Title: Gendered Relationship of Childbearing with Earnings Accumulated by Midlife in Two Nordic Countries

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Abstract: Nordic countries are considered advanced in terms of gender equality, but also in these countries women still take longer family leaves and have lower earnings than men. This study provides novel insight by assessing the differences in accumulated earnings by midlife associated with childbearing among women and men in Finland and Sweden. We place particular attention to the magnitude of the gender gap in accumulated earnings across groups characterized by different childbearing history and level of education. We hypothesize larger gender gaps among those with a larger number of children and an earlier timing of entry into parenthood, among those with a lower level of education, and overall, in Finland. The study is based on full-population register data, with highly accurate longitudinal measures of individual labor earnings across decades. Our results on cohorts born in 1974–1975 indicate that women accumulated on average 32 % and 29 % less labor earnings than men by age 44 in Finland and Sweden, respectively. The number and timing of children strongly modifies the magnitude of the gender gap, especially in Finland. Among the more highly educated, the gaps are moderately smaller in both countries. In light of the limited previous evidence on gender gaps in accumulated earnings, these findings suggest gaps in earnings accumulated until midlife that are smaller in the Nordic countries than in some other countries, yet still sizeable for countries considered forerunners in gender equality.

Keywords: earnings, fertility, gender inequality, labor market, life course, Nordic countries

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Declarations of interest: none.

Introduction

The Nordic countries tend to be seen as forerunners in promoting gender equality. This view is in line with the comparatively high labor force participation rates of women and modest gender gaps in employment rates in these countries (OECD 2019). Despite these progressive features of the Nordic societies, considerable gender inequality continues to be present in some labor market outcomes, such as wages and representation in authority positions (Grönlund, Halldén, and Magnusson 2017), and labor markets remain highly gender-segregated (European Institute for Gender Equality 2017). Also in these countries parenthood is a fundamental source of gender gaps in earnings (Cools and Strøm 2016; Nisén et al. 2022) and authority positions (Bygren and Gähler 2012; Mandel and Semyonov 2006), and longer family leaves may hinder subsequent career progression (Evertsson and Duvander 2011). Furthermore, the contribution of child penalty of mothers to the gender inequalities in the labor market has increased over time (Kleven, Landais, and Søgaard 2019). While the motherhood penalty in wages is found to be comparatively small among Nordic women (Cukrowska-Torzewska and Matysiak 2020), it appears to be somewhat larger in Finland than in Sweden (Budig, Misra, and Boeckmann 2016). As a whole, earnings trajectories in the Nordic labor markets have been suggested to be relatively strongly explained by individuals' human capital, thereby supporting the idea that Nordic welfare state policies do function in reducing labor market inequality overall (Hällsten and Yaish 2022).

We contribute to the existing knowledge by providing a novel insight on how earnings accumulated by midlife (age 44) by women and men vary according to their childbearing history (i.e., the number and timing of children) in two Nordic welfare states. Gender gaps in accumulated earnings have received limited previous attention, especially outside the context of the U.S. A recent study estimated that in the U.S. women born in the 1970s accumulated around 60 % of earnings relative to men between ages 27 and 35–45, and improvements towards closing the gender gap have been slower across cohorts born in the 1960s and 1970s than across earlier cohorts (de Castro Galvao 2022). More specifically, the current study assesses the accumulated earnings among women and among men, and focuses on the respective gender gaps in accumulated earnings across different groups, using a similar case comparison of Finland and Sweden. Comparative studies related to fertility, family policy, and labor market are timely in the Nordic context in light of the recent unexpected fertility decline in the Nordic countries (Hellstrand et al. 2021), as well as in several other high-income countries, including the U.S (Human Fertility Database 2022). Comparisons of countries with similar institutional settings are interesting also more broadly given their potential to pinpoint reasons behind differential outcomes between countries (Neyer and Andersson 2008). We assess how recent cohorts of women and men born in 1974–75 have accumulated earnings by their midlife, which covers the first half of the life course to which many of the welfare state policies, including family policies, are targeted. Our empirical approach builds on a highly accurate measurement of earnings spanning across 25 years from Nordic administrative registers covering full resident populations.

Background

There is increasing interest to understand how gender inequalities develop cumulatively over the life course (de Castro Galvao 2022). Earnings accumulated over the life course can be viewed as a comprehensive measure of individuals' labor market history and accumulated economic resources. They are important from the perspective of chances in life and lifestyles of individuals (Tamborini, Kim, and Sakamoto 2015). Gender differences in accumulated earnings over the life course also contribute to gender differences in wealth accumulation (Ruel and Hauser 2012), as well as differences in pension income later in life (Kuivalainen et al. 2020). They can also be viewed to have relevance in the perspective of relative resources of women and men (see Brines 1993; Lundborg, Plug, and Rasmussen 2017; Milkie 2011). Childbearing can be regarded as a fundamental source of gender gaps in various indicators of attachment to and success in the labor market, such as level of earnings and the share of women in authority positions, also in the Nordic countries (Bygren and Gähler 2012; Cools and Strøm 2016; Mandel and Semyonov 2005, 2006). Over the life course, women and men may be expected to accumulate earnings differently depending on their childbearing history. Differences in accumulated earnings based on childbearing are likely to unfold due to processes involving both selection into parenthood and higher parities, as well as effects of parenthood on employment and wages of women (Jalovaara and Fasang 2020; Kolk 2022). These processes over the individual life courses can be viewed as embedded in the broader societal context, which enables and constraints individuals in reaching their goals in difference life spheres, such as employment and family (Bernardi, Huinink, and Settersten Jr 2019; Heckhausen and Buchmann 2019; Huinink and Kohli 2014).

Similar cultural and institutional characteristics of the Nordic countries are believed to have contributed to similar fertility patterns, characterized so far by stable and relatively high cohort fertility rates as compared to other European countries, i.e., close to two children (Andersson et al. 2009; Hellstrand et al. 2021). In particular, the political aims of supporting the combination of employment and childbearing, as well as promoting gender and social equality, are strong characteristics of the Nordic welfare regime (Ellingsæter and Leira 2006; Esping-Andersen and Billari 2015). In the Nordic countries, selection by education, employment, and earnings into parenthood is mainly positive (Jalovaara and Miettinen 2013; Vikat 2004), with the exception of young low educated women among whom a weak attachment to the labor market is associated with elevated first birth risks (Kreyenfeld and Andersson 2014; Miettinen and Jalovaara 2020). For entering higher parities, selection is either weaker than into parenthood, or even negative, such that those with a weak attachment to the labor market may even have a slightly higher risk of having third births (Andersson, Kreyenfeld, and Mika 2014; Andersson and Scott 2007; Erlandsson 2017).

Remarkably, the Nordic countries are similar also in that the least educated are most likely to remain childless regardless of gender, while the educational gradient in the eventual number of children is weak among women but notably positive among men (Jalovaara et al. 2019). The differences by educational attainment in the risk of remaining childless are however slightly more pronounced in Finland than Sweden, where women and men show even greater similarity in this respect (Jalovaara, Andersson, and Miettinen 2022). The mean age of

becoming a mother is close to 30 years in both Finland and Sweden (Statista 2022), but in Finland both lifetime childlessness and higher parities (3+) are more common than in Sweden (Jalovaara et al. 2019).

