



Sick leave in Sweden following separation among parents

Anna-Karin Nylin

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Department of Sociology, Stockholm University

Abstract

Leaning upon the assumption that separation poses both economic and emotional strain for the individuals involved and can be detrimental to one's health, this study explores whether separation increases the use of sick leave for mothers and fathers in Sweden and how this relationship varies over the years around the separation. By relying on register data covering all married or cohabiting parents in Sweden with a youngest child below 18 in 2005–2020, I distinguish those who separate sometime between 2009 and 2012. A panel approach that covers couples longitudinally allows me to track sick leave from 3 years before separation, during the separation year, and for 8 years after separation and compare sick leave levels between separating and partnered parents. To disentangle possible causal effects from selection effects in relation to separation, within-group variation has been exploited using FE methods. Overall, the study indicates that both selection mechanisms and causal effects from separation can explain parents' sick leave uptake both temporarily and over a longer period. Sick leave patterns following the separation show that mothers experience both a temporary peak during the separation year and cumulatively growing sick leave rates compared to partnered mothers thereafter, whereas fathers, especially those with primary education, have steady but elevated long-term sick leave rates compared to partnered fathers.

Keywords: parenthood, separation, union dissolution, sick leave

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Introduction

The number of individuals receiving sick leave compensation in Sweden has averaged close to 600.000 yearly, of which the share of women persistently has reached just over 60 percent over the last decades (The Swedish Social Insurance Agency, 2022). This gender gap in sick leave emerged in the 1980s and changes in gender differences in self-rated health or in changes in the work environment have not fully been able to explain this gap. Researchers instead ascribed the findings to the rising labour supply of women in combination with parenthood (Angelov et al., 2013). The Swedish Social Insurance Agency has likewise pointed to the double workload that women carry, by participating in the labour market to an equal extent as men while also carrying the lion's share of care work over children, as a risk factor behind sick leave (The Swedish Social Insurance Agency, 2015). Although some international research has found a link between having children and increasing sick leave risks to be weak (Allebeck & Mastekaasa, 2004; Markussen et al., 2011; Mastekaasa, 2000), a recent literature review by Fransson and colleagues (2021) contest this to some extent. Although most women do not experience any long-term health problems after having children, the authors found that lower labour market performance, including sick leave, among women compared to men could partly be explained by deteriorating somatic and mental health after having children. They further found that it is foremost among socioeconomically weaker women that underlying health problems may be amplified when having children.

Within the marriage and health literature, divorce is presented as a potential driver of poor health across a range of outcomes such as self-rated health, mental health, and mortality (Hughes & Waite, 2009; Liu & Umberson, 2008; Rendall et al., 2011; Simon, 2002), as well as work absence due to sick leave (Blekesaune & Barrett, 2005; Brüggmann, 2020; Couch et al., 2015; Dahl et al., 2015; Tamborini et al., 2016). Although equality has improved over time, a gendered pattern in care burden related to children following separation exists. For instance, despite high levels of shared physical custody, the children who do not live equally much with both parents tend to more often live only or mainly with their mother (Statistics Sweden, 2014). This suggests that women may face greater stress and strain than men after a separation. Separation may thereby intensify the already documented gendered patterns in sick leave. However, studying sick leave in relation to separation is rare, and previous Swedish studies are few. Understanding the role separation plays in the development of health for parents is important. Although compensation for sick leave protects the livelihood

of individuals during periods of sickness, health impairments that are restricting individuals from working have direct negative consequences for individuals as compensation levels are below what one would earn when working¹. This financial concern may be rather distinct among parents given the support burden that they have for their children. The concerns may increase in severity the more children a family has and may be amplified among single parents if costs for the children are not shared between the former spouses, which they often are not (Statistics Sweden, 2014).

In this paper, I lean upon the assumption that separation poses both economic and emotional strain for the persons involved up to the point that it can be detrimental to one's health. Theories vary on supporting explanations based on whether health-related consequences from break-ups are chronic, or time-dependent, or if they simply are a consequence of selection. The research questions I aim to answer in this paper are:

Does separation have an impact on sick leave for mothers and fathers in Sweden and how does sick leave vary over time around the separation?

I study sick leave rates by comparing partnered and separating parents who receive compensation for being absent from work due to illness or disease from the 15th sick day. I rely on register data covering all married or cohabiting parents registered in Sweden with a youngest child below 18 in 2005 to 2020 and distinguish those who separate in 2009 to 2012. I apply a panel approach that covers couples longitudinally and tracks sick leave from 3 years before separation, during the separation year and for 8 years after separation. As eligibility for sick leave is based on employment, Sweden constitutes a prime location to study separation and sick leave patterns for both women and men as very few women opt out of the labour market when becoming parents. To my knowledge, this is the first nationally representative study that tracks sick leave from before, during and after separation for both women and men in Sweden. Previous research has been restricted to only cover women (Floderus et al., 2012) or only cover small regional samples (Hallberg & Mattsson, 1992) in the country. Additionally, previous research has been limited to studying divorce effects due

¹ The compensation level from the Swedish national insurance system varies over time and since 2005 the level was, at its minimum, set to 78 percent at the beginning of the sick leave. Over the course of the sick leave period, the compensation level incrementally lowers. Sick leave periods lasting longer than a year has since 2008 (when compensation levels distinctly lowered) been compensated at a level just above 70 percent. A substantial amount of persons also hit the ceiling for the maximum amount of cash benefits that are payed. Additionally, individual compensation levels may be higher due to private insurances.

to data limitations on separations from cohabitation (Blekesaune & Barrett, 2005; Brüggmann, 2020; Couch et al., 2015; Dahl et al., 2015; Tamborini et al., 2016). The data used in this study offer the possibility to include the large portion of cohabiting parents in the analysis. This is of importance for the Swedish case as having children within cohabitation is a common practice in Sweden, and relatively high divorce rates are complemented with even higher separation rates of cohabiting parents (Andersson, 2002).

Theoretical framework

Theoretical viewpoints within the divorce health literature originate from social role theory (Kiecolt-Glaser & Newton, 2001; Koball et al., 2010; Ross et al., 1990) where divorce is addressed as the event that removes individuals' marriage benefits carried through protective effects of financial resources and material wellbeing (Halpern-Manners et al., 2015; Lillard & Waite, 1995; Wilmoth & Koso, 2002), social support (Idler et al., 2012) and health monitoring of spouses (Umberson, 1992). Because of this, divorced individuals experience poorer health than married persons do. The main competing explanation for this is found in selection theory where it is argued that divorced persons have poorer health already before the separation and that they are selected into divorce to a higher degree than individuals with better health prospects (Blekesaune & Barrett, 2005; Fu & Goldman, 2000; Joung et al., 1998; Karraker & Latham, 2015; Mastekaasa, 1992). Traditionally, these selection processes have been argued to be particularly strong for men due to the social expectation of men as breadwinners. If health declines among men limit their ability to work, union dissolution may follow more often, or more quickly, than would be the case if women experience health declines. However, the empirical findings are not cohesive. Some studies are restrictive in drawing conclusions about gendered differences (Blekesaune & Barrett, 2005; Fu & Goldman, 2000) while other studies show contradictory results. Some argue that selection effects are stronger for men (Joung et al., 1997) while some argue that selection effects are stronger for women (Karraker & Latham, 2015; Mastekaasa, 1992).

Over time, the divorce health literature has advanced. Rather than viewing divorce as a time-specific event, it is now viewed as a process unfolding over time (Amato, 2000) that is characterized by fluidity and variation (Demo & Fine, 2022). This shift carried with it the realization that changes in well-being and health can occur already during the relationship and that poor health in the years preceding divorce should not automatically be attributed to

selection, even though selection cannot be ruled out as playing a role alongside causal explanations (Johnson & Wu, 2002; Wade & Pevalin, 2004).

