Intergenerational Consequences of Parental Employment Under Childcare Scarcity

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Abstract

As female employment has increased globally, more children are being raised in dual-earner households. Yet childcare provision has not kept pace. We exploit Sweden's 1971 shift from joint to individual taxation, which reduced most mothers' marginal tax rates. The reform generated large, lasting increases in maternal labor supply at a time when adequate childcare was scarce and available substitutes were of low quality. Leveraging cross-family variation in mothers' tax cuts and within-family differences in sibling ages, we identify age-specific causal effects on children. Children with working mothers experience significant lifetime earnings losses, with effects concentrated among preschool-age sons. Proximity to grandparents attenuates these effects. The earnings losses operate through two channels. First, they are reflected in lower human capital: diminished cognitive and non-cognitive skills and weaker educational performance. Second, maternal employment shapes caregiving in the next generation's households: sons of working mothers take more parental leave while their wives work more, and the mirror image holds for daughters and their husbands. The consequences perpetuate to grandchildren and lower their educational performance. Our findings indicate that, for the next generation, maternal employment can promote within-couple gender equality but may also impede human capital development under childcare scarcity.

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1 Introduction

One of the most transformative changes in the labor market over the past half-century has been the global and secular rise in female labor force participation. The rise reflects, above all, the entry of married women into paid work (Albanesi et al., 2023). As a result, the share of children growing up in dual-earner households has more than doubled during this period (see Fox et al. (2013) and Figure 1). What are the long-run consequences for the next generations? The answer is theoretically ambiguous. Higher household income may benefit children, but reduced parental time and supervision may offset these gains (Page, 2024). At the same time, maternal employment may alter family dynamics more broadly: fathers may increase their involvement in childcare, and children may internalize new norms about gender roles and labor market participation (Galassi et al., 2024).

The answer also depends on the relevant counterfactual. When both parents work, child development depends critically on the availability and quality of non-parental care. In settings where public childcare provision has not kept pace with demand—as remains true in many countries today (Gromada and Richardson, 2021)—families must rely on private childcare or informal arrangements, such as grandparents, nannies, or older siblings, whose quality is unevenly distributed but likely to fall short of parental care. In the Swedish context we study, the quality of available substitutes was low: the vast majority of family daycare providers had no relevant childcare training, and a single childcare worker in formal daycare centers was typically responsible for between five and ten children (SOU, 1967, 1972). Yet most evidence on the long-run effects of maternal employment comes from periods and countries in which formal childcare was already widely available (Danzer et al., 2022a; Lo Bue et al., 2023). This leaves open whether the effects of maternal employment differ when increases in mothers' labor supply are not accompanied by broad access to formal care.

To address these issues, we leverage Sweden's 1971 tax reform, which shifted from joint to individual taxation and sharply increased work incentives for married women. Because the reform predated universal provision of public childcare, it incentivized mothers to work at a time when formal non-parental care was virtually nonexistent. This unique context allows us to investigate the effects of increased maternal employment on children's long-term outcomes in an environment where formal childcare was scarce and of limited quality. This is precisely the relevant context for countries with limited provision of public childcare, as well as countries with joint taxation, where evidence is scarce, and the income-time tradeoff is most acute.

Our empirical strategy leverages both within-family and across-family variation in exposure to the tax reform. Across families, we exploit differences in pre-reform marginal tax rates among mothers, which are determined by their husbands' pre-reform earnings. Within families, we compare siblings who experienced different years of exposure to increased maternal labor supply depending on their age at the time of the reform.

This dual approach enables us to disentangle the causal effect of maternal employment from

confounding family characteristics and broader economic trends. Using a potential-outcomes framework, we derive an age-specific estimand and show how sibling differences in age at reform, together with cross-family variation in reform intensity, identify the causal effect under standard instrumental-variables assumptions. Because intergenerational income transmission differs by gender—sons' incomes are more strongly linked to their fathers' (Nekoei and Sinn, 2021)—we restrict our main analysis to same-gender sibling pairs, which removes a potential source of bias in the within-family comparisons.

The first stage of our analysis is to show that the 1971 reform generated a large and persistent increase in married mothers' labor supply. We built a tax calculator based on the Swedish tax code, similar to what is used in the literature on elasticities of taxable income (e.g. Gruber and Saez, 2002a). Using the tax calculator, we simulate each mother's reform-induced change in the marginal net-of-tax rate. Because joint taxation tied wives' marginal tax rates to their husbands' income, the move to individual taxation raised work incentives most strongly for mothers with higher-income husbands. The relationship between changes in weekly hours and the simulated change in the marginal net-of-tax rate is strongly positive and approximately linear. Using husbands' pre-reform earnings as the source of variation in marginal tax rates, we estimate that a one percentage point increase in the net-of-tax rate raises weekly hours by about 0.22, implying an overall labor supply elasticity of 1.29, with a corresponding extensive-margin elasticity of about 0.50. These magnitudes are broadly consistent with existing estimates for mothers and married women (e.g. Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001; Selin, 2014; Kleven, 2024).

Maternal labor supply has a lasting effect on the children's labor-market outcomes. Measuring lifetime income as cumulative labor earnings between ages 30 and 50, we find that effects vary by age of exposure and gender. Negative effects are concentrated in the preschool years: a one-year earlier exposure to a persistent 10-hour increase in maternal weekly hours reduces sons' lifetime income by approximately 4.7 percent. Effects attenuate sharply after school entry—approaching zero for boys and small, imprecise negatives for girls. For preschool boys, the earnings loss reflects a downward shift in the middle of the distribution, with little change at the tails. Under childcare scarcity, the long-run earnings costs of maternal employment fall primarily on sons exposed in early childhood.

The long-run earnings losses spill over to children's households. For sons, preschool-exposure losses are partly offset by higher wives' earnings; for daughters, the household penalty operates primarily through lower husbands' income.

To discipline our empirical investigation, we embed it in a parsimonious intergenerational model linking parental decisions to children's environments, decisions, and outcomes. Parents allocate both time and financial resources to their children, thereby raising children's returns to human capital, which in turn determines future wages and sorting in the marriage market. A central feature of the model is that greater symmetry in parental time investments endogenously generates a taste for couple equality in the next generation. The reform we study—an increase in maternal labor supply—thus operates through two countervailing channels: (i) a reduction in

parent time that reduces the return and endogenous level of human capital and (ii) a reallocation of parental time that equalizes caregiving and fosters preferences for equality. The interaction of these forces governs the equilibrium returns to human capital, and thereby shapes both wage outcomes and patterns of couple formation in the subsequent generation.

We investigate these two channels through which individual and household income can be shaped: human capital and marriage. We find strong evidence for a human-capital channel. Maternal employment during childhood reduces their sons' cognitive and non-cognitive skills and lowers educational attainment, with the clearest schooling losses appearing for boys exposed in preschool and for girls exposed in primary school. These effects are quantitatively important: among sons, skill losses account for about one-third of the decline in lifetime earnings, education accounts for about one-half, and education and skills jointly account for roughly two-thirds of the total income loss. For daughters, we also find negative effects on education, although these do not translate into a comparable decline in lifetime income.

We investigate childcare quality as a mediating channel, proxying for care quality using grandparent availability and municipal-level availability of formal and informal childcare workers at the time of the reform. The results reveal a clear quality gradient. Children with access to grandparents experience substantially smaller negative effects, suggesting grandparent care is of higher quality than the formal and informal alternatives available at the time. Among children without nearby grandparents, negative effects are paradoxically larger in municipalities with greater formal and informal childcare availability—consistent with these alternatives being of low quality relative to parental or grandparental care. The long-run costs of maternal employment thus reflect not merely the absence of maternal time, but the quality of the care that substitutes for it.