Nevertheless, there are some important institutional differences between Finland and Sweden that we hypothesize to produce differences between the countries in regard to women's and men's accumulated earnings, as well as to the respective gender gaps. First, the uptake of parental leave is more strongly gendered in the case of Finland (Duvander and Lammi-Taskula 2011). In 2016, fathers took 11 % of all parental leave days with a daily cash benefit (including maternity and paternity leave) in Finland while the respective share in Sweden was 28 % (NOSOSCO 2017). Second, after parental leave, in Finland parents continue to have the option to care for their child at home until the child turns three, while receiving a flat-rate home care allowance (also referred to as a cash-for-care benefit), combined with the security of a parent being able to return to her/his job after the home care episode (Hiilamo and Kangas 2009; Sipila, Repo, and Rissanen 2010). In Sweden this benefit was available briefly in 1994 and again in 2008–2016 in some municipalities, but the take-up was much lower than in Finland (Ellingsæter 2014). The benefit in Finland is taken almost exclusively by mothers, and it has been criticized for encouraging long spells outside the labor market (Sipila et al. 2010). Indeed, as compared to Sweden, the employment rate of Finnish mothers of young children is lower, and the share of children enrolled in publicly subsidized daycare is smaller (Duvander, Mussino, and Tervola 2021; Eydal and Rostgaard 2011; Grødem 2014; Sipila et al. 2010). In 2016, less than 50 % of one to two year-old children were covered by childcare in Finland while this share in Sweden reached 70 % (NOSOSCO 2017).

Third, in Sweden part-time work is more commonly used among mothers to accommodate care responsibilities, while part-time work among Finnish mothers has typically not been a common solution to reconcile work and family responsibilities (Grönlund et al. 2017; Rønsen and Sundström 2002). In both countries, however, women with a stronger labor market attachment return to work sooner after childbirth (Evertsson and Duvander 2011; Kuitto, Salonen, and Helmdag 2019), and higher levels of education and income of the partners facilitate the use of parental leave by fathers (Duvander et al. 2021). Overall, differences in policies are likely to be the main driver behind the two countries' dissimilar patterns of care and work, but different cultural norms regarding the right modes of caring for children may also play a role (Duvander et al. 2021; Mussino, Tervola, and Duvander 2019). Indeed, Finland may also be culturally more supportive of home care of children than Sweden (Hiilamo and Kangas 2009).

Two recent studies from the Nordic context assessed the variation in accumulated earnings, one according to the number of children in Sweden (Kolk 2022) and the other one according to the family life course type in Finland (Jalovaara and Fasang 2020). The Swedish study showed that across cohorts the relationship between labor earnings accumulated over the lifetime and number of children has become more similar between genders, and in the 1970 cohort both women and men displayed a reversed U-shaped relationship. The study did not assess earnings level differences by gender, but a higher level of earnings of men was visible also in the recent cohorts. Assessing variation in earnings accumulated by age 39 in cohorts born 1969–70, the Finnish study found that among men, fathers who had married late had earned more than other men. Among women,

the respective group, yet also childless women with a history of cohabitation, had relatively high earnings comparing to other women. However, this study emphasized that within-gender differences between groups of different family life courses were modest as compared to gender differences overall in accumulated earnings, which amounted to over 30 %.

Evidence from other high-income countries is limited but also suggests notable and even larger gaps in accumulated earnings between women and men. An earlier cross-comparative study predicted smaller gender gaps in accumulated earnings by age 45 in the Nordic countries than elsewhere, with differences amounting to 32–44 % of men's earnings in Norway and Finland (Sigle-Rushton and Waldfogel 2007). Differences between mothers and other Nordic women as well as mothers of one and two children, were also predicted to be smaller than in other studied countries. A recent study on Germany estimated an overall gender gap of accumulated lifetime earnings exceeding 50 %, and a larger gap among those with more children (Glaubitz, Harnack-Eber, and Wetter 2022). Previous studies from the US suggest an overall gap of approximately 40 % in earnings accumulated by midlife (de Castro Galvao 2022), and a larger gap among persons with lower levels of education (Kim, Tamborini, and Sakamoto 2015). Furthermore, gender gaps in accumulated earnings by the timing of parenthood (i.e., age at having the first child) have not been properly assessed, but later timing of motherhood has been shown to associate with a higher level of lifetime earnings in Denmark and Sweden (Cantalini, Härkönen, and Dahlberg 2017; Leung, Groes, and Santaeulalia-Llopis 2016).

Hypotheses

This study utilizes high-quality data from the Finnish and Swedish population registers covering detailed demographic and labor market data on all permanent residents in the respective countries. This study aims to provide a broad description of gender differences in individual accumulated earnings associated with childbearing history by midlife in two Nordic countries in order to unravel patterns typical of the Nordic welfare regime and to highlight any country-specific patterns. We calculated accumulated earnings by gender, childbearing history (i.e., distinguishing between childless, 1st parity, 2nd parity, and 3rd parity or higher; as well as between early and late parents), and educational attainment. Education is considered primarily an indicator of human capital (Baum 2002), and a strong correlate of timing of childbearing (i.e., age at having the first child) (Andersson et al. 2009; Nisén et al. 2014). We study accumulated earnings over the life course at the individual rather than household level, given the high degree of instability of marital and cohabiting unions in contemporary societies (Härkönen 2014). We aim at answering the following questions:

Q1 *How childbearing history relates to earnings accumulated by midlife among women and men in two Nordic countries?*

In both countries, there is a positive relationship between the number of children and accumulated earnings among men, while among women this relationship may be either negative or reversed U-shaped. This follows primarily from that parents are positively selected on education and earnings, but a larger number of children

is expected to have additive negative effects on women's but not men's careers, for instance due to a longer time spent on family leave[1], which may facilitate the depreciation and slower accumulation of human capital (Mincer and Ofek 1982; Mincer and Polachek 1974), as well as potential earnings losses during the leave (Baum 2002). Further, career-oriented women tend to enter motherhood later (Andersson et al. 2009), and a later timing of childbearing may mitigate the accumulation of negative effects of motherhood (Amuedo-Dorantes and Kimmel 2005; Bratti and Cavalli 2014; Doren 2019), for instance, by allowing her to get established in the labor market before embarking on motherhood (Troske and Voicu 2013).

Q2 *How does the gender gap in accumulated earnings vary by childbearing history in the two countries?*
In both countries, the gender gap in accumulated earnings is expected to exist regardless of childbearing history, but to be larger among those with more children. In addition to points raised under Q1, this expectation is based on that occupational gender-segregation (Hook et al. 2022), as well as potentially statistical discrimination in the labor market (see, e.g., Evertsson and Duvander 2011), may affect women's earnings regardless of their number of children. Further, later timing of childbearing may decrease the gender gap, given less time for motherhood to exert any negative effects on the labor market (Cantalini et al. 2017; Leung et al. 2016; Nisén et al. 2022).

Q3 *How does this gender gap vary across different levels of educational attainment in the two countries?*
In both countries, the gender gap in accumulated earnings is expected to be larger among those who are educated to lower levels. This expectation follows from the more common uptake of long family leaves by women and the less gender-neutral leave sharing practices overall those with a lower level of education, as well as their average earlier timing of childbearing. Alternatively, the gap potentially could be neutral or even larger among the more highly educated, given larger potential earnings losses due to childbearing- and rearing among these women. In addition, timing may play a greater role for the highly educated, given that postponing motherhood may provide additional benefits for their career progression given their (potential of) steeper earnings trajectories in early career (Amuedo-Dorantes and Kimmel 2005; Doren 2019; Herr 2016; Miller 2011), including the importance of timely investment in work experience (Light and Ureta 1995).

Q4 *Are gender gaps in accumulated earnings larger or smaller in Finland as compared to Sweden?*
Differences based on childbearing history, as well as the overall gender gaps, are expected to be generally larger in Finland than Sweden, given Finnish women's tendency to take longer family leaves after childbirth and the less gender-neutral leave sharing practices in Finland as compared to Sweden. Such country differences in gender gaps may be expected to be larger among those with a larger number of children. This is primarily based on considerations about the accumulation of negative effects of multiple children, including several career breaks (Troske and Voicu 2013). Plausibly, differences could also be more clearly visible among those who enter parenthood earlier (see Lorentzen et al. 2019), and among the less highly educated groups. Mothers

[1] Family leave refers to the combination of parental leave (including maternity/paternity leave) and any home care leave of children taken by a parent after parental leave.

with low education are particularly likely to make use of the availability of cash-for-care in Finland, with potential negative effects thereof on their subsequent earnings.