The uncoupling process is described as a gradual breakdown with growing apathy and unhappiness (Kayser & Rao, 2006) or growing estrangement and dissatisfaction (Emery, 2011) that, according to Amato (2000), reaches a point when stress and strain peak in response to the crisis of separation. When this peak occurs varies between individuals, even within couples as it is argued to be closely related to whether one is initiating the breakup or not. However, in his divorce-stress-adjustment perspective, Amato (2000) argues that most individuals will adapt to their new life, and then stress and strain levels decrease. However, the author also acknowledge that for some, chronic stressors related to being single continue to affect their health and well-being long after a break-up.

Although the crisis and chronic strain models, referenced by Amato (2000), are usually considered competing models, Lorenz et al. (2006) show that they might very well be complementary, as different health outcomes interact differently with time. Volatile outcomes, such as psychological distress, are more reactive to acute stressors like the ending of a relationship and are therefore more suited to explanations such as the crisis model. Physical illness on the other hand is likely to accumulate incrementally in response to more stable dimensions of chronic stress that single life entails (Lorenz et al., 2006).

Education and health are strongly interlinked and across countries, adults with higher educational attainment have better health compared to less-educated adults (Raghupathi & Raghupathi, 2020). The cumulative advantage and disadvantage theory (CAD) stipulate that risk factors also accumulate over the life course, impacting not only the individual but also increasing heterogeneity between groups in later life (Dannefer, 2003). This is often taken to mean that inequality between groups grows over time as the advantage versus disadvantage of resources and rewards such as career position, income, wealth, or health accumulates (DiPrete & Eirich, 2006). Hence, health implications following separation may appear years later and, in line with the cumulative advantage-disadvantage theory, also risk widening with age (Elder, 1969) and exposure to singlehood. However, aging might also work as a leveller (House et al., 1990, 1994) and differences between coupled and single persons may instead attenuate as people age. Ferraro and Kelley-Moore (2003) suggest that health disadvantages that have accumulated over time may be compensated by ‘risk factor elimination’, exemplified in their study as weight loss. Applying this logic to the case of separation,

entering a new relationship may compensate for disadvantage that has accumulated during the years as a single parent. To put this in terms from the social role theory, a new relationship would reinstate the protective effects that marriage carries.

From a theoretical viewpoint, both women and men experience distress in relation to a union dissolution. However, the reasons behind the distress following separation vary between women and men. Men are assumed to experience a substantial decline in social support (Shor et al., 2012), and suffer more from loss of social control than women (Umberson, 1992), for example, by spending less time with their children following the break-up. Women's distress following separation is instead likely to stem from higher financial strains (Andreß & Bröckel, 2007; Mortelmans, 2020), which may also be amplified by increasing care burden when having sole custody over children.

To summarize, theories render expectations that effects vary over time from separation. Regardless of supporting crisis or cumulative effects, theoretical perspectives have put a strong emphasis on negative health consequences following break-ups. Effects are also expected to be gendered. However, as Amato (2000) points out, the focus on negative effects may be a bias in both theoretical focus and research and if more studies were to explicitly focus on positive outcomes, then the number of studies documenting beneficial effects of divorce would be larger.

Previous research

Studies focusing on the outcome of work absence from sick leave have both investigated the connection between health and having children as well as the impact from divorce, although the later mentioned studies are still few.

Parenthood and sick leave

Previous studies linking increased sickness to being a parent have found varying results. Reports from both survey based samples (Lidwall et al., 2010) and register based total populations (Angelov et al., 2013; Lidwall & Voss, 2020; The Swedish Social Insurance Agency, 2015) have found parents in Sweden to be overrepresented in sick leave while international studies have presented mixed evidence on whether children are associated with increased sick leave risks or not (Allebeck & Mastekaasa, 2004; Markussen et al., 2011; Mastekaasa, 2000). A systematic review from 2017 indicate that work-family conflict may

contribute to the gender gap in sick leave, as work-family conflict is associated with later sickness absence, especially for women (Nilsen et al., 2017). A recent literature review summarises that it is mainly among socioeconomically weaker women where underlying health problems are being amplified when having children (Fransson et al., 2021). Overall, statistics show that sick leave rates follow a negative gradient over education, meaning that the higher the education, the lower the sick leave rate is (Lidwall, 2021). In a Swedish study, Lidwall and Voss (2020) found the connection between parenthood and sick leave to vary between different families. Those sharing care work equally within heterosexual couples experienced increased sick leave risks compared to couples with a more traditional division and the study point out that although family-friendly policies in Sweden are facilitating a dual earner lifestyle, the policies do not fully counteract work-life demands of parents. Floderus and colleagues (2012) focused on women and detected increased sick leave risks among mothers in Sweden, but found that the risk of sick leave decreased with age. However, this decrease did not appear to happen among single mothers.

Separation among parents and sick leave

Studies suggest that divorce increases sick leave risks among parents and that the risk varies before, during, and following the year of divorce. Most of these studies are located in northern Europe or the United States, countries that are considered to have low social and legal barriers to divorce and hence have less selection into separation than elsewhere (Kalmijn, 2010). However, selection may still pose an important explanation. Blekesaune and Barrett (2005) studied sick leave in Norway over a five-year period surrounding divorce and concluded that increasing sick leave following divorce was mainly due to selection of the less healthy into pathways leading to divorce. However, by extending the study period to start six years before the divorce, Dahl and colleagues (2015) presented contradicting results. They found that the sickness absence rate in Norway increased in the years preceding the divorce, peaked in the year of divorce, and stayed at a higher level for at least 5 years after the divorce compared to before the divorce. Six years before the divorce, the rate was similar to those who stayed married, leading the authors to question the selection theory. Had they started the study period closer to the event of divorce, the study would have echoed the results of Blekesaune and Barrett (2005) but disregarded the fact that divorce is a process unfolding over time and likely causes increased sick leave risks during the years preceding the divorce. The authors do not, however, completely rule out selection playing a role, but rather state that it is unlikely that selection would be the main explanation for increases in sick leave risks

around divorce. Further, the study showed that the short-term response in sick leave and the significant long-term effects are especially evident among women with children. Although fathers did have higher sick leave rates than men without children, they seemed to better adapt to pre-divorce levels of sick leave than mothers did. Following the initial peak in sick leave, mothers displayed increasing sick leave rates over time.

Focusing on health in the United States for a period of 20 years following divorce, the importance of remarriage is highlighted. The research shows a significantly higher cumulative probability of work disability among both women (Tamborini et al., 2016) and men (Couch et al., 2015) who do not remarry. This lasting impact of divorce is influenced, but not radically changed, by economic hardship, work history or selection into divorce. However, remarriage, if it stays intact, lowers the probability of work disability. This may be due to selection into remarriage and/or due to health benefits associated with marriage being reinstated and overturning any cumulative disadvantage from the years lived as a single household.

However, some research finds no substantial differences in the effects of divorce on work disability by remarriage (Blekesaune & Barrett, 2005), while other research suggests that marriage benefits from a second marriage are smaller than for first marriages (Carr & Springer, 2010). Overall, research indicates that remarriage rates are lower for women than men (de Graaf & Kalmijn, 2003; Maslauskaitė & Baublytė, 2015; Shafer & James, 2013; Wu & Schimmele, 2005). Although some research suggests educational or other socio-economic differences in remarriage rates (Payne, 2018), most studies show that educational differences only apply to first marriage and that educational differences are weak or non-existent when it comes to reforming families (de Graaf & Kalmijn, 2003; Shafer & James, 2013; Turunen, 2011).

Although previous research shows that both women and men may face health concerns in relation to separation, women and men may display different patterns in sick leave. As seen in the study by Dahl and colleagues (2015), women with children seemed to face cumulative effects as their sick leave rates continued to increase following the initial peak during the divorce year. Overall, previous studies have found that women are more likely to seek health care than men are (Galdas et al., 2005; Mackenzie et al., 2006; Matheson et al., 2014; Thompson et al., 2016). Unlike earlier studies, a recent study measuring the health consequences of divorce in western Germany have found gender differences to the detriment of men. The study shows that work disability uptake sums up to 13.4 more days among divorcing men compared to a control group and only 4.1 more days among divorcing women

(Brüggmann, 2020). The author did however point out that this large gender difference may be related to women often working marginally or part time in western Germany and thereby may have adopted different strategies to manage health impairments compared to men. The study did to some extent support selection theories as work disability uptake was more common already before the divorce. However, temporary effects were also evident, with disability rates increasing around 3–4 years before the divorce and peaking during the divorce year for women and the year after divorce for men, before adapting to the levels found 7 years before divorce (Brüggmann, 2020).