The family channel operates not through whether children form families, but through how those families are formed and how childcare is allocated within them. Exposure has essentially no effect on partnering rates, spouse age, the likelihood of having children, or completed fertility. Instead, exposed daughters sort into less educated partners, while exposed sons enter parenthood earlier, consistent with the schooling losses documented above an earlier transition into adult life. Within the next generation of households, childcare is reallocated in a more gender-equal direction: exposed sons take more parental leave and their wives take less, whereas exposed daughters take less leave and their husbands take more. Maternal employment thus reshapes within-household specialization across generation, without affecting family size.

The costs of maternal employment under childcare scarcity extend to the third generation. Children of those exposed to maternal employment during preschool years perform worse at the end of compulsory school, with the largest losses among the children of exposed sons and little evidence of harm when exposure begins only in primary school. This pattern is consistent with intergenerational transmission through parental human capital and household resources: the reform reduced education, skills, and adulthood income among the cohort that later became parents, and a more equal division of childcare in the next generation does not fully offset these losses. The costs of maternal employment under childcare scarcity, therefore, persist across generations.

Our findings carry a broader policy message. Fiscal incentives for dual-earning—whether through individual taxation or other policies—must be paired with commensurate expansions in high-quality childcare. Sweden's experience offers a cautionary tale of the costs of missequencing such reforms. The 1971 tax reform raised maternal labor supply, yet it preceded the construction of the institutional infrastructure necessary to support it: gender-neutral parental insurance was not introduced until 1974, and the major expansion of public preschools did not begin until 1975 and accelerated through the late 1970s and 1980s. The long-run costs documented in this paper thus reflect, in substantial part, a consequence of this policy sequencing failure: incentives for dual-earning were deployed before the complementary childcare system was in place to sustain them.

Framed this way, our results connect to Lindbeck's political-economy account of the Swedish welfare state, in which rising female labor-force participation both broadens the tax base and generates political pressure for the parental-leave and child-care systems that make work and family more compatible (Lindbeck, 2001). In Lindbeck's terms, women's employment and family policy expansion are mutually reinforcing; our contribution is to show that the timing of those complementary reforms has consequences for subsequent generations.

Related Literature

This paper is most closely related to the causal literature on maternal employment during childhood and children's human capital. One strand studies school performance, including test scores, grades, and related measures of academic achievement (James-Burdumy, 2005; Løken et al., 2018; Nicoletti et al., 2023). A second studies longer-run educational attainment and schooling outcomes (Ermisch and Francesconi, 2013; Mosca et al., 2021). A third focuses on skill formation more directly, focusing on cognitive and socio-behavioral outcomes (Baum, 2004; Peter, 2016). Taken together, this literature does not deliver a single sign: maternal employment can reduce maternal time with children, but it can also raise family resources and change the type of non-parental care received, so estimated effects depend on the child's age, the employment margin affected, and the relevant counterfactual care arrangement. Causal evidence on adult outcomes remains comparatively thin, as few papers in this literature follow children into adulthood.

A related literature study parental leave and maternal time at home around birth, rather than maternal employment per se. This strand spans a wide range of outcomes—school performance, educational attainment, and early health and socio-emotional development (Liu and Nordström Skans, 2010; Danzer and Lavy, 2018; Rasmussen, 2010; Dahl et al., 2016; Dustmann and Schönberg, 2012; Ginja et al., 2020; Rossin, 2011; Baker and Milligan, 2010, 2015; Huber, 2019; Huebener et al., 2019; Albagli and Rau, 2019; Houmark et al., 2024; Canaan, 2022)—and earlier U.S. evidence specifically links very early returns to work to worse infant health and developmental outcomes (Berger et al., 2005). Fewer papers trace effects into adulthood, although some do examine later health and labor-market outcomes (Danzer et al., 2022b; Heisig and Zierow, 2025). The central lesson for our purposes is that effects appear to depend critically on what maternal time at home replaces: mod-

erate leave extensions tend to have small average effects on grades and attainment, but can matter for health and socio-emotional development, while very long extensions need not be beneficial.

A third relevant strand examines child care and the availability of non-parental care—particularly relevant here given that formal care was limited in Sweden when the 1971 reform shifted mothers into employment. This includes structural work on mothers' employment and child-care choices (Bernal, 2008; Bernal and Keane, 2011) and a large quasi-experimental literature studying cognitive and developmental outcomes (Drange and Havnes, 2019; Felfe and Lalive, 2018; Cornelissen et al., 2018; Fort et al., 2020), school performance and longer-run educational outcomes (Black et al., 2014; Felfe et al., 2015; Datta Gupta and Simonsen, 2016; Havnes and Mogstad, 2011)m and adult outcomes, including earnings, labor-market participation, welfare dependence, health, and crime (Havnes and Mogstad, 2011, 2015; Baker et al., 2019; Herbst, 2017). The central lesson is that effects depend on what formal care replaces and on program quality. High-quality expansions that displace informal or lower-quality alternatives tend to improve outcomes, especially for disadvantaged children (Havnes and Mogstad, 2011, 2015; Cornelissen et al., 2018). When formal care instead substitutes for parental care, however, the evidence is more mixed: some expansions still improve later cognitive and schooling outcomes (Felfe et al., 2015), whereas others generate persistent non-cognitive losses (Baker et al., 2008, 2019), and the returns to public programs more generally can differ sharply when close substitutes exist (Kline and Walters, 2016). Home-care reforms that jointly reduce maternal employment and formal care are best treated as adjacent to this literature (Bettinger et al., 2014). Our paper connects to all three literatures, but it is closest to the maternal-employment strand because the 1971 reform primarily shifts mothers' labor supply; the parental-leave and child-care literatures are nonetheless central for interpreting mechanisms. Together, these three strands motivate our focus on the still-limited causal evidence tracing early-life changes in maternal labor supply and care arrangements into adult outcomes.

A further related literature studies the intergenerational transmission of gender norms and female labor supply. Fernández et al. (2004) show that men raised by working mothers are significantly more likely to have working wives, providing early evidence that attitudes toward female employment are transmitted within families. Bütikofer (2013) validates and extends this evidence using data from Switzerland. Fogli and Veldkamp (2011) develop a learning model in which agents update beliefs about the costs of maternal employment from their social environment, and show this mechanism can account for long-run dynamics in female labor force participation. Fernández (2013) extends this perspective, modeling cultural change as a gradual learning process that can account for the century-long rise in female labor force participation. More directly relevant for our daughters' outcomes, Olivetti et al. (2020) provide evidence that daughters' labor supply and gender-role attitudes are shaped by maternal employment during childhood. Our paper contributes causal evidence to this strand, and the transmission mechanism it identifies motivates the norms channel in our theoretical framework.

Our work is also related to a large literature estimating female labor supply elasticities, especially studies exploiting tax reforms that shift between joint and individual taxation (Crossley

and Jeon, 2007; LaLumia, 2008; Selin, 2014; Kalíšková, 2014). We build most directly on Selin (2014), who exploits the same 1971 Swedish reform to estimate participation elasticities for married women, using dummies for deciles of husbands' pre-reform income as instruments for changes in the participation tax rate. We extend this approach in two directions: we more precisely isolate the tax rate changes driven by the joint-to-individual shift, and we estimate elasticities along both the intensive and extensive margins. Our hours elasticity of 1.3 and extensive margin elasticity of 0.5 are broadly consistent with estimates from the EITC literature (Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001; Eissa and Hoynes, 2004), though above more recent estimates (Kleven, 2024). The 1971 reform is particularly well-suited for this purpose as it generated large and salient changes in married women's marginal tax rates, which matters given that adjustment frictions may cause small reforms to understate true elasticities (Chetty, 2012a).

2 Data and Childcare Around 1971

2.1 Data

Datasets Our analysis draws on several linked administrative registers maintained by Statistics Sweden, identified through the Swedish personal identity number.

Family structure and intergenerational links are constructed from the Multigenerational Register (Flergenerationsregistret) (Statistics Sweden, 2017a), which links all individuals in Sweden to their biological parents and covers the full population. This register is the basis for constructing our sample of mothers, their children, and the third generation.

