welfare state and high level of gender equality. Analysis of a panel survey (HUS) attests to gender differences in both the determinants and the effects of illness interruptions. For example, having a child in the household and the absence of a spouse or cohabiting partner significantly raise men's likelihood of experiencing an illness interruption, but is non-significant for women. With regards to the consequences of an illness interruption, women suffer significant losses in wages, while men experience no significant effect. For women, working full-time and working in a blue-collar job influence wages at a significant level. The paper concludes with a discussion of the implications of such findings and ends with policy implications.*

A career is defined as a sequence of occupations, jobs and positions in an individual's life (Spilerman 1977, Super 1957). In the social and behavioral sciences, occupational careers are usually assumed to be continuous in time. Yet, most workers' careers are characterized by periods of interruptions (Groot, Schippers & Siegers 1990, Light & Ureta, 1995, Rindfuss, Swicegood & Rosenfeld 1987). Despite the fact that most careers have interruptions, few studies incorporate interruptions into models of occupational mobility and status attainment. Even fewer studies focus on interruptions due to long-term illness. Examining gender differences in the occurrence and consequences of illness is an important topic of inquiry, in that it illuminates processes that lead to possible disparities in social rewards for women and men.

The purpose of this paper is to provide an empirical analysis of the determinants of occurrence and the effects of illness interruptions in Sweden,

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1501-7419 Print/1745-3011 Online/06/02-300132-18 © 2006 Taylor & Francis  
DOI: 10.1080/15017410600796668

with the focus on gender differences. Only long-term interruptions, longer than 8 weeks, are included in this analysis. There are two important topics to consider when discussing career interruptions: the factors that influence one's likelihood of having an illness and the monetary outcomes for illness. The former topic has received much less attention in the literature than the latter. With regards to the former, this paper explores whether the same factors affect women and men's chance of taking an illness interruption.<sup>1</sup> The first topic answers the question: are there gender differences in what determines whether one is removed from the labor force due to one's *own* illness? A type of event history analysis is employed for this purpose: a multivariate Cox proportional hazard model.

The second topic focuses on gender differences in the monetary outcomes for taking an illness interruption. Economic literature has found that interruptions due to ill health have greater than average wage penalties (Mincer & Ofek 1982). For this, I will employ regression to answer the question: after controlling for other relevant variables, does illness result in a decrease in wages and is this different for women and men?

### **Theoretical Framework**

Disability has traditionally been defined by restricted activity (Thomas 2004), impairment (Finkelstein 2001a) or, more specifically, as a restriction or lack of ability to perform an activity in a normal manner (Bury 2000). Disability studies also encompass the social construction aspect of disability, where disability is construed as a source of oppression and inequality (Thomas 2004, Finkelstein 2001b). This paper does not necessarily define disability and illness in those terms, nor are disability and illness seen as separate concepts. Disability/illness is defined only in terms of labor market participation. Hence, a person is considered ill/disabled long-term only if they are removed from the labor force for more than 8 weeks due to their own illness/disability. A person might not be ill/disabled and be considered so if they report that they were removed from the labor market for their own illness. Conversely, a person might be ill/disabled and not removed from the labor force during the period of study. However, this study fills a gap in the disability literature because illness is placed within a career context and because removal from the labor force for illness of self disproportionately affects disabled persons.

Epidemiological and social science research has found differences in how women and men experience illness. These differences include differences in labor market participation (Chirikos & Nestel 1984), in probabilities of changing employers (Magee 2004, Pelkowski & Berger 2003), in the socio-economic determinants of ill health (Lahelma, Arber, Rahkonen & Silven-toinen 2000, Lahelma, Martikaninen, Laaksonen & Aitomaki 2004), and employment rates for ill persons (Burström, Holland, Diderichsen & Whitehead 2003). These differences are due to women's labor market disadvantage (Chirikos 1993), which is largely tied to women's altered labor market activity because of childcare and household responsibilities. Several factors are expected to influence the likelihood of having an illness interruption. These

factors can be categorized in terms of family and job characteristics, including those that relate to human capital. Human capital characteristics include job experience, education, on-the-job training and occupational skills.