Hypotheses

Derived from theories in the divorce health literature, three mechanisms visualize sick leave according to different time trends over the separation process. Possible selection mechanisms would be discerned by higher sick leave rates for separating parents compared to partnered parents already before the separation takes place, with sick leave rates staying higher during and following the separation. A possible crisis effect would manifest as a temporary peak in sick leave during the separation year, whereas a possible cumulative mechanism effect would show up as growing differences in sick leave between separating and partnered parents.

Traditionally, selection processes have been argued to be particularly strong for men due to the social expectation of men as breadwinners. However, the breadwinner role of men is arguably weak in Sweden, where a dual earner-carer model instead is in effect. Hence, I expect both women and men to be affected by selection. In previous literature, selection, crisis, and accumulation are often presented as competing models, but previous findings rather support a viewpoint where the models complement each other. *I hence expect that both selection and causation explain sick leave differences between separating and partnered parents and I hypothesize that separating women and men display higher sick leave rates compared to partnered women and men before separation—demonstrating selection effects—but that high rates remain also during and after separation in models adjusted for selection effects (H1).* While I, in H1, expect selection to impact both women and men, this is not necessarily the case for both of the causal mechanisms that also may vary depending on education, as explained further down.

Although the crisis model suggests that strain and stress from separation can be the most intense at different time points for different individuals, there is no reason to believe that the

shock of separation would have different impacts on women and men or between parents of different educational attainments. *Based on the highly disruptive nature of separations, I expect the sick leave rate for women and men to temporarily peak around the year of separation compared to partnered parents, regardless of the parents' educational attainment (H2).*

When it comes to the cumulative effects, I expect a significant effect for women but not for men for various reasons. Women usually experience significant financial consequences following a separation (Andreß & Bröckel, 2007; Mortelmans, 2020), and can therefore be expected to suffer from financial stress. Additionally, children often reside with their mother after separation, contributing to a heavy workload following separation as women balance work and childcare. When chronic stressors like these continue to impact life, stress and strain may accumulate causing increasing sick leave rates over time. Men on the other hand, tend to form new romantic relationships, reinstating their 'marital benefits' which in turn should lower their sick leave risks. *I hence expect separating women to experience cumulatively increasing sick leave rates compared to partnered women over time from separation, while men do not (H3).* Following the concept of cumulative advantage and disadvantage, negative health consequences following separation are likely stronger the fewer resources one has while access to greater resources equips individuals with means to better handle the consequences of a separation. *The cumulatively increasing sick leave rates for separating women, hypothesized in H3, is therefore expected to be particularly articulated the lower the educational attainment among the women, while for men, no cumulative effects are expected regardless of educational attainment (H4).* If family formation after a union dissolution were to differ between socio-economic groups, it would be possible that groups of fathers whose 'marital benefits' are not reinstated would experience similar cumulative effects on sick leave as I expect women to do. However, research mainly shows small or no educational or other socioeconomic differences in stepfamily formation (de Graaf & Kalmijn, 2003; Shafer & James, 2013; Turunen, 2011), which is why I do not expect any group of men to experience cumulative effects.

Data and methods

Population

The data used in this study is derived from population registers covering the total population of Sweden. Starting with a full sample of all married and cohabiting parents, 0-64 years old, registered in Sweden with a youngest child below 18 in 2005 to 2020, I distinguish those who

separate in 2009 to 2012. I apply a panel approach that covers couples longitudinally and, following the argumentation that separation is a process unfolding over time, I track changes in sick leave for 3 years before separation, during the separation year, and for 8 years after separation compared to when being partnered. The observation years in question have been selected on the basis that sick leave can be traced without any radical policy changes from 2005 and the separation years are selected to get a sample where all who separate can be followed for an equal amount of time before and after separation. To keep the data limited to parents, I censor research subjects when their youngest child turns 19. This censoring amounts to 23 percent of the original number of observation years. Censoring also takes place in a few cases when the youngest child's other parent dies; if not, they would wrongly have been included as separations (0.3 percent of the original number of observation years). To avoid the estimated sick leave being affected by pregnancy-related issues, as well as eligibility issues during parental leave, I have further restricted the analysis to cover only observations from when the youngest child was 2 years old. At this age, almost all children in Sweden are attending pre-school (The Swedish National Agency for Education, 2023). Sensitivity analyses showed that this only affected the estimates of women in the years directly surrounding the separation, while men were not affected. The reason why men are not affected is probably due to them taking considerably shorter periods of parental leave (and of course by never being directly affected by pregnancy-related health issues). In total, 8.739.206 observations of women and 8.641.401 observations of men can be followed. However, missing information on a few independent variables further restrict the number being analysed. If income from the year before the separation is unknown, or amounts to zero, the observations are not included in the analyses. For a small portion of the population, educational background is also unknown. In total, the number of observations to be analysed are reduced by 11 percent among women and by 7 percent among men. The larger portion stems from unknown or lack of income.

Sick leave

The variables analysed in this paper are derived from the 'Longitudinal integrated database for health insurance and labour market studies' (LISA). In this database, Statistics Sweden has gathered a vast amount of variables from different registers. The measure on sick leave originates from the Swedish Social Insurance Agency who compensates individuals for lost income from employment from the 15th day of the sick period. For the first 14 days, the

employer pays sickness benefits (The Swedish Social Insurance Agency, 2022). Information about sick pay paid from the employer is not available through the register system and short-term absence from work due to illness or disease is hence not included in the measure of sick leave used in this paper. This is however not a drawback as long-term absences from work are more likely to reflect serious health problems than shorter absences, which may also be more strongly impacted by individual behaviour and seasonal variations as absences up to a week do not require a medical certificate. However, sick leave issued based on a doctor's medical certificate is still subjective and cannot fully reflect a person's health status (Hägglund & Johansson, 2016). Poor health may very well be present but not assessed to reduce one's work capacity which is needed to be granted sick leave compensation (The Swedish Social Insurance Agency, 2022). Nevertheless, sick leave is an important factor with financial impact as it does not fully compensate for lost income. Before 2005, the length of period paid from the employer has varied between years, which is why the observation period begins in 2005. Following previous Norwegian studies (Blekesaune & Barrett, 2005; Dahl et al., 2015), where the insurance system is similar to that in Sweden, *sick leave* is treated as a dummy variable that takes the value of 1 if there is a reported period of compensation for sick leave, regardless of the extent of the sick leave. A more refined operationalization using number of days with sick leave compensation would have been an alternative approach. However, given that sick leave can be taken for either 100, 75, 50, or 25 percent a day, two persons experiencing sick leave during the same period may have vastly different total leave lengths when measured in days due to various levels of daily sick leave uptakes. In addition, and more importantly, as sick leave in the registers only start to count after the first 14 days each period during a year, a person with two registered sick days may actually have a total of 16 days (1 period=14 days + 2 days) or 30 days (2 periods=(14 days + 1 day) + (14 days + 1 day)).

Independent variables

The main independent variable used in the analysis is a time varying variable of *civil status*. Partnered parents, those who are living with their youngest child's other parent, either in a marriage or in cohabitation, are the reference group and are coded as 0. Everybody is coded as partnered until 3 years before separation from when parents are tracked up to 8 years after separation.

Sick leave rates tend to vary between years and depend on person's age. To account for period effects in sick leave, I include *year dummy* variables and control for *age* categorized in

groups of 20-29 (reference category), 30-39, 40-49 and 50-64. According to theory, age may also work as a leveller to any cumulative disadvantage that may take place.