Data and method

The study is based on high-quality Finnish and Swedish register data covering the total populations residing permanently in these countries. The analytical sample consists of 113,415 individuals born in Finland and 183,946 in Sweden, in 1974–1975. We include women and men who were constantly residing in the country from age 20 until age 44 (i.e., not emigrated in any of the years, and for whom we have information on earnings for each year). The core strength of using individual-level administrative data is that we can combine individuals' earnings measures longitudinally from several years, as well as other measures, including childbearing history and educational attainment. Earnings accumulated by midlife are measured as a total of annual (gross) work earnings of salaried employees and entrepreneur earnings subject to state taxation between ages 20 and 44 (25 years). This age span covers the period in the life course when individuals typically attain degrees, establish themselves in the labor market, and form families and have children, including any family leaves from work to take care of children. We conduct sensitivity analysis to see how adding employment-based benefits to the labor earnings influence the gender gaps in accumulated earnings. Employment-based benefits include parental leave benefits (including paternity and maternity leave) and sickness leave benefits, and in the case of Finland, also home care allowance benefits[2].

We present accumulated earnings in the price level of 2019 euros. We harmonize our earnings measure to enhance country comparability by first converting annual earnings in Sweden measured in Swedish krona (SEK) to euro using the annual conversion rates provided by Eurostat (Eurostat 2023a), and additionally annual rates of living costs to adjust for differences in these costs between the countries (Eurostat 2023c). After this we convert euros from each year into 2019 euros by adjusting for inflation over the years covered (1992–2019) using the Finnish price index (OSF 2023). We top-coded the (gender-specific) one percent of women and men with the highest earnings in both countries in order to avoid the strong influence of outliers (in effect, men with extremely high earnings) on the findings. Of the total analytical samples, 0.6% in Finland 0.5% in Sweden had no earnings. Earnings are reported in 1,000s of euros.

We measure individuals' childbearing history as the total number of children born in the end of the year of turning 44, based on monthly records of births of all registered (biological) children. We group together those who had three or more children. In addition, to analyze how the timing of childbearing influences the gender gaps in accumulated earnings among parents, we distinguish between late and early parents by dividing those with at least one child by the age of 44 according to the gender-specific median ages at first birth into two gender- and education-specific categories. Those who had their first child at an age below the median are

[2] We do not have the information from year 1994 in Finland, that is the year in which the cohort born in 1975 turns 20. However, this is not likely to bias our findings in any meaningful extent given low levels of fertility at these ages: 5.4 % in the Finnish sample had a birth by the end of the year of turning 20.

categorized as having "early" and those above (and including) the median as having "late" timing of childbearing. Education-specific values are used given that the average timing of having the first child strongly varies by the level of education, especially in women (Nisén et al. 2014), and therefore the same age at first birth can be argued to have a different meaning depending on the level of education (Andersson et al. 2009). Age 44 represents for women generally the end of the reproductive life span, and very few children are born after this age for men either (Dudel and Klüsener 2021; Nisén et al. 2014).

We distinguish conventionally between three levels of educational attainment based on the highest degree attained: low refers to compulsory education only (9 years), medium refers to academic or vocational higher secondary-level degree (2–3 years), and high refers to academic or vocational tertiary-level degree (3 or more years). For Finland, the information was obtained using Statistics Finland's register data on highest completed degrees beyond the compulsory basic education (up to nine years), meaning that the lowest level was inferred from the fact that the data were missing. This is a conventional procedure in register-based research (see, e.g., Jalovaara et al. 2019). The register on educational degrees in Finland is of very high quality, and misclassification of educational level based on this procedure is therefore negligible.

The analysis is based on a description of group-specific means as well as assessing gender gaps across groups based on the relative difference of women's mean earnings to those of men (in per cent, i.e., the gender gap). Appendix Tables 1 and 2 include 95 % confidence intervals of all the gender-specific earnings mean estimates. In none of the studied groups the confidence interval of men and women overlaps, indicating that all gender difference (i.e., gender gap) estimates shown in Figures 1–3 are statistically significant from zero. We conducted sensitivity analysis using the median instead of mean (see end of Results for more details).

Results

There is a relatively large difference in the level of accumulated earnings between women and men born in Finland and Sweden in 1974–75. In Finland, men have earned on average 763 thousand euros by age 44, while women have correspondingly earned 521 thousand euros (Table 1). This equals to that women have earned 32 % less as compared to men by the age of 44 (Table 2). In Sweden, correspondingly, men have earned 764 thousand euros and women 546 euros, equaling to a gender gap of 29 %. This is true despite the fact that women in these cohorts are more highly educated than men, especially in Finland: half of women in Sweden (52 %) and over a half in Finland (59 %) have attained a tertiary-level degree, while among men this share reaches only 36 % in Sweden 39 % in Finland. In turn, a small share of men in Finland (11 %) and in Sweden (7 %) has not attained a secondary degree, and in women having no attainment beyond the compulsory school is even less common (4–5 % and 4 %).

In terms of the number of children, men stand out with a higher share of those who remain childless in both countries (27 % of men vs. 19 % of women in Finland; 21 % vs. 13 % respectively in Sweden), but the levels of childlessness are on average higher in Finland. The most common eventual number of children at age 44 in

both countries is two children: in Sweden 49 % of women and 44 % of men have two children, while in Finland the respective shares are 37 % in women and 33 % in men. Only 16 % in Finland and 14 % in Sweden are one-child parents, while again having three or more children is more common especially in Finland (28 % of women and 24 % of men in Finland; 25 % of women and 21 % of men in Sweden). As expected, late timing of having the first child is more common among those with a lower number of children across countries.

Table 1 Distribution of variables and accumulated earnings by childbearing history and educational attainment in women and men. Cohorts born in 1974–1975, Finland and Sweden.

	FINLAND								SWEDEN							
Distribution of variables	**Women**				**Men**				**Women**				**Men**			
Accumulated earnings,	M	Sd.	Min	Max	M	Sd.	Min	Max	M	Sd.	Min	Max	M	Sd.	Min	Max
1,000 euros	521	280	0	1,450	763	401	0	2,071	546	241	0	1,294	764	323	0	1,788
Number of children,	Zero	One	Two	≥Three	Zero	One	Two	≥Three	Zero	One	Two	≥Three	Zero	One	Two	≥Three
%	19	16	37	28	27	16	33	24	13	14	49	25	21	14	44	21
Early timing, %		24	44	72		28	45	72		24	46	72		28	47	71
Late timing, %		76	56	28		73	55	28		76	54	28		72	53	29
Educational attainment,	Low	Medium		High	Low	Medium		High	Low	Medium		High	Low	Medium		High
%	5	35		59	11	50		39	4	44		52	7	58		36
Accumulated earnings, 1,000 euros	**Women**				**Men**				**Women**				**Men**			
Number of children	Zero	One	Two	≥Three	Zero	One	Two	≥Three	Zero	One	Two	≥Three	Zero	One	Two	≥Three
	537	554	566	431	571	747	866	848	513	550	579	489	613	737	836	803
Early timing		503	545	415		694	873	853		497	553	467		722	852	809
Late timing		567	578	460		765	861	839		571	606	553		747	838	827
Educational attainment	Low	Medium		High	Low	Medium		High	Low	Medium		High	Low	Medium		High
	265	410		609	471	688		937	300	500		601	553	748		838
	N = 55,365				*N = 58,050*				*N = 89,307*				*N = 94,639*			

Note: Early and late timing of childbearing refer to the gender- and education-specific timing of having the first child, classified based on the median age at having the first child in the respective group.