#### *Family Characteristics*

The presence of a child, a spouse, or single parenthood, should not lead to increased likelihood of taking an illness interruption, although in reality these factors greatly influence whether workers take an interruption. Studies show that women are more likely to miss more work due to illness of others compared with men, in part because of women's greater propensity to be caretakers of children and family members (Wellington 1993, Vistnes 1997). Individuals may be removed from the labor force if there is some other source of economic support, such as a spouse or a cohabiting partner. The opposite is predicted for the presence of a child. The presence of a child in the household decreases the likelihood of an illness interruption due to the financial burden. Family characteristics, in particular, whether one has a child in the household or not, should not determine whether one has an illness interruption, but workers are expected to negotiate their illness within the context of the welfare state according to their family needs and their preconceived notion of negative sanctions or a lack of sanctions for taking an illness interruption. Women who have children in the household are predicted to be less likely to take illness interruptions than are men, due to their greater need to be in the labor force. Women have a greater need to remain in the labor force because their labor force participation is already altered to a greater degree than men's because they are more likely to be removed for childcare and household responsibilities. Hence, although women and men might take interruptions with relatively similar frequency, the same factors do not influence their decision to take an interruption. Given the previous literature on gender differences in the impact that family has on labor market patterns, one would expect to find statistical evidence that women are more likely to experience an illness interruption. Moreover, family characteristics are predicted to influence whether one has illness interruption. More specifically, one would expect that the presence of a child in the household would decrease the likelihood that women take an illness interruption, especially single mothers, while parenthood and single parenthood is expected to have a non-significant impact for men.

#### *Job Characteristics*

Job characteristics include working full-time and type of job. The type of job (e.g. blue collar) influences the likelihood of interruption due to differences in the nature of the jobs (Smith 1985) and because the type of job is an indicator of placement in the system of strata (Lahelma et al. 2004). Blue-collar jobs have the potential to increase the likelihood of illness due to the more physical and/or demanding nature of the jobs (Smith 1985). Hence, job characteristics, such as working full-time and type of job have different effects for women and

men. Women and men are envisaged to make decisions about whether or not to take an interruption within a context of rewards or sanctions, and these decisions differ depending upon their occupational context (e.g. a higher-paying position) and whether according to their occupational context, they expect a positive or negative sanction. Therefore, it is reasonable to expect that job characteristics produce gender differences in the determinants and consequences of illness interruptions. In terms of consequences, job characteristics are predicted to be particularly important because they indicate factors that effect wages and the worker's placement in the strata.

#### *Human Capital Characteristics*

With regards to the consequences of an illness, human capital theory is often used to explain why interruptions create wage penalties. This theory posits that workers build "capital" in the form of job experience, education, on-the-job training and occupational skills. According to this theory, workers who experience occupational-career interruptions receive less pay than workers without interruptions because their human capital diminishes due to lost on-the-job experience, skill, and overall human capital investment (Ben-Porath 1967, Corcoran, Duncan & Ponza 1983, Duncan & Hoffman 1979, Mincer & Ofek 1982, Mincer & Polachek 1974). Human capital theory has been found only partially to explain depressed wages caused by interruptions, especially when comparing men and women. There is evidence that even after controlling for relevant variables, women suffer additional penalties for certain interruptions (Gronau 1988).

Advocates of human capital theory state that workers' decisions regarding their labor force participation strongly influences their wages and wage growth (Corcoran et al. 1983); therefore, workers who expect to have unusual labor force participation patterns form weaker attachments to the labor force and invest less in on-the-job training and experience, which causes more disruptions in their employment (Duncan & Hoffman 1979, Edin & Nyabb 1992). Although most workers do not usually anticipate being removed from the labor force because of a physical condition, and even when it is somewhat anticipated (such as in the case of jobs that have a high risk of injury, e.g. coal miners and construction workers), the exact timing of the illness is unknown (Brim & Ryff 1980, Smith 1985). However, despite the fact that workers might or might not expect to be ill, in many cases, they make decisions regarding whether to remove themselves from the labor force (Magee 2004), based upon how they perceive the interruption to influence their future career attainment. Human capital characteristics include factors that are assumed to alter one's potential for wages – educational degree and age. This literature leads to the expectation that human capital variables should be included in the models to control for their potential to effect whether one has an interruption and the consequences for an illness interruption.

*Sweden as an Institutional Setting*

The institutional context and/or the amount of social protection provided by the state greatly influences both the factors that create differential probabilities of illness and the impact that career interruptions have on wages by reducing or increasing inequalities between women and men. Burström et al. (2003) found that in Sweden, with its generous welfare state, the employment rates for healthy and chronically ill Swedish women were uniformly high across social groups – almost comparable to men's employment rates. By contrast, British women with chronic illnesses had less than half the employment rates of healthy women. They conclude that women and other disadvantaged groups have greater levels of equality in more regulated countries. Therefore, if any country should produce near gender equality, it should be Sweden with its 65-week paid parental leave, universal childcare, and universal healthcare (International Reform Monitor 2005). Even though Sweden has high levels of gender equality and a generous welfare state compared with other industrialized nations, generally, I predict significant gender differences in what factors predict an illness interruption and what factors influence a decrease in wages due to this interruption. More specifically, family and job characteristics are expected to produce different likelihoods for experiencing an illness interruption for women and men. Additionally, women are expected to have a decrease in wages for an interruption, while men are predicted to have a non-significant effect of an interruption.