Multiple variables controlling for the effect of children are added to the models. Assuming that younger children are in need of more care work than older children and that the number of children is increasing the total care burden in the family, two variables were created to control for this. *Number of children (below 19)* was grouped as 1 child (reference category), 2 children and 3+ children. The *age of the youngest child* was categorized in several groups where 16-18 is the reference category. The rest of the categories are following the age division of the Swedish schooling system and is divided between 2-6, 7-9, 10-12, and 13-15.

Given that income and education relates to working conditions, health behaviour, as well as health selection and selection into marriage and separation, both factors are considered in the models. Income including transfers from the year before the observation year is categorized in quartiles and are adjusted to the inflation of 2004. Those without earnings are set to missing to not contribute to the model, as they are less likely to be eligible for sick leave.

However, this is a rather crude approximation for eligibility as sick leave is compensating for lost income from work during the sick period and is not based on previous earnings.

However, sensitivity analysis indicate that sick leave levels get underestimated for the groups with the lowest socio-economic positions if the analysis is based on a population including those with 0 SEK in earnings. This is in line with the Social Insurance Agency's analyses on how to define the size of the group with social insurance for sick pay (Lidwall, 2021). Of the total observations for women, 11 percent is set to missing income, while the corresponding percentage for men is 7. *Education* was grouped into three levels consisting of primary (reference category), secondary and tertiary level. Primary education in Sweden covers today 9 years of obligatory schooling. Secondary education most often covers 3 years while the number of years in university level schooling varies more as not everybody stays for a degree. A small group consisting of less than 1 percent have unknown level of education.

Modelling

Following the recommendation of Mood (2010), I rely on linear probability models when estimating parents' sick leave rates before, during and after separation compared to being partnered. In the first set of analyses I compare a model where differences in sick leave rates are estimated using Ordinary Least Squares (OLS) with one using Fixed Effects (FE). As theoretically argued in the selection model, it is possible that poor health exists pre-separation

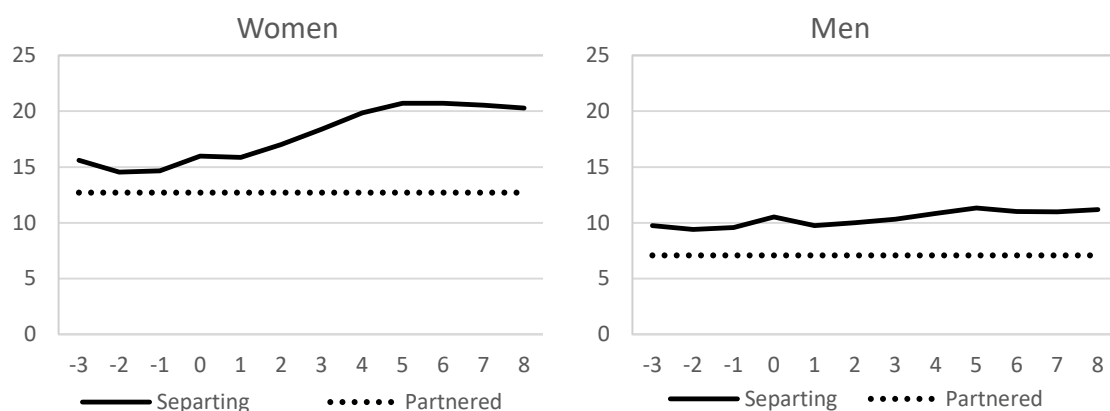
and not necessarily due to the separation itself. With a FE model, all unobserved time-invariant variables, such as chronic poor health or other variables causing chronic poor health, are controlled for. By comparing sick leave rates estimated by OLS and FE, we may gain a sense of the effect selection may have on the uptake of sick leave. In the second set of analyses, I focus solely on the results from the FE-models. To be able to discern any socio-economic differences that may occur in relation to sick leave, I run the second set of analyses separately for three educational groups. All models are run separately for women and men as sick leave varies and possibly interacts differently with parenthood between the sexes.

Results

Descriptive statistics

Of 1.071.011 women and 1.097.152 men, 7 percent of both women and men separated in the population under study. As seen in Figure 1, the share of separating women who took sick leave amounted to 15 percent before the separation took place. The share then increased to at most 20 percent towards the end of the study window. Men, instead experienced a sick leave level of around 10 percent before separation, with only a minor increase over the years. On average, 13 percent of women and seven percent of men experienced sick leave as partnered.

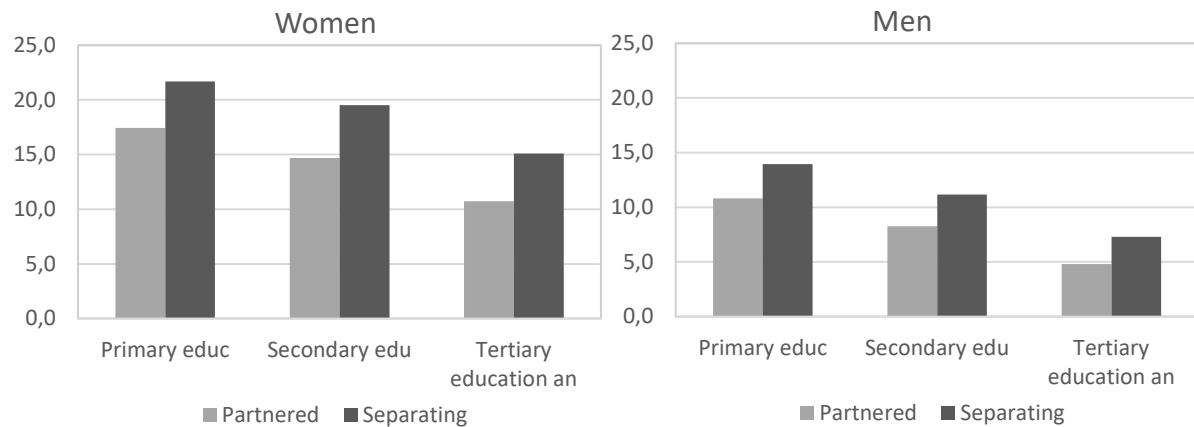
Fig. 1. Share in sick leave among partnered and separating mothers and fathers with at least one child 2-18 years old



To visualize the clear negative gradient that exist in sick leave levels over educational background, Figure 2 show average sick leave rates. Both partnered and separating women and men with primary education experience the highest levels of sick leave while the lowest levels appear among the tertiary educated population. Additionally, the descriptive statistics show that the difference between separating and partnered parents are roughly the same

regardless of educational level. Numbers of observations over additional independent variables can be found in Appendix Table 1.

Fig. 2. Share in sick leave among partnered and separating mothers and fathers with at least one child 2-18 years old, by educational background



Analyses

Main effects of sick leave rates are here presented graphically while marginal effects and the full results from the linear probability models are presented in the Appendix. Figure 3 illustrates the difference in sick leave rates measured in percentage points between separating and partnered women and men before, during, and after separation using OLS and FE. Estimates from the OLS model are shown on the left-hand side and estimates from the FE model are shown to the right.

