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Mapping how family dynamics shape income inequality between families with young children: The case of Sweden, 1995-2018

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Abstract

Increased gender equality in the labor market and the home are both cited as stabilizers to income inequality between households, but shifts in the economic organization of families over the life course instead appear to amplify household income inequality. Using the case of Sweden, where men have taken longer parental leave in recent years and the age at parenthood continues to advance, we analyze between-family income inequality for couples with a young child. We decompose how changes in women's and men's income before and after entering parenthood, as well as the timing of parenthood, contributed to income inequality between the years 1995 to 2018. Analyses of income from population registers show no evidence that assortative mating has increased and that a minor decline in inequality between couples over this 24 year period resulted from two opposing trends: Dis-equalizing changes related to women's post-birth income advancements were eclipsed by equalizing changes related to his pre-birth income changes and the postponement of parenthood. Men's pre-birth income gains were particularly strong for the youngest men who were soon to become fathers. Post-birth income trends reveal how improved gender equality may increase between-family inequality through women's income development and decrease inequality through men's.

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Introduction

There is a growing body of scholarship analyzing how family processes contribute to household economic inequality. Household composition has been explored as an important driver of rising inequality through more single-headed households in both the US and Sweden (Western, Bloome, and Percheski 2008; McCall and Percheski 2010; McLanahan and Percheski 2008; Robling and Pareliussen 2017), as has assortative mating (Henz and Sundström 2001, Esping-Andersen 2007, Dribe and Nystedt 2013). In addition, inequality may increase because socioeconomic patterns of divorce and remaining single imply gains for those with high socioeconomic status who are more likely to be partnered (Härkönen & Dronkers 2006; Perelli-Harris et al. 2010).

Existing research has focused on processes that shape family composition and structure but less so on processes that shape the economic dynamics within families. It is well known that childbirth is a central family and life-course event that dramatically shapes women's labor supply (Sanchez and Thompson 1997), and that women experience a shift in her share of household income after entering parenthood in contexts as diverse as Germany, UK and US (Musick, Bea, and Gonalons-Pons 2020) and Sweden (Nylin et al., 2021). Yet we know little about how childbirth impacts economic inequality between households (see Gonalons-Pons et al. 2021). Instability in women's income during their childbearing years may lead to more income inequality between couples. Earlier research has shown that socioeconomic patterns of women's labor force participation in general (Boertien and Permanyer 2019) have the potential to increase inequality because women with high earnings capacity are more attached to the labor market. Understanding why and when women's labor supply increases or declines and how it affects

women's earnings trajectory is therefore crucial to understanding patterns of inequality between couples.

Research focused on family dynamics has primarily revolved around women's gains in the labor market, and not men's, as we would expect the most change to be related to labor supply and less change in earnings developments (Nieuwenhuis et al. 2017). Yet, evidence points to polarization in men's earnings as a main driver of the increase in inequality between households across European countries (Harkness 2013; Sudo 2017; OECD 2011). Women's employment was of less importance and had the opposite effect, by minimizing between-household inequality (Cancian & Reed 1999; Reed & Cancian 2013). In a context such as Sweden, little change in women's labor supply has occurred since the 1990s, implying that earnings developments—particularly men's—may be of greater importance.

Furthermore, recent changes in men's involvement in family and child rearing could contribute to a decline in inequality, which is a possibility that has been overlooked. Recent research in contexts such as Sweden and other Nordic countries show increases in men's work interruptions to care for a child, resulting in temporary declines in his earnings (Nylin et al. 2019). If women's labor supply during this stage in the family formation process increases in response to the new post-birth trends in men's income, inequality may be suppressed. This specific contribution to inequality may only be relevant in the last decades to contexts such as Sweden and other Nordic countries in which family policies and gender norms make it possible and desirable for men to take parental leave, and where women are encouraged to work more than part-time when children are young.

Nordic family policies may also play a role in the timing of family formation, as leave benefits are tied to previous earnings and therefore encourage women's labor market attachment

before entering parenthood. Postponing parenthood provides some protection against the consequences of childbearing for women's labor market attachment and earnings (Amuedo-Durantes & Kimmel 2005; Miller 2009), which should influence their income trajectories and also be a pathway through which family processes contribute to income inequality. This may be true for men as well, to the extent that they assume care-taking responsibilities in the home.

In Sweden and other Nordic countries, the economic organization of the household has moved toward gender equality more than most other wealthy contexts. In addition, women's labor supply has become not only highly resilient to childbearing, but is also a prerequisite for childbearing due to women waiting to enter parenthood until they earn a sufficient income. These developments have likely resulted in important changes in how men's and women's income adjusts around the first birth. By assessing how inequality between couples with children has developed over recent decades, we can understand how demographic and social developments related to family processes influence income inequality between these couples. This may help us understand recent developments in inequality across all households, even if our focus on couples' income dynamics surrounding the entrance to parenthood excludes the contribution of single-headed households or partnership instability to overall inequality.

A few studies have focused on how much income inequality is related to changes in the economic organization of the household after a childbirth relative to assortative mating in the US (Gonalons-Pons and Schwartz, 2017; Gonalons-Pons, Schwartz, and Musick 2021). We push the frontiers of this research by additionally considering the role of postponed parenthood as well as a context that is a forerunner in gender equality. We present trends from 1995 to 2018 in income inequality between Swedish couples around the time of the first birth, assortative mating (the correlation between partners' pre-birth income), his and her income developments, as well as

how these components vary by childbirth cohorts over the period of time surrounding the first birth. We decompose how changes in women's and men's income before and after entering parenthood, as well as the correlation and interdependency between the two, have contributed to the change in household income inequality in Sweden. Our findings aim to identify how inequality between couples has been influenced by changes in the last decades in 1) assortative mating, 2) the division of labor after entering parenthood, 3) women's and men's gains in the labor market, and 4) advancement of the age of first childbirth.

Family processes and household inequality

The first generation of research on household inequality and family processes focused on shifts in household size and composition, and the growing relevance of single-headed households. In the US, Western et al. (2008) used a log income variance decomposition and showed that the higher proportion of single-headed households was a major driver of rising inequality among households with children. A number of other articles have used DiNardo's re-weighting decomposition and concluded that similar patterns also drive increases in inequality in other countries, including Sweden (Robling and Pareliussen 2017; Cancian and Reed 1999; Cancian, Danziger, and Gottschalk 1993; Sudo 2017). Studies have found that both in the US and Sweden the growing share of single-headed households has contributed to the increase in economic inequality across households (Western, Bloome, and Percheski 2008; McCall and Percheski 2010; McLanahan and Percheski 2008; Robling and Pareliussen 2017). This is because patterns of income pooling within households have the potential to exacerbate or offset economic inequalities generated in the labor market (Schwartz 2010). Family processes can offset economic inequalities if they lead to low-income people being more likely to live in households with multiple earners than high-income people, for instance. Nowadays, however, a number of

family processes are pointing in the opposite direction, raising the possibility that family processes exacerbate rather than ameliorate inequality. Research finds, for instance, that the likelihood of events like divorce or singlehood (not marrying) is higher among low-income people (Härkönen & Dronkers 2006; Perelli-Harris et al. 2010).

Patterns of assortative mating are also pointing in the dis-equalizing direction, with a higher frequency of couples with both higher education degrees and high earnings potential (Henz and Sundström 2001, Esping-Andersen 2007, Dribe and Nystedt 2013). With educational expansion increasing the share of couples with both higher-education degrees, the core hypothesis of this literature was to link these patterns of couple formation to increasing inequality. Most studies failed to find evidence for such a relationship (Breen and Salazar 2011; Eika, Mogstad, and Zafar 2014; Hryshko, Juhn, and McCue 2015; Kremer 1997; Western, Bloome, and Percheski 2008; Torche 2010; Boertien and Permanyer 2019; Sudo 2017; but see Fernandez, Guner, and Knowles 2001; Greenwood et al. 2014). These studies found either that assortative mating patterns were not sufficiently strong or, in the case that the patterns were strong, that their connection to economic inequality was miniscule at best.

Unlike educational homogamy, studies on couples' economic homogamy do find that it substantially shapes economic inequality across households (Schwartz 2010). The discrepancy in results between studies focusing on couples' educational similarity and studies focusing on couples' economic similarity suggests that processes determining earnings and labor supply decisions are crucial (Breen and Salazar 2010). As Greenwood et al. (2014) show, high levels of educational homogamy fail to leave any imprint on economic inequality when women's levels of labor force participation are low. To add to the complexity, Shen (2021) showed that inequality is impacted by homogamy the most when there is more homogamy among top earners, and that

this effect diminishes when the homogamy is instead higher among lower earners. In addition to where in the income distribution homogamy is increasing, Shen (2021) demonstrated that the power of homogamy to influence inequality is moderated by the overall level of inequality within a context. Eeckhaut & Stanfors (2021) found that homogamy contributed to household income inequality both depending on the degree of stratification and the degree of gender equality. Taken together, a number of family developments have the potential to exacerbate household income inequality.

Unlike the past where women's employment was secondary and more likely among low-income households, nowadays women in high-income households are as likely if not more likely to remain employed (Boertien and Permanyer 2019). In order to better understand the processes that shape labor supply decisions, in particular women's, the study of economic processes within families (and away from its focus on processes shaping composition) is necessary. A second generation of research on household inequality has therefore begun to look at changes within couples over time. One of the first studies looking at how economic processes within families shape spouses' economic homogamy and inequality focused only on marriage and used data from the US (Gonalons-Pons and Schwartz, 2017). This study found that spouses' economic homogamy at the beginning of marriage/union have barely changed since the 1940s, and that it is changes in how spouses' economic homogamy evolves *during* marriage that have increased spouses' economic homogamy overall and contributed to increased inequality. These results are consistent with the idea that parenthood can play a major role in shifting spouses' economic homogamy during marriage.

Only one study has begun to examine this hypothesis related to the role of parenthood (Gonalons-Pons et al. 2021). They found that changes in homogamy after marriage used to be

the main driver in inequality and more recent trends show that it is homogamy after entering parenthood that is the main driver. This was largely due to changes in women's employment before and after entering parenthood. We add to this generation of research on income inequality within and between families by examining the case of Sweden, as well as consider a few additional ways in which family processes might play a role, particularly surrounding the entrance to parenthood. We conduct a more detailed decomposition analysis by separating the impact of within-couple income correlation and changes in his and her pre and post-birth income, as well as changes in the timing of parenthood. In the next section we review the situation of women and men's employment specifically in the context of Sweden.

Parenthood and women's and men's earnings in Sweden

Trends in income inequality have been extensively studied both in comparative and national work. In the case of Sweden there was concern that the economic crisis that hit Sweden in the early 1990s caused increased income inequality between households. However, the immediate effect of the crisis was moderate (Jäntti and Björklund 2011). The development of income inequality has been heatedly debated and scrutinized at length (Björklund and Waldenström 2021). When investigating the whole population, Sweden and the other Nordic countries still have lower income inequality than the US, for example, even if there has been an increase over time (Aaberge et al., 2002). Income inequality between households has increased since the 1980s, after two decades of decreased inequality. As measured by the gini-coefficient, income inequality has increased slowly since the 1990s but has been relatively stable since 2015 (Finance Ministry 2022). It is the increase in income among top earners that is the main reason for the increased inequality (Finance Ministry 2022), but it seems that no single explanation is the cause of this shift towards more inequality, as less progressive tax reforms, an increase in

more single individuals and other changes in household structure, as well as changes in the labor market are all at play (Robling and Pareliussen 2017).

Couple income homogamy has also been shown to have a modest role on increasing inequality looking across changes in between household inequality in Sweden (OECD 2011), but such an effect over the couple life course has not been disentangled. In a study covering 1983-2010 and following cohorts born in 1948 and 1958, women at the bottom of the income distribution increased their earnings, and women at the top decreased (Jansson 2021). The pattern was the opposite for men, leaving low income men behind the general income increase. During the last decades, while income inequality has increased, women's earnings as a share of men's have also increased to around 86 % in 2020 (Finance Ministry 2022).

Parenthood is a crucial event shaping couples' gender division of household labor in Sweden, as elsewhere, and affects earnings in both the short and long run. Women's earnings typically take a hit at parenthood in Sweden; estimates find that women's share of couple's earnings drops by 20% during the first year of parenthood (Nylin, et al. 2019). Family policies such as paid parental leave and affordable childcare keep women attached to the labor market after entering parenthood (Hook and Paek 2020) and this is particularly evident in Sweden: 83 percent of mothers with children under the age of 12 participate in the labor market, as compared to 94,1 percent of the same group of men; 35 percent of women in the labor market with young children are working part-time (less than 35 hours per week), as compared to 9 percent of men (Official statistics from 2018, Statistics Sweden 2019).

Men's earnings have typically either remained unaffected or even benefited from parenthood. Some studies report fatherhood bonuses, though the causal effect is contested (Killewald 2012). In Sweden, men's earnings are also starting to decline immediately after

entering parenthood in recent cohorts, though these declines are much smaller than the decline in women's earnings (Nylin et al., 2019). A similar pattern has been observed in Finland (Morosow & Cooke 2022).

The main reason for the change in men's earnings pattern is increased parental leave use; today a large majority of Swedish fathers use some leave during the first years after a child is born. During the eligible period (preschool years), 9 out of 10 fathers use parental leave, and almost 8 out 10 do so in the first two years. Fathers' leave increased primarily when the reserved months for fathers were introduced and also extended in 1995, 2002 and 2016 (Duvander and Johansson 2012; Ma et al. 2019). The leave length is also increasing for fathers; on average they use about three months today, while mothers' use almost a year of leave (see www.forsakringskassan.se). As the leave system is very flexible and paid and unpaid leave can be mixed (Duvander and Viklund 2019), it may be that labor supply is not changing as much as one would assume from the provided benefit (Karimi et al. 2012). One interpretation is that while reserved months for men may increase their leave, later labor supply may compensate for such exits, and that women are extending their unpaid leave as women's possibilities to use paid leave is decreasing as men's increases. It may however be less possible to extend unpaid leave in all families, especially among mothers with low income before entering parenthood.

Indeed both women's and men's income developments are positive after the first few years of being parents. Women's contribution to couples' income is remarkably stable both over time (Nylin et al 2019) and cohorts (Boschini et al. 2011); the decline associated with the first birth persists and has not changed much despite men's increasing use of parental leave. Nevertheless, for specific groups we may find a different family formation pattern with effects that are period specific. Family formation at different economic periods may have varying

effects, where women who entered parenthood during high unemployment in the 1990s were more likely to end up as single parents and be economically vulnerable, an effect that mainly applies to women with low chances of further education or employment (Engdahl, Godard, Nordström-Skans, 2018).

Earlier Swedish studies have used a number of different income measures, such as disposable income where both the tax system, transfers and income from capital is included (see for example Jäntti and Björklund 2011), life-time income (Björklund et al 1995), and both earnings and wage as well as with different selections of participation in the labor market (Angelov et al 2016, Nylin et al 2019, Boschini et al 2011) for different illustrative purposes. It has, for example, been shown that income from capital is today the main reason for gender income inequality in Sweden among the working age population (Finance Ministry 2018). We are here interested in inequality related to the life changing event of parenthood and whether this transition has changed gendered income development over time. We are also interested in how couple income homogamy varies in the pre- and post-birth periods. Earlier studies indicate large changes in income at birth for both women and men in couples with relatively (but not completely) equal incomes, and then recuperation of different speeds for women and men in hypergamous, homogamous and hypogamous couples (Nylin et al 2019). It seems clear that income development in couples with different characteristics have different trajectories (Dribe and Nystedt 2013), but so far the impact of these different trajectories, both pre and post birth income developments, on inequality between couples has not been disentangled.

Fertility has been notoriously high in Sweden, relative to other wealthy countries, hovering around replacement level (total fertility rate (TFR) of 2.1) except during the economic crisis in the early 1990s and the fertility decline beginning in 2010. Besides this general trend,

demographers have shown a marked postponement of parenthood among young women during and following the economic crisis in the 1990s (Andersson 2000). Recovery of the TFR during the 2000s was partially due to a recuperation of lost childbearing by women now entering older age groups; in other words, women entering parenthood later (Andersson and Kolk 2015). In general the 1990s was a period of education expansion and delayed first births in Sweden, but did not result in larger shares of permanently childless individuals (see scb.se). The more recent decline in TFR again appears to be due to postponed parenthood at even older ages than in the 1990s, reflecting another advancement of the age at which women enter parenthood, or increased childlessness (Andersson & Wijk 2021). Statistics Sweden (SCB) reports that in the time span from 2000 to 2018, the mean age of women at first birth increased from 28.2 to 29.4, and for men from 30.7 to 31.7.

Women and men have therefore added more than an entire year of work and life experience before entering parenthood in the last two decades. According to Miller's (2011) estimates, one year of delayed parenthood is associated with a 9% increase in earnings for women. In the case of Sweden, Cantalini et al. (2017) have shown that delaying parenthood alleviates the cumulative earnings penalties related to motherhood. We know that the motherhood wage penalty attenuates over time (Kahn et al. 2014), and there may be differences in the extent that women's earnings recuperate depending on when in their career they enter parenthood. The same argument may be true for men if they also experience work interruptions after entering parenthood. To the best of our knowledge, how the timing of parenthood affects between-couple inequality, as well as men's income developments in contexts where they take parental leave, have not yet been explored.

Expectations

We focus explicitly on couples in our study and formulate multiple expectations about how changes surrounding parenthood may contribute to increasing or reducing inequality among them. An important assumption drawn from the literature is that income gains are stronger for earners at the top of the income distribution. If they were more prevalent at the bottom of the distribution instead, income gains would not necessarily lead to greater inequality. For this reason, we 1) explore where growth appears along the income distribution, and 2) evaluate how these changes might contribute to increases or decreases in between-couple inequality, even when the direction might be ambiguous.

1. Women's advancements in the labor market: Improvements in women's economic standing in the labor marker should translate into increases in pre-birth earnings. If improvements are more marked for women in higher income groups, this could contribute to increasing inequality between couples.
2. Income developments for men: Pre-birth income developments of men reflect income gains related to the general labor market functioning. If improvements are more marked for men in higher income groups than for women, this could contribute to increasing between-couple inequality.
3. Increased gender equality in care-taking: As men began to take more parental leave,
    a. we expect a decline in inequality between couples due to men's income losses after the birth and any recuperation effect of taking parental leave.
    b. we expect women to compensate by taking shorter parental leave and, therefore, show improved post-birth income trajectories.
4. Increased homogamy

a. Assortative mating: As partners become increasingly similar before entering parenthood, income inequality between couples increases.
b. Increased homogamy in income after entering parenthood: Similar to the case with increased gender equality in parental leave, women's labor supply and income may have become less affected by entering parenthood over time. However, in light of evidence from the US case, this pattern may also reflect women's stronger commitment to labor force participation after entering parenthood.

5. Postponement of parenthood: As the average age at parenthood advances, the returns to entering parenthood later are experienced by more couples and this factor may therefore act as an income equalizer. Conversely, if the distribution of parenthood ages remains similar even as the average age advances, and if there is no age threshold at which returns to postponement stagnate, this factor could widen income differentials.

Data and Method

We use data from a compilation of Swedish registers that provide information to match partners who are married or have a joint child. This resource also provides demographic and annual labor earnings information. We selected all individuals in the population of Sweden who had a joint biological or adopted child with a different-sex partner in the registers and created a panel data set where we follow the couple from two years before the birth to eight years after. We observe couples between 1995 and 2018. In each year observed, we have the same composition of couples in relation to this parenthood trajectory: we observe couples in every year that vary from being two years away from having a child to having a first child up to eight years old. Couples

are censored when they separate or when either partner migrates or dies. In total, we observe 920,385 couples.

Our earnings measure is derived from pre-tax annual labor income and includes taxable transfers from the state, including parental leave benefits, pension, and sick leave. It does not include study loans and social welfare benefits. Parental leave benefits are of primary interest here, as income is replaced at approximately 80% of previous income up to a relatively low ceiling benefit (however, collective agreements often require employers to top-up this benefit to reach 90% of previous income with no benefit ceiling). The change we observe after entering parenthood therefore reflects the extent to which women's and men's income has been replaced and the extent of any unpaid leave. We include those observations in which a person had no income at all, which could be the case if they were studying. Income is inflation-adjusted to 2012 Swedish kronor. We top-coded the top 3% of men in order to avoid the strong influence that a few very high earners can have on the estimates. In other words, men whose income was higher than the 97th percentile were coded as having the same income as the 97th percentile. Women's income was not adjusted.

We present various statistics as descriptive trends to facilitate understanding of the decomposed trends in inequality. We use the correlation coefficient as a measure of the association between partners' income. The measure of inequality we use is the coefficient of variation (CV= the ratio of the standard deviation to the mean), which is a commonly used, standardized measure of dispersion. Following the approach used by Cancian et al. (1993), Gonalons-Pons and Schwartz (2017), and Gonalons-Pons et al. (2021), we decompose the CV into parts including the correlation of partners' income and trends in men's and women's income shares and income inequality. For more details see Cancian et al. (1993).

We decompose the change in inequality between 1995 and 2018 into parts due to changes in pre- and post-birth men's and women's income developments and the correlation between the two. The first step is to construct a data set with measures of men's and women's income inequality (the coefficient of variation), men's and women's income share, and the correlation between men's and women's earnings by year and time since birth. We reconstruct the period inequality trend estimated from individual-level data as the weighted average of the recalculated CV using the aforementioned income measures corresponding to different birth cohorts (approach adapted from Gonalons-Pons and Schwartz (2017) Table 3). For instance, the reconstructed 1995 CV is estimated as the weighted average of post-birth income measures and correlations for couples with children ages 0-8 in 1995 and pre-birth income measures and correlations for couples who had their first birth in 1996 and 1997.

Additionally, to examine the role of postponement in shifts in pre- and post-birth income developments, we compute a reweighting factor variable to hold constant the age distribution at first birth to the 1997 cohort. For instance, in the 1997 parenthood cohort, 25.7% of the women had a first birth by age 24 but in the 2017 parenthood cohort only 16.1% had a first birth by this age. Applying this reweighting factor shifts the 2017 parenthood cohort to have the same proportion of women who had births by age 24 as the 1997 cohort. If changes in pre- and post-birth income developments are related to postponement of parenthood, the observed and the re-weighted results will be different. For instance, if changes in men's pre-birth income are related to postponement, we should see the influence of changes in men's pre-birth income on patterns of inequality to be smaller when the age distribution is held constant.

Next, we simulate counterfactual trends holding constant key components of interest. The first simulation constrains her pre-birth income developments to remain constant between 1997

and 2017; that is, we assign 1997 cohort pre-birth values for her income components to all birth cohorts that follow the 1997 cohort and leave all other components (his pre-birth income components and correlations as well as all post-birth income components) to evolve as observed. This estimates what trends in income inequality would look like if her pre-birth income components had not changed over this period. The second simulation constrains his pre-birth income components to remain constant over time. The third simulation constrains the correlation between women's and men's earnings to remain constant between 1997 and 2017. The fourth, fifth, and sixth simulations repeat the same sequence of constraints but constrain post-birth trajectories instead. For instance, the fourth simulation constrains her post-birth income developments to remain constant between 1997 and 2017, while all other components remain the same (all pre-birth income components as well as his post-birth income components and the post-birth correlations). The final simulation uses the age distribution reweight factor described above to evaluate the extent to which shifts in the age composition of the couples shape the influence of changes in pre- and post-birth income developments on between-couple inequality.

The decomposition approach is therefore non-cumulative (we examine one component at a time instead of stacking components) and clearly shows the weight of each component we have discussed.

Results

Mapping family inequality developments in Sweden

Figure 1 presents income inequality between couples in our analytical population over the time period of this study, 1995-2018, as well as inequality between women and between men. The CV was highest at the beginning of our time series and then gently slopes down until the mid-2000s,

stabilizing until 2010 and beginning another slow decline. This trend results in an overall decline of 9%. This general pattern was mirrored, although with milder changes, for couples with a child of any age in the household and couples with or without children (See Appendix Figure A1). As expected, the trend for couples maps on to the trend for men, which are the stronger earners in the household most often (Sudo 2017). The trends are nevertheless similar, with women experiencing more dramatic increases and decreases, reflecting more diversity in labor force participation and hours worked by women with young children. We can conclude from this figure that the more recent decline in inequality is driven by a decline in income inequality for men and not women.

Figure 1. Income inequality between couples, men and women with young children, coefficient of variation

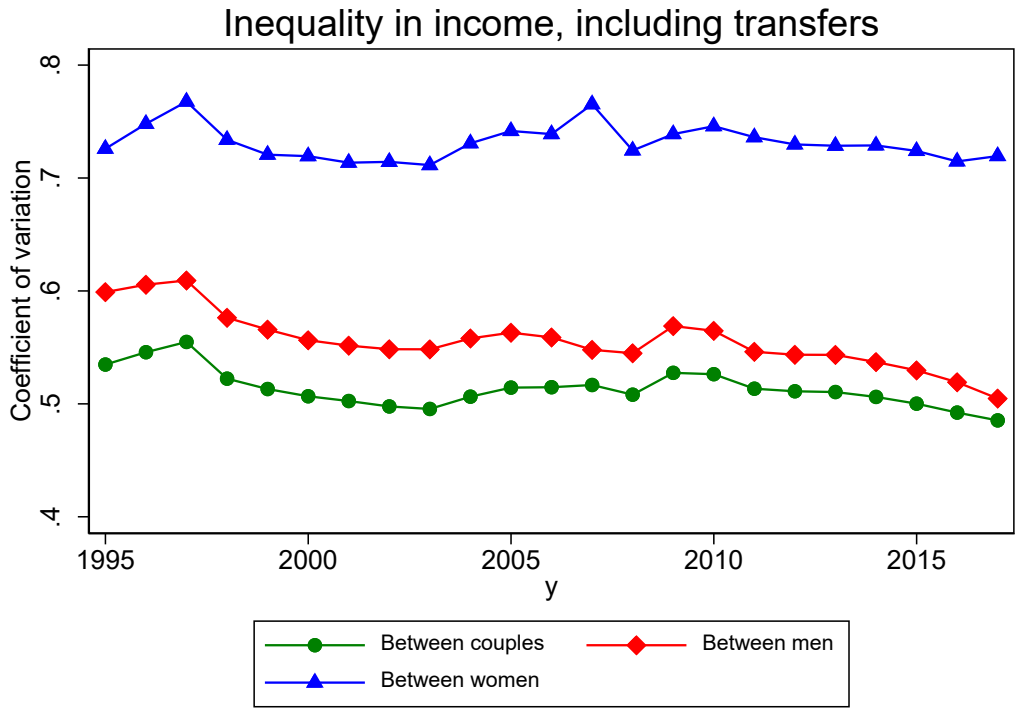


Figure 2 shows income developments over time for men and women according to their location in the income distribution. Both men and women in the lowest income quartile made gains at the end of the 1990s economic crisis, relative to those in the top quartile, until around 2008, when the global economic crisis began. Men's gains are steeper overall than women's both at the top and the bottom of the income distribution. However, the distance between the top and bottom has remained mostly stable for men since 2010, whereas the distance has grown for women.

Figure 2. Men's and women's income developments by quartile over time, analytical population of couples -2 to 8 years after entering parenthood

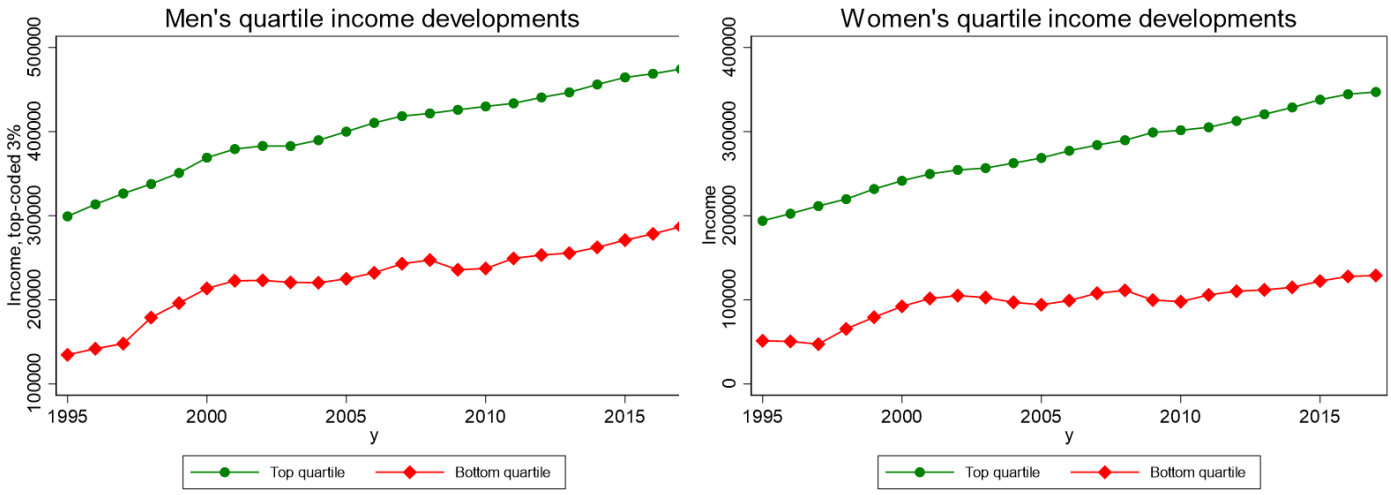
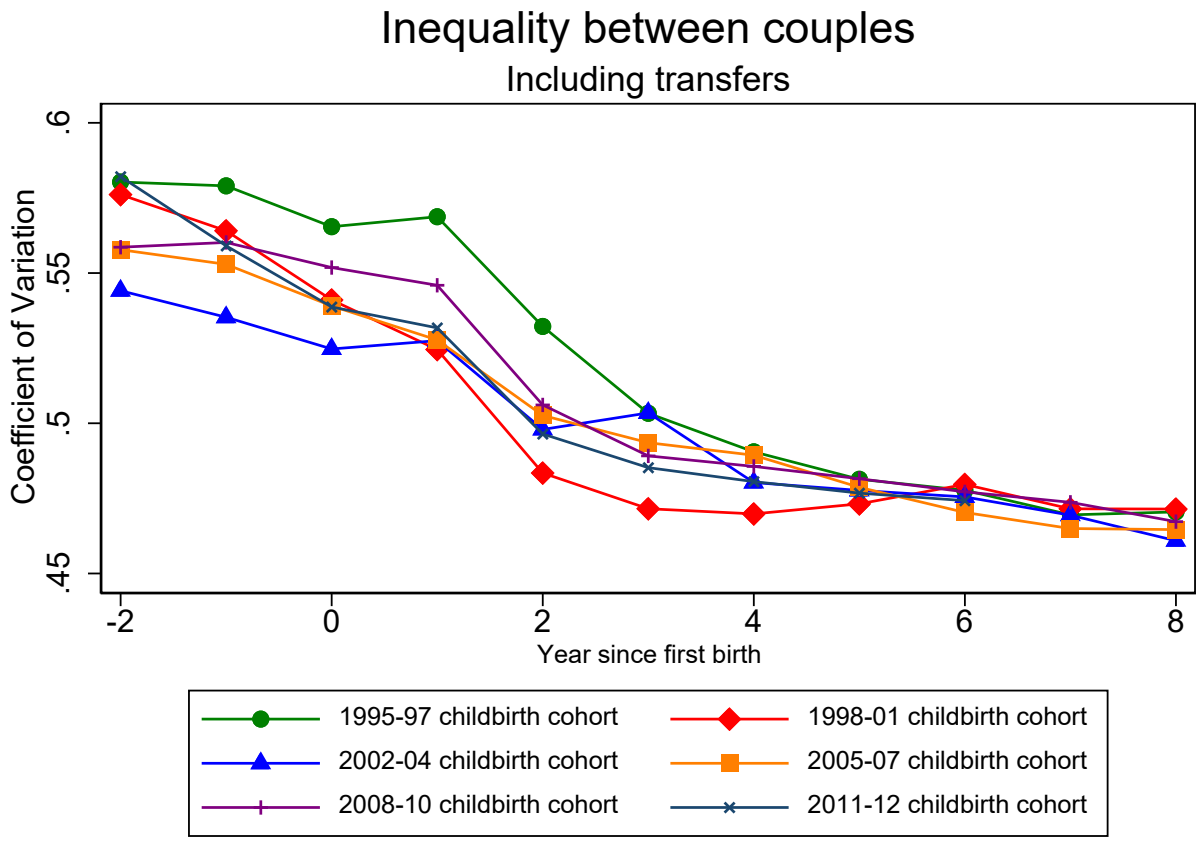


Figure 3 shows how inequality between couples has changed across the family formation stage of a couple's life course and how this trajectory has changed over time. The first birth cohorts are designed to reflect births that occurred when the first reserve months for fathers was introduced (1995-1997), the years after (1998-2001), the years the second reserve month for fathers was introduced (2002-2004), the years after (2005-2007), the years including the global economic crisis (2008-2010), and the years in which we begin to see a fall in the fertility rate (2011-2012). We do not observe later childbirth cohorts in these descriptive trends because we do not have sufficient follow-up time. Descriptive statistics of this smaller analytical population are displayed in the Appendix Table A1.

Overall, inequality declined moderately or held stable in the years leading up to the first birth and then declined rapidly thereafter until around the fourth year after the first child was born. This falls at the time point most couples have completed having their second child and the

related parental leave. By the fifth year, there is very little difference between childbirth cohorts in income inequality.

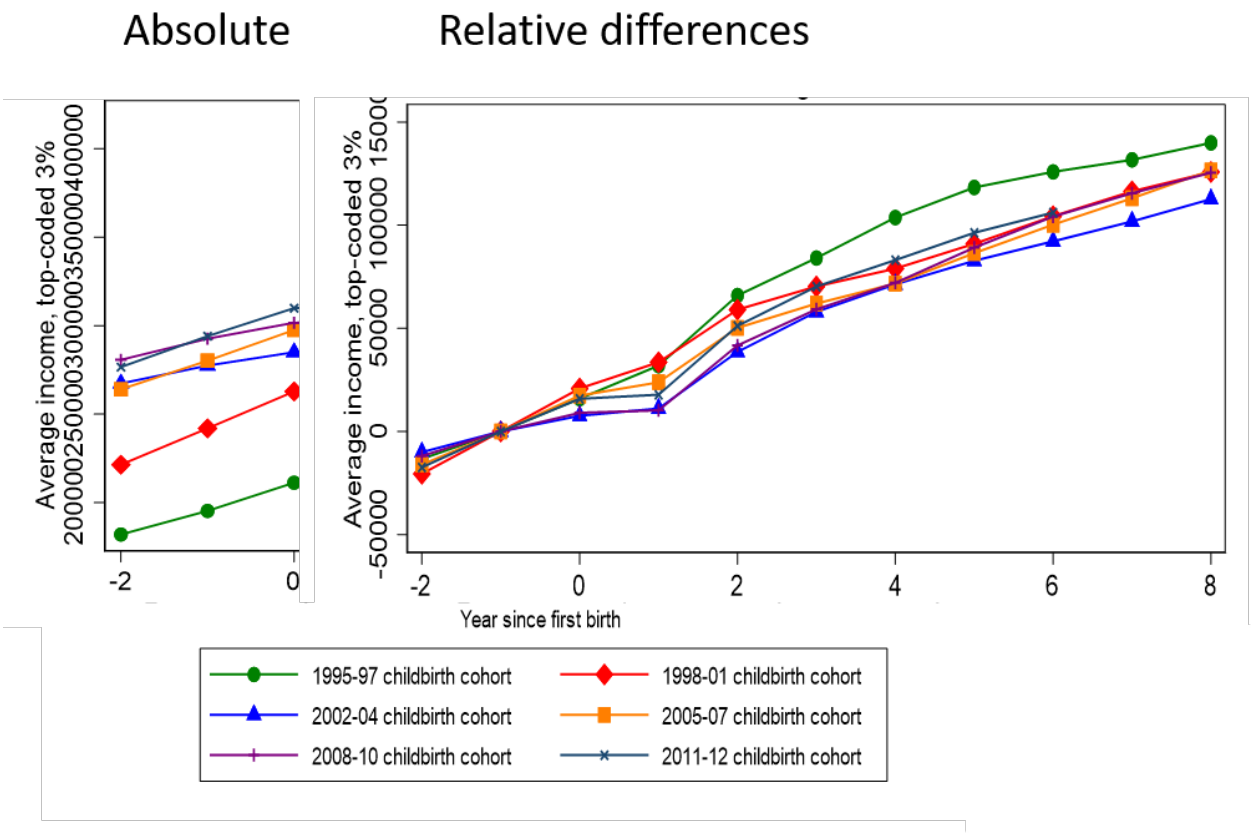
Figure 3. Income inequality between couples over the years surrounding the first birth, stacking first birth cohorts, coefficient of variation



Descriptive trends: men's and women's income, within-couple correlations, and postponement

Figures 4 and 5 show how his and her income changes, both the absolute differences before entering parenthood and differences relative to income at time -1 (one year before the birth of the first child). The x-axis tracks the family formation stage of couple's life course and childbirth cohorts show shifts over time. As evident in the time trend of average income for men, positive income developments for men somewhat stalled by the 2002-2004 childbirth cohorts, with only a slight increase for the 2008-2010 cohorts and no increase for the following cohorts. After entering parenthood, relative changes show a trend that used to generally be a consistent increase flatten for the 2002-2004 cohort, when the second reserve month for parental leave was introduced. This change in men's income trajectory becomes more noticeable in the development of a dip in income in later childbirth cohorts, growing more marked in the most recent years. The extent to which men's income developed positively by year eight differed over time as well. A decline was particularly marked over the years 1995-2004, but little change appears since then.

Figure 4. Men's income developments before and after entering parenthood across childbirth cohorts

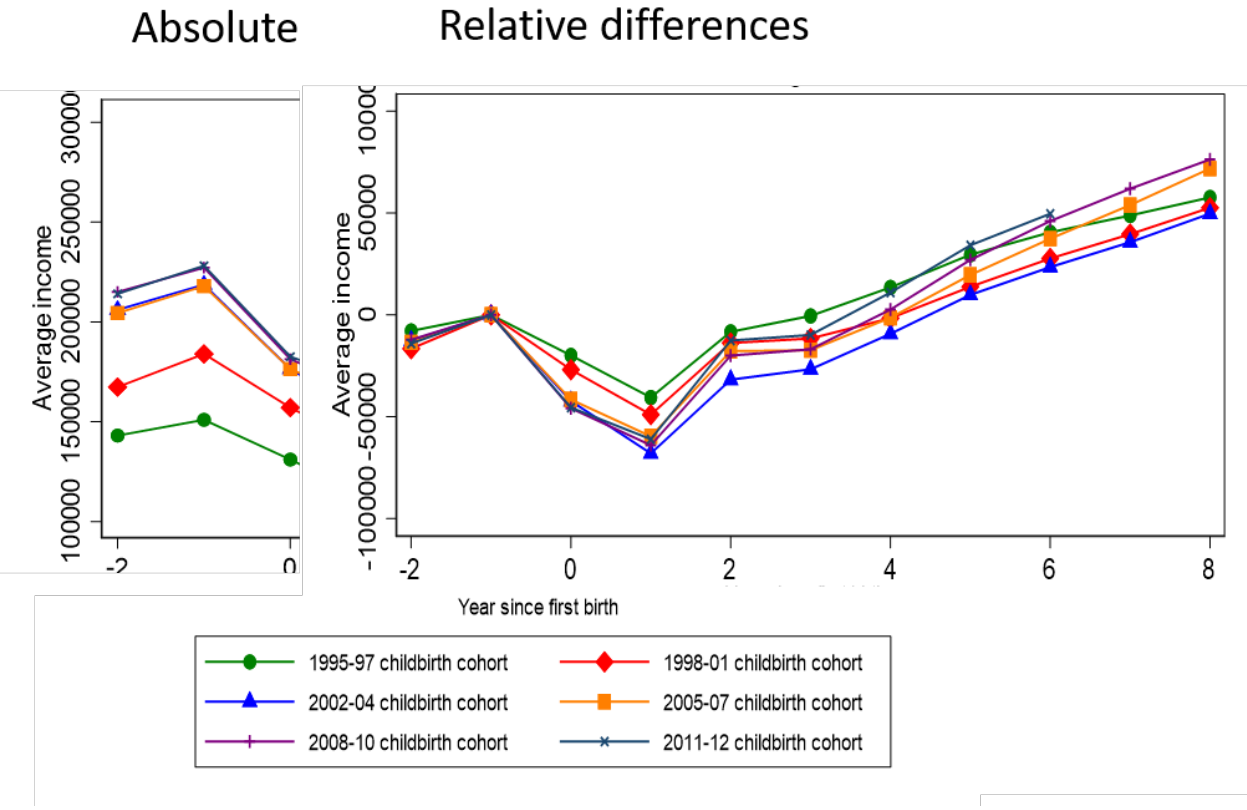


In Figure 5, we see the same stagnation men experienced in women's pre-birth income development for the 2002 to 2010 childbirth cohorts. A minor increase in income continued again in the 2011-2012 period.

The income loss after the first child is born that was evident for men is minor in comparison to women's. Women's income bottoms out in the year after giving birth, then quickly increases by year two. This income loss after entering parenthood deepened when the second reserve month was implemented (2002-2004 childbirth cohort), and has held constant. However the rebound in year two has improved in the two most recent cohorts, which may be when men are taking their parental leave. Nevertheless, we cannot yet see a clear improvement

in women's income developments until the recuperation of women's post-birth income. The most recent childbirth cohorts (starting with 2005-2007) generally have higher income by year eight than earlier cohorts.

Figure 5. Women's income developments before and after entering parenthood across childbirth cohorts

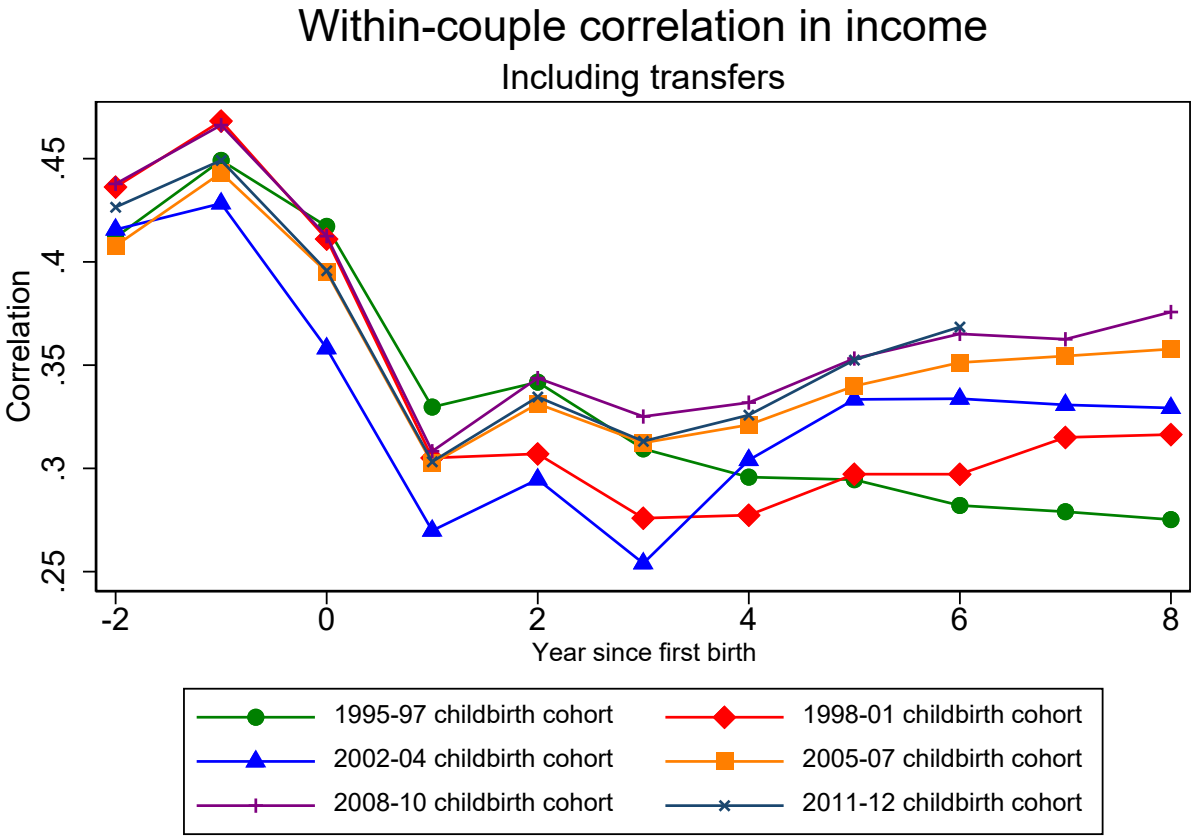


Income correlation trends are similarly displayed for childbirth cohorts in Figure 6. Pre-birth correlation trends reveal no change over time, with the exception of the 1998-2001 and most recent childbirth cohorts showing a slightly higher starting point. Assortative mating according to income appears to not have strengthened continually over time for these cohorts.

No clear trend over time can be found in the immediate impact of parenthood on income similarity between partners either. Rather significant differences across childbirth cohorts emerged in the post-birth correlations. By one year after birth, income similarity between partners was at its lowest although it was just as low and sometimes lower for some childbirth cohorts the time around the second birth (three years after the first birth).

By the last year of our couple observation the differences between cohorts were greatest. Whereas income correlation was the lowest at any point eight years after entering parenthood for the earliest cohort, we see improvements over time in recuperating income homogamy. A steady increase in the final correlation coefficient shows that women have increasingly improved their income in relation to their partners.

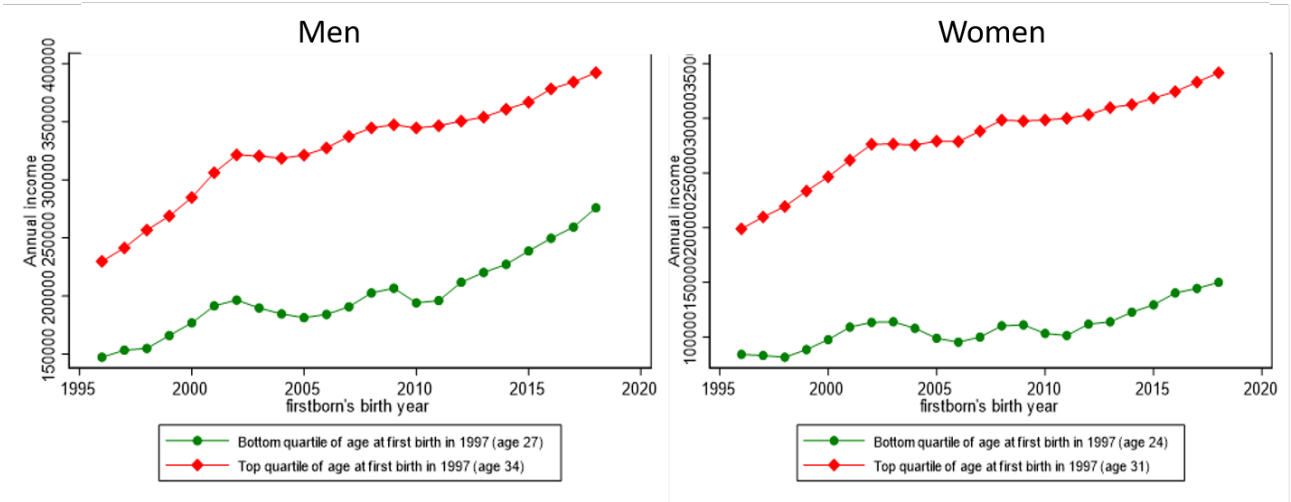
Figure 6. Income correlation within couples before and after entering parenthood across childbirth cohorts



We explore changes related to the postponement of parenthood in Figure 7 (and Figure A2 in the Appendix). As the average age at parenthood advanced, so did the income levels at which couples started their families. In Figure 7, we see how pre-birth income developed for the youngest and oldest parenthood quartiles in 1997. The share of people in the lowest age group declined over time slightly and the share of people in the highest age group increased slightly due to postponement.

Two trends are clearly evident. First, there is greater income inequality by birth timing for women than men, and this inequality has increased over time. The younger fathers experienced a significantly steeper increase in income than the older fathers since around 2010. Although the income trends for women are similar for the youngest and oldest mothers in the last 15 years, the youngest mothers missed out on income gains in previous years. In terms of recuperation, we can see in the Appendix (Figure A2) steady income growth for men in the earliest cohort, but a marked dip in income when the first child is one year old for the oldest fathers. These older fathers also do not show as rapidly increasing income as younger fathers, which may be due to taking parental leave and not to their timing of parenthood. However, the pattern appears both for the 1997 and 2012 childbirth cohorts, and the earlier did not show an income loss after entering parenthood. Women, on the other hand, show that the more recent cohort of older mothers had stronger income growth than the younger mothers by year four. This pattern is remarkable given that this group of women also experienced the greatest loss in income after entering parenthood (along with the oldest mothers in 1997). This potentially points to an emerging pattern of greater income recuperation for older mothers than for younger.

Figure 7. Average pre-birth income, including transfers, according to the bottom and top age quartiles in 1997



Decomposition analysis of between-couple income inequality

We decompose the decline in income inequality that we have observed, which will tell us whether any of the potential drivers of change that we identified have played a role as well as whether there were counteracting forces that kept income inequality somewhat stable. The decomposition of the coefficient of variation (inequality between couples) allows us to observe counterfactual trends. By tracking the years surrounding the first birth and by stacking childbirth cohorts, we can assess which component changes the trend the most if we alter it. Specifically, we isolate the independent contributions of his and her pre-birth income developments, the pre-birth income correlation within a couple, his and her post-birth income developments, the post-birth correlation within a couple, and changes in age at first birth. The importance of these seven components are visible in Figure 8, which plots income inequality between couples from 1995 (two years before our first childbirth cohort) to 2016 in eight different lines. Note that we stop the simulation at 2016 to make sure we observe the full range of years around the birth of a child

(-2 to 8 years after) because our registers stop at 2018. The first is the observed trend and starting from 1998, we can see that income inequality between couples fell until 2003, then increased sporadically until 2010 at which point it declined again to reach a new low by 2016.

Holding constant her pre-birth income, and not allowing developments in this component to affect income inequality, we see in Figure 10 that the decline in inequality would have been slightly smaller without the impact of this trend (C1). We can infer then that changes in women's income before entering parenthood, including changes in income inequality between women and her share of income within a couple, contributes to explain a small part of the decline in inequality over this period. Changes in men's pre-birth income exert a strong influence in the trend; we see that the decline in income inequality was remarkably less when we do not allow the developments in his pre-birth income to influence the trend (C2). A large part of the reduction in income inequality was due to changes in men's pre-birth income. Fixing couples' pre-birth income correlations to remain constant at 1997 birth cohort levels (C3) does not significantly change the trend, indicating a small influence of changes in income correlations on income inequality developments over this period.

Changes in most post-birth components generally appear to have increased income inequality. In particular, adjusting women's post-birth income developments (C4) to remain fixed since 1997 results in a larger decline in inequality than the one observed. This result indicates that inequality would have declined more if women's post-birth income components had not changed over this period, and thus that changes in women's post-birth income developments increased inequality. In other words, the decline in inequality over this period occurred despite changes in women's post-birth income components going in a dis-equalizing direction. Men's post-birth income developments (C5) contributed little to level differences, but

stabilized the trend significantly. Changes in his post-birth income suppressed the decline in inequality until 2011 and thereafter contributed to the decline in inequality. Changes in men's post-birth income components play a relatively small role, which suggests that changes in how births impact their earnings are largely transient (or short lived). The post-birth correlation trajectory (C6) appears to have played a negligible role up to the mid-2000s (note small differences between C3 and C4 up to mid-2000s), but then it starts to counter the equalizing changes in pre-birth income trends, particularly his income.

Changes in the age distribution (C7) show very little impact until 2011, at which point the postponement of parenthood contributes to reducing inequality. This timing coincides with the onset of fertility decline in Sweden. Without age at parenthood advancing, income inequality would have been even higher in the last 15 years we observe. This trend largely maps on to changes that occur for pre-birth income for men.

Figure 8. Simulated inequality trends under listed counterfactual conditions, non-cumulative

C1 = holding constant her pre-birth income for all cohorts after 1997

C2 = holding constant his pre-birth income components for all cohorts after 1997

C3 = holding constant pre-birth correlations for all cohorts after 1997

C4 = holding constant her post-birth income components trajectories for all cohorts after 1997

C5 = holding constant his post-birth income components trajectories for all cohorts after 1997

C6 = holding constant post-birth correlation trajectories for all cohorts after 1997

C7 = holding constant age distribution in 1997

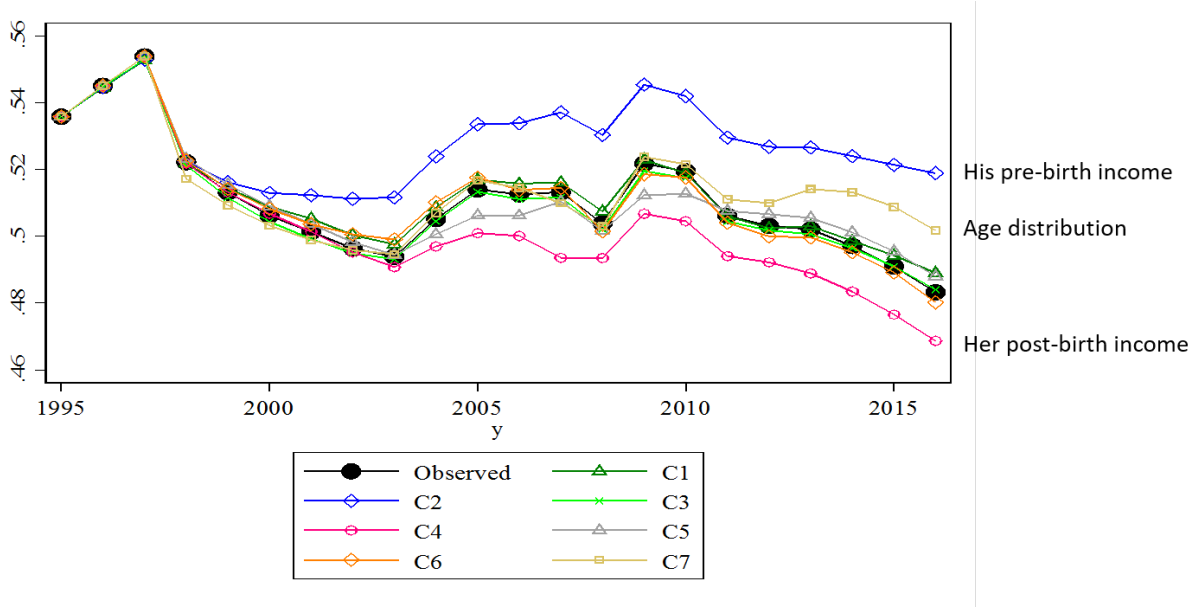


Table 1 summarizes all the results in accordance with the main arguments that relate to different family and labor market changes. In addition, it provides an estimate of the overall contribution of each component according to the difference in the beginning and end of our time trend in the last column. This estimate is the percent difference between the observed decline and the counterfactual decline (See Appendix Table A2). For instance, we interpret 10.978 in the following way: the decline in inequality between 1995 and 2016 would have been 11% smaller if her pre-birth earnings had not changed over time, so changes in her pre-birth earnings explains

11% of the decline in inequality between 1995 and 2016. As noted, the most important contributors to the income inequality trend between couples were changes in his pre-birth income, changes in the age distribution, and changes in her post-birth income trajectory. His pre-birth income developments accounted for 68% of the decline in income inequality. Postponement contributed to 35% of the income inequality decline. These two components are not mutually exclusive, and they likely are inter-related. Slightly less than half of the contribution of his pre-birth income developments to inequality is related to postponement, if we assume that the numbers we obtain with the reweighted data differ solely based on postponement. In contrast, her post-birth trajectory accounted for 21% of the trend, but pushing in the opposite direction. We found no evidence of an increase in assortative mating in Sweden during the period of observation. Both men's and women's labor market gains contributed to less inequality between couples in the early family formation stage, with men's predominating. These trends coincide with the impact of postponed childbearing on inequality. After entering parenthood, women's income trajectories pushed inequality in the other direction, by exerting a disequalizing effect. Yet, we found little evidence that income homogamy after entering parenthood played a role in how inequality developed. Instead, gender equal developments in post-birth income contribute in opposite directions to inequality, with women's disequalizing effect predominating.

Table 1. Summary of results according to different family and labor market changes

Family and labor market changes	Decomposition element	Accompanying descriptive trend	Descriptive support	Simulated effect on inequality
Assortative mating	Correlation pre-birth	Increase in correlation of pre-birth income	No	negligible (1%)
Men's gains in the labor market	Men's pre-birth income	Increase over time in average income	Yes	strong (68%) equalizing
Women's gains in the labor market	Women's pre-birth income	Increase over time in average income	Yes	minor (11%) equalizing
Postponement of the first birth	Advancement of age at first birth	Increase in age at first birth and greater starting income	Yes	moderate (35%) equalizing
Income homogamy after entering parenthood	Correlation post-birth	Increase in correlation of post-birth income	Yes	minor (6%) disequalizing
Gender equality in division of labor after entering parenthood	Men's post-birth income	Greater dip after childbirth in men's post-birth income or less recovery	Yes to greater dip	minor (9%) equalizing
	Women's post-birth income	Reduced dip after childbirth in women's post-birth income or less recovery	Yes to greater recovery	moderate (28%) disequalizing

Discussion

Family change is central to understanding recent patterns in household income inequality. While prior research has focused on changes in family structure and inequality, recent work emphasizes that shifts in the economic organization of families over the life course plays an important role too. Extending this line of work, we studied how changes in the effects of parenthood on women's and men's earnings contribute to couples' economic similarity and to household income inequality.

Unexpectedly, we found that there has been a minor decrease in income inequality between couples with young children during the period 1995 to 2018. This is in contrast to the general development toward more income inequality in Sweden. Our findings differ from other calculations for many reasons: we 1) do not include capital gains, 2) exclude single parents as well as separated parents who live with a new partner but share no children together, and 3) include transfers, which alter inequality trends significantly. We also did not find a clear trend toward couples' economic similarity in Sweden in recent childbearing cohorts for the period immediately surrounding the entrance to parenthood. This is in contrast to what has been observed in the US (Gonalons-Pons et al. 2021; Gonalons-Pons & Schwartz, 2017). But by eight years after the birth of the first child, we do see a pattern similar to the US in which partners' income increasingly resembles each other.

The relatively slight decline in income inequality between parents of young children is due to forces operating in opposite directions. Whereas women's income developments after entering parenthood (greater dip in income immediately after childbirth, but better recuperation) were pushing toward an increase in inequality, similar to what has been shown in other contexts, men's income developments before entering parenthood and the postponement of parenthood were pushing in the opposite direction. Essentially, the small decline in household inequality can largely be explained by the rapid income growth among

men before they have children. Specifically, gains for men at the bottom of the income distribution and for the youngest men entering parenthood appear to underlie decreased inequality. That men's income matters most to family inequality in general is consistent with past research (Gonalon-Pons et al. 2021; Harkness 2013; Sudo 2017).

To more clearly see how family processes contributed to income inequality between couples, we explored key descriptive trends. These descriptive trends clarified the relevance of a few potential contributors to between-family inequality. First, there was no increase in assortative mating during the time period in which we observed couples transitioning to parenthood. This reflects the fact that homogamy was already high in the 1990s in Sweden. Similarly, our window of observation is too late to catch the more remarkable developments in women's labor force participation in Sweden. By the 1990s, women had already established themselves in the labor market before entering parenthood.

Both the postponement of parenthood and increased gender equality in parental leave taking are potential drivers of inequality according to our descriptive trends. Men have begun to take a small income hit in the year following the first child's birth in relation to their uptake of parental leave. This change might be expected to improve women's income developments after entering parenthood; income loss of men is likely to be balanced by less of an income loss for women at the same time since they share the parental leave. We do not see strong interdependency, however; women took an even greater income loss on average in Sweden in the most recent years. As Killewald and García-Manglano (2016) warned in their study of work responses in couples after entering parenthood in the US, we cannot assume that there will be gender equality in the consequences of parenthood just by a greater contribution of the father in household production. It is worth additionally noting that because women's income loss did not respond positively to men's, couples have less income

immediately after entering parenthood than they used to, relative to their pre-birth starting point.

However, this development does not appear to be linked to overall between-family inequality because men's post-birth income developments and partner correlations had a negligible impact on inequality in the decomposition analysis. One mechanical reason for this is that the immediate dip in income takes place for only one or two years and this short-term effect is lost among the numerous contribution of years in which there was a rapid and steady return to higher earnings. Recuperation factors will always weigh more heavily in the post-birth trajectory decomposition analysis. It may be that developments related to fathers' leaves will not have a meaningful effect on inequality unless it has repercussions for the recuperation of men's and women's income as well. Although men show some sign of not achieving as high income growth in recent cohorts after entering parenthood, this change has not been substantial enough to make a difference to overall inequality.

The other factor that appears to play a role in shaping inequality in Sweden is the increasingly late age at parenthood. The advancement of age at first birth was substantial and widespread enough to change the income profiles of those entering parenthood in later childbearing cohorts. We might have expected inequality to increase in response to the later age of men entering parenthood, in particular, whereas we found that men's pre-birth income developments suppressed inequality. The decline in inequality was primarily driven by the fact that the youngest fathers experienced the steepest increase in income.

Postponement of parenthood was also an argument for why women's income would recuperate more in recent childbearing cohorts. An interruption in work is less consequential when it happens later in women's careers (Miller 2011; Cantalini et al. 2017), and this appears to extend to the speed of income recovery. Our results show that the oldest mothers in the most recent cohort had the fastest recuperation of income, which is in line with this

argument. As expected, this development increases inequality. Unexpectedly, although older parents started parenthood off with substantially higher income, they took the greatest income losses after entering parenthood. After the initial years of childrearing, older mothers have strong income recuperation, whereas older fathers do not outperform younger fathers.

In sum, we find that downward pressure on income inequality between families with young children comes from developments primarily before entering parenthood and primarily from men. Upward pressure on income inequality arises from what happens after couples enter parenthood and primarily involves women's income developments. Together, these mostly balanced out, but generated a modest decline in income inequality from 1995-2018 in Sweden.

One important limitation of our study is that we do not address the increasing selection into parenthood that occurred in Sweden after 2010. The TFR declined from around 2 in 2010 to 1.66 in 2020 (OECD 2022a). This unusual decline is mirrored in other Nordic countries. Because the predominant pattern underlying the fertility decline appears to be the postponement of parenthood and increased childlessness (Ohlsson-Wijk & Andersson 2022), it is possible that the population of men and women that entered parenthood during this decline became more selective, particularly those who had low income and still managed to start a family. Kolk (2022) found that there was a stronger fertility decline for low-income earners during this time period, which suggests increases selectivity among this group and another pathway through which income inequality declined among families with young children.

The fact that Sweden could be considered as already having reached the second stage of the gender revolution (Goldscheider et al. 2015), in which progress in gender equality now revolves around household behavior, makes this an important comparison case to other countries in which gender equality is still being achieved in the public sphere, at least when

women have young children. Our findings, for example, do not align with those in the US; we did not find a strong contribution of income homogamy after entering parenthood on inequality. In Gonalons-Pons et al. (2021), increased income homogamy after entering parenthood in the US was driven by women's labor supply being less affected by parenthood. In the Swedish context, women's labor supply in relation to men's has not changed significantly since the 1990s, but more gender equal leave taking and postponement of parenthood have the capacity to influence men and women's post-birth income trajectories. However, similar to the case of the US, these later developments for women have increased inequality in Sweden.

This study on Sweden in the 1990s and early 2000s illustrates one time period of demographic and socioeconomic change, and a follow-up study may very well lead to different trends. This study also focuses on a type of household that is increasingly challenged as the main household type in Sweden (i.e., couples living together with children). Not only is childbearing postponed or foregone in recent years, but an increasing share of households split up after childbearing, and thereafter stay single or form new households. Although income inequality is not increasing for this group, it is far from reflecting a full population perspective. Couples living together with children should be seen as one part (among many) of the puzzle in understanding the development of income equality.

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Appendix

Table A1.

Averages at the time of the first birth

	Childbirth cohorts					
	1995-1997	1998-2001	2002-2004	2005-2007	2008-2010	2011-2012
Couples (N)	98,194	129,886	112,704	117,548	125,436	81,891
Men's age	28.4	29.1	29.7	29.9	29.9	29.9
Women's age	25.9	26.6	27.1	27.4	27.2	27.1
Men's income	181,981	221,423	267,344	264,074	280,708	276,616
Women's income	143,136	167,416	206,084	204,448	215,006	214,118

Table A2.

Income inequality decomposition according to components of his and her pre and post-birth income and correlation

Earnings association simulation		1995	2016	Change
D1	Observed (simulated)	0.536	0.483	-0.053
D2	Her pre-birth components fixed	0.536	0.489	-0.047
D3	His pre-birth components fixed	0.536	0.519	-0.017
D4	Pre-birth correlation fixed	0.536	0.484	-0.052
D5	Her post-birth components fixed	0.536	0.469	-0.067
D6	His post-birth components fixed	0.536	0.488	-0.048
D7	Post-birth correlation fixed	0.536	0.480	-0.056
D8	Re-weighted age distribution	0.536	0.502	-0.034

Decomposition			% Contribution
D2 - D1	Change in her pre-birth	-0.006	10.978
D3 - D1	Change in his pre-birth	-0.036	67.818
D4 - D1	Change in pre-birth correlations	-0.001	1.494
D5 - D1	Change in her post-birth	0.015	-27.648
D6 - D1	Change in his post-birth	-0.005	9.105
D7 - D1	Change in post-birth correlations	0.003	-5.778
D8 - D1	Change in age distributions	-0.018	35.142

Figure A1. Income inequality between couples at different stages in the life course, coefficient of variation

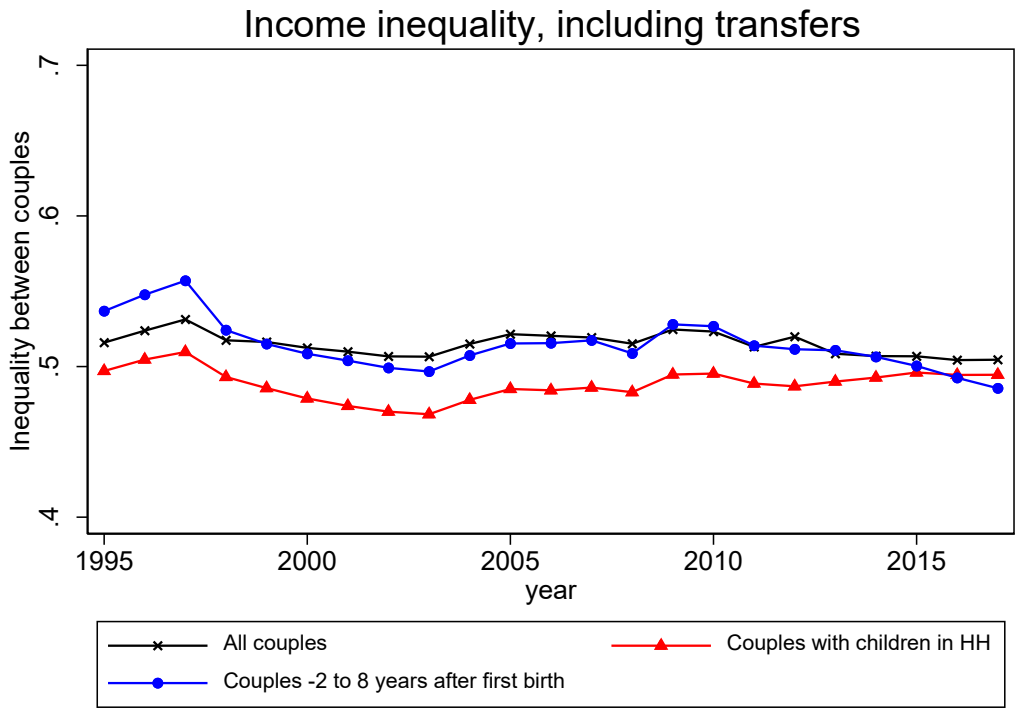

Figure A2. Mean income by age quartiles at first birth, 1997 and 2012 childbirth cohorts

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