**Swedish Illness Policies**

Esping-Anderson (1990) considers Sweden an institutional or consensus welfare regime. Accessibility to social programs is based upon citizenship and is available for everyone (at least in theory). Protection is construed as vital and universal, because without protection citizens would be denied a basic standard of living. In a sense, Sweden has been the "ideal" welfare state, in that it adopts generous policies. Many occupational career interruptions (e.g. parental leave, unemployment, schooling and retirement), including illness, carry high replacement wages for long periods of time. Additionally, the high levels of gender equality signifies that if any country was to possess equality in terms of what influences an illness interruption and the consequences for this interruption, it would be Sweden.

Sweden's healthcare is tax-financed (80% through taxes with the remaining financed by federal subsidies and patient fees) and universal in scope. Healthcare is in large part free or low-cost to patients. Families with children receive free care, regardless of family income. Co-payments have risen in recent years, but still remain very low. The cost to the patient is determined on a regional level and by the type of service provided. The care includes health and medical, dental, psychiatric, elderly and pharmaceutical care (International Reform Monitor 2005).

The replacement wages for sickness are 80% (with a maximum threshold) with a supplemented 10% for the first 90 days through collective insurance. Collective insurance is based upon whether the recipient is a resident of Sweden or gainfully employed in Sweden. Long-term or permanent compensation (over 1 year) for illness is given to those for a full or partial disability, based upon their physical or mental incapacity to work. For long-term disability, the amount of compensation does not depend on how long the individual has worked but on the average of the three highest net annual incomes earned in a given period. The number of years in a period depends upon the age of the worker, with older individuals having longer periods (Ministry of Health and Social Affairs 2002).

### **Data and Measurement**

#### *Household Market and Non-market Activities Survey*

The Household Market and Non-market Activities (HUS) survey is a panel survey that started in the 1980s by the Department of Economics and School of Economics and Commercial Law at Göteborg University, Sweden. The focus of the survey is economic behaviors of the household. The survey also includes topics on occupational-career interruptions, family formation, child-care, housing, market work, income and wealth. There are seven waves: 1984, 1986, 1988, 1991, 1993, 1996 and 1998. Refresher samples were added to the original panel sample in 1986, 1993 and 1998. The individual is the sampling unit and the household is defined as the household in which the individual belongs. Within each household, one to three individuals were selected, depending on the composition of the household. In households that were comprised of two spouses, both were selected, and if a third person was identified as a household member and was not already selected, all three were included in the sample. Hence, selection probabilities depend upon household size. Each wave differs in sample size, but ranges from approximately 2000 to 4000.

#### *Likelihood of Experiencing an Illness Interruption*

The survey asks the respondents to list the number of weeks that they were removed from the labor force for their *own* illness. An illness interruption is defined as an interruption lasting more than 8 weeks; therefore, the event is a dummy variable indicating that they were removed for more than 8 weeks. The social protection policies in Sweden led to the choice of 8 weeks as the point of demarcation. In many cases, there is some form of protection provided to residents by the state for more than 8 weeks. Moreover, in defining an illness as more than 8 weeks in duration, a distinction between sick leave and illness is established. Although the duration of social protection varies for each individual, more than 8 weeks is the best estimate for the starting point for durations. Since the focus of this analysis is on the factors

that influence the occurrence and consequences of an illness, there is no differentiation for the type of illness.<sup>2</sup>

Cases were right-censored if they had not experienced an illness interruption or if their interruption was 8 or less weeks. Random censoring occurs when individuals drop out, die, or are otherwise lost before they experience the event. Informative censoring occurs when an individual is censored at time  $t$ , but gives information about their risk of an event at time  $t$ . Non-informative censoring is preferable because it implies that for a set of individuals with the same values of the explanatory variables, individuals cannot be censored because they appear to be unusually high (or low) risk of an event. In this analysis, informative and non-informative censoring were not expected to be present because all individuals have an equal likelihood to report experiencing the event. Moreover, random censoring is not a factor in the analysis because the total number of respondents in the analysis ( $n = 2190$ ) were only those who were in all three waves of the survey (1993, 1996 and 1998)<sup>3</sup>.