There is a reversed U-shaped association between the eventual number of children and the earnings accumulated by age 44, but the strength of this association varies between genders and across countries (Table 1 and Appendix Figure 1). Among both women and men, those with two children have accumulated highest earnings, but among women differences to those with one child or no children are small especially in Finland. In contrast, in men parity is strongly positively associated with earnings up to two children. Men and women with three or more children earn generally less than those with two, and among Finnish women this difference is the largest – women with three of more children earn less than other women in Finland. In Sweden, earnings of women with three of more children are close to the earnings of childless women. Overall, the relationship of number of children with accumulated earnings by age 44 is more gender-neutral in Sweden than Finland. Among mothers, those who entered motherhood late have higher earnings than those who entered motherhood early, regardless of the number of children in both countries. The differences based on timing of childbearing are less pronounced among fathers, and late fathers do not always earn more than early fathers given their number of children.

Figure 1 shows that the differences within and between genders in absolute levels of earnings translate into notable earnings gaps in relative terms. In terms of earnings accumulated by age 44, there is a positive relationship of the number of children with the gap between genders, that is, the gap is larger among those with a larger number of children. Among the childless, women have accumulated only 6 % less than men in Finland and 16 % in Sweden on average, while in both countries the gender gap among those with one child is similar at 25–26 % (see also Table 2). Among those with at least two children, the gaps are moderately larger in Finland than Sweden. Among parents with two children – the most common number of children in both countries – mothers earn on average 35 % less than fathers in Finland and 31 % less in Sweden. Among parents of three or more children, the gap in Finland equals 49 %, but is in Sweden 10 percentage points smaller at 39 %. In addition, early parents show consistently larger gender gaps in both countries, and in Finland especially among those with a higher number of children and among the more highly educated (Table 2).

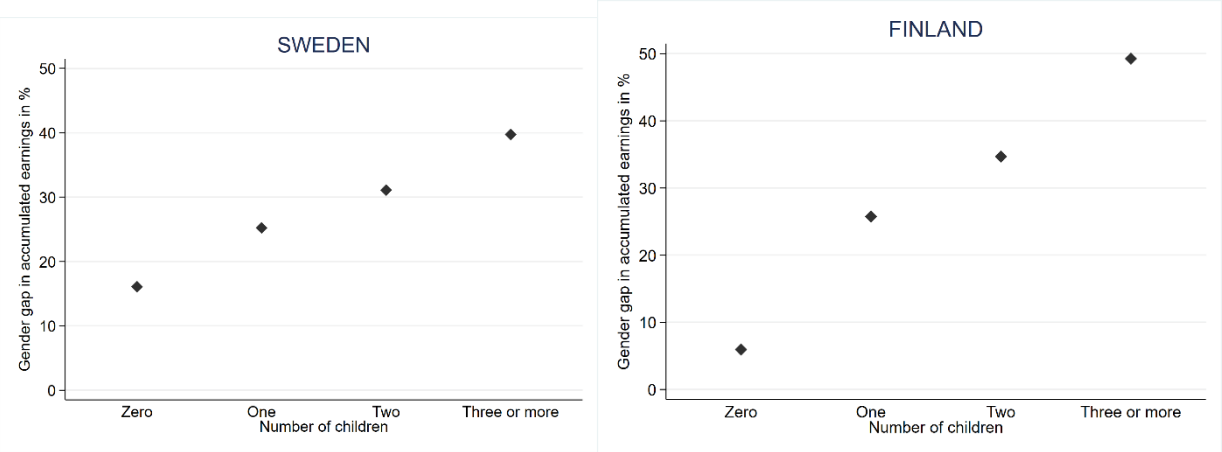

Figure 1 Gender gap in earnings accumulated by midlife by number of children, cohorts born 1974–75, Finland and Sweden.

The average gender gap is smaller among the more highly educated, reaching 44 %, 40 %, and 35 % among the low, medium and high educated, respectively (Figure 2 and Table 2), in Finland. Similarly in Sweden, the medium-educated (33 %) have a moderately larger gender gap as compared to the high-educated (28 %), yet the low educated stand out with a notably large gap (46 %). Thus, the country difference is somewhat more pronounced for the medium and high-educated. Notably, because women have more often attained a higher degree than men in both countries, the overall gender gaps are often smaller than any of the education-specific gaps. A comparison by childbearing history and educational attainment indicates that, regardless of educational level, women have earned the least relative to men in the same category when they have three or more children in both countries. In Finland, among the low and medium educated the gender gap exceeds 50 %, but even the mothers of three or more children educated to the high level have earned only 49 % less as compared to fathers in the respective category in Finland. In Sweden, respectively, this gap is at 37–43 % among the medium- to high-educated and at 56 % among the low-educated. In Sweden, the low-educated childless and one-child-

parents display a relatively large gender gap, but it is worth noting that they constitute only a small share of the total population in cohorts born in the mid-1970s in Sweden. In both countries, the group-specific gender difference is smallest among the highly educated and childless, where women have earned 14 % and 13 % less than men in Finland and Sweden, respectively.

Additional results shown in the appendix (Appendix Table 1 and Appendix Figure 1) on absolute levels of earnings highlight also the similarity of level of earnings of highly educated mothers as compared to low-educated fathers. For instance, highly-educated mothers of two children have accumulated similar levels of earnings that low educated men have by age 44 in both countries. This is remarkable especially given that highly educated mothers constitute 48 % and 45 % of all women in Finland and Sweden, while low educated fathers constitute respectively only 7 % and 5 % of all men in these countries.

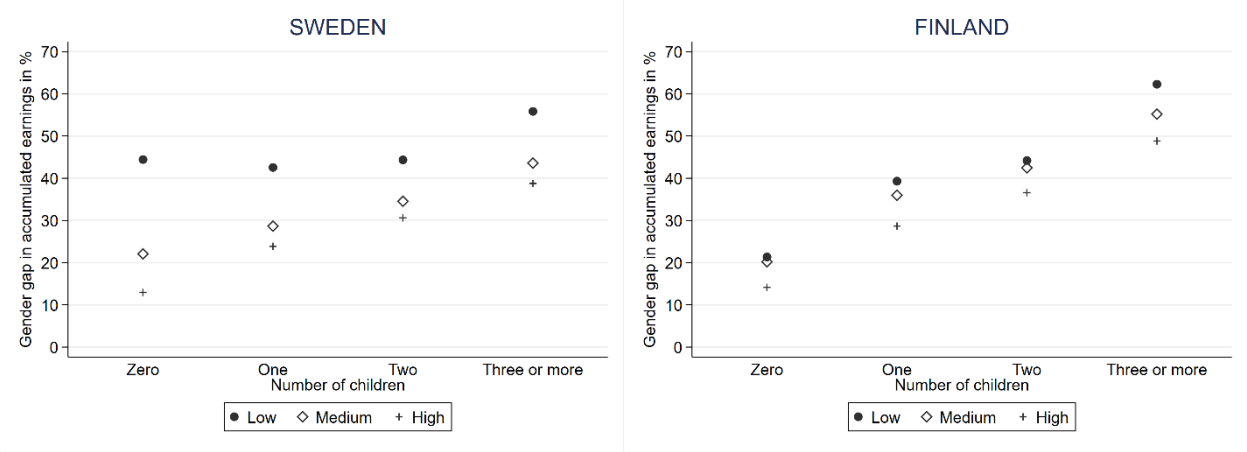

Figure 2 Gender gap in earnings accumulated by midlife by number of children and educational attainment, cohorts born 1974–75, Finland and Sweden.