Data on maternal employment and working hours around the time of the reform come from the Population and Housing Censuses (Folk- och bostadsräkningarna, FOB; Statistics Sweden, 1990), conducted every five years between 1960 and 1990. The censuses collected detailed information on employment status, hours of work, occupation, and household composition from the near-universe of the Swedish population, with near-complete response rates due to mandatory participation.

Income and employment outcomes are drawn from the Income and Taxation Register (Inkomst- och taxeringsregistret, IoT), which provides annual information on income, taxes, and transfers from 1968 onwards.

Educational attainment, field of study, and parental leave take-up are drawn from the Longitudinal Integration Database for Health Insurance and Labour Market Studies (LISA; Statistics Sweden, 2020), which covers all Swedish residents aged 16 and above on an annual basis from 1990 onwards. LISA integrates data from the Education Register (Statistics Sweden, 2017b), the Income and Taxation Register, and records from the Swedish Social Insurance Agency, including parental leave days.

Cognitive and non-cognitive skills are measured for men using data from the military enlistment register (Swedish National Archives, 2005). Until the abolition of mandatory conscription, all Swedish men underwent enlistment testing at age 18, comprising assessments of cognitive abil-

ity across four subtests—inductive reasoning, spatial ability, technical understanding, and verbal comprehension—as well as non-cognitive traits assessed through a structured interview with a certified psychologist. The overall non-cognitive score reflects social maturity, psychological energy, intensity, and emotional stability (Mood et al., 2012).

School performance for the third generation is measured using results from national standardized exams taken at the end of compulsory schooling (9th grade, age 16), administered by the Swedish National Agency for Education (Ramstedt, 2005). These exams are high-stakes, as GPA determines eligibility for oversubscribed upper-secondary programs.

Sample Our primary sample consists of children born between 1958 and 1970, who were therefore at most 12 years old at the time of the reform, and who have at least one older sibling still at compulsory-schooling age, i.e. younger than 16 years old. We further restrict the sample to families in which parents filed taxes jointly in 1970 and where the father had positive labor income. Individuals who do not appear in the tax registry between ages 30 and 50 are excluded. These are individuals who die early, emigrate, or for some other reason do not earn taxable labor income during those ages. As discussed in Section 4.4, the main analysis is limited to same-sex siblings, since the identifying assumptions are violated for opposite-sex sibling pairs. Throughout the analysis, we define the preschool-age sample as families in which the younger sibling is below age 7 at the time of the reform, and the primary school-age sample as those in which the younger sibling is between ages 7 and 12 at that time.

Variable Definition Lifetime income is defined as the sum of an individual's total labor income between ages 30 and 50. This age range is the longest range of post-education adulthood life we can observe in the data for the youngest cohorts in our sample. Educational attainment is measured by the highest completed degree as of 2020. Because maternal labor supply decisions are influenced by the tax schedule applied to the father's earnings, we construct a measure of expected paternal earnings in 1970 that accounts for transitory income fluctuations and mean reversion. Specifically, we estimate a reduced-form income process in which fathers' earnings in 1970 are regressed on their lagged earnings in 1968 and 1969. To allow for heterogeneous income dynamics, we interact lagged earnings with indicators for the father's education category and year of birth. The resulting fitted value serves as our measure of expected paternal earnings and is used throughout the analysis.[1]

2.2 Childcare in Sweden Around the 1971 Tax Reform

In the late 1960s and early 1970s, the period before the expansion of public childcare in Sweden, childcare was organized through a mixed system of formal and informal arrangements. To document the prevalence of different childcare arrangements at the time of the reform and to put our

[1] Appendix Figure A.1 shows the expected labor income against the actual income in 1970. The correlation is high and around 0.98.

findings into context, we use data from a nationally representative interview survey conducted in autumn 1966 (SOU, 1967). To our knowledge, this survey provides the best available evidence on childcare use prior to the 1971 tax reform. The childcare survey was implemented as a special supplement to Statistics Sweden's Labor Force Survey and covered children whose custodial parent(s) worked at least 15 hours per week. For each child, the survey recorded the main childcare arrangement in use at the time of the interview. In the main text, we focus on childcare availability for preschool-aged children (below age 8), while Appendix C extends the analysis to children below age 10 and provides further institutional details on childcare provision during this period.[2]

Public childcare comprised both center-based childcare institutions (*barnstugor*), which existed in several forms differing in time coverage and function, and municipal family childcare (*kommunala familjedaghem*), in which children were cared for in private homes by childminders under municipal organization and supervision. Public provision of childcare, however, was limited and highly rationed, covering only 18 percent of children (Figure 2). As a result, the majority of working parents relied on alternative arrangements to meet their childcare needs.

There were two important alternatives. The first option was private family childcare (*privata familjedaghem*), which comprised 23 percent of children of working parents. These consisted of home-based care similar in form to municipal family childcare but operated without municipal oversight or financial support. Family childcare settings—both municipal and private—typically involve a single childminder caring for a small group of three to five children.

The second option was grandparents, or, according to the survey, grandmothers, who cared for more than 23 percent of children.[3] An additional 8 percent were cared for by other relatives or siblings. The third main option was privately arranged childcare in the child's own home, including nannies and domestic employees (*hemhjälp*). The remainder of the children were taken care of by neighbors or friends, or the children were left on their own.

The observed reliance on informal childcare arrangements is most likely to have reflected the scarcity of public childcare rather than parental preferences. Direct evidence on this comes from a survey conducted by the Preschool Commission (*Barnstugeutredningen*) in 1972, after the reform (SOU, 1972). Among children aged 0–6 with working mothers, 68 percent were reported to demand a place in either childcare centers or family childcare. Moreover, stated preferences were strongly tilted toward public provision: conditional on demanding childcare, 48 percent of parents expressed a preference for a place in a childcare center, and 24 percent in family childcare.

3 The 1971 Tax Reform and Its Effect on Female Labor Supply

[2]We exclude from the sample children who are cared for by one of the two parents. The full breakdown of survey responses is available for the survey population, which are children aged 0–10, and partially for the subset of younger children aged 0–7. To break down the share of children taken care of by grandmother and relatives out of children at home or in private childcare, we assume the same proportion for children 0–7 as children aged 0–10.

[3]This share reflects both care by a grandmother in the child's home or as part of private family childcare organized by the grandmother in her own home.

3.1 Transition from Joint to Individual Taxation

The pre-reform system. Prior to 1971, married couples in Sweden were taxed jointly at the central-government level. When income taxation was introduced in 1902, joint taxation reflected prevailing legal and social norms: husbands were the legal guardians of their wives, and the labor market participation among married women was low (Nyberg, 2017). This remained the operative regime for half a century. A reform in 1952 replaced the single schedule with two separate federal schedules for married couples and singles. While this reform eliminated the so-called "marriage penalty" that arose when both spouses had earnings, it simultaneously created a strong disincentive for wives to work as under the new system the wife's earnings were effectively stacked on top of her husband's as a tax base. The key mechanical consequence of this system was that a wife's tax rate was an increasing function of her husband's earnings. Her income was immediately taxed the couple's marginal tax bracket, even at low levels of her own earnings.

Two additional features of the tax system influenced the effective tax rate faced by married women. First, while local income taxes were levied at a flat rate, they interacted with the progressive central-government tax schedule as they were deductible against the central government tax base, attenuating effective tax progressivity. Second, a work deduction (*förvärvsavdrag*) applied to women with positive earnings. For married women with children below age 16, the deduction equaled 25 percent of earnings up to a threshold, partially offsetting statutory marginal rates for this group. Despite this deduction, the marginal and participation tax rates faced by wives remained strongly increasing in their husbands' income under joint taxation.