It is possible that an individual might have more than one illness interruption. However, for the purpose of this analysis, only the first interruption was the topic of interest. First interruption was differentiated from repeated interruptions because it is theorized that the determinants of first interruptions might vary for subsequent illness disruptions.

The sample was limited to all those who were in all three waves and due to the nature of the question (i.e. whether they were removed from their job), the sample is limited to only those who were currently working or had worked during the year in which the survey was taken. Unfortunately, the HUS survey did not include questions regarding illness for every year. For example, in the 1993 wave, the survey asked if the respondent had been removed from the labor force in 1992, and in 1996, the respondents were asked about their labor force participation in 1995. Therefore, the results of this analysis represent a conservative estimate of interruptions. It is highly possible that the people who experienced illness in 1992, 1995 and 1997 also experienced illness in 1993, 1994 and 1996.

Separate models for women and men were compared in order to test whether women differed from men in regards to their likelihood of experiencing an illness interruption. The factors included in the models are categorized as family characteristics and job characteristics including human capital variables. Family characteristics include the presence of a spouse or cohabiting partner in 1993 and child in the household in 1993. Spouse is a dummy variable that indicates whether the respondent is married or cohabiting in 1993<sup>4</sup>. Cohabitators are combined with married persons due to the high rate of cohabitation in Sweden, in addition to the financial support that a cohabiting partner provides. The variable, child, is a dummy variable indicating the presence of a child in the household 18 years of age or younger in 1993.<sup>5</sup>

Job characteristics include working full-time, a college degree (all other educational degrees are the reference category), and the presence of a blue-collar job. The variable for working full-time is a dummy variable indicating

whether the respondent worked for 40 or more hours at their main job. Respondents were also asked to categorize their job according to whether their job was blue collar, white collar or other. A dummy variable for blue collar was created with the reference category being white collar and other.

Event history analysis was used for estimating the models (see Allison 1984 for an introduction to event history). If no illness interruption lasting 8 weeks or less occurred by the time of interview, the observation is right-censored. Duration of the likelihood of an illness interruption is measured through the use of hazard models. The hazard rate at time  $t$  is defined as the likelihood that an event will occur at time  $t$ , given that it has not already occurred (Box-Steffensmeier & Jones 2004). A commonly used hazard regression model is a Cox regression. In Cox models, the hazard rate is a function of the baseline hazard function, multiplied by the covariates and regression parameters:

$$h_i(t) = h_0(t) \exp(x'b)$$

where:

$h_i(t)$  = hazard at time  $t$

$h_0(t)$  = baseline hazard at time  $t$

$x$  = covariate matrix

$b$  = vector of parameters to be estimated

Cox models are proportional models, but unlike other proportional hazard models (e.g. Gompertz and Weibull), Cox models do not specify a particular distributional form for the duration time, but the baseline hazard and baseline survivor functions can still be estimated. Therefore, Cox regressions are less restrictive than other proportional models.

Cox regressions, unlike other proportional models, have partial likelihood functions that are solely based on ordered duration times and not on the length of the interval between duration times. Therefore, the issue of ties becomes important with Cox regressions. In this analysis the Efron method was chosen because Efron is preferable to the Breslow method in Cox regression (Box-Steffensmeier & Jones 2004). Additionally, the standard errors are adjusted for sample size, to take into account that individuals remain in the model until they experience the event.

### *Consequences of Illness Interruptions*

For the OLS regression analysis, the same three waves of data, 1993, 1996 and 1998, were included. The sample size ( $n=689$ ) reflects the total number of persons who responded to all three waves, were currently working or had worked during the survey year, and reported a monthly job income in 1993 and 1998. The dependent variable is the log of monthly job income in 1998.

The variable for illness for the regressions was constructed in the same manner as in the multivariate Cox proportional hazard model. Respondents were asked to give the duration of an illness, and all respondents who had an interruption lasting more than 8 weeks were coded as a one. Variables were included according to the same categorization system as the Cox model – family characteristics and job characteristics. One additional variable is

included for family characteristic – single parenthood. This is an interaction for the absence of a spouse or cohabiting partner and having a child in the household. Age and age squared were included in the model to account for the curvilinear relationship that age has with income. Monthly job income in 1993 was also included in the model as an independent variable. Therefore, the coefficients represent the change in wages from 1993 to 1998. The coefficients are estimated by OLS regression but the standard errors are robust to account for dependencies in the model. The standard errors are Huber/White sandwich estimators. Additionally, the cases have been clustered in order to account for the same individuals being examined at two time periods. The coefficients can be interpreted as changes in wages.