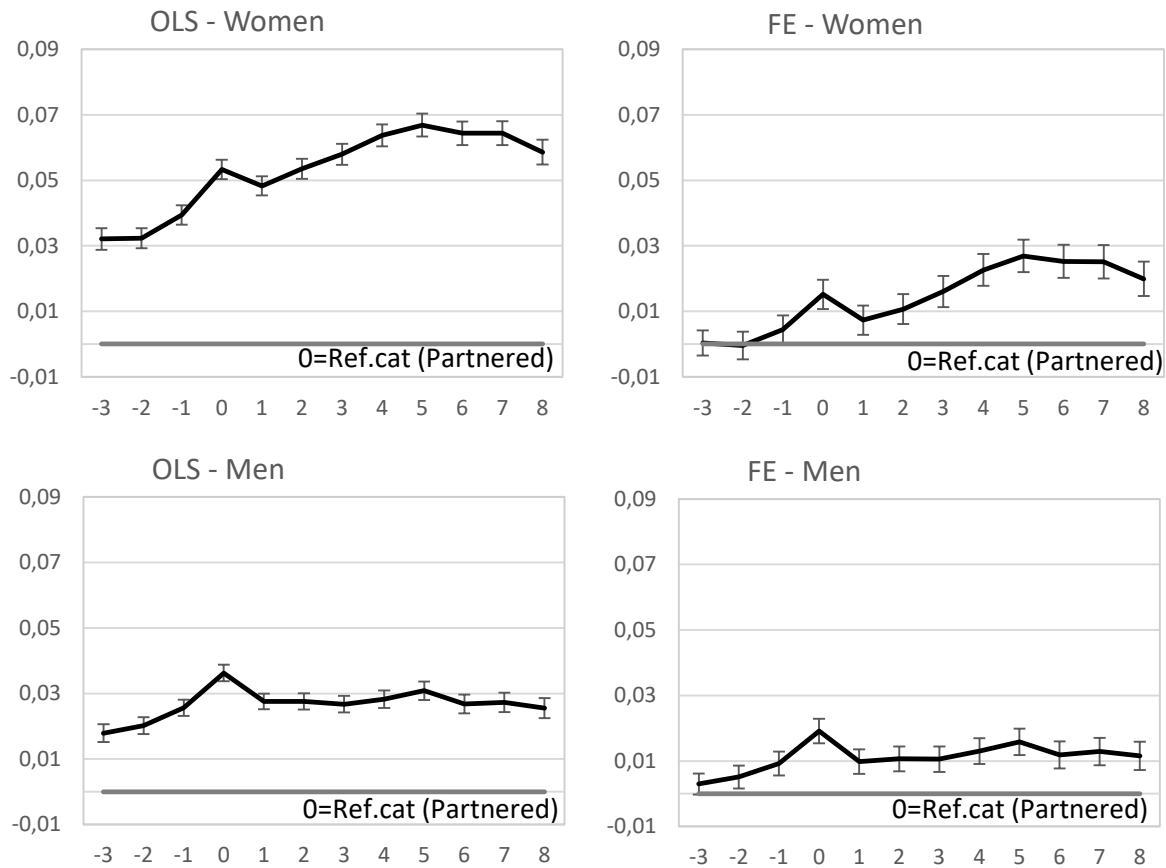
Focusing on the results from the OLS models first, both women and men who separate have higher sick leave rates already before the separation compared to partnered women and men. Focusing on the years closest to the separation, the difference between separating and partnered parents increased during the year before separation, peaked during the separation year, and then decreased. The difference in sick leave rates between separating and partnered women increases from two years after separation and surpasses the difference noted during the separation year. By five years after separation, sick leave rates start to level out close to 7 percentage points higher than for partnered women. For separating men, sick leave rates following the separation year instead stay stable at around 3 percentage points above partnered men for the rest of the study window. Sick leave trajectories presented as levels instead of differences can be found in Appendix Figure 1.

The fact that sick leave rates are higher among separating women and men already three years before the separation year indicates that selection effects could be at play. In an effort

to ‘net out’ these initial selection effects, the same models are applied using FE. As seen in the graphs to the right in Figure 3, the rates of sick leave among separating women and men are no longer statistically significantly different from the reference category of partnered parents three years before the separation. This is to be expected in a model where selection effects are successfully controlled for. If the difference in sick leave rates between separating and partnered parents also would disappear for the remaining years in the study window, we would have been able to conclude that differences are likely mainly due to selection into separation and pre-existing poor health. Even after applying fixed effects to the model, however, differences between separating and partnered parents’ sick leave rates exist. However, when controlling for selection effects, the temporary peak in sick leave rates compared to partnered women during the separation year is lowered from 5 percentage points (OLS) to almost 2 percentage points (FE). The corresponding change between the models applied for men shows that the peak lowers from 4 to 2 percentage points. Regarding sick leave rates in the years following the separation year, differences between separating and partnered women and men are still statistically significant in the FE-model, although the differences are much smaller than estimated by the OLS-model. Selection effects are suggested to be at play by the fact that differences between separating and partnered parents exist pre-separation and that the differences during and following separation are reduced once selection effects are controlled for in the FE models. However, as the differences are only reduced and not completely removed in the FE models, causal mechanisms are suggested to be simultaneously at work. The results are hence in line with the first hypothesis where I expected women and men to display higher sick leave rates compared to partnered women and men before separation—demonstrating selection effects—but that high rates remain also during and after separation in models adjusted for selection effects.

Although estimates in the FE-models remain statistically significant, indicating causal mechanisms to be at work, the higher sick leave rates that follow separation compared to partnered parents are rather small and the overall impact of separation on sick leave should not be overstated. However, as sick leave rates overall vary depending on socioeconomic background, it is possible that the differences seen so far may be bigger or smaller for different subgroups. The remaining analyses are hence carried out by FE-models run separately according to educational background.

Fig. 3. Estimated difference in sick leave for separating parents compared to partnered parents, with at least one child 2-18 years old, using OLS and FE.



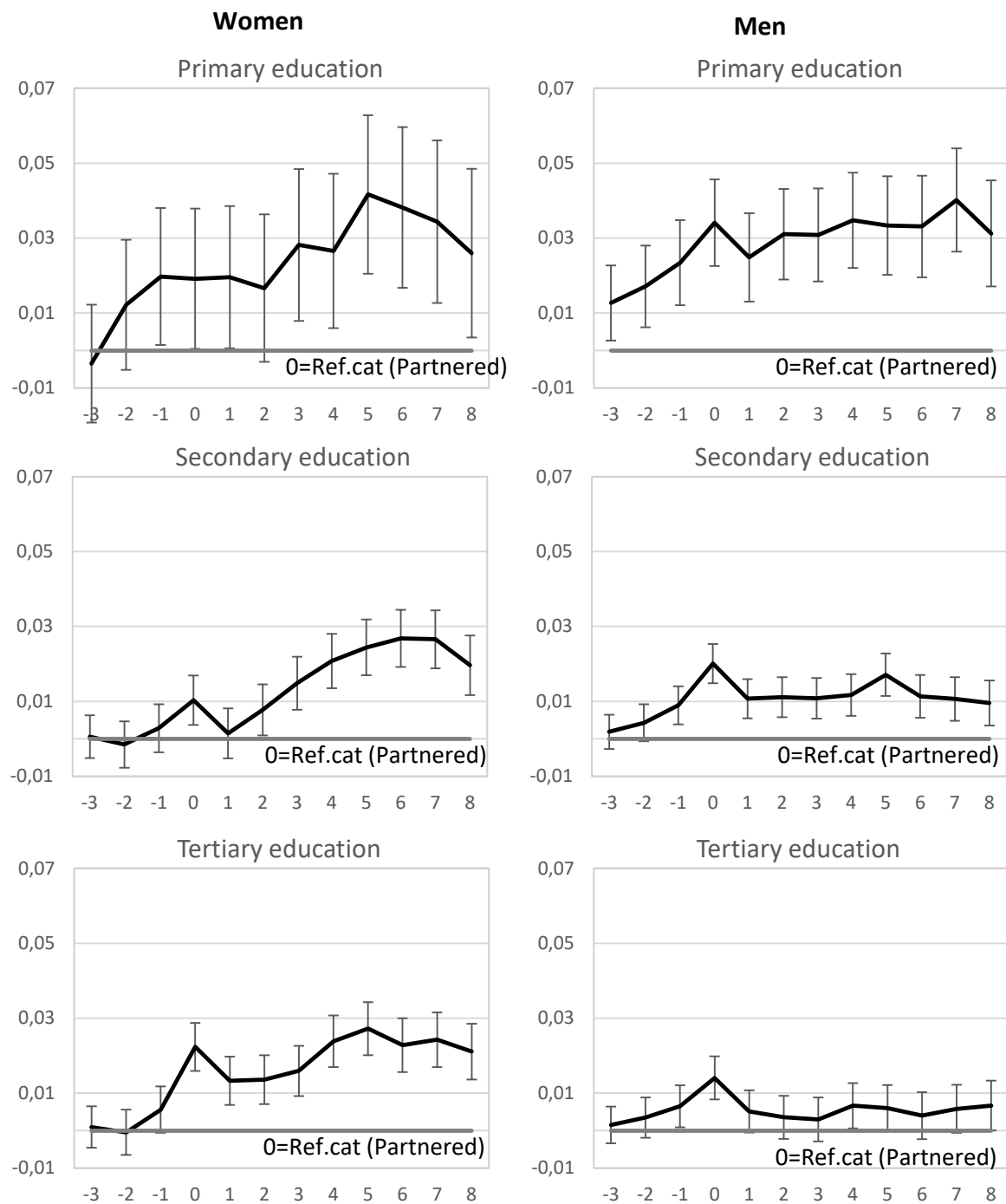
As seen in Appendix Table 1, primary educated parents constitute the smallest group, which also translates into rather wide confidence intervals for the estimations as seen in Figure 4.