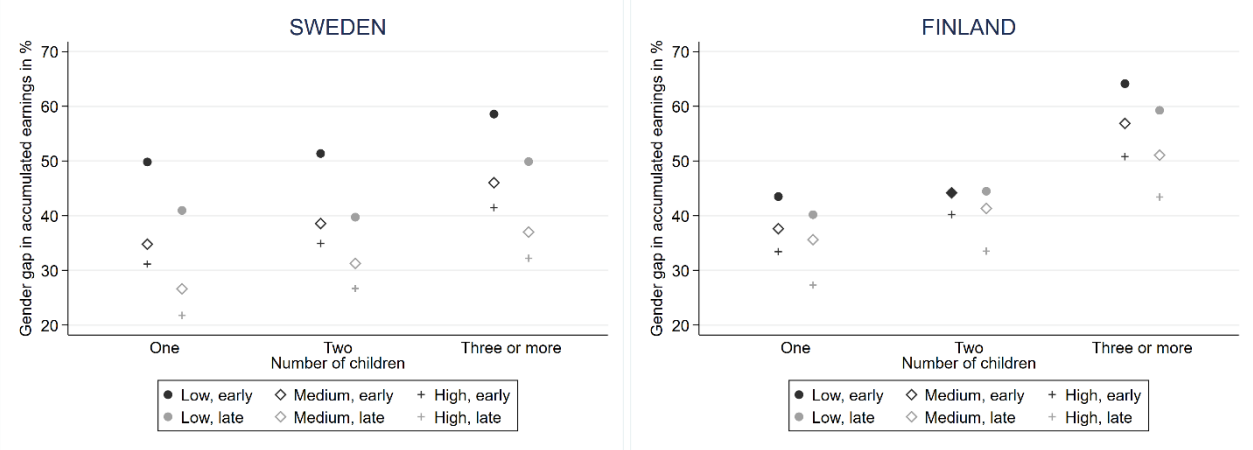

Figure 3 Gender gap in earnings accumulated by midlife by number and timing of children, and educational attainment, cohorts born 1974–75, Finland and Sweden.

There is heterogeneity between early and late parents in the magnitude of the gender gap (Table 2 and Figure 3). In Finland, the timing of childbearing (i.e., the age at having the first child) plays a larger role for those with high as compared low or medium education: the difference between early and late parents amounts to 5–8 %-points among the high and 0–6 %-points among the medium to low educated. The timing plays a larger difference among those with a larger number of children, who generally show larger gender gaps. In Sweden, the timing of childbearing is reversely associated with the gap as in Finland, but the difference here is rather similar across educational groups and parities (7–10 %-point difference between early and late parents).

Table 2 Gender gap in earnings accumulated by midlife (in %) by number and timing of children, and educational attainment, shown as the difference of women's earnings relative to those of men in the same category. Cohorts born in 1974–1975, Finland and Sweden.

	FINLAND				SWEDEN			
	Low	**Medium**	**High**	**Total**	**Low**	**Medium**	**High**	**Total**
Zero	**21**	**20**	**14**	**6**	**44**	**22**	**13**	**16**
One	**39**	**36**	**29**	**26**	**43**	**29**	**24**	**25**
Early	*43*	*38*	*33*	*27*	*49*	*35*	*31*	*31*
Late	*40*	*36*	*28*	*26*	*40*	*27*	*22*	*24*
Two	**44**	**42**	**37**	**35**	**44**	**34**	**30**	**31**
Early	*44*	*44*	*40*	*37*	*51*	*39*	*34*	*35*
Late	*44*	*41*	*34*	*33*	*41*	*31*	*27*	*28*
Three or more	**62**	**55**	**49**	**49**	**56**	**43**	**37**	**39**
Early	*64*	*57*	*51*	*51*	*58*	*46*	*42*	*42*
Late	*59*	*51*	*43*	*45*	*50*	*37*	*32*	*33*
Total	**44**	**40**	**35**	**32**	**46**	**33**	**28**	**29**

The results presented above are based on labor earnings and do not include social transfers. Sensitivity analyses in which employment-based benefits (including parental leave benefits) have been added to the labor earnings are shown in Table 3 (see also Appendix Figures 2 and 3). This analysis shows to what extent the inclusion of the employment-based transfers reduces the gaps. Overall, these publicly funded benefits reduce the gender gaps by 4 %-points in both countries. The reduction varies clearly by the number of children, from 0–1 %-point among the childless, to 3, 4, and 6–7 %-points among parents with one, two and three or more children on average similarly in both countries. Therefore, the inclusion of benefits attenuates modestly the relationship shown in Figure 1 in both countries but does not explain away these differences, nor the difference in the strength of the relationship between countries, i.e., stronger relationship in Finland (Appendix Figure 3). The difference in the gap between childless and parents of three or more children is attenuated from 42 to 36 %-points in Finland and 23 to 19 %-points in Sweden. The reduction is more pronounced among the lower educated at least in Finland, and thus weakens somewhat the educational differences in the gap as compared to the gap excluding benefits. The gaps among early and late parents conditional on educational attainment and the number of children weaken similarly after including benefits in both countries.

Table 3 Impact of the employment-based benefits on the gender gap in earnings accumulated by midlife (in %) by number and timing of children, and educational attainment, shown as the difference of women's earnings relative to those of men in the same category. Cohorts born in 1974–1975, Finland and Sweden.

Gender gap in accumulated earnings including employment-based benefits

	FINLAND				SWEDEN			
	Low	**Medium**	**High**	**Total**	**Low**	**Medium**	**High**	**Total**
Zero	**21**	**20**	**14**	**6**	**43**	**21**	**12**	**15**
One	**35**	**33**	**26**	**23**	**39**	**25**	**21**	**22**
Early	*38*	*35*	*32*	*25*	*46*	*32*	*28*	*28*
Late	*36*	*33*	*25*	*23*	*35*	*23*	*18*	*20*
Two	**38**	**38**	**33**	**31**	**40**	**30**	**26**	**27**
Early	*39*	*40*	*37*	*33*	*48*	*34*	*31*	*31*
Late	*38*	*37*	*30*	*28*	*37*	*27*	*23*	*24*
Three or more	**51**	**47**	**43**	**42**	**50**	**37**	**32**	**33**
Early	*52*	*48*	*45*	*44*	*53*	*39*	*36*	*36*
Late	*49*	*43*	*37*	*38*	*43*	*30*	*27*	*27*
Total	**36**	**35**	**31**	**27**	**41**	**28**	**24**	**25**

Difference in gender gap in accumulated earnings with and without employment-based benefits

	FINLAND				SWEDEN			
	Low	**Medium**	**High**	**Total**	**Low**	**Medium**	**High**	**Total**
Zero	**0**	**0**	**0**	**0**	**-1**	**-1**	**-2**	**-1**
One	**-4**	**-3**	**-2**	**-3**	**-4**	**-3**	**-3**	**-3**
Early	*-5*	*-3*	*-1*	*-2*	*-3*	*-3*	*-3*	*-3*
Late	*-4*	*-3*	*-3*	*-3*	*-5*	*-4*	*-4*	*-3*
Two	**-6**	**-4**	**-4**	**-4**	**-5**	**-4**	**-4**	**-4**
Early	*-5*	*-4*	*-3*	*-4*	*-3*	*-5*	*-3*	*-4*
Late	*-6*	*-4*	*-4*	*-4*	*-4*	*-4*	*-4*	*-4*
Three or more	**-12**	**-8**	**-6**	**-7**	**-6**	**-7**	**-6**	**-6**
Early	*-12*	*-9*	*-6*	*-7*	*-5*	*-7*	*-6*	*-6*
Late	*-10*	*-8*	*-6*	*-7*	*-7*	*-7*	*-5*	*-6*
Total	**-8**	**-5**	**-4**	**-4**	**-5**	**-5**	**-4**	**-4**

We conducted sensitivity analysis also estimating median instead of mean earnings. The main results remained in most cases very similar with this alternative outcome specification. The average gap based on median was in Finland 33 % and in Sweden 30 %, that is a one %-point higher than when based on mean. For those with zero, one, two, and three or more children the corresponding gender gaps based on median earnings in % were in Finland 5, 26, 35, and 49 and in Sweden 16, 25, 31, 39. Among the low-educated and childless the gender gap in Sweden was larger when based on median, because of many women with very low earnings in this group. We note that the low-educated in Sweden are a very small group and likely to be more marginalized in the labor market than the respective group in Finland. It also includes a larger share of second-generation migrants (i.e., persons born in Sweden with at least one parent born abroad) in Sweden, which may in part explain the larger gender gap in Sweden than Finland in this group.