## Results

### *Sample Selection and Characteristics*

Modeling was conducted in Stata, version 9.2 for Windows (College Station, Texas, USA). The event in this analysis is the likelihood of having an illness interruption ( $n = 136$ ). The duration variable – the theoretical entry into the labor force, age 16 years – was calculated by subtracting 16 from age in 1998; thus the risk of having an interruption begins at age 16 years. All persons ( $n = 2190$ ) remain in the analysis until they experience the event, or not. Taking into account the duration variable and the size of the sample, the total number of year-observations is 77,767.

The mean time span in the labor force is 35.51 years with a standard deviation of 12.51. The range for the duration variable (the amount of time at risk for an interruption) is from 7 to 76 years (results not shown). The descriptive statistics for all of the other explanatory variables that were previously described are given in Table 1. As predicted, women are more likely to experience an illness interruption. The mean for women 0.080 and for men was 0.045, so 8% of women had an illness interruption and 4.5% of men.

### *Likelihood of Experiencing an Illness Interruption*

Table 2 represents two multivariate Cox proportional hazard models for the likelihood of having an illness interruption. For each of the models, women and men were analyzed separately in order to test whether factors that influence the likelihood of having an illness are gender-specific. Model 1 tests the assumption that family characteristics influence the likelihood of having an illness interruption. The presence of a spouse does not significantly effect the likelihood of an illness interruption. Hazard ratios close to one suggest that the hazard rate is in essence invariant to changes to the covariate, meaning that the coefficient has no effect on increasing (or decreasing) the hazard of having an interruption. For model 1, women with children in the household have a hazard ratio of 1.675, which is interpreted as having a child in the household significantly increases the likelihood of experiencing the

**Table 1.** Descriptive statistics for the variables

Variable	Women <sup>a</sup>		Men <sup>b</sup>	
	Mean	SD	Mean	SD
<i>Event and duration variables</i>				
Illness	0.080	0.271	0.045	0.207
Time in the labor force	35.02	14.83	35.99	14.28
<i>Dependent variable</i>				
Log of monthly job income, 1998	9.555	0.400	9.874	0.420
Log of monthly job income, 1993	9.336	0.360	9.723	0.335
<i>Job characteristics</i>				
Work full-time	0.302	0.460	0.619	0.486
Blue collar job, 1993	0.128	0.334	0.123	0.329
College degree	0.295	0.457	0.258	0.428
Age	51.02	14.83	51.99	14.28
Age squared	2822.4	1587.1	2906.7	1545.1
<i>Family characteristics</i>				
Child in the household, 1993	0.594	0.491	0.377	0.485
Single parent	0.044	0.204	0.024	0.154
Spouse, 1993	0.788	0.409	0.833	0.373

<sup>a</sup>*n* = 1078 for all variables except log of income, 1993 (*n* = 403) and log of income, 1998 (*n* = 604).

<sup>b</sup>*n* = 1112 for all variables except log of income, 1993 (*n* = 432) and log of income, 1998 (*n* = 678).

event by approximately 67.5%<sup>6</sup> in comparison with women without a child. The hazard ratio for men is 4.986, which says that men with children have an increased likelihood of illness of 398.6%, although the coefficient for men is non-significant.

A positive parameter indicates that the hazard of experiencing the event – illness – is increasing with changes in the covariate, while a negative parameter indicates a decreasing hazard with changes in the covariate, or in other words that a person has a decreased likelihood of an illness interruption (Box-Steffensmeier & Jones 2004). The coefficient for the presence of a spouse is non-significant for both women and men, which is in opposition of the hypothesis that says that having an additional source of support would increase the chance of illness. The sign for the coefficient for the presence of a child is opposite of the predicted direction but significant, which lends support for the fact women and men have different probabilities of illness based upon the same family characteristics.

Model 2 in Table 2 includes job characteristics in addition to an interaction term for the absence of a spouse or cohabiting partner in 1993 and the presence of a child in 1993. Spouse and child were also included in a separate model (minus the single parent variable) and neither spouse nor child is significant (results not shown). College degree is significant and positive for women but non-significant for men. Women with college degrees – as

**Table 2.** Multivariate Cox proportional hazard model for likelihood of having an illness interruption for women and men