The overall pattern of sick leave before, during, and after separation is anyhow similar to what we have seen so far. However, a few distinct patterns emerge when dividing the results by education. In H2, I suggested that parents, regardless of their educational attainment, would experience a temporary peak in the sick leave rate around the year of separation compared to partnered parents. Overall, the results support this hypothesis. Women and men show a clear peak during the separation year, indicating a clear crisis effect from separation. But for primary educated separating women, there is no clear peak at the year of separation. In this group, the increase in sick leave starts already at two years before separation suggesting that the peak may be more averaged out over the years surrounding the separation rather than being condensed to the separation year like in the other studied groups.

In the final two hypotheses, I argued that separating women would experience cumulatively increasing sick leave rates compared to partnered women over time from separation, while men do not (H3), and that the cumulatively increasing sick leave rates for separating women,

would be particularly articulated the lower the educational attainment among the women, while for men, no cumulative effects would be expected regardless of educational attainment (H4). Looking at Figure 4, the results only show partial support for these hypotheses. Women seem to indeed display cumulatively increasing sick leave risks following separation compared to partnered women regardless of educational attainment, but not throughout the entire study window. Separating women's sick leave rates increase compared to partnered women's from one or two years following the separation year and then tend to decrease toward the end of the study window with some variation in when the cumulative trend breaks. However, as seen in Appendix Figure 2, the sick leave levels for separating women compared to partnered women are still higher by eight years after separation compared to before the separation. Among men, it is only the tertiary educated group that doesn't show any increased sick leave rates compared to partnered men in the long run. Although primary and secondary educated men do not show any cumulative increases in sick leave rates compared to partnered men, they do display consistently higher sick leave rates compared to partnered men following separation that last until the end of the study window. Additionally, the point estimates for fathers indicate a clear negative gradient across educational levels with larger difference between separating and partnered fathers, the lower their education. Among the primary and secondary educated men, an interesting second peak in sick leave rates compared to partnered men is also discernible that takes place at 7 years after separation for primary educated men and by 5 years after separation for secondary educated men.

Fig. 4. Estimated difference in sick leave for separating parents compared to partnered parents divided by education, with at least one child 2-18 years old, using FE



Discussion

In this study, the research interest has revolved around separation and its possible impact on sick leave for mothers and fathers in Sweden. Leaning upon the assumption that separation poses both economic and emotional strain for those involved, I have argued that separation may cause negative health consequences measured in the form of increased sick leave rates.

To disentangle possible causal effects from selection effects in relation to separation, within-group variation has been exploited using FE methods. Overall, the study supports the idea that both selection and causal effects are at play. At most, women's sick leave rates were found to be almost 7 percentage points higher following separation compared to partnered mothers. When controlling for selection effects, this difference decreased to less than 3 percentage points, indicating that selection has a distinct impact on women's sick leave rates following separation. Selection effects were also found among men, but overall with considerably smaller differences in sick leave rates between separating and partnered men.

Despite clear selection effects, the results also reveal well-defined patterns supporting causal effects. However, differences between separating and partnered parents are considerably smaller when selection effects are controlled for. Separation, although a common transition many parents go through in Sweden, indeed seems to be a tumultuous event able to cause stress and strain to the point that it interferes with one's work capacity. Clear peaks in sick leave rates during the separation year indicate a crisis effect among mothers and fathers across educational levels. For separating mothers with primary education, this peak looks a bit different from other groups. Here, sick leave rates compared to partnered mothers distinctly increase already 2 years before separation and do not decrease until 2 years after separation. It is difficult to say why this is as there are no theoretical arguments to explain this pattern. This group of women could be highly vulnerable but it could also be that the separation year is not adequately measured for this group, making interpretation more difficult. If couples with primary educated women are facing larger difficulties in finding new housing it is possible that the former couple continue to be registered at the same address for longer periods than other couples are, hence causing a mismatch between the crisis effect of separation and the actual event when the couple move into separate households.

Sick leave patterns that follow the year of separation show that mothers experience cumulatively growing sick leave rates compared to partnered mothers that exceed the initial peak before experiencing decreasing sick leave levels. Although sick leave levels decrease towards the end of the study period, the sick leave rate is still higher than it was before separation, indicating that many mothers do not fully adapt to life as a single parent. Surprisingly, fathers also show long-term effects on sick leave following separation. Although the results do not indicate that fathers have cumulatively increasing sick leave rates following separation compared to partnered fathers, the result shows that especially primary educated fathers have chronically higher sick leave rates following separation throughout the

study window compared to partnered fathers, approximately three percentage points higher. Earlier research shows that while women often suffer from stress and strain related to financial concerns (Andreß & Bröckel, 2007; Mortelmans, 2020), it has been suggested that men suffer stress and strain from losing contact with their children (Umberson, 1992). This is a plausible explanation to what is being witnessed here since the lower the education, the less common it is to share physical custody equally between the parents (Statistics Sweden, 2014). However, primary educated men are also the only group where controlling for selection effects doesn't lower the sick leave rates three years before the separation. This group may very well still be a highly selective group despite efforts to control for selection effects. It is also reasonable to believe that this group of men, to account for the declines in disposable income following separation, over time end up in jobs with higher health risks as they pay better than other jobs with similar educational requirements. Although household income declines following separation are found to be particularly strong for women, they do appear for men as well in Sweden (Andreß & Bröckel, 2007).

Another surprising finding from the results is that men seem to experience a second crisis following separation. For primary educated men this second peak in sick leave rates compared to partnered men takes place at 7 years after separation, and for secondary educated men it takes place by 5 years after separation. This interesting pattern has no clear explanation and will require further analysis.

A caveat of this study is that I have not been able to control for repartnering. When following individuals long-term after a separation, it is likely that women and men over time find new partners and establish new families. How this would impact various health indicators are, however, yet to be understood. Some studies show health-strengthening effects (Couch et al., 2015; Tamborini et al., 2016), whereas other studies find no (Blekesaune & Barrett, 2005) or only small effects (Carr & Springer, 2010). Complex family histories mean that childrearing needs to be negotiated across relationships with ex-spouses and bonus children (Carr & Springer, 2010). The large increase in joint physical custody of children that has taken place in Sweden may dampen the positive effects of marital benefits that repartnering is assumed to reinstate. Future research should aim to disentangle various pathways following separation and how they interact with various health indicators such as sick leave.