Discussion

This study assessed the magnitude of gender gap in earnings accumulated by midlife associated with childbearing history in two countries considered relatively advanced in terms of gender equality. Expectedly, also in these countries there is a gendered relationship of childbearing with accumulated earnings by age 44. This is true especially in Finland, where women with three or more children and childless men stand out with lower earnings **(*Q1*)**. Notably, a large average gender gap in accumulated labor earnings is found in both studied Nordic countries, where women by age 44 have earned on average 32 % less than men in Finland and 29 % in Sweden. This gap is larger than recent cross-sectional estimates of gender gaps in employment or wages alone for Finland or Sweden (OECD 2018)[3]. This between-gender gap varies systematically with childbearing history in the way that among those with a larger number of children the gap is larger **(*Q2*)**. As hypothesized, the gender gap is moderately larger among those with a lower level of education in both countries. Yet, the tendency for a larger gender gap among those with more children is not consistently stronger among the less highly educated, at least not in Sweden. We also find that a later timing of childbearing (i.e., age at having the first child) is related to a smaller gender gap, in particular among the highly educated in Finland **(*Q3*)**. Overall, the results are largely in line with our hypothesis according to which less gender-equal practices of paid and unpaid work after childbirth in Finland than Sweden contribute to larger gaps in accumulated earnings overall and particularly among those with a larger number of children, but in both countries a later timing of childbearing predicts smaller gender gaps **(*Q4*)**. Additional analyses show that the gender gaps are moderately reduced (on average, by 4 %-points) in both countries if employment-based benefits are taken into account, showing how the Nordic welfare states partly compensate for the lower earnings of women from the labor market over their life course.

Several mechanisms across the life course, including those related to selection into parenthood and high-order parities, as well as negative effects of childbearing on earnings among women – are likely to contribute to the current findings. The notable gender differences overall suggest that structural mechanisms which produce gender differences in earnings across the life course are rooted also in the Nordic societies and especially Finland. We expect the long family leaves in Finland to be one crucial issue behind the country differences, as leaves longer than a year are almost entirely taken by women. In support of this argument, recent research shows that the provision of home-care allowance has a long-term negative impact on the earnings of mothers as compared to fathers in Finland (Gruber, Kosonen, and Huttunen 2023), in part by delaying mothers' return to employment after childbirth (Österbacka and Räsänen 2022). More broadly, such a leave take-up pattern may signal to (potential) employers that young women are at risk of long employment breaks even if they have no children (at least not yet). Our results could be viewed to be in line with the view that family leave policies which allow long job-protected absences from the labor market may have unintended negative implications for gender equality (Mandel and Semyonov 2005, 2006). Moreover, lower individual accumulated earnings

[3] In 2016, the gender employment gap was below 5 %-point in both countries, and the gender wage gap reached 18 % in Finland and 13 % in Sweden in the population aged 15–64 (OECD 2018).

are likely to contribute to fewer individual savings (e.g., in the form of a housing asset) of mothers than fathers and may thus increase the dependency of mothers of their partners economically, as well as contribute to lower bargaining power of mothers. This can be critical for instance after a divorce or partnership dissolution where one parent can no longer rely (as strongly as before) on the resources of the other.

However, we should emphasize that Finland is a particular case among the Nordic countries with stronger policy incentives and perhaps also stronger cultural values supporting long family leaves of mothers. The results on Sweden are more likely to be representative of the Nordic welfare state context at large, yet the gender gap in accumulated earnings varies systematically by childbearing history also in Sweden, from 17 % among the childless to 38 % among those with three or more children. In both countries a later timing of childbearing translates into smaller gender gaps in earnings, and the pattern in Finland is more pronounced among the highly educated and those with more children. This may be interpreted in terms of larger losses of (potential) earnings among women who enter motherhood relatively early in Finland as compared to Sweden. This is in line with earlier Nordic comparative results, showing that young mothers in Finland are at a particularly high risk of developing a weak attachment to the labor market over a longer period of time (Lorentzen et al. 2019). The cohorts under investigation here, born in the mid-1970s entered the labor market in the aftermath of the recession of the early 1990s which was particularly severe in Finland and had a longer-lasting impact on the economy and society (Ólafsson et al. 2019). It is plausible that particularly in Finland motherhood may have provided a means to seeking fulfillment in life among those with uncertain prospects in the labor market (Miettinen and Jalovaara 2020; Vikat 2004).

Unfortunately, we could not assess the role of part-time work (i.e., work hours) for the current findings due to data limitations. The gender gaps in accumulated earnings among parents working (mainly) full-time are likely to be smaller than on average and as found in this study for Sweden, given that part-time work of mothers has been one strategy to balance work and care in Swedish families (Grönlund et al. 2017). Given that women's part-time work has been less common in the case of Finland (ibid), it is plausible that conditional on mothers' type of employment (full vs. part-time) the differences between the two countries in the gender gaps in accumulated earnings would be larger than estimated in this study. However, over the last two decades the difference between the countries in the share of women (aged 25–49) working part-time has converged notably as a consequence of opposite country trends, from 19 %-points in 2003 to 6 %-points in 2022 (Eurostat 2023b).

The current findings have implications also for the later life course. Lower levels of earnings accumulated over the life course generally translate into lower level of pensions. The home care allowance episodes in Finland count as contributions to one's employment pension (since 2005), but only at a modest contribution level as compared to Sweden, which adds to the economic risk of Finnish mothers with long care episodes (Koskenvuo 2016). At the same time, childless men and women can be considered a vulnerable group at older ages not least because they may lack potential support from close family members, such as own children. In the Nordic context, this is not a group characterized by particularly high earnings, which would help to access alternative means of support. Childless women with low- to medium education and childless men with low education

have relatively low earnings, yet childless men with medium education earn already more than Finnish women on average. Thus, it is important to pay attention to the well-being of these groups, especially in the light of the increasing levels of childlessness among those with relatively low education in the Nordic context – and readily high average levels of childlessness in Finland (Jalovaara et al. 2019).

Moreover, the results may have relevance in light of the current low period fertility in Finland (2020: 1.37) (OSF 2021). Also exceptionally high levels of lifetime childlessness in Finland contribute to lower levels in cohort fertility as compared to Sweden. It is plausible to ask whether institutional support and cultural expectations for long absences from paid work, combined with potential issues that women face in establishing themselves in the labor market before (potentially) having children, may have contributed to the current low fertility landscape of the country. While Sweden, along with other Nordic countries, has also witnessed a fertility decline recently, it has been less dramatic than in Finland (Hellstrand et al. 2021). Lack of gender equality is unlikely to be the engine of the 2010s fertility declines across the Nordic countries, but it may provide a hint to the strength of the decline in Finland. It is plausible that "normative confusion" around gender roles might contribute to low period fertility rates in Finland (Esping-Andersen and Billari 2015), where much higher levels of education of women relative to men raise the expectation for women's earnings' potential, which is unlikely to be realized when long family leaves taken almost exclusively by women remain normative. It would be in line with contemporary theorizing on fertility (Goldscheider, Bernhardt, and Lappegård 2015; McDonald 2000; Neyer, Lappegård, and Vignoli 2013) that a potentially larger discrepancy between the level of gender equality in the family sphere and the public sphere in Finland than in Sweden would partially explain the average lower levels of fertility there. In addition, in the case that the current results are partly attributable to the effects of childbearing on earnings, they would imply that the delayed fertility of women currently at childbearing ages will contribute towards diminishing the gender gap in accumulated earnings especially in Finland.

To conclude, this study demonstrates that childbearing strongly modifies the gender gap in accumulated earnings also in the Nordic welfare state context – especially in Finland – and that the highly educated women are moderately closer to closing the gender gap in accumulated earnings than their lower educated counterparts. We call for more scholarly interest to unravel how gender inequalities accumulate across the life course. As data limitations have been one reason for the limited prior evidence on gender inequalities in accumulated earnings, the increasing availability of longitudinal individual-level data will be helpful here.