Covariates	Model 1						Model 2					
	Women			Men			Women			Men		
	Regression coefficient	Robust standard errors <sup>a</sup>	Hazard ratio	Regression coefficients	Robust standard errors	Hazard ratio	Regression coefficients	Robust standard errors <sup>a</sup>	Hazard ratio	Regression coefficients	Robust standard errors	Hazard ratio
<i>Family characteristics</i>												
Spouse in 1993 (yes = 1)	0.049	0.296	1.050	-0.587	0.417	0.556						
Child in household, 1993 (yes = 1)	0.516*	0.253	1.675	1.607	0.349	4.986						
Single parent (yes = 1)							-0.962	1.042	0.382	1.644*	0.727	5.177
<i>Job characteristics</i>												
Work full-time							0.017	0.259	1.017	-0.148	0.364	0.863
College degree (yes = 1)							1.127***	0.230	3.086	0.411	0.338	1.508
Blue-collar job (yes = 1)							0.153	0.351	1.165	0.672	0.447	1.957
Wald $\chi^2$	5.10 (2 df)			21.75 (2 df)			25.67 (4 df)			8.74 (4 df)		
Log-pseudo-likelihood	-533.743			-300.596			-524.498			-308.930		
<i>n</i>	1078			1112			1078			1112		

<sup>a</sup>Standard errors are adjusted for sample size.\*\*\**p* < 0.001, \*\**p* < 0.01 one-tailed, \**p* < 0.05 one-tailed.

compared with all other educational degrees – have an increased likelihood of an illness by 208.6%.

The interaction for single parenthood is included because it is theorized that single parenthood is more important in influencing the likelihood of the event than just the presence of a spouse or child. This interaction is significant for men but not for women. Single mothers have a non-significant decreased chance of an illness interruption by 61.8%, while single fathers' significant increased likelihood is 417.7%. However, it should be noted that there are a smaller number of single parents, so the results should be interpreted with caution. This finding is opposite in direction but not magnitude, as predicted by the hypotheses. I expected the sign for both women and men to be negative. The results show that being a single mother does not significantly increase or decrease the likelihood of illness for women, but greatly increases the likelihood for men.

In order to explore this unexpected finding, I calculated the proportions of women and men who experienced an illness interruption by cohort and child in the household. Table 3 shows that among young women with children 9% had an illness interruption over 8 weeks in duration and, among young men with children, 5.4% had an illness interruption. The gap is higher among young people without children: 12.8% women had the illness interruption while only 1.4% men had this type of interruption. Surprisingly, among the oldest cohort of women and men with children, the proportion experiencing the event is relatively high, much higher than for the same cohort but without children. Older individuals might be living in the same household as children but are not solely responsible for the care of a child. Although these older individuals might be increasing this likelihood, the effect is so strong, it is doubtful that it can solely attributed to the several individuals who live with younger generations in the same household. Additionally, it should also be noted that these individuals increased chance of having an illness interruption

**Table 3.** Proportion of women and men experiencing illness interruption, according to cohort and having a child in the household

Have child in household	Yes	No
	Proportion experiencing an illness	
<i>Cohort</i>		
Young (age 23–40 years, <i>n</i> = 536)		
Women	0.090	0.128
Men	0.054	0.014
Middle-aged (age 41–55 years, <i>n</i> = 828)		
Women	0.063	0.080
Men	0.050	0.067
Old (age 56+ years, <i>n</i> = 826)		
Women	0.105	0.052
Men	0.087	0.036

because of their age is not affecting these parameters because age is controlled for in the analysis because the duration variable is constructed from age.<sup>7</sup>

In conclusion, for women, having a child in the household increases the likelihood of having an illness interruption but not for men; however, this changes when examining single parents, where men have a significantly higher likelihood of experiencing an illness interruption if they are single fathers but single mothers' likelihood for the same event does not significantly increase nor decrease. By comparison, single mothers are less likely than single fathers to have an illness interruption, which was the predicted pattern. Furthermore, education significantly increases the chance of experiencing an illness for women but has no significant effect for men. These findings give strong support for the different family patterns that women and men experience, in that women are more likely to be responsible for childcare and household responsibilities. Additionally, the only job characteristic that significantly influences the likelihood of having an illness interruption is having a college degree, but this factor was only significant for women.

