***Materfamilias: The association of mother's work on children's absolute income mobility, Southern Sweden (1947-2015)*¹.**

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Abstract

This article examines the association of mothers' employment on children's economic mobility in a period of transition for women's labor market participation in Sweden, when mothers faced higher barriers to employment. Using absolute upward mobility (i.e., earning more than their fathers), I found that whether a mother was in paid work, was economically independent, and had an income similar to that of the father – which is a proxy for economic autonomy – during the late childhood and adolescence of her children associated positively with her children's upward economic mobility, and especially on that of her daughters.

1. Introduction

Intergenerational associations on socioeconomic mobility has traditionally attracted the interest of social scientists, who have found important evidence on how social mobility has developed since the start of industrialization until today. We now have enough knowledge to argue that higher degrees of intergenerational mobility correlate positively with the creation of opportunities and lower levels of inequality at the societal level (Corak, 2013).

Nevertheless, recent studies on this topic have focused almost exclusively on the influence of fathers on their children, while neglecting the likely influence of mothers on intergenerational mobility (Beller, 2009). Among the main arguments researchers have made are that in the modern period, women (mothers) have become increasingly likely to earn more than men (fathers), to have a higher educational status, and to head a household (Blau, Brummund, & Liu, 2013; McLanahan & Percheski, 2008). Thus, the practice of only including inputs for fathers in most methods of intergenerational social mobility analysis could lead to considerable biases in its measurement (Thaning & Hällsten, 2018).

The majority of studies that have paid more attention to the mother's associations on intergenerational social mobility have focused only on periods after 1970, and thus have largely neglected earlier periods, even though some studies have argued that there were few differences between maternal and paternal influences prior to the 1970s (Buis, 2013). However, the main arguments against extending studies on the mother's influence to earlier periods are that there is a lack of data; or that in most Western, male breadwinner societies prior to the 1970s, the mother's employment status had little impact on intergenerational mobility. Accordingly, there is little research on the mother's influence on intergenerational mobility during historical periods when it was far from common for mothers to be in paid work, especially when they had school-aged children, and the father's income usually exceeded that of the mother.

The aim of this article is to study the association of the mother's employment on her children's social mobility in a period when women's labor participation was still uncommon. This study evaluates the correlation on intergenerational mobility of the working status and the economic independence of mothers during the late childhood and adolescence of their sons and daughters. I hypothesize that

whether a mother was in paid work could have influenced her children's income mobility. The main focus of the analysis is on the decades between the 1940s and the 1980s, which represented a period of transition for women's labor market participation in Sweden, during which mothers faced higher barriers to employment. Thus, in this study, I seek to determine whether the labor market participation of these forerunner mothers – i.e., those who continued to work after entering motherhood – correlated with their children's social mobility. For this purpose, I use rich longitudinal data from Southern Sweden with enough income and sociodemographic information to enable me to study intergenerational income mobility in a consistent way.

In line with the results of previous studies, my findings show that while the mother's income level did not associate with her children's social mobility directly, whether the mother was working at all, and, in particular, whether her income was similar to that of the father, did have positive correlations. Thus, I found that whether a mother was in paid work, whether her income was similar to that of the father (which is a proxy for economic autonomy), and whether the mother's income was similar to that of other mothers during her children's late childhood and adolescence associated with the upward economic mobility of her children, and especially of her daughters. These results suggest that while a mother's income level may not have a direct influence on her children's future income, a working mother can serve as a role model for her children, which can, in turn, promote social mobility and narrow gender disparities.

2. Background

Influence of mothers on intergenerational income mobility and labor force participation

Despite the important literature that has been published in recent decades on income mobility, most of these studies have examined father-son relationships. In contrast, fewer studies have focused on father-daughter relationships, and even fewer studies have analyzed mother-child relationships. This is partly due to a lack of suitable data on women's incomes, as assessing women's lifetime income can be difficult because women's labor force participation is often interrupted by factors such as childbearing, and women have higher degrees of labor career truncation after having children. However, like the other Nordic countries, Sweden has more data on both father-daughter and mother-child income mobility than most other countries, because its female labor force participation rates are relatively high (Nyblom & Stuhler, 2016). The results of studies of income mobility across different countries have generally shown that income mobility between fathers and their daughters tends to be high, and that these mobility levels are affected not just by overall mobility, but by the gender disparities in different labor markets (Fortin & Lefebvre, 1998; Heidrich, 2017; Österberg, 2000; Pascual, 2009). These results also indicate that mother-child income mobility associations are usually much lower than father-child relationships, and that in some contexts, elasticities between mothers and daughters are higher than those between mothers and sons (Heidrich, 2017; Österberg, 2000; Pascual, 2009).

Therefore, the available literature is even scarcer if we only focus on the associations on intergenerational income mobility of the mother's employment during her children's childhood. To my knowledge, the only study that has examined the influence the mother's paid employment on intergenerational income mobility is a chapter in a book by Martha Stinson and Peter Gottschalk (2016). To assess the economic mobility of children born between 1978 and 1982, the authors used American survey data on labor force participation linked to administrative records on family, demographic, and earnings information. In general, they found no evidence that the mobility levels of children differed depending on whether their mother was or was not in paid employment. Similar findings for intergenerational mobility in economic or academic performance have also been reported (Dunifon, Hansen, Nicholson, & Nielsen, 2013). Finally, an interesting study from Delabastita and Buyst (2021) based on occupational mobility in nineteenth-century West Flanders found daughters to be more mobile than sons, but with minor translations into upward socioeconomic status with a significant social gradient.