Although causal effects have been found to likely impact sick leave following separation in this study, differences between separating and partnered parents are small and hence not a

likely main driver of poorer health among mothers and fathers in general. However, given the expenditure invested in sick leave compensation, which amounted to 27.6 billion SEK in 2021 (The Swedish Social Insurance Agency, 2022), even small variations in sick leave are important to understand. This study has demonstrated that separation, by now a common transition for many parents, can be quite turbulent. As the Swedish Social Insurance Agency (2022) points out, underlying reasons for sick leave cannot be dealt with solely within the framework of the sick leave insurance. In addition to the health care system, which of course is a key player in medical treatment and rehabilitation, policymakers play a key role. Facilitating a successful combination of work and parenthood has long been underpinned by family policies. With today's high levels of family complexity, it is equally important that this view extends across the many transitions that occur over life. In fact, the point of departure for the commission to investigate the situation of families ('Familjeutredningen' in Swedish) was that economic support for families should not only act to equalize income between families, but also to equalize income over the life course. By economically supporting single parents, a healthier balance between work and care may be achieved. The report was published in 2001 and concluded that, among other things, a supplement to the child allowance directed towards single parents was needed (SOU, 2001:24). At this time, Sweden was the only Nordic country without any benefits targeted at single parents. Two decades later, Sweden still does not have any targeted benefits or any official proposals to introduce them. In the most recent investigation covering family support, the investigators themselves point out that because of aims to limit increasing costs, the recently proposed changes are not as far-reaching as needed to improve the situation for families today (SOU, 2021:101, p. 382). As shown by this study, separation may have extensive and long-term consequences for individuals. Limiting improvements of family support to narrow budgets may have reverse effects when viewed from a wider perspective, which is why future policy implementation should not exclusively focus on the cost of policies but also on the possible wider gains from investing in support during vulnerable situations for parents and their children.

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Appendix

Table 1. Descriptive statistics. Number of observations included in analyses.

	Women				Men			
	Partnered		Separating		Partnered		Separating	
	With sick leave	Total	With sick leave	Total	With sick leave	Total	With sick leave	Total
Civil state								
Partnered	917 474	7 221	-	-	523 665	7 419	-	-
-3	-	-	7 262	46 568	-	-	4 449	45 628
-2	-	-	7 379	50 729	-	-	4 669	49 685
-1	-	-	8 097	55 203	-	-	5 189	54 252
0	-	-	9 421	58 967	-	-	6 106	58 112
1	-	-	9 653	60 877	-	-	5 850	59 966
2	-	-	10 033	58 951	-	-	5 677	56 822
3	-	-	10 382	56 481	-	-	5 561	53 955
4	-	-	10 732	54 068	-	-	5 553	51 212
5	-	-	10 662	51 440	-	-	5 494	48 470
6	-	-	10 149	49 003	-	-	5 077	46 079
7	-	-	9 549	46 466	-	-	4 778	43 487
8	-	-	8 863	43 707	-	-	4 565	40 815
Education								
Primary	64 629	370 494	10 728	49 444	77 694	717 875	11 236	80 508
Secondar	437 457	2 979	59 341	304 239	296 083	3 588	38 115	341 460
Tertiary	415 388	3 871	42 113	278 777	149 888	3 113	13 617	186 515
Year								
2005	63 614	401 812	0	0	39 296	413 477	0	0
2006	59 646	403 760	2 149	11 732	37 112	416 460	1 278	11 437
2007	54 030	407 264	4 099	24 648	33 546	419 746	2 510	24 064
2008	47 937	414 836	5 706	38 136	30 054	425 474	3 683	37 318
2009	42 186	407 589	7 602	53 156	27 385	418 490	5 011	52 189
2010	41 489	408 266	8 093	56 063	25 847	419 699	5 154	55 054
2011	43 497	412 865	8 937	58 067	25 211	423 571	5 217	56 656
2012	46 135	420 249	9 474	58 746	25 921	431 125	5 697	57 115
2013	49 805	427 607	10 095	57 488	27 499	437 669	5 566	55 328
2014	54 597	437 216	10 607	54 831	29 408	447 074	5 683	52 286
2015	60 780	451 126	10 997	52 414	32 131	461 683	5 614	49 640
2016	64 890	469 374	10 723	50 015	33 846	480 990	5 474	47 118
2017	65 473	492 238	9 853	47 557	34 282	504 320	4 942	44 715
2018	67 233	521 220	6 946	34 894	35 430	535 499	3 536	32 859
2019	69 878	554 573	4 405	23 032	36 746	571 939	2 243	21 686
2020	86 284	591 015	2 496	11 681	49 951	612 774	1 360	11 018
Age								
20-29	16 950	120 971	3 409	21 469	4 863	64 355	1 380	13 090
30-39	270 450	2 193	36 177	198 774	99 363	1 635	14 234	141 341
40-49	484 441	3 883	58 227	334 331	254 206	3 874	30 262	310 507
50-64	145 633	1 022	14 369	77 886	165 233	1 845	17 092	143 545
Number of children								
1	316 672	2 230	45 402	249 121	191 416	2 339	27 387	252 606
2	441 681	3 760	49 169	294 189	240 924	3 784	25 896	270 165
3+	159 121	1 229	17 611	89 150	91 325	1 295	9 685	85 712
Age of youngest child								
2-6	289 608	2 427	26 475	158 585	162 894	2 590	17 012	165 438
7-9	159 480	1 279	25 993	137 599	87 826	1 304	14 098	133 042
10-12	156 158	1 203	24 432	132 305	89 006	1 218	12 677	124 186
13-15	156 039	1 171	19 025	109 505	90 399	1 176	10 374	100 568
16-18	156 189	1 138	16 257	94 466	93 540	1 130	8 807	85 249
Earnings quartiles								
1	240 914	1 659	31 682	161 544	195 272	1 725	29 285	202 004
2	285 752	1 794	32 735	144 242	157 323	1 826	17 721	156 953
3	233 473	1 848	29 752	170 535	108 963	1 882	10 741	135 896
4	157 335	1 917	18 013	156 139	62 107	1 985	5 221	113 630

Table 2. Main effects for women and men estimated with FE. Excluding children < 2 years old.

		Women		Men	
		Coefficient	Robust standard	Coefficient	Robust standard
Civil status	Partnered	ref.		ref.	
	-3	.0003266	.0019762	.0029746	.0016504*
	-2	-.0004386	.0021536	.0051266	.0017923***
	-1	.0044214	.0022071**	.0092259	.0018541***
	0	.0151686	.0022791***	.0191492	.0019006***
	1	.0072832	.0022941***	.0098233	.001897***
	2	.0106636	.0023386***	.0106404	.0019335***
	3	.0160378	.0024131***	.0105631	.001973***
	4	.0226258	.0024762***	.0130185	.0020273***
	5	.0269184	.0025347***	.0158316	.0020697***
	6	.0252509	.0025797***	.0118528	.0020964***
	7	.025133	.0026212***	.0128825	.0021386***
	8	.0199026	.0026807***	.0115529	.0021956***
Year	2005	ref.		ref.	
	2006	-.00882	.0006422***	-.0023275	.0005184***
	2007	-.0223659	.0007299***	-.0082813	.0005822***
	2008	-.0388919	.0007893***	-.0150024	.0006213***
	2009	-.0492908	.0008628***	-.0171254	.0006699***
	2010	-.0507947	.0009436***	-.0184566	.0007244***
	2011	-.0460497	.0010313***	-.018287	.0007857***
	2012	-.0411553	.0011209***	-.014818	.0008504***
	2013	-.0335679	.0012213***	-.0100137	.0009212***
	2014	-.0239032	.0013234***	-.0044246	.0009941***
	2015	-.0126291	.0014272***	.0014748	.0010697
	2016	-.008165	.0015295***	.004223	.0011447***
	2017	-.0129331	.0016293***	.003262	.0012157***
	2018	-.0164117	.0017265***	.0030768	.0012869**
	2019	-.0186368	.0018223***	.0026884	.0013561**
	2020	.0024652	.0019249	.0218655	.0014335***
Age	20-29	ref.		ref.	
	30-39	.01232	.0015416***	-.003305	.0015878**
	40-49	.0097119	.0016688***	-.0075601	.0016684***
	50-64	.0133299	.0018456***	-.0056402	.0017681***
Number of children	1 child	ref.		ref.	
	2 children	-.0032615	.0005992***	-.0007105	.0004826
	3+	-.0056808	.0009316***	-.0022561	.0007362***
Youngest child's	2-6	.0015153	.0014044	.0017778	.0010823
	7-9	.0026715	.0011005**	.0019666	.0008481**
	10-12	.0022854	.0008456***	.0017877	.0006586***
	13-15	.0003923	.000592	-.000471	.0004725
	16-18	ref.		ref.	
Educational level	Primary	ref.		ref.	
	Secondary	.0019809	.0034165	-.0024258	.0045087
	Tertiary	-.0301869	.0036481***	-.0242506	.0048178*
Quartiles	1 (lowest)	ref.		ref.	
	2	.0447679	.0004845***	.0092921	.0004226***
	3	.051973	.0005554***	.0061113	.0004857***
	4 (highest)	.0475191	.0006895***	.0026527	.0005745***
rho		.38999972		.37896927	
Number of observations		7 853 470		8 028 473	
Number of groups		1 071 011		1 097 152	

* p<.1; ** p<.05; *** p<.01

Fig. 1. Sick leave levels for separating and partnered parents with at least one child 2-18 years old, using OLS and FE.