#### *Consequences of Illness Interruptions*

In order to assess the differential consequences for women and men of illness interruptions, OLS regressions were performed (see Table 4). The dependent variable is the log of monthly income in 1998. The log of wages in 1993 is included as an independent variable, so the coefficients can be interpreted as change scores. Therefore, these findings can be interpreted as factors that increase or decrease a change in wages over a 5-year span. Model 1 illustrates that having an illness significantly decreases wages for women but not for men. Model 2 incorporates variables for family characteristics and job characteristics. The results indicate that women and men have different consequences for an illness and different wage rewards and/or patterns. After controlling for the relevant variables, illness is still associated with a significant decrease in wages from 1993 to 1998 for women but not for men. In terms of differential patterns of employment for women, working full-time (40 or more hours per week) at the main job has a significant, positive relationship increase in a change in wages for the 5-year span of 1993 to 1998 for women but not men. Having a college degree significantly increases wages among women and men. Having a blue-collar job for women significantly decrease wages over the 5-year span but is non-significant for men.<sup>8</sup>

#### **Discussion**

This analysis contributes to the literature on illness interruptions in several ways. First, illness interruptions are placed in an occupational-career context of employment and gender equality and not necessarily in a public health context. Much of the literature on this topic is concerned with examining the actual illness instead of placing the interruption in an occupational-career context. This paper conceptualizes illness interruptions in more of a career

**Table 4.** OLS Regressions with Robust Standard Errors of monthly job income, 1998 on illness controlling for family characteristics and job characteristics

Covariates	Model 1				Model 2			
	Women		Men		Women		Men	
	Regression coefficients	Robust standard errors <sup>a</sup>	Regression coefficients	Robust standard errors	Regression coefficients	Robust standard errors <sup>a</sup>	Regression coefficients	Robust standard errors
Illness (yes = 1)	-0.103*	0.053	-0.068	0.076	-0.092*	0.046	-0.550	0.078
Log of monthly job income	0.859***	0.072	0.832***	0.053	0.727***	0.097	0.812***	0.065
<i>Family characteristics</i>								
Spouse, 1993 (yes = 1)					-0.061	0.064	-0.031	0.034
Child in household, 1993 (yes = 1)					0.038	0.032	0.004	0.026
*child in household, 1996 (yes = 1)								
<i>Job characteristics</i>								
Work full-time (yes = 1)					0.062*	0.038	0.035	0.042
Blue collar job, 1993 (yes = 1)					-0.063*	0.031	-0.049	0.030
College degree (yes = 1)					0.112***	0.031	0.086**	0.033
Age					0.020	0.016	-0.005	0.014
Age squared					-0.000	0.000	-0.000	0.000
R-square	0.612		0.577		0.657		0.609	
Root MSE	0.242		0.232		0.231		0.227	
Constant	1.544	0.684	1.836	0.517	2.358	0.886	2.223	0.731
<i>n</i>	301		347		299		388	

<sup>a</sup>Standard errors are clustered and are robust, Huber/White sandwich estimates.

\*\*\**p* < 0.001, \*\**p* < 0.01 one-tailed, \**p* < 0.05 one-tailed.

context. Therefore, it is emphasized in this paper that the type of illness is less relevant as how the occurrence and outcomes for illness disruptions vary by gender. In other words, having an illness interruption is not solely a matter of illness, but what effects whether one decides to interrupt one's career. Hence, women and men might have relatively equal chances of becoming ill, but they differ in terms of whether they interrupt their career and how that interruption influences their wages. This paper contributes to the disability literature in that it focuses on gender differences in the social consequences of illness within a career context. Disability studies has construed illness/disability as socially constructed with implications for oppression and inequality. The results indicate that women and men experience illness interruptions differently, with different determinants and consequences for inequality.

Workers make decisions within institutional contexts, implying that women and men differ in terms of how they make decisions about whether they can afford to alter their labor market activity for an illness, accounting for the perceived impact that an interruption could have on their wages. Not all people who are ill alter their labor market activity, nor do only well people maintain their labor market activity.

Additionally, this paper adds to the literature in that it examines a topic that has received very little attention, the determinants or predictors of illness interruptions instead of just the outcomes, the loss of wages, for this disruption. Lastly, this research focuses on illness interruptions in a country with a high level of social protection for its citizen regarding interruptions in labor market activity, in addition to high levels of gender equality, especially in the workforce. Cross-national studies of the determinants of illness have found that institutional context matters. In particular, the type of welfare state influences the rates at which certain groups "win" or "lose." The degree of regulation and protection provided by the state influences disadvantaged groups differently than more advantaged groups, with the more generous welfare states having more equality; hence, more disadvantaged groups are better off in a more regulated labor market. The question becomes, even in a generous welfare state, to what extent are there gender differences in factors that determine whether one has illness interruption and the consequence of illness. The results of the analyses suggest that even in arguably the most generous state, there are still gender differences.