In their study, Martha Stinson and Peter Gottschalk (2016) observed that daughters whose mothers were working when they were at high school ages were more likely to be in the labor market themselves. Such findings relate to a much more studied topic, which refers to the intergenerational mechanisms involving labor force participation of children, primarily from daughters. Accordingly, Fernández (2013) contributes with an extensive analytical approach that advocates for a net gender role of mothers and other women relatives, increasing the labor participation of younger women within families, in explicit "emulation" behavior. Similarly, recent studies that have examined the effects of the mother's employment on her children when they are older have found substantial evidence of such effects, especially on the economic performance of her daughters.

However, other studies with a causal framework, using exogenous shocks as the World Wars have also pointed to different mechanisms explaining the higher probability of engaging in the labor force for daughters. In this regard, Fernández, Fogli, and Olivetti (2004) pointed that rather than a direct maternal effect (mother-daughter), women in the post-WWII in the US would have their probability of staying in the labor market longer if they were married to men whose mothers also worked. In other words, the authors argued a more substantial mother-in-law effect. Similarly, Gay (2019) used a wide dataset at the geographic level in the post-WWI in France, to get to the interesting findings of geographic based influence, expanding the interpretations to a more varied social interaction for women to start gainfully working.

Nevertheless, in the period covered in this paper, the labor participation of daughters (adults between the 1960s and the 2010s) was widespread in Sweden (Stanfors & Goldscheider, 2017). Therefore, this paper follows the hypothetical approach of a positive gendered role transmission from mothers to daughters in terms of upward income mobility, in line with what has been shown in many industrialized

countries. Accordingly, women whose mothers were in paid work while they were adolescents tend to have higher labor force participation rates, a lower likelihood of career truncation after childbearing, higher earnings, and a higher probability of performing supervision tasks within the labor market (McGinn, Ruiz Castro, & Lingo, 2019; Olivetti, Patacchini, & Zenou, 2020).

Finally, another important aspect in this paper regards the exact age ranges children would benefit more from their mother's gainfully working role. Accordingly, Stinson and Gottschalk (2016), focused on the mother's influence on mobility only based on the mother's employment status when the children were aged 0-5. However, other studies that have examined the influence of working mothers on more general economic outcomes have argued that the best age range for observing the effects of the mother's employment on her children's mobility is late childhood and adolescence; i.e., primary and secondary school years (usually 7-18 years old). For instance, Killewald and Zhuo (2019) argued that most of previous studies on this topic centered on the immediate post-partum period, whereas the best periods for observing the influence of the mother's employment on her children are when her sons and daughters are older, and are thus more likely to perceive this influence.

The socioeconomic context

The children observed in this study grew up in the period between World War II and the first years of the 1980s. During this period, Sweden was experiencing rapid economic growth and deep societal transformations. From 1950 to 1975, the country had a yearly economic growth rate of around 3% per capita, and a population growth rate of 0.6% (Schön, 2010). In addition, during this period, economic inequality was decreasing monotonically, following a trend that started at the beginning of the century (Roine & Waldenström, 2008).

In first two decades after World War II, rates of high school and higher education enrollment increased rapidly in Sweden due to the equalization of access to education across gender and class (Erikson & Jonsson, 1993). The welfare state continued to expand during the 1970s and 1980s in strategic areas such as income security, education, child care, and health care. After 1973, Sweden, like many other industrial societies, suffered a major structural crisis and experienced low economic growth and unemployment. Then, like other Western countries, Sweden entered a recovery starting in the 1980s that was driven by new forms of globalization, and by the adoption of new (neo-liberal) economic and social policies that led to rising economic inequality (Roine & Waldenström 2008).

Thus, although Sweden, along with the other Nordic countries, is today considered to be a global leader in promoting gender equality and social policies aimed at supporting working mothers, this was not always the case. The first Swedish policies on parental leave were adopted as early as 1974, and more egalitarian leave policies, including policies designed to promote gender parity, date back to the early 1990s (Duvander, Ferrarini, & Thalberg, 2005; Ekberg, Eriksson, & Friebe, 2013). Additionally, policies aimed at strengthening public child care were first adopted around the mid-1970s (Björnberg,

2002; Gustafsson, 1992). Hence, although women's labor force participation rates increased continuously after World War II (Gustafsson & Jacobsson, 1985; Stanfors, 2003), prior to the late 1970s, the Swedish state offered women few incentives to work, especially after having children.

Today, Sweden has largely embraced the dual-earner model, whereby the earnings of both men and women are seen as essential to maintain sufficient household income and living standards (Stanfors & Goldscheider 2017). It is now common for both men and women to work during the years when their children are young, and this pattern is much less class-specific today than it once was. However, between 1947 and 1983, the conditions for working women in Sweden were different. Moreover, the progressive increase in the share of women in paid labor was not followed by a significant change in the traditional gendered division of domestic tasks and child care. Therefore, while women had access to limited institutional child care support, most felt they had to choose between career and family (Stanfors & Goldscheider, 2017). Thus, during that period, maternal employment could be seen as a forerunner behavior within a male breadwinner model.

3. Data and analytical strategy

The Scanian Economic-Demographic Database (SEDD)

For my analysis, I use data from the Scanian Economic-Demographic Database (SEDD) linked to the national register data from Statistics Sweden. SEDD is a unique database of individual-level longitudinal data from five rural and semi-urban parishes and a port town in Southern Sweden spanning a period from 1650 to 1968 (Bengtsson, Dribe, Quaranta, & Svensson, 2021). The database can be used to follow the demographic outcomes, incomes, and occupations of individuals across multiple generations from preindustrial times up until the present. For the analysis, I also use information from continuous population registers (a household-based register continuously updated) on demographic events, including information on migration to and from households for all individuals in the selected parishes.

Moreover, from 1968 onward, individual-level information covering the entire country is available from various administrative registers at Statistics Sweden (SCB). These data were linked to the pre-1968 historical sample using identification numbers available from 1947 onward. The linkage of the two sets of data allowed for a considerable expansion of the database. First, the linkage makes it possible to follow until 2015 any individual who ever lived in the area prior to 1968, and who was still alive in that year, regardless of his/her geographic location in Sweden. Second, various kin, such as parents, grandparents, children, and siblings of individuals who belonged to the original population in Scania were aggregated to the database if they were alive and residing in Sweden sometime after 1967 and until 2015. The most important economic variable used in this study is total income from sources related to labor (including self-employment, but excluding income from capital and real estate).. All income data were adjusted for constant prices using the consumer price index (SCB, 2020).

As this study aims to assess the economic association of mothers and their children, the periodization is also an important part of the analysis. Separate income information should be available for the mothers in the sample, most of whom would have been married. Until 1947, married women were usually not included in the income and taxation registers, but their earnings were included in the tax returns of their husbands. However, between 1947 and 1953, the earnings of married women were included separately from those of their spouses in the registers; and between 1954 and 1971, both their income and their taxes were reported separately. Thus, although the Swedish tax reform implementing separate taxation for married men and women dates back only to 1971 (Gustafsson, 1992), separate economic information for mothers is available in the registers at least from 1947 onward. Therefore, this analysis focuses on the information for men and women between 1947 and 2014.

Assessing lifetime income

For computing measures of intergenerational income persistence and relative and absolute mobility, I follow children born between 1940 and 1964 who were living in the study area (the five rural and semi-urban parishes and the port town) during their late childhood and adolescence (ages 7-18). This strategy was chosen for two different reasons. First, it enables me to include information on the working status and income reported by mothers, which became available starting in 1947. Thus, the earliest birth year for the children in the analysis is 1940. Second, it allows me to collect enough income information on the most productive working ages in adulthood to get consistent lifetime income measures, which are, in practice, until age 50. Thus, for the youngest birth cohorts in the analysis (born in 1964), 2014 is the last year with available income information.

Lifetime income measures were created calculating the mean income for children and their parents between ages 23-50². It should be noted that these data allow me to use income in an almost identical life-cycle for parents and children with a considerable number of income observations for both generations (G1 and G2) within an age range that includes most of their active working ages. Therefore, I am able to greatly reduce issues of attenuation bias (Björklund & Jäntti, 1997; Mazumder, 2005; Solon, 1992), and of life-cycle bias (Bhuller, Mogstad, & Salvanes, 2011; Nybom & Stuhler, 2016).

Having a lifetime income measure as the mean income over adulthood allows me to set different quantiles (percentiles, deciles, and quintiles) of income distribution based on the birth years and the sex of the children. This approach was used in many of the analyses carried out in this study. A similar approach was used for the parents, with the only difference being that they were divided into groups

² Setting age 23 as the first income observation to be taken into account is in line with the approaches used in other studies working with similar cohorts and lifetime income measurement in southern Sweden, which uses the same age as the first observation (Lindahl, Palme, Massih, & Sjögren, 2015). A primary reasoning for this choice was that the age should be set at a point when most of the children had already have entered the labor market, including those who enrolled in tertiary education.

based on the birth years of their children. A similar procedure has also been adopted in other studies (Chetty et al., 2017; Chetty, Hendren, Kline, & Saez, 2014; Heidrich, 2017).

The different quantile measures were created based on comparisons to a much bigger sample from 1968 onward, when the modern registers were linked to SEDD. The full sample of individuals with yearly positive income information is displayed in the following way. From 1947 to 1967, only information from the study area was available, which turned the sample of individuals with yearly valid income information into around 20,000 people per year. Then, from 1968 onward, the total sample increased to roughly 175,000 individuals per year, and continued to rise, reaching 400,000 cases per year in the 2000s. An advantage of having a bigger sample was that at least from 1968 onward, different lifetime incomes and quantiles could be assessed based on an income scenario that was much closer to the national level.

Measuring women's working status

Apart from the lifetime income, the other important variable used in this study was the working status of mothers during childhood. Data on labor force participation in Sweden in periods prior to the 1990s can be derived from two different kind of sources. On an annual basis, the most accurate information is generally provided by the Labor Force Surveys (*Arbetskraftsundersökningen*). However, these surveys were first started in 1963 (Gustafsson & Jacobsson, 1985; Stanfors, 2003).

On the other hand, occupational information from decadal or quinquennial censuses, as well as other administrative and parish data, can reach further back in time. This kind of occupational data is present in the SEDD data, yearly for the historical setting (in our case, from 1947 to 1967), and every five years from 1968 until the 2000s. However, using this kind of data is associated with considerable methodological challenges, as women's occupational information tends to be less reliable than men's, especially in historical periods. This problem has been reported both in the international context (Humphries & Sarasúa, 2012), and in Sweden in particular (Nyberg, 1989; Stanfors, 2014).

Thus, I used a different approach to establish whether an individual was or was not working. It was based on the continuous annual income information that is present in the database. In applying this approach, I was taking advantage of previous methodologies used by the OECD in research about taxation (OECD, 2005). In these publications, they introduced the concept of the Average Production Worker (APW), which can be defined as in essence, the average income of blue-collar workers. It can approach the median income of a given population in which blue-collar workers were still a considerable fraction of the population, as would have been the case in many parts of Sweden between the end of World War II and the 1980s (Dribe, Helgertz, & Van de Putte, 2015; Schön, 2010).

The next step the OECD used in its taxation research was to set the minimum threshold for considering an individual (usually women in their data) as having at least a part-time job. They established this threshold as 33% of the APW's income (Jaumotte, 2003).

Hence, as a proxy for this methodology, for each year that I wanted to know whether a woman was working at least working part-time based on her reported income, I first computed the median income for the year. Next, I set the working status threshold by simply multiplying the median income by 0.33. Finally, in the last step, I created a dummy variable for not working (0) and working (1) for all individuals who were below or above the threshold.

For checking the results, the best procedure was to compare the labor force rates using the income proxy, the registered occupation, as well as information derived from the Swedish Labor Force Surveys (LFS) (Gustafsson & Jacobsson, 1985). As Figure 1 shows, for the years for which we have information from the LFS at the national level, in 10% of cases, the reported occupation for women was unregistered, and it was only from the 1970s onward that it started to be closer to the LFS shares. Conversely, the labor rates derived from the income proxy were almost identical to those in the LFS.

Interestingly, the labor rates plotted for men did not show the same discrepancy between income proxy and occupation as those for women. This appears to confirm the assumption that the female labor force was underreported in censuses and parish data (Stanfors, 2014). In addition, the similar rates found in both the income and occupation approaches underscores the accuracy of estimating working status with income. Therefore, based on the results of tests of its effectiveness and its annual frequency in the data (differently than occupation), working status derived by income was chosen to be the variable for distinguishing between mothers who were and were not working when their children were aged 7-18.

[Figure 1 about here]

Intergenerational data and variables

For the children's birth cohorts (born between 1940 and 1965), there were a total of 9,000 sons and daughters in the study sample, and more 100,000 if the full sample was taken into account. The complete analysis was carried out only for individuals who were living in the study area during their late childhood and adolescence (ages 7-18). However, for the sake of robustness and to allow for better comparisons with studies carried out at the national level, I also computed measures of intergenerational income persistence for the full sample.

Table 1 displays the main sociodemographic variables for both the study sample and the full sample of both children and parents (G2 and G1). Overall, the values across the samples are similar, with the only difference being that the mean age (computed from all observations individuals have) was slightly higher for parents in the study sample than in the full sample. This could be due to some left-censoring in the

full data, which do not include a large number of observations until 1968 onward. Accordingly, Figure 2 displays the birth years of both the parents' (G1) and the children's (G2) generations.

[Figure 2 about here]

Moreover, in the lower part of Table 1, we can see the information regarding late childhood and adolescence for the G2 study sample. It spans 12 years of observations for each individual over the 1947-1983 period. Interestingly, from the annual working status dummy variable, we could obtain the sum of the years spent working during the childhood of G2 for both fathers and mothers. The results show that, on average, mothers were working only about half (close to six years) of the period when their children were aged 7-18. However, it has to be taken into account that as the proxy for considering parents to be working was having an income over 33% of the median income, individuals below this threshold would be considered non-working, the reason for what the average working years of fathers was about 9.

[Table 1 about here]

Finally, from the lifetime income for parents and children, I have created different income variables to be tested within the income persistence measures. This approach is in line with the most recent literature on stratification, which has tried to disentangle which income combinations better track the intergenerational influence on children (Thaning & Hällsten, 2018). Thus, in addition to the variables for the lifetime income of fathers and mothers, another two variables were derived. The first measure captured the **average** lifetime income of both parents over time by summing the income of the father and the mother who shared the same children and dividing it by two. The second measure picked up the **highest** income present in each year. While this was usually the father's income, in some cases in which the father's income was low or absent, the mother's income was observed.

4. Methods

First, I compute the intergenerational rank-rank associations developed in previous studies by Chetty et al., 2014. In rank-rank models, the dependent variable regarding G2 income is replaced by the children's percentile of lifetime mean income, which is assessed in accordance with their birth year (separately by men and women). The dependent variable, in turn, takes the G1 percentile in the distribution of all fathers or mothers who had children born in the same year. The lifetime income used in rank-rank estimates is defined with a focus on the children, which means that the percentiles were derived among all parents sharing children who were born in the same year.

$$y(children)_i = \alpha + \beta_1 parents_i + \varepsilon_i \quad (2)$$

After measuring the income persistence across generations, I focus only on the study sample for whom we have information on the G2 late childhood and adolescence. This analysis investigates absolute

income mobility; or, in other words, having a lifetime income higher than that of the father. Here, in order to reflect the association of mothers, the models have as dependent variables only the likelihood of having absolute mobility in comparison to the father. This approach captures the mother's association in more indirect terms or as a mediator, given that from simply looking at the income measures shown in Table 2, it is clear that the mother's income *per se* would tend to be slightly correlated with that of her children. Moreover, I repeat the same categorization while differentiating between those who had an income that was 50% higher than that of their father and the rest, which can be seen as a measure of extreme upward mobility.

The interesting part of such an analysis is that it can be used to observe the effects of the gender gap in intergenerational terms, as it may be assumed that sons would tend to have a much higher likelihood of experiencing absolute mobility than daughters. Thus, seeing their mother working or earning income during their childhood could have different effects by sex. Absolute mobility determinants are assessed with logistic regression models that differ only by the dependent variable (Y_i) of earning more than the father did or having an income that is more than 50% higher than that of the father. Accordingly, the specified models of absolute mobility have three main blocks of independent variables:

$$Y_i = \ln (P/1-P) = \beta_1(\text{mother working status and income during G2 childhood})_i + \beta_2(\text{socioeconomic controls G1})_i + \beta_3(\text{socioeconomic controls G2})_i + \varepsilon_i \quad (3)$$

1-Mother's working status and income during the G2 late childhood and adolescence: The first variable in this block relates to the time the mother spent working when her children were aged 7-18, which implies summing the years they worked and categorizing the results by quartiles (see Table 1).

The second variable takes into consideration both the father's and the mother's mean income during G2 childhood in order to assess the contribution of the mother to the parental economy. Thus, I compute a ratio of *mother's income/father's income*. The ratio gives a result closer to zero if, for instance, the mother did not have any income in that period, and a value close to one if the mother's mean income during G2 childhood was similar to that of the father. This variable is also categorized by quartiles³.

³ The ratio mean value of quartile 1 was zero, which shows that a considerable proportion of the mothers did not have any income when the children were aged 7-18. In addition, the ratio mean value of quartile 4 was 0.99, which shows that most of the mothers could have had a similar income to that of the fathers (See table 1).

Finally, the third variable in this block refers to the quintile of the mothers' income distribution during G2 childhood, which simply places the mothers in comparison to each other.

2-Socioeconomic controls G1: These variables are a set of controls at the parental level, especially for fathers. These are mainly quintiles or deciles.

3-Socioeconomic controls G2: These variables capture some important socioeconomic and demographic conditions of the children during adulthood. The first variable reflects whether an individual was living for most or part of his/her adult life in the same area as during childhood, or migrated permanently to another place in Sweden. Finally, the last control reflects the children's years of education at age 50, which distinguishes between individuals with incomplete or complete primary, secondary education, and tertiary education.

5.Results

Did mothers directly associate with their children's income? Insights on intergenerational income persistence

In the first approach, I attempt to disentangle how the mother's economic status might have influenced her children by assessing her direct influence. To do so, I first look at estimates of income persistence measured with rank-rank, which indicates to what extent the income positions of sons and daughters correlated with the income of the father, the income of the mother, the averaged parental income, or the highest of the two parental incomes.

Table 3 presents estimates of rank-rank for sons and daughters for all of the birth cohorts studied (1940-1965) for both the study sample and the full sample. The associations for the father's income show similar values for sons (around 0.2) and daughters (between 0.18 and 0.14) in all sample specifications. These results are in line with most of the existing empirical evidence for Sweden, we find little variation of the coefficients, which range between 0.18 and 0.27.

My estimates show associations of 0.21 for the study area and 0.18 for the full sample, while previous studies found estimates of 0.27 (M. Nybom & Stuhler, 2016), 0.21 and 0.23. Overall, my measures of income persistence are in line with those of other studies, and confirm previous findings showing that in Sweden, income persistence is lower than in other countries such as the US, where estimations are usually above 0.4 (Corak, 2013; Mazumder, 2016), or are around 0.35 (Chetty et al., 2014). Father-daughter income associations are much less common in the literature, but in comparison with the

findings of studies at the international level as well as in the Swedish context, the estimates shown in Table 3 are similar. Overall, income persistence between fathers and daughters is found to be lower than that between fathers and sons (Fortin & Lefebvre, 1998; Heidrich, 2017; Österberg, 2000; Pascual, 2009).

Nevertheless, the estimates for mothers and their children, which are of primary interest in this study, show that the mothers' economic positions had almost no influence on their children. The rank-rank had the highest values, at around 0.04 and 0.06, respectively; in many cases, they were not statistically significant. Overall, I found higher associations between mother and daughters than between mothers and sons; a gradient that is the opposite of that found for the association between fathers and their children, and that is in line with previous studies (Heidrich, 2017; Österberg, 2000; Pascual, 2009). Interestingly, the other two income measures used, parental average income as well the highest parental income observation, do not show higher coefficients for sons and daughters for either the lower standard errors or higher R^2 values (not reported in the table). In contradiction to some of the recent literature that has argued that the averaged income measure (both parents) has a more direct association on income persistence, the results in this study indicate that only the father's income has more influence. This could be because the children's cohorts included in this study were older than those used in most other studies on the same topic, as I observed G2 born in the 1940s, whereas other studies have used cohorts born in the late 1950s or in the 1960s. A simple look at the evolving patterns of women's labor market participation rates in recent Swedish history would show us that mothers of individuals born in late 1940s or 1950s had lower labor market participation rates, especially after childbearing. Thus, models of income persistence that consider the mother's income could be underestimated (Bhuller et al., 2011; Heidrich, 2017; Stanfors, 2003).

[Table 3 about here]

The results for intergenerational income persistence showed that the mother's income *per se* had a small association with her children's economic outcomes in adulthood. However, having a mother who was participating in the labor market during the child's childhood and adolescence could be associated with decreased income persistence between the father and the child. In Figure 3, I estimate the father-child rank-rank associations for sons and daughters by birth cohorts, and differentiate between those whose mothers were and were not in paid employment when they were aged 7-18. I do so by controlling between those mothers who never took part in the labor market, and those who took part at least once during this period.

Overall, the results show that for sons, income persistence was usually higher for individuals whose mothers never took part in the labor market than it was for the others. However, for daughters, the pattern was reversed, as those who had mothers who were working during their childhood and adolescence had higher income persistence than those whose fathers were working. This divergent pattern between sons

and daughters may provide insights into the socioeconomic mobility of both groups, as increased associations between fathers and daughters would be explained by the increasing economic and labor force participation of women. Interestingly, the associations' values were similar among sons and daughters when the mothers took part at least once in the labor market, though they differed markedly in other ways (Table 3).

[Figure 3 about here]

Other pathways: Mothers' employment and economic status and their association with their children's economic mobility

Nevertheless, the lack of direct association found for mothers does not mean they did not influence their children's social mobility in other ways. This influence could have operated in a less tangible manner; i.e., a working mother's influence may have been based on her value as a role model due to her employment status and relative economic independence (Fernández, 2013). Thus, in the next sections, I apply models for measuring absolute upward intergenerational mobility in order to investigate how children moved upward from their fathers' positions, and how maternal influence correlated with that mobility. The results are reported in different predicted probabilities, while the full regression tables can be found in the appendix.

In any exercise involving comparisons of men and women in economic mobility studies, it is always important to bear in mind that the existing gender gap in economic outcomes works as an additional barrier to the upward mobility of daughters. A simple absolute income measure, such as observing which children earned more than their fathers, or even 50% more than their fathers, also allowed me to capture to what extent gender disparities might have jeopardized the daughters' upward economic mobility.

Figure 4 displays the fraction of sons and daughters who earned more (and 50% more) than their fathers over time, by birth year. Across cohorts, we see that the oldest sons had higher mobility than the younger sons (declining from 90% to 70%). However, for the daughters, the shares who were earning more than their fathers were constantly lower than they were for the sons, as across all of the birth cohorts, less than 50% of the women were earning more than their fathers. These disparities are even more clear when we look at the children who experienced extreme upward mobility by earning 50% more than their fathers. Interestingly, the proportion of sons who earned 50% more than their fathers was about the same as the proportion of daughters were simply earning more than fathers, which shows the deep gender disparity in earnings between men and women born in the 1940s to 1960s.

The general level of absolute mobility found for sons and daughters in the study area is in line with that reported in previous studies using different sources (Berman, 2018); or similar sources (Liss, Korpi, & Wennberg, 2019) in the national context. The absolute mobility differed by sex, as the share of sons who had a higher lifetime income than their fathers was almost double that of the share of daughters. Interestingly, there appears to be a declining pattern of absolute mobility for the sons, from around 90%

in the oldest cohorts (1940s) to levels oscillating between 70-65% for those men born between the late 1950s and 1960s. Such declining patterns have been found for other European countries, as well as for Japan, Australia, and the US (Berman, 2018; Chetty et al., 2017).

[Figure 4 about here]

Figure 5 decomposes the absolute mobility by the income deciles of fathers. As expected, the children of poorer fathers (e.g., deciles 1, 2, and 3) were more likely to experience absolute upward mobility than the children of richer parents. A similar pattern has been observed in the United States (Chetty et al., 2017). However, the gender disparity was considerable: whereas the sons of fathers up to decile 5 of the income distribution had a probability higher than 0.8 of experiencing absolute upward mobility, only the daughters of fathers in first decile overcame this threshold. Indeed, the trend for daughters declined almost linearly. For instance, the daughters of fathers in deciles 7 and 8 had a probability of 0.2 of experiencing absolute upward mobility; while for the sons, the probability was 0.6 and 0.4, respectively (See Figure 6). The differences were again even higher for earning 50% more than the fathers (See Figure A1).

[Figure 5 about here]

If we test the variables from the mother's influence during childhood, we can observe an opposite pattern of divergence between sons and daughters. Figure 6 predicts the probability of having a higher lifetime income than their father for children based on the working status of their mother (based on quartiles). While the sons did not have substantial or statistically significant different levels of absolute mobility, the daughters of mothers who worked at least part-time when they were aged 7-18 (quartile 4) had a 10% higher probability of experiencing upward absolute mobility than others.

[Figure 6 about here]

The differences between sons and daughters are even clearer in Figure 7, which predicts the probabilities of children earning more than their fathers by the quartiles derived from the ratio of the mother's income to the father's income during childhood. For the children of mothers in the fourth quartile, who had, on average, a mean income similar to that of fathers (when the children were aged 7-18), the daughters had probabilities of almost 0.5, while the other daughters had probabilities of between 0.35-0.39. Conversely, for the sons, there were no differences based on the parental income ratio. Additionally, the same patterns were repeated in the probability of earning 50% more than the father, which again shows that the influence of the mother also played an important associative role in extreme upward mobility for their daughters (See Figure A3).

[Figure 7 about here]

Finally, Figure 8 shows another measure of economic independence; i.e., the probability of earning more than the father by all of the mothers' income quintiles during the children's childhood. This measure indicates how economically independent the mothers were compared to other mothers. We can see that the daughters whose mothers worked and had more earnings were three times more likely to earn more than their fathers than the daughters of mothers who did not have an income during their daughters' childhood. However, there were no differences for sons, and the same pattern occurred for extreme upward mobility; i.e., for earning 50% more than the father (See Figure A4).

[Figure 8 about here]

Sensitivity Analysis

One of the most interesting findings for both relative and absolute upward mobility was the positive association of the mothers' employment based on how close their reported income was to that of the fathers. The variable used to measure this relationship was a ratio resulting from dividing the mother's mean income by the father's mean income when their child was aged 7-18. However, based on our observations of the trends in relative or absolute mobility, the children of fathers at the bottom of the income distribution (lower quintiles or deciles) were much more likely to experience upward mobility.

The reasons why a father might be at the bottom of the lifetime income distribution go beyond simply earning systematically less. For instance, if a man had a chronic disease or a psychological disorder that rendered him incapable of working or working full-time for a large part of his life, he would end up in the lower percentiles of lifetime income. Moreover, a direct consequence of the father being unable to fully participate in the labor market is a greater likelihood that the mother would increase her participation, which would lead to a much more equal mean income between the parents.

The scenario outlined above could lead to biased results regarding upward mobility, as its level could be a mere artifice of how the variables were derived. The values reported in Table 4 summarize this dynamic. If we observe the shares of the mothers based on the quartiles of the parental income ratio (mother income/father income) by the deciles of income distribution of the fathers, we can easily see that when the fathers were in decile 1, almost 50% of the mothers were in the fourth quartile of the parental income ratio (see Table 4). For the fathers in decile 2, a similar, albeit smaller gap (33% of the mothers were in quartile 4) can be observed. But from D3 onward, the quartile share was equally distributed.

[Table 4 about here]

To check whether the levels and the differences in mobility could be biased, I have applied as a robustness check the models on absolute mobility to four different samples. Figure 9 displays the probabilities of having a higher lifetime income than their fathers for sons and daughters according to the quartile of parental income ratio (mother/father). The estimates were replicated first by excluding

children of fathers in the first decile of income distribution; second by excluding deciles 1 and 2; third by not considering deciles 1, 2, and 3; and, finally, by only including the children of fathers from decile 5 or higher.

The results from Figure 9 are similar to those in Figure 8, as the daughters of mothers in the fourth quartile would always have a higher probability of achieving absolute upward mobility, while there were no substantial differences for the sons. Therefore, it may be concluded that the gender differences in absolute mobility driven by the mother's income capacity were not due to any artificial construction of the variables. Moreover, it should be taken into account that if there had been any bias, it should have affected both the sons and the daughters, and not only the daughters, as the results showed.

[Figure 9 about here]

6. Conclusions

In this article, I studied the association of mothers' labor market participation on the economic mobility of their children between the 1940s and 1980s, a period when women's (especially mothers) labor market participation was still increasing, and it was still far from common for a mother to be in paid employment. This was a period of transition for women's labor market participation in Sweden, when mothers faced higher barriers to working.

My findings on intergenerational income associations were largely in line with the results of the literature on the same topic in Sweden, as I found low income persistence comparable to the levels reported at the national level, even though my study sample covered a smaller area of the country. Additionally, my rank-rank estimations showed that the mother's income did not associate directly with their children's income, which has also been observed in most other studies on this issue. Most importantly, when analyzing the trends in upward mobility, I found that the mother's working status and her economic independence during the late childhood and adolescence of her children had a huge positive association with upward economic mobility, especially for her daughters.

However, my analysis also has some important limitations that should be taken into account. Even if my results are similar in many respects to those of other studies at the national level, they obviously cannot be representative for Sweden as a whole. Finally, it is important to keep in mind that basing employment status is no substitute for having other more consistent occupational and socioeconomic measures for individuals. Despite these limitations, the results represent a valid contribution to our understanding maternal roles on economic mobility. Accordingly, the study estimated labor rate participation for periods prior to the Labor Force Surveys using income data, which can be a valid complementary method for addressing the well-known problem of underreported information in historical census data.

Most importantly, the results suggest that while mothers may not directly associate with the incomes of their children, mothers who serve as an active role model by participating in the labor market could help to promote social mobility and to narrow gender disparities. Mothers' employment and economic autonomy during their children's late childhood and adolescence could be correlated with the future labor supply decisions of their daughters, and with economic growth. Therefore, the potential mechanisms determining the results could vary. On the one hand, when the mother served as a *double role* model (by performing both paid labor and household labor), children's main exposure was to a *working mother*. Thus, being exposed to a *paid* working mother in a crucial age range, such as between 7-18 years old, may have helped to generate opportunities and furthered the development of the welfare state in Sweden (1950s-1980s). Education was obviously well-established as the main channel for fostering social mobility in this context. Hence, mothers could add more economic resources at home.

On the other hand, and more specifically, the mothers' paid labor and relative economic independence may have acted as a booster of human capital development. For instance, the father's income might have mainly provided for the family's basic needs, while the mother who was spending more time with her children would have known where to strategically allocate resources to meet her children's needs in order to improve their human capital, and, consequently, their adult outcomes (especially for daughters).

Thus, the main mechanism was likely to be the existence of an imitation process, as daughters who saw their mothers in active employment and economic roles would have been more likely to evolve economically (Stinson & Gottschalk, 2016). This mechanism would have been especially important for individuals with less disadvantaged backgrounds.

7. References

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TABLES AND FIGURES

Figure 1: Labor force participation of men and women aged 20-64 and study area and in Sweden (for women).

Note: Two different approaches are used: 1-Occupational information (titles), annual from 1947 to 1967 and quinquennial afterwards. 2-Proxy estimated with declared income as an individual having at least the 33% of the median income of a given year. Besides, the official national statistics form the Labor Force Survey are also plotted for women. *Source:* Own elaboration (SEDD) and official Labor force participation for Swedish women from Gustafsson and Jacobsson (1985).