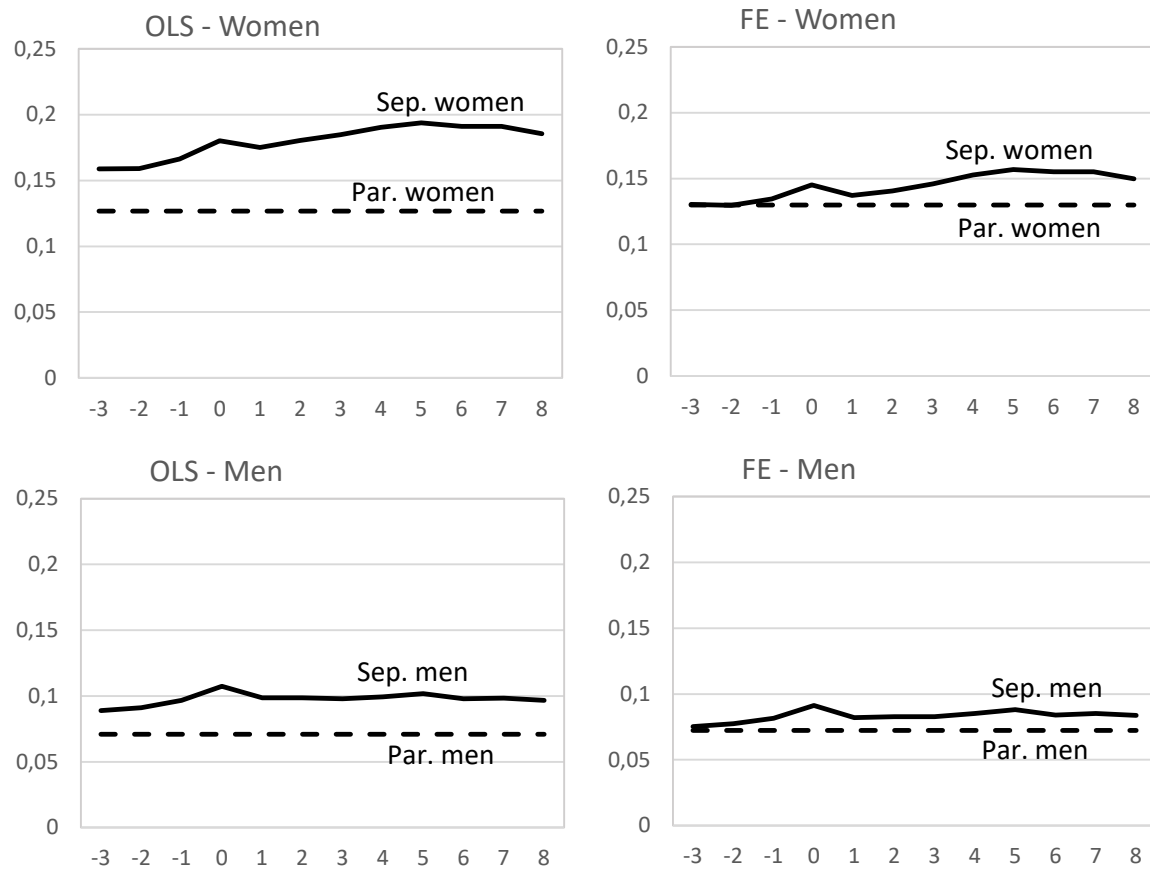
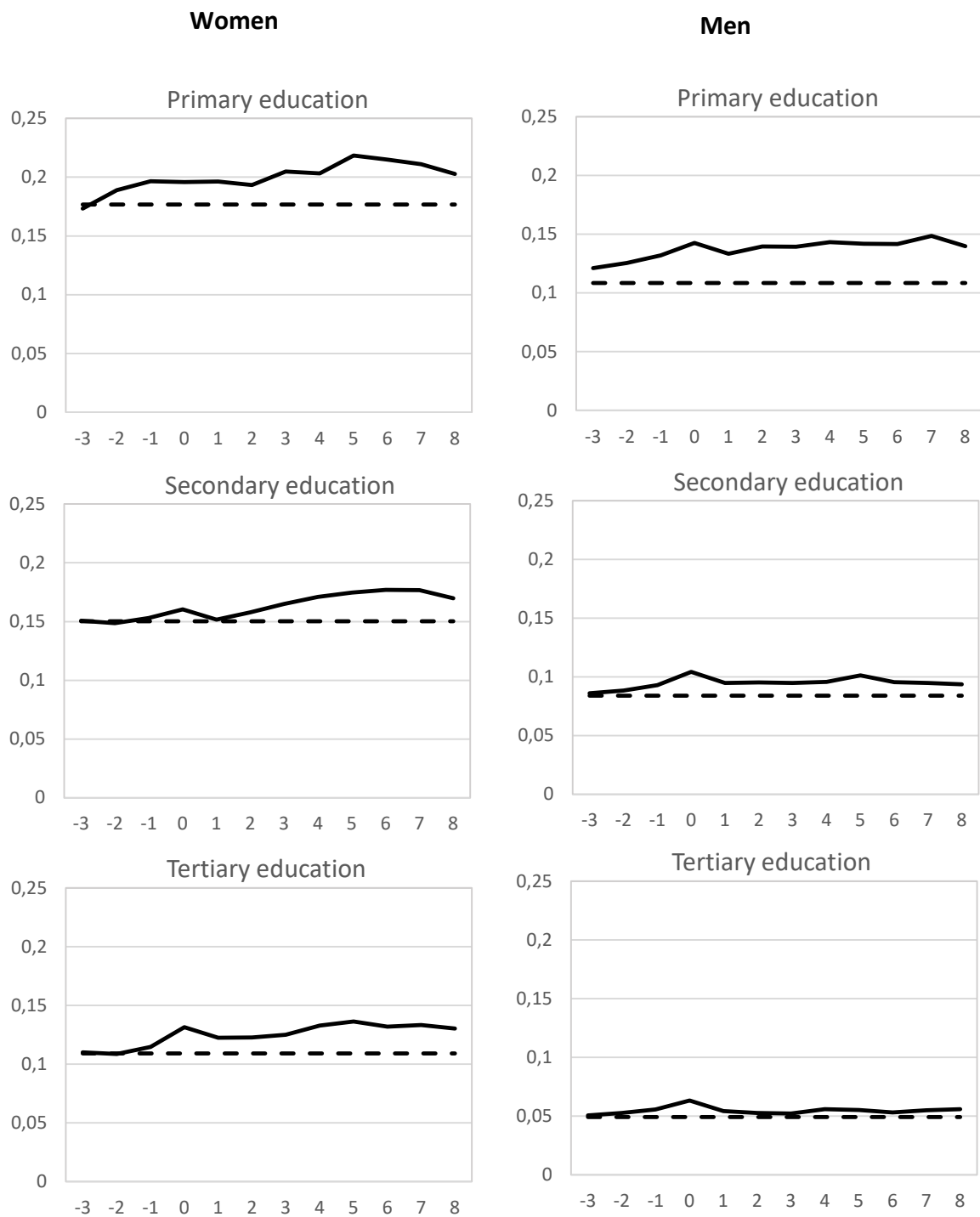


Fig. 2. Sick leave levels for separating and partnered parents with at least one child 2-18 years old divided by education using FE



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