Regarding the consequences of illness interruptions in Sweden, further investigation is required to uncover to what extent this illness wage penalty for women is a function of discrimination in the labor market or a function of women employing strategies in the workplace that lessen the burden of employment and family responsibilities (e.g. lower wages for more flexibility in the labor market). This paper cannot answer the question as to why women experience this female wage penalty for illness, but it does provide a starting point for the investigation. Hence, the policy implications of this research hinge on resolving this question.

In industrialized countries, especially in the more generous welfare states, there is a great deal of concern about providing adequate social protection for

single mothers; however, little attention has been paid to single fathers. Although the single parent findings in this paper should be interpreted with caution, these findings lend support to the idea that perhaps, special efforts should be made to provide social protection to single fathers. Hence, more research needs to be conducted on single fathers in order to uncover possible disadvantages in the labor market for illness interruptions.

### **Conclusion**

This analysis has focused on answering two questions: whether the same factors influence the likelihood of having an illness interruption for women and men, and if the consequences for the interruption are the same for women and men. The results indicate that women and men differ with regards to both the predictors and outcomes of illness. Women with children have a significant increase in the likelihood of having an illness, although this relationship becomes non-significant when other control variables are included. However, the increased likelihood of an illness for those without a spouse or cohabiting partner but with a child in the household is highly significant, for men but not women. However, these results should be interpreted with caution, due to the smaller number of single parents. This result is surprising but is still in conjunction with the theory. I expected that the hazard ratio and coefficients for single mothers would be negative, which is the finding, although the coefficient is non-significant. Single fathers have a significant, positive likelihood. I explain this result as a function of how actors within the welfare state use the system to meet the needs of their personal situations and how workers make decisions regarding an interruption with their occupational-career context.

Women are more likely to be the family caretaker and are cognizant of how taking an illness interruption for oneself might be negatively perceived, and hence, take illness interruptions less often than men, if they are single parents. The hazard ratio for single fathers indicates that they are increasingly more likely to take an interruption for their own illness. However, it is questionable as to whether these workers are actually more ill, but instead, are more likely to take an illness interruption in order to care for others in the family – even more than women’s likelihood to care for others in the family. All gender literature attests to women’s greater family responsibilities, which would suggest that women, especially single mothers are more likely to take an interruption because of these responsibilities, and the results of this analysis found that women do take illness interruptions more than men. Consistent with the literature, family responsibilities do appear to influence the likelihood of illness. Single fathers have an increased chance of the event, but not single mothers, which is in opposition to the research expectations (which predicted both single mothers and fathers to have a decreased chance), but it is an interesting finding. This finding suggests that single mothers, in particular, are making decisions regarding their labor market activity based upon preconceived notions of how an illness could effect their future career attainment and chose to take illnesses less often than men.

This research also attests to gender differences in the consequences for an illness. Women have significant decreases in wages for illness, while men have no effect. This finding is in agreement with the idea that women not only perceive a negative impact of taking an interruption (which is why single mothers are less likely than single fathers to experience an illness interruption) but are correct in their assumption. The results also demonstrate differences in women and men's wage-reward patterns, where in only a 5-year period, job characteristics, such as having a blue-collar job, are associated with a significant, negative effect on wages. Additionally, working full-time increase wages over a 5-year period for women but not for men.

### Acknowledgements

The author is indebted to Kazimierz M. Slomczynski for guidance and expert advice in the formulation and revision of this topic and on previous versions of this paper, to the *Scandinavian Journal of Disability Research* guest editor, and to the three anonymous reviewers for their helpful advice and suggestions.

### Notes

- <sup>1</sup> It is important here to note that I am not measuring whether a person will become ill; instead, I focus on whether they are removed from the labor force due to their own illness.
- <sup>2</sup> The exact penalty for an illness varies depending on the type of health condition and the type of health indices used (Chirikos 1993); however, the type of illness is not distinguished in this paper because all illnesses can be construed as long-term, hence the type of illness matters less.
- <sup>3</sup> These waves were selected due to the similarity in the questions asked.
- <sup>4</sup> 1993 was chosen for all of the variables (except log of wages in 1998 – the dependent variable in Table 4) because this signifies the starting point in which an interruption could occur.
- <sup>5</sup> An interaction for private sector job in 1993 and child in the household in 1993 was also included in the analysis, but was removed due its non-significant effect.
- <sup>6</sup> To make the interpretation more meaningful, I calculate the  $(e^{\beta} - 1) * 100$  value for the hazard ratios.
- <sup>7</sup> Age and age squared cannot be included in the model due to multi-collinearity problems with the duration variable.
- <sup>8</sup> Interactions for illness and a college degree, and illness and working full-time, were also included in previous models but were removed because of non-significance.

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