Political and economic motivations. Three distinct arguments converged in favor of individual taxation. The push was initiated by highly educated women who argued that joint taxation was unfair and disproportionately benefited high-income households where the wife did not work (Elvander, 1972; Nyberg, 2017). Political parties were initially divided and indecisive, but during the 1960s all came to endorse individual taxation except the Conservative Party (Elvander, 1972). A second argument was that economic forecasts predicted that sustaining growth would require a substantial increase in labor supply, and married women were identified as the primary untapped reserve. This argument ultimately proved decisive with the Social Democratic Minister of Finance (Elvander, 1972). Third, and perhaps most importantly for the governing Social Democrats, it was shown that the deductions available under joint taxation disproportionately benefited high-income families, allowing the reform to be framed primarily as a redistribution measure. Prime Minister Olof Palme publicly described the move to separate taxation as first and foremost a reform to benefit low-income workers, while also emphasizing its contribution to women's independence (Nyberg, 2017). With all three arguments pointing in the same direction, the reform was passed in 1971.

The reform. The reform was announced in a government bill released in March 1970 and took effect on January 1, 1971. In an earlier reform in 1966, optional individual taxation had been

introduced for the central government tax and pension insurance fee, but take-up was only around 5 percent of couples and local taxes remained unaffected (Selin, 2014). For the vast majority of married households, joint taxation thus remained binding until the 1971 reform. In our main analysis, we restrict the sample to children whose parents jointly filed taxes in 1970.

Effective January 1, 1971, each spouse's labor earnings were taxed separately under a unified progressive schedule that did not depend on partner income. Unearned income remained jointly taxed until 1988, and the last family-based elements of the income tax were not fully eliminated until the major reform of 1991, but labor income—the relevant margin for employment decisions—was fully individualized from 1971.

Three further structural changes accompanied the reform. First, the deductibility of local taxes from the central government tax base was abolished, substantially increasing effective progressivity. Second, a spousal tax reduction was introduced to partially compensate one-earner households. Third, the work deduction was retained but made gender-neutral, applying to the secondary earner rather than specifically to wives, but was set in nominal terms and therefore declining in real value with inflation over subsequent years before being abolished in 1991. Detailed statutory formulas for deductions, thresholds, and tax reductions are provided in Online Appendix B.

Figure 3 illustrates the implied marginal tax schedules for a married woman with two children under the statutory rules. Panel (a) shows the 1970 schedule under joint taxation. For any given level of the wife's earnings, the marginal tax rate (MTR) increases with the husband's income, generating a substantial secondary-earner tax wedge and sharply reducing the net return to work in high-income households. Panel (b) shows the 1975 schedule following the reform. The wife's MTR no longer depends on her husband's earnings. The reform, therefore, eliminated the mechanical link between husband's income and the wife's tax rate, substantially weakening work disincentives for married women in high-income families. In net terms, wives married to husbands at the top of the earnings distribution experienced reductions in participation tax rate of approximately 40 percentage points, while wives of lower-income husbands experienced little change or small increases (Selin, 2014).

3.2 Effect on Married Women's Labor Supply

As a first step in our empirical analysis, we estimate the effect of the tax reform on female labor supply. As we will explain in detail in the next section, our identification strategy will combine across-family variation in exposure to the reform—driven by differences in mothers' marginal tax rates under joint taxation—with within-family variation arising from siblings' differential exposure to the timing of the reform.

Figure 4 presents the first step of our analysis. Panel (a) plots the reform-induced change in married women's marginal net-of-tax rate (MNTR) between 1970 and 1975 against their husbands' labor income in 1970. Using the tax function we built and described in Appendix B, we simulate each woman's MNTR under the pre- and post-reform tax schedules. The figure shows that the

reform increased the net-of-tax return to work more for women married to higher-earning husbands. Under joint taxation, a married woman's MTR depended on her husband's earnings; as a result, the move to individual taxation generated larger tax cuts, and thus larger increases in the net-of-tax rate, for women with higher-income husbands.

Panel (b) plots the change in married women's weekly hours of work between 1970 and 1975 against their husbands' labor income in 1970. Maternal labor supply rises with the husband's pre-reform income, closely mirroring the pattern in panel (a). This indicates that the tax reform generated economically meaningful increases in married women's labor supply, with the strongest responses concentrated among women who faced the largest increases in the return to work. Because the outcome is weekly hours, it captures changes at the intensive margin and, as non-employment is recorded as zero hours, at the extensive margin as well.

Appendix Figure A.4 presents the corresponding results for married men. In contrast to the pattern for women, there is no systematic relationship between husbands' labor supply response and pre-reform income, and the overall effect is small. This indicates that husbands did not compensate for their wives' increased hours by reducing their own labor supply.

Panel (c) relates the change in married women's weekly hours between 1970 and 1975 to the reform-induced change in their MNTR. Following the logic of the conventional Gruber-Saez approach (Gruber and Saez, 2002b), we first simulate the change in the MNTR using the tax function. We then project this simulated change non-parametrically onto the husband's pre-reform income, thereby isolating the component of tax variation mechanically generated by the reform through joint taxation. The relationship is strongly positive and approximately linear. The estimated slope of 21.93 (s.e. 0.713) implies that a 1 percentage point increase in the MNTR is associated with about 0.22 additional weekly hours worked between 1970 and 1975. This linear pattern supports the use of reform-induced changes in the marginal tax rate, reflecting differences in pre-reform husband income, as a continuous measure of treatment intensity in the empirical analysis.

The implied labor supply elasticity is 1.29. To see this, note first that the estimated slope in Panel (c) implies that a one percentage point increase in the MNTR is associated with approximately 0.22 additional weekly hours of work. Equivalently, a one percentage point decline in the marginal tax rate yields the same increase in hours. The implied elasticity is $\frac{\Delta H/H}{\Delta(1-\tau)/(1-\tau)}$, where H denotes working hours and τ the marginal tax rate. The slope in Panel (c) estimates the change in hours for a one-percentage-point change in the net-of-tax rate. Using average pre-reform hours of 10.6 and an average marginal tax rate of 37.4 percent, we obtain a labor supply elasticity of 1.29, which reflects both intensive- and extensive-margin adjustment.

The implied extensive-margin elasticity can be calculated similarly as $\frac{\Delta E/E}{\Delta(1-\tau^p)/(1-\tau^p)}$, where E denotes employment and τ^p the participation tax rate. An estimated employment effect of around 0.40 implies that a one percentage point decline in the participation tax rate is associated with roughly a 0.4 percentage point increase in the employment rate. Relative to the pre-reform employment rate of 0.55 and an average participation tax rate of 31.6 percent, this yields an extensive-margin elasticity of 0.50.

These elasticities are in line with, and in some cases larger than, existing estimates of married women's labor supply responses to tax changes. One plausible reason is that the Swedish reform generated a large and salient change in work incentives. In the presence of adjustment costs, larger reforms are likely to induce stronger behavioral responses than smaller, incremental tax changes (Chetty, 2012b). Related evidence from other settings likewise points to meaningful labor supply responses among married women (Crossley and Jeon, 2007; Selin, 2014; Kalíšková, 2014), although not all studies can map those responses into directly comparable elasticities. For example, LaLumia (2008) estimates that employment of married women in states adopting joint taxation decreased by 2 percent, although the estimated elasticity is not possible due to a lack of data on MNTR.

Two questions are central for interpreting these results and for motivating our empirical framework. First, is the estimated effect truly driven by the reform, or would wives of high-income husbands have increased labor supply even in its absence? Panel (d) addresses this concern using an event-study difference-in-differences specification in which treatment intensity is given by the reform-induced change in the mother's tax incentive, itself determined by the husband's pre-reform income under joint taxation. This figure uses employment rather than hours as a measure of female labor supply, as data on hours is from the population census, available every five years, while employment can be measured each year using tax-returns. There is no evidence of differential pre-trends before the reform. In 1971, employment rises sharply for women who experience a larger increase in their MNTR, increases further over the next few years, and then remains persistently positive. This pattern is consistent with a reform-driven response rather than a continuation of pre-existing trends.[4]

Second, was the labor supply response persistent? Appendix Figure A.2 shows that women who entered the labor market following the reform tended to remain employed. Persistence is high for all entrants, but even stronger among wives of higher-income husbands, who experienced the largest increase in work incentives. This persistence is an important foundation for the empirical strategy developed below.

4 Empirical Framework

This section develops the empirical framework for estimating the causal effect of mother's labor supply during childhood on children's long-run outcomes using the 1971 tax reform.

4.1 Data-Generating Process

Let Y_i denote the long-run outcome of child i. We model the generation-specific data-generating process as

$$Y_i = \mathbb{Y}\big(A_{f(i)}, B_i, C_i\big), \tag{1}$$

[4] Appendix Figure A.3 further shows that the results are robust to using either the marginal tax rate or the participation tax rate to measure tax incentives.

where the arguments capture distinct sources of heterogeneity that shape later-life outcomes. The variable $A_{f(i)}$ denotes the family environment—indexed by $f(i)$—broadly construed to include parental investments, care, and other features of the household that are shared across siblings. The vector B_i collects individual-specific characteristics not mediated by the family, such as endowments and gender. The term C_i represents individual-specific events and investments that arise outside the family environment or within the family but child-specific—forms of nurture not already summarized by $A_{f(i)}$.

Our object of interest is a particular component of C_i: the mother's labor supply during the child's developmental years. To make this dependence explicit, we partition C_i into two parts, writing (with a slight abuse of language)

$$Y_i \;=\; \mathbb{Y}\big(l^m_{i,1}, \ldots, l^m_{i,\bar{a}}, A_{f(i)}, B_i, \widehat{C}_i\big), \tag{2}$$

where $l^m_{i,a}$ denotes the labor supply of child i's mother when the child is of age a, for ages $a = 1, \ldots, \bar{a}$, and $\widehat{C}_i$ collects all remaining individual-specific inputs other than maternal labor supply.[5]

Fix an age $a \in \{1, \ldots, \bar{a}\}$. Let $\widetilde{\mathbb{Y}}(.)$ denote the potential long-run outcome that would prevail if maternal labor supply were increased by a persistent amount ε starting when child i is age a. Formally,

$$\widetilde{\mathbb{Y}}(\varepsilon, a, A_{f(i)}, B_i, \widehat{C}_i) = \mathbb{Y}\Big(l^m_{i,1}+\varepsilon\mathbf{1}\{1 \geqslant a\}, \ldots, l^m_{i,t}+\varepsilon\mathbf{1}\{t \geqslant a\}, \ldots, l^m_{i,T}+\varepsilon\mathbf{1}\{\bar{a} \geqslant a\}, A_{f(i)}, B_i, \widehat{C}_i\Big), \tag{3}$$

where $\mathbf{1}\{t \geqslant a\}$ indicates that the increment applies at ages greater or equal than a.

4.2 Estimand

The estimand of interest is the marginal effect of this persistent increase, evaluated at zero:

$$\beta_a := \left.\frac{\partial \widetilde{\mathbb{Y}}(\varepsilon, a, A_{f(i)}, B_i, \widehat{C}_i)}{\partial \varepsilon}\right|_{\varepsilon=0}. \tag{4}$$

This parameter is the marginal effect on child's outcome Y_i of a persistent increase in maternal labor supply that begins at age a, holding fixed all other inputs. Given that B_i collects fixed characteristics, like gender, it remains unchanged. For a child exposed to the reform at age $a(i)$, the realized outcome can be written as

$$Y_i \;=\; \widetilde{\mathbb{Y}}(\Delta L^m_{f(i)}, a(i), A^{T=1}_{f(i)}, B_i, \widehat{C}^{T=1}_i).$$

[5] We specify $\bar{a}$ as an age threshold beyond with maternal labor supply no longer affect children's outcomes. Our empirical strategy does not require specifying a specific age threshold.

where $T = 1$ and $T = 0$ denote the treated and untreated potential outcomes, respectively. The relevant treatment, $\Delta L^m_{f(i)}$ is the persistent treatment effect on mother's labor supply,

$$\Delta L^m_{f(i)} := L^{m,T=1}_{f(i)} - L^{m,T=0}_{f(i)},$$

A first-order Taylor expansion of $\widetilde{\mathbb{Y}}(., a, A^{T=1}_{f(i)}, B_i, \widehat{C}^{T=1}_i)$ around $\varepsilon = 0$ yields the local approximation

$$Y_i \approx \widetilde{\mathbb{Y}}(0, a_i, A^{T=1}_{f(i)}, B_i, \widehat{C}^{T=1}_i) + \beta_a \, \Delta L^m_{f(i)}, \tag{5}$$

where the first term is the potential outcome in the presence of the reform but in the absence of the reform-induced change in maternal labor supply.

$$Y_i \approx \mathbb{Y}\big(A^{T=1}_{f(i)}, B_i, \widehat{C}^{T=1}_i, L^{m,T=0}_i\big) + \beta_a \, \Delta L^m_{f(i)}, \tag{6}$$

We assume that the outcome function $\mathbb{Y}$ is additively separable in maternal labor supply and the remaining components $(A_{f(i)}, B_i, \widehat{C}_i)$, so that the effect of a change in maternal labor supply does not depend on the realization of family background, individual endowments, or other child-specific investments.[6] Under this assumption, we can operationalize equation (6) in a non-parametric specification

$$Y_i = A^{T=1}_{f(i)} + B_i + \widehat{C}^{T=1}_i + \beta_a \, \Delta L^m_{f(i)}. \tag{7}$$

We define what we will refer to as the *exposure effect* at age a for gender s as:

$$\gamma^s_a =: \beta^s_a - \beta^s_{a+1} \tag{8}$$

This parameter measures the effect of one additional year of exposure to increased maternal labor supply starting at age a rather than at age $a + 1$. While identification of β_a requires exogenous variation in maternal labor supply that is uncorrelated with other determinants of children's outcome, we show that the exposure effects are identified under weaker assumptions in the following subsection.

4.3 Estimation Approach

The key identification challenge is that $\Delta L^m_{f(i)}$ is not randomly assigned in observational data, even when it is induced by a tax reform. Our research design address this endogeneity in two ways. First, it exploits cross-family variation in exposure to the reform. More precisely, we instrument the change in mother's labor supply using her pre-reform marginal tax rate, as explained by her husband's pre-reform income, as an instrumental variable Z_f.

Despite generating exogenous variation in mother's labor supply, exposure to the reform may be correlated with family characteristics, including fathers' income, generating endogeneity in

[6] We will allow for heterogeneous treatment effect by child's gender, maternal education and other pre-reform characteristics like access to grandparents.

(7) absent further assumptions or design-based variation. The research design address this by combining the cross-family differences in exposure to the reform with within-family differences in exposure to the reform. Siblings in the same family share the same ΔL_f^m, but they differ in their ages when the reform occurs. We illustrate the two sources of variation that our research design leverages in Figure 5. Let i and i' denote two siblings from the same family, with i the younger. Let a_i and $a_{i'}$ denote their respective ages at the time of the reform.

Within a family, taking the difference between siblings removes all time-invariant determinants of outcomes that are shared within the household. Using the parametric approximation introduced above, the within-family outcome difference can be written as

$$Y_i - Y_{i'} = \left(\beta^s_{a(i)} - \beta^s_{a(i')}\right) \Delta L_f^m + \left(B_i - B_{i'}\right) + \left(\widehat{C}_i^{T=1} - \widehat{C}_{i'}^{T=1}\right), \tag{9}$$

where β^s_a captures the marginal effect of a persistent increase in maternal labor supply beginning at age a. The term $\widehat{C}_i^{T=1} - \widehat{C}_{i'}^{T=1}$ collects unobserved sibling-specific differences that remain after differencing within the family. Equation (9) makes clear that identification hinges on separating the causal component

$$\left(\beta^s_{a(i)} - \beta^s_{a(i')}\right) \Delta L_f^m,$$

which is an exposure gradient by age scaled by the reform-induced change in maternal labor supply, from the residual unobserved sibling difference $\widehat{C}_i^{T=1} - \widehat{C}_{i'}^{T=1}$. The identifying variation thus combines (i) within-family differences in age at reform, which eliminate shared background and family fixed effects, with (ii) between-family differences in reform-induced labor supply responses, which provide variation in ΔL_f^m.

4.4 Identification Assumptions

We assume that $\widehat{C}_i^T$ can be decomposed as

$$\widehat{C}_i^T = \lambda^T_{a(i)} + \theta_i^T$$

where λ_a captures age-at-exposure effects common across **birth cohort**, and θ_i absorbs **unobserved** individual heterogeneity. This implies that

$$Y_i - Y_{i'} = \left(\beta_{a(i)} - \beta_{a(i')}\right) \Delta L_f^m + \left(B_i - B_{i'}\right) + \left(\lambda^{T=1}_{a(i)} - \lambda^{T=1}_{a(i')}\right) + \left(\theta_i^{T=1} - \theta_{i'}^{T=1}\right), \tag{10}$$

Under a constant exposure effect, $\gamma^s_a = \gamma^s$, the sibling difference equation becomes

$$Y_i - Y_{i'} = \underbrace{\left(\frac{\beta^s_a - \beta^s_{a'}}{\Delta a}\right)}_{\gamma^s} \Delta a \; \Delta L_{m(i)} \; \mathbf{1}[g(i) = s] \; \mathbf{1}[g(i') = s] + (\theta_i^* - \theta_{i'}^*) \tag{11}$$

where $\Delta a = a_{i'} - a_i$ is the age gap between siblings at the time of the reform. Under a constant exposure effect or when $\Delta a = 1$, the coefficient γ^s identifies the exposure effect at age a, and θ_i^* is the

unobserved term, combining B_i and $\theta_i^{T=1}$. We estimate this equation using instrumental variable using reform-induced tax change, differentially increasing incentive maternal labor supply. This sibling-difference IV design rests on four assumptions.

1. **Exclusion.** Conditional on siblings' ages at the time of the reform, the instrument affects the sibling outcome gap only through the reform-induced change in maternal labor supply. Equivalently, fathers' pre-reform income should not predict systematic differences in unobserved sibling gaps beyond what is implied by $(a(i), a(i'))$:

$$\mathbb{E}\big[\theta_i^* - \theta_{i'}^* \,\big|\, a(i), a(i'), Z_f\big] = \mathbb{E}\big[\theta_i^* - \theta_{i'}^* \,\big|\, a(i), a(i')\big]\,. \tag{12}$$

   Prior research shows that intergenerational income transmission is gender-specific, with sons exhibiting stronger correlations with paternal income than daughters (Nekoei and Sinn, 2021). Because this pattern would violate the exclusion restriction, our specification restricts attention to same-gender sibling pairs, $g(i) = g(i') = s$.

2. **Relevance.** The instrument shifts maternal labor supply:

$$\mathrm{Cov}(Z_f, \Delta L_f^m) \neq 0.$$

3. **Conditional as-good-as-random assignment** Conditional on $(a(i), a(i'))$, the instrument is orthogonal to the determinants of sibling outcome differences. A sufficient formulation is that the instrument is independent of the potential sibling outcome gap in the absence of any reform-induced labor supply change:

$$\Big(\widetilde{\mathbb{Y}}_i(0, a(i)) - \widetilde{\mathbb{Y}}_{i'}(0, a(i'))\Big) \perp Z_f \mid a(i), a(i').$$

   This condition rules out differential trends in sibling gaps by fathers' pre-reform income, once ages at reform are held fixed.

4. **Monotonicity.** The instrument moves maternal labor supply in the same direction across families, so that there are no "defiers." In potential-outcomes notation for the first stage, this can be stated as

$$\Delta L_f^m(Z_f = z_2) \;\geqslant\; \Delta L_f^m(Z_f = z_1) \quad \text{for } z_2 > z_1 \text{ and for all } f,$$

   with the inequality reversed if higher Z_f weakens the incentive to increase labor supply.

Under these conditions, the IV estimand recovers a local average exposure gradient, linking within-family differences in age at reform to exogenous cross-family differences in the reform-induced change in maternal labor supply.

5 Theoretical Framework

Our goal is to develop a theoretical Framework to discipline our thinking about the intergenerational impact of maternal labor supply resulting from a change in their tax rate. We first develop a setting in which each generation invests in the next, helping them accumulate human capital. Human capital shapes both adulthood wages and marriage sorting. We first drive comparative statics in this setting and then connect the model to our experiment by investigating mothers' tax rate change.

5.1 Setting

Each generation receives parental investments in time,

$$T = t + \tilde{t}, \tag{13}$$

and money,

$$I = i + \tilde{i}. \tag{14}$$

Together with study time s, these investments raise human capital, $h = H(s, T_{-1}, I_{-1})$, where H is strictly increasing in all three arguments. Childhood time is allocated between leisure and study according to

$$1 = \bar{l} + s. \tag{15}$$

so studying come at the cost of lost leisure. But return to higher human capital is harvested l, where M is a strictly increasing real-valued function W is strictly increasing.

The marriage market is modeled in reduced form through perfectly assortative matching. In particular, an individual with wage w is matched with a spouse whose wage is $\tilde{w} = M(w)$ where $M(\cdot)$ is a strictly increasing real-valued function. We denote its slope by $m(w) := \frac{\partial M(w)}{\partial w}$. Once matched, the household chooses allocations so as to maximize a Pareto-weighted aggregation of spouses' utilities, with Pareto weights η and $\tilde{\eta} := 1 - \eta$.[7]

A distinctive feature of the model is an inherited preference for equality within the couple, captured by the parameter γ. We measure within-couple equality by $E := e(t, \tilde{t})$, where $e(\cdot, \cdot)$ is a similarity index satisfying $e(x, x') \in [0, 1]$ for all (x, x'), with $e(x, x') = 1$ if and only if $x = x'$. Each individual derives utility γE from a more equal allocation within the household. [Connection to social welfare fucntion.]

This taste for equality is itself transmitted across generations. Specifically, the next generation's preference parameter is given by $\gamma_{+1} = \Gamma(E)$, where $\Gamma(\cdot)$ is a strictly increasing real-valued function. Thus, more equal allocations within the household do not merely affect contemporaneous utility; they also shape the strength of egalitarian preferences in the next generation. In this sense, the model embeds the intergenerational transmission of norms favoring within-household

[7] This formulation is consistent with a Nash-bargaining interpretation under exogenous outside options.

equality.

Each adult derives utility from private consumption and leisure, represented by $u(c, l)$, in addition to the utility generated by within-couple equality described above. On the budget side, an adult allocates labor income across private consumption, investments in children, and a transfer to the spouse:

$$c + i + y = z, \tag{16}$$

where z denotes labor income. Since earnings are equal to the wage rate multiplied by hours worked, the corresponding time constraint is

$$1 = l + t + \frac{z}{w}. \tag{17}$$

The spouse faces the analogous budget and time constraints,

$$\tilde{c} + \tilde{i} + \tilde{y} = \tilde{z}, \tag{18}$$

and

$$1 = \tilde{l} + \tilde{t} + \frac{\tilde{z}}{\tilde{w}}. \tag{19}$$

For tractability, we imposed two simplifying assumptions. First, children do not derive direct utility from contemporaneous household consumption; parental expenditures affect them only through investments that enter the human-capital production process. Second, matching in the marriage market is determined by wages rather than by preferences, so individuals sort by earning potential rather than by a taste for within-couple equality.

5.2 Analysis

The household's problem can therefore be written recursively as

$$V(T_{-1}, I_{-1}, E_{-1}) = \max \bar{u}(\bar{l}) + \delta\Big[\eta\, u(c, l) + \tilde{\eta}\, u(\tilde{c}, \tilde{l}) + \gamma E\Big] + \beta\delta\, V(T, I, E). \tag{20}$$

The continuation value $V(T, I, E)$ captures the fact that current parental investments and the realized degree of within-couple equality become state variables for the next generation.

The maximization (20) is subject to the aggregation constraints (13) and (14), the time constraints (15), (17), and (19), and the budget constraints (16) and (18). In addition, human capital and wages satisfy $w = W \circ H(s, T_{-1}, I_{-1})$, the marriage function implies $\tilde{w} = M(w)$, within-couple equality is given by $E = e(t, \tilde{t})$, intrahousehold transfers must satisfy the household budget-balance condition $y + \tilde{y} = 0$, and the inherited taste for equality is given by $\gamma = \Gamma(E_{-1})$.[8]

Define the indirect utility function given wage, money transfer to, and time investment in the next generation as

$$v(w, t, i) := \max_{c,z,l} u(c, l) \tag{21}$$

[8]For simplicity, we suppress standard bound constraints, namely $s, t, \tilde{t}, \bar{l}, l, \tilde{l} \in [0, 1]$ and $c, \tilde{c}, I \geqslant 0$.

subject to time constraint (17) and budget constraint (16). The optimization can be written using indirect utility as

$$V(T_{-1}, I_{-1}, E_{-1}) = \max_{s,\, t,\, i,\, T,\, I, y} \bar{u}(1-s) + \delta\Big[\eta\, v(w, t, i+y) + \tilde{\eta}\, v(\tilde{w}, T-t, I-i-y) + \Gamma(E_{-1})E\Big] + \beta\delta\, V(T, I, E) \tag{22}$$

given that: $E = e(t, T-t)$, $w = W \circ H(s, T_{-1}, I_{-1})$ and $\tilde{w} = M(w)$.

It will be useful to separate the adulthood problem

$$\mathcal{U}(w, E_{-1}) := \max_{t,\, i,\, T,\, I, y} \Big[\eta\, v(w, t, i+y) + \tilde{\eta}\, v(\tilde{w}, T-t, I-i-y) + \Gamma(E_{-1})E\Big] + \beta\, V(T, I, E) \tag{23}$$

given that $E = e(t, T-t)$ and $\tilde{w} = M(w)$, from the childhood study problem

$$V(T_{-1}, I_{-1}, E_{-1}) := \max_{s} \underbrace{\bar{u}(1-s) + \delta\, \mathcal{U}(w, E_{-1})}_{=:\mathcal{V}(s, T_{-1}, I_{-1}, E_{-1})}, \tag{24}$$

given that $w = W \circ H(s, T_{-1}, I_{-1})$. First-order and Envelope conditions are derived in Appendix Section E.1.

5.3 Functional Form Assumptions

Given that we are not interested in inter-couple transfers, let us assume quasi-linear utilities

$$\bar{u}(l) = \alpha \ln l, \quad u(c, l) = c + \alpha \ln l, \tag{25}$$

We also need to assume that $\eta = \tilde{\eta} = \frac{1}{2}$ because an unequal Pareto weight leads to the allocation of all resources to a single partner.

Moreveor, we assume $W(h) = \omega h$

$$H(s, T_{-1}, I_{-1}) = AsT_{-1}^{\theta} I_{-1}^{1-\theta}, \quad M(w) = mw, \quad e(t, \tilde{t}) = 1 - \frac{\kappa}{2}(t - \tilde{t})^2, \quad \Gamma(E) = E^{\cdot 5}.$$

Let the productivity of study be noted as $\hat{A} := \omega A T_{-1}^{\theta} I_{-1}^{1-\theta}$, as $w = \hat{A}s$.

Appendix Section E.2 derives a few implications of the assumptions used in the next section, which then derive the comparative statics.

5.4 Comparative Statistics

As we prove in Appendix section E.3, the comparative statistics of human capital with respect to parental time investment can be decomposed into three compoenents:

$$\frac{d\ln h}{d\ln T_{-1}} = \underbrace{\theta}_{\text{direct effect}} + \underbrace{\frac{\delta\hat{A}}{s\,|\mathcal{V}_{ss}|}\left[\underbrace{\frac{\partial\ln\hat{A}}{\partial\ln T_{-1}}\mathcal{U}_w}_{\text{Productivity effect}} + \underbrace{\frac{\partial\mathcal{U}_w}{\partial\ln T_{-1}}}_{\text{Time endowment effect}}\right]}_{\text{Human capital amplification}}. \tag{26}$$

Three components are:

1. a *direct productivity effect*, parental time investment directly;
2. a *Productivity effect*: parental time received in childhood raises the marginal return to study time s;
3. a *time endowment channel*: parental time received in childhood affects later household time allocation, and through that channel, the return to human capital.

To see that all three terms in the decomposition are positive, note that we can rewrite it as:

$$\frac{d\ln h}{d\ln T_{-1}} = \underbrace{\theta}_{\text{direct effect}} + \underbrace{\frac{\delta\hat{A}}{-2s\mathcal{V}_{ss}}\left[\underbrace{\theta[1+m-(t^*+m\tilde{t}^*)]}_{\text{XXX}} - \underbrace{\frac{\partial(t^*+m\tilde{t}^*)}{\partial\ln T_{-1}}}_{\text{XXX}}\right]}_{\text{study amplification}}. \tag{27}$$

The third term is positive given that $\frac{\partial(t^*+m\tilde{t}^*)}{\partial w} \leqslant 0$, see appendix equation (38). The third term act through marriage/household-reallocation.

The comparative statics of human capital with respect to parental investment is similar because both T and I affect the next generation through marginal productivity of studying, $\hat{A}$.

$$\frac{d\ln h}{d\ln I_{-1}} = \underbrace{\tilde{\theta}}_{\text{direct effect}} + \underbrace{\frac{\delta\hat{A}}{s\,|\mathcal{V}_{ss}|}\left[\underbrace{\frac{\partial\ln\hat{A}}{\partial\ln I_{-1}}\mathcal{U}_w}_{\text{Productivity effect}} + \underbrace{\frac{\partial\mathcal{U}_w}{\partial\ln I_{-1}}}_{\text{Time endowment effect}}\right]}_{\text{Human capital amplification}}. \tag{28}$$

Proven in Appendix Section E.5

$$\frac{d\ln h}{d\ln E_{-1}} = -\frac{\delta\hat{A}}{2s|\mathcal{V}_{ss}|}\frac{\partial(t^*+m\tilde{t}^*)}{\partial\ln E_{-1}}. \tag{29}$$

5.5 Connecting Thoery to Our Empirical Setting

The first generation directly exposed to the 1971 reform is affected in adulthood, once marital sorting has occurred and human capital has already been determined.

$$\max_{t,\, i,\, T,\, I} \delta\Big[\eta\, v((1-\tau)w, t, i+y) + \tilde{\eta}\, v(\tilde{w}, T-t, I-i-y) + \Gamma(E_{-1})E\Big] + \beta\, V(T, I, E)$$

given that $E = e(t, T-t)$.

Comparative statics of (T, I, E) with respect to τ

$$\varepsilon_{T,1-\tau} = \frac{\theta\varepsilon_{s,\hat{A}} - \varepsilon_{s,E_{-1}}\varepsilon_{E,w}}{\varepsilon_{s,\hat{A}} - (1-s)} - 1. \tag{30}$$

$$\varepsilon_{I,1-\tau} = \frac{\theta\varepsilon_{s,\hat{A}} - \varepsilon_{s,E_{-1}}\varepsilon_{E,w}}{\varepsilon_{s,\hat{A}} - (1-s)}. \tag{31}$$

The first two together imply

$$\varepsilon_{\hat{A},1-\tau} = \theta\varepsilon_{T,w} + (1-\theta)\varepsilon_{I,w} = \frac{\theta(1-s^*) - \varepsilon_{s,E_{-1}}\varepsilon_{E,w}}{\varepsilon_{s,\hat{A}} - (1-s^*)}.$$

6 Empirical Results

6.1 Long-Run Effects on Individual and Household Income

Figure 6 summarizes the first-stage and instrumental variables estimates for children's lifetime income by age at exposure. Panels (a) and (b) show the first-stage coefficients for sons and daughters respectively. In both cases, the reform increased maternal labor supply throughout childhood: the first stage is smaller at the very youngest ages, rises through early childhood, peaks around school entry, and then declines somewhat at older ages. The similarity across panels is important, as it implies that any gender differences in long-run income effects cannot be attributed to weaker first stages for daughters.

Panels (c) and (d) show the corresponding instrumental-variables estimates of the effects on lifetime income, and reveal sharp heterogeneity by both age at exposure and child gender. For sons, Panel (c) shows that the negative effects are concentrated in the preschool years: a one-year earlier exposure to a persistent 10-hour increase in maternal weekly working hours lowers sons' lifetime income by about 4.8 percent on average, while estimates after school entry are close to zero. For daughters, Panel (d) tells a strikingly different story: preschool-age coefficients are centered near zero, and while estimates become somewhat more negative at older ages, they remain smaller in magnitude and less precisely estimated than the preschool effects for sons.

Panels (e) and (f) examine the distributional effects for preschool-exposed sons. Panel (e) uses the cumulative distribution function and shows that the largest negative effects appear around

thresholds in the middle of the income distribution, meaning that exposed sons are less likely to attain earnings near or slightly above the median. The effects are considerably smaller in the upper tail, providing little evidence that maternal employment reduced the probability of reaching very high earnings. Panel (f) confirms this pattern using the probability density function: probability mass shifts away from middle-income levels and toward somewhat lower earnings. The negative average effect for preschool sons thus operates mainly through a movement from average to below-average lifetime income, rather than through a sharp increase in very low earnings or a reduction in the chances of reaching the top of the distribution.

Figure 7 shows that the effect on individual lifetime income does not translate one-to-one into household income, because exposure also affects the earnings of spouses. For sons exposed during preschool ages, the negative effect on own lifetime income of about 4.8 percent is partially attenuated at the household level: their wives earn about 2.5 percent more, leaving total household income down roughly 3.5 percent. For daughters, the pattern reflects the mirror image. Despite essentially no change in their own income, their husbands earn about 3.2 percent less, leading household income to fall by about 1.5 percent. For sons exposed at primary school age, there is no effect on their own or their spouses income, while daughters experience declines in both own and spousal earnings. The patterns of effects on spousal earnings anticipates the reallocation of childcare we document below.

6.2 Heterogeneity by Quality of Childcare

To understand the mechanisms behind our main results, we examine how the effects on children vary with the quality of care that substitutes for maternal time. Table 2 reports the results.

We first ask whether the effects reflect a particular cost of mothers entering the labor market, or a more general effect of any increase in maternal hours. Column (1) shows that the negative effect of an additional maternal work hour is similar regardless of whether the mother was employed prior to the reform, suggesting that what matters is the reallocation of maternal time rather than anything specific to the transition into work itself.

Next, we use maternal education as a proxy for the quality of home care foregone. Column (2) shows that the negative effects are substantially larger for children of more educated mothers—roughly three times as large—consistent with higher-educated mothers providing higher-quality home care prior to the reform.

We then turn to the quality of available childcare alternatives. Since we do not observe which type of care working mothers used, we proxy for availability using two sources of variation. First, we measure access to formal and informal childcare using the share of preschool teachers and childcare workers per preschool-age child across municipalities in 1970. Formal preschool was rare at the time, covering just 6 percent of preschool-age children in 1966 (SOU, 1967), while private family childcare was more common—covering 31 percent of children compared to 5 percent in municipal family childcare (SOU, 1967). Second, we measure grandparent availability as an alternative care source, defined as having at least one grandparent residing in the same municipality

and either not employed in 1970 or working at least part time (25 hours or more) in childcare. We then split children by whether grandparents are accessible, and separately by whether they live in a municipality with above- or below-median availability of formal and informal childcare.

The results point to meaningful differences in care quality across these alternatives. Children with access to grandparents experience smaller and statistically insignificant negative effects, suggesting that grandparent care is of higher quality than the formal and informal options available at the time. Among children without nearby grandparents, the negative effects are substantially larger in municipalities with greater availability of formal and informal childcare—a counterintuitive pattern that suggests these alternatives were of relatively low quality, particularly compared to care provided by parents or grandparents.

6.3 Human Capital: Skills and Education

Figure 8 quantifies the role of human capital in mediating the long-run effects on income. We begin with the effects on skills and educational attainment.

Panel (a) reports effects on cognitive and non-cognitive skills, measured for all men at age 18 through military enlistment testing. The pattern is broadly negative across both dimensions. On the cognitive side, inductive reasoning, spatial ability, and technical understanding all decline, while the effect on verbal comprehension is positive but imprecisely estimated. The non-cognitive effects are larger in magnitude, with particularly pronounced declines in intensity and social maturity (extroversion), and a smaller decline in psychological energy (perseverance). The effects of increased maternal labor supply on sons' skills are thus broad-based, but most pronounced on the non-cognitive side.

Panel (b) turns to post-compulsory educational attainment, and reveals that the educational effects are both gender-specific and age-specific. For boys, the clearest effects emerge at preschool ages—a reduction of approximately one percentage point in post-compulsory enrollment—while exposure at primary school ages has little discernible effect. For girls, the pattern is reversed: preschool exposure has little effect, while the negative effect on educational attainment appears at primary school ages. This gender-age interaction echoes the broader heterogeneity documented elsewhere in our results, and suggests that the timing of maternal labor supply matters in ways that differ systematically between sons and daughters.

To quantify the role of human capital in mediating these income effects, we run Mincerian regressions of lifetime income on cognitive, non-cognitive, and physical skills, as well as education level, field of study, and grades. This allows us to decompose the total income effect into components explained by each dimension of human capital. Since skill measures derive from military enlistment testing, this full decomposition is available for sons only; for daughters we rely on educational outcomes alone.

Panels (c)–(e) report the decomposition for sons. The effect of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours is a lifetime income loss is approximately 4.5 log points. Panel (c) shows that skill losses alone account for about one-third of this decline,

with cognitive, non-cognitive, and physical skills each contributing, though the physical component is less precisely estimated. Panel (d) shows that educational outcomes account for roughly one-half, with the largest contribution from education field, followed by education level, and a smaller contribution from grades. When skills and education are included jointly in Panel (e), the predicted loss rises to about 3.1 log points—roughly two-thirds of the total—with education field, non-cognitive skills, and education level as the largest contributors. Notably, cognitive skills add almost nothing once education is controlled for, suggesting that the cognitive channel operates largely through its effect on educational attainment and field choice rather than directly on earnings.

Panel (f) turns to daughters, where the picture is strikingly different. The total lifetime income effect is essentially zero, yet the education-based predicted effect remains negative at around 1.0 log point, with education level, field, and grades all contributing negatively. Daughters thus experience measurable human-capital losses, but these do not translate into comparable earnings losses, pointing to other forces that offset the human-capital channel for women. We will shed more light on those forces below.

6.4 Family Formation and the Allocation of Childcare

Table 1 reports the effects on adult partnering and fertility. We define a spouse as the individual's first partner observed between ages 30 and 50, measured either as marriage of cohabitation with a child. The estimates show no statistically or economically significant effects on the probability of having a spouse, spouse age, the probability of having any child, or completed fertility. The two margins that do move are partner sorting and timing. Exposed daughters are 2.0 percentage points (2.2 percent) less likely to have a spouse with post-compulsory education, consistent with the decline in their own educational attainment and with the idea that education shapes partner matching. Exposed sons, in turn, have their first child about 0.4 years earlier—roughly five months sooner—which is consistent with a shorter education and earlier transition into adult family life.

Figure 9 turns to the division of childcare in the next generation, measuring parental leave take-up across total days per child (Panel a), the intensive margin (Panel b, days conditional on taking any leave), and the extensive margin (Panel c, probability of taking any leave). Exposed sons take about 3.9 additional days of parental leave per child, or 6.1 percent relative to the sample mean of 64 days. This increase is driven mainly by the intensive margin: conditional on taking