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Appendix Table 1. Earnings accumulated by midlife by gender, childbearing history, and educational attainment: mean and 95 % confidence interval (CI). Gender gap shown as share (%) of men's earnings. Cohorts born in 1974–75, Finland.

LOW	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**244**	**221**	**266**	**310**	**296**	**324**	**21**
One	**296**	**274**	**319**	**488**	**468**	**508**	**39**
Early	*220*	*178*	*262*	*389*	*356*	*422*	*43*
Late	*322*	*297*	*348*	*539*	*515*	*563*	*40*
Two	**330**	**312**	**347**	**591**	**573**	**609**	**44**
Early	*306*	*278*	*333*	*548*	*520*	*575*	*44*
Late	*346*	*324*	*369*	*624*	*601*	*647*	*44*
≥Three	**222**	**209**	**235**	**548**	**520**	**575**	**59**
Early	*205*	*190*	*220*	*572*	*549*	*594*	*64*
Late	*256*	*233*	*278*	*627*	*597*	*657*	*59*
Total	**265**	**256**	**274**	**471**	**462**	**481**	**44**

MEDIUM	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**430**	**421**	**439**	**539**	**532**	**546**	**20**
One	**449**	**441**	**456**	**701**	**692**	**710**	**36**
Early	*422*	*406*	*437*	*676*	*659*	*693*	*38*
Late	*458*	*449*	*467*	*711*	*700*	*722*	*36*
Two	**445**	**440**	**450**	**773**	**766**	**780**	**42**
Early	*428*	*421*	*435*	*767*	*757*	*777*	*44*
Late	*457*	*450*	*463*	*778*	*769*	*787*	*41*
≥Three	**340**	**335**	**345**	**758**	**751**	**766**	**55**
Early	*327*	*322*	*333*	*759*	*750*	*767*	*57*
Late	*371*	*362*	*380*	*758*	*743*	*772*	*51*
Total	**410**	**407**	**413**	**688**	**684**	**692**	**40**

HIGH	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**639**	**632**	**647**	**745**	**734**	**756**	**14**
One	**645**	**638**	**653**	**905**	**892**	**918**	**29**
Early	*594*	*580*	*608*	*893*	*868*	*918*	*33*
Late	*660*	*651*	*669*	*908*	*893*	*923*	*27*
Two	**636**	**632**	**641**	**1 003**	**995**	**1 011**	**37**
Early	*615*	*608*	*621*	*1 028*	*1 016*	*1 039*	*40*
Late	*654*	*648*	*660*	*983*	*973*	*994*	*34*
≥Three	**523**	**517**	**528**	**1 021**	**1 011**	**1 032**	**49**
Early	*507*	*500*	*513*	*1 029*	*1 017*	*1 041*	*51*
Late	*566*	*555*	*578*	*1 001*	*980*	*1 021*	*43*
Total	**609**	**606**	**612**	**937**	**932**	**942**	**35**

Appendix Table 1 continues

TOTAL	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**537**	**531**	**543**	**571**	**565**	**577**	**6**
One	**554**	**549**	**560**	**747**	**739**	**754**	**26**
Early	*506*	*495*	*517*	*697*	*682*	*711*	*27*
Late	*570*	*563*	*576*	*766*	*757*	*774*	*26*
Two	**566**	**562**	**569**	**866**	**861**	**871**	**35**
Early	*549*	*544*	*554*	*871*	*863*	*880*	*37*
Late	*579*	*574*	*584*	*862*	*855*	*869*	*33*
≥Three	**431**	**427**	**435**	**849**	**842**	**855**	**49**
Early	*418*	*414*	*423*	*852*	*844*	*859*	*51*
Late	*462*	*454*	*470*	*841*	*829*	*853*	*45*
Total	**521**	**518**	**523**	**763**	**760**	**766**	**32**

Appendix Table 2. Earnings accumulated by midlife by gender, childbearing history, and educational attainment: mean and 95 % confidence interval (CI). Gender gap shown as share (%) of men's earnings. Cohorts born in 1974–75, Sweden.

LOW	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**199**	**180**	**218**	**357**	**342**	**372**	**44**
One	**327**	**305**	**349**	**571**	**550**	**592**	**43**
Early	*266*	*227*	*305*	*530*	*493*	*567*	*50*
Late	*351*	*324*	*378*	*594*	*568*	*620*	*41*
Two	**382**	**367**	**397**	**688**	**675**	**701**	**44**
Early	*328*	*304*	*352*	*674*	*654*	*695*	*51*
Late	*423*	*403*	*443*	*702*	*684*	*719*	*40*
≥Three	**274**	**260**	**287**	**620**	**604**	**637**	**56**
Early	*248*	*233*	*264*	*600*	*580*	*620*	*59*
Late	*336*	*310*	*363*	*671*	*643*	*700*	*50*
Total	**300**	**291**	**308**	**553**	**544**	**562**	**46**

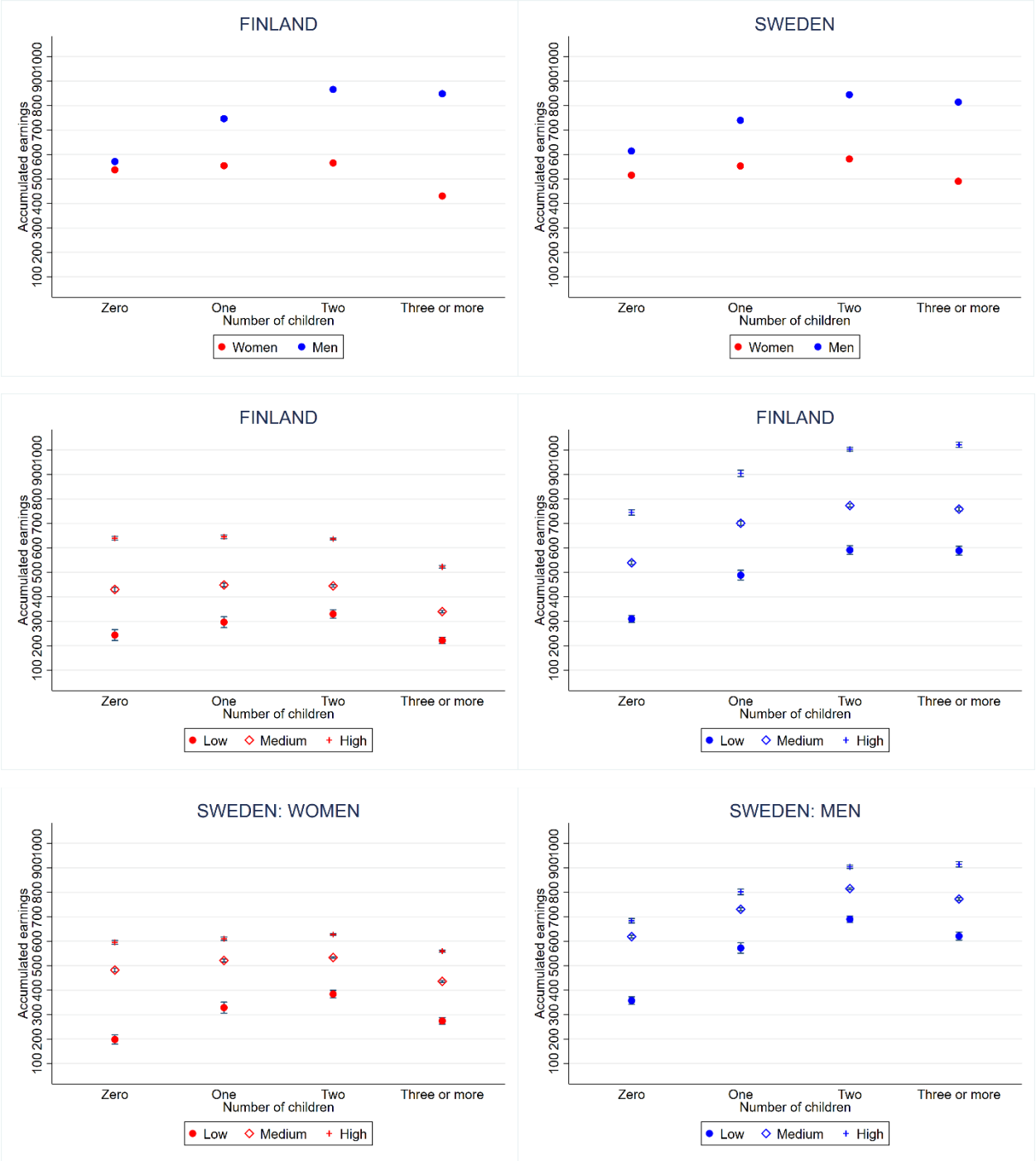
MEDIUM	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**482**	**474**	**489**	**618**	**613**	**624**	**22**
One	**520**	**514**	**526**	**729**	**723**	**735**	**29**
Early	*463*	*451*	*474*	*709*	*698*	*721*	*35*
Late	*543*	*536*	*550*	*740*	*733*	*747*	*27*
Two	**533**	**530**	**535**	**812**	**809**	**816**	**34**
Early	*501*	*496*	*505*	*815*	*810*	*820*	*39*
Late	*560*	*556*	*565*	*815*	*810*	*821*	*31*
≥Three	**435**	**432**	**439**	**769**	**764**	**774**	**43**
Early	*413*	*409*	*418*	*766*	*759*	*772*	*46*
Late	*498*	*489*	*506*	*790*	*778*	*802*	*37*
Total	**500**	**498**	**502**	**748**	**746**	**751**	**33**