Table 1: Descriptive Statistics of the main sociodemographic variables by generations (G1 and G2

Variables	Study Sample					Full Sample				
	μ	SD	Min	Max	N	μ	SD	Min	Max	N
Age at observation										
Children	36.26		23	50		35.66		23	50	
Fathers	39.19		23	50		35.18		23	50	
Mothers	38.77		23	50		35.31		23	50	
Birth year										
Children	1953	7.31	1940	1965	9002	1952	7.59	1940	1965	108744
Fathers	1924	10.01	1897	1948	3558	1927	8.47	1897	1948	29216
Mothers	1927	9.90	1897	1949	5695	1928	8.33	1897	1950	32837
Age at birth										
Fathers	29.96					28.79				
Mothers	27.15					26.07				
Childhood observation (G2 aged 7-18)										
Years	1966		1947	1983						
Age of Children	12.5		7	18						
Age of Fathers	43		24	82						
Age of Mothers	39.8		22	68						
Father working (sum of years)	8.52	4.29	0	12						
Mother working (sum of years)	5.88	4.44	0	12						
Main independent Variables (Quantiles)										
Maternal variable during childhood (Study Sample)	Q1		Q2		Q3		Q4		Q5	
	μ	SD	μ	SD	μ	SD	μ	SD	μ	SD
Mother - Time spent working (Childhood) (Quartiles)	0	0	0.121	0.042	0.421	0.12	0.882	0.123	-	-
Income's Parental Ratio (Childhood) (Quartiles)	0.025	0.03	0.196	0.059	0.415	0.072	0.9	0.418	-	-
Mother's Income Quintile (Childhood) (Quintiles)	1195	1511	10514	3413	22343	3446	34793	3952	58114	23954

Table 2: Distribution of the main income variables used in the analysis

Income measures	Study Sample						
	μ	SD	Min	Max	p50	p90	p10
Sons	82,185	38,378	0	523,460	77,874	120,535	43,552
Daughters	54,710	23,564	0	247,845	54,144	80,712	27,274
Fathers	66,836	39,697	0	621,614	59,494	103,814	33,833
Mothers	22,461	20,494	0	363,226	19,130	47,857	443
Average (G1)	51,047	30,415	0	591,351	46,158	77,770	25,147
Highest income observed (G1)	57,254	35,732	0	621,614	52,586	90,899	23,237
Fathers (G2 aged 7-18)	71,511	46,109	0	1,022,094	63,498	112,964	34,301
Mothers (G2 aged 7-18)	20,657	21,323	0	379,063	16,119	46,649	0
Income measures	Full Sample						
	μ	SD	Min	Max	p50	p90	p10
Sons	76,187	38,523	0	1,003,367	73,728	113,940	34,735
Daughters	51,226	24,227	0	503,255	50,725	77,289	22,849
Fathers	72,687	45,994	0	829,026	66,127	113,100	32,788
Mothers	28,387	22,884	0	1,054,606	26,544	55,159	1,247
Average (G1)	54,110	36,376	0	1,054,606	48,814	85,642	22,478
Highest income observed (G1)	57,377	41,294	0	1,054,606	52,897	94,485	17,166

All values expressed in 1980 SEK, the same year used for CPI adjustment.

Figure 2: Birth year distribution of the Parental generation (G1) and Children generation (G2)

Table 3: Intergenerational Rank-Rank associations for sons and daughters by different income measures.

	Study Sample		Full Sample	
	Son	Daughter	Son	Daughter
Father	0.21 (0.02)	0.18 (0.02)	0.21 (0.007)	0.16 (0.008)
<i>N</i>	4,090	4,005	14,864	14,349
Mother	-0.02 (0.02)	0.04 (0.02)	0.032 (0.007)	0.060 (0.007)
<i>N</i>	4,379	4,316	16,685	16,148
Average	0.22 (0.02)	0.18 (0.02)	0.17 (0.006)	0.14 (0.007)
<i>N</i>	4,322	4,277	19,407	18,753
Highest	0.21 (0.02)	0.18 (0.02)	0.18 (0.007)	0.14 (0.007)
<i>N</i>	4,368	4,320	19,742	19,087

Note: Coefficients' standard errors are reported between parentheses.

Figure 3: Father-Child Rank-Rank Associations by Mothers' Gainfully Working Status and Child's Birth Cohorts in the study sample

Figure 4: Fraction of children earning more or 50% more than their fathers by birth year

Figure 5: Probability of earning more than their father, by father income decile

Note: Predicted probabilities from Model 1 (Table A1, Annex) using the Margins command (STATA 16)

Figure 6: Probability of earning more than their father by mother working status during children ages 7-18 (Quartiles)

Note: Predicted probabilities from Model 2 (Table A1, Annex) using the Margins command (STATA 16)

Figure 7: Probability of earning more than their father by parental income ratio (mother/father) during children ages 7-18 (Quartiles)

Note: Predicted probabilities from Model 3 (Table A1, Annex) using the Margins command (STATA 16)

Figure 8: Probability of earning more than their father by mother income during children ages 7-18 (Quintiles)

Note: Predicted probabilities from Model 4 (Table A1, Annex) using the Margins command (STATA 16)

Table 4: Parental income ratio (mother/father) during children ages 7-18 (Quartiles) by father's lifetime income decile.

Dec. income father	Ratio income childhood (mother/father)			
	Q1	Q2	Q3	Q4
D1	20%	18%	14%	49%
D2	26%	21%	21%	33%
D3	28%	26%	24%	22%
D4	27%	26%	27%	19%
D5	31%	26%	27%	16%
D6	26%	28%	28%	17%
D7	35%	27%	25%	13%
D8	33%	30%	27%	10%
D9	42%	33%	18%	8%
D10	54%	32%	10%	4%

Figure 9: Sensitivity analysis of the probability of earning more than their father by parental income ratio (mother/father) during children ages 7-18 (Quartiles) excluding poorest father's lifetime income deciles.

Note: Predicted probabilities from Models 9-12 (Table A3, Annex) using the Margins command (STATA 16)