HIGH	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**590**	**583**	**597**	**681**	**673**	**690**	**13**
One	**606**	**600**	**612**	**795**	**785**	**804**	**24**
Early	*572*	*559*	*586*	*831*	*804*	*859*	*31*
Late	*620*	*613*	*628*	*793*	*781*	*805*	*22*
Two	**622**	**619**	**625**	**887**	**882**	**892**	**30**
Early	*601*	*597*	*605*	*924*	*915*	*933*	*35*
Late	*650*	*646*	*655*	*887*	*877*	*896*	*27*
≥Three	**556**	**552**	**560**	**888**	**881**	**896**	**37**
Early	*535*	*531*	*540*	*915*	*903*	*927*	*41*
Late	*618*	*608*	*627*	*912*	*890*	*934*	*32*
Total	**601**	**599**	**603**	**838**	**834**	**841**	**28**

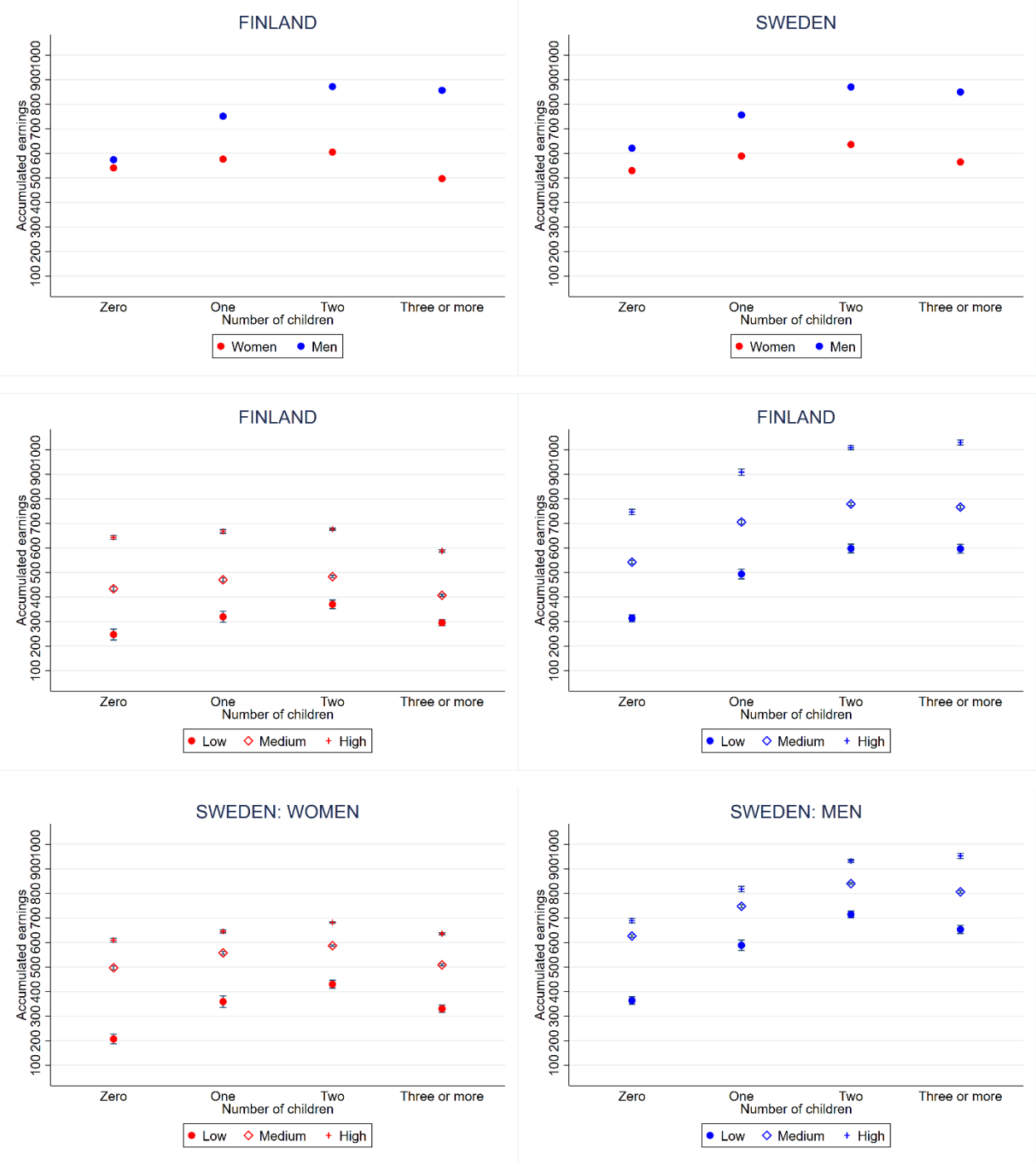
Appendix Table 2 continues

TOTAL	WOMEN			MEN			GENDER
	Mean	95% CI		Mean	95% CI		GAP
Zero	**513**	**507**	**518**	**613**	**609**	**618**	**16**
One	**550**	**546**	**555**	**737**	**732**	**742**	**25**
Early	*497*	*488*	*506*	*722*	*711*	*732*	*31*
Late	*606*	*603*	*609*	*838*	*833*	*842*	*28*
Two	**579**	**576**	**581**	**836**	**833**	**839**	**31**
Early	*571*	*566*	*577*	*747*	*741*	*753*	*24*
Late	*467*	*463*	*470*	*809*	*803*	*815*	*42*
≥Three	**489**	**486**	**492**	**803**	**799**	**807**	**39**
Early	*553*	*551*	*556*	*852*	*848*	*857*	*35*
Late	*553*	*546*	*559*	*827*	*816*	*838*	*33*
Total	**546**	**544**	**548**	**764**	**762**	**766**	**29**

Appendix Figure 1. Earnings accumulated by midlife by gender, number of children, and educational attainment. Cohorts born in 1974–75, Finland.



Appendix Figure 2. Earnings accumulated by midlife by gender, number of children, and educational attainment. Cohorts born in 1974–75, Finland. Earnings including employment-based benefits.



Appendix Figure 3. Gender gap in earnings accumulated by midlife by number and timing of children, and educational attainment, cohorts born 1974–75, Finland and Sweden. Earnings including employment-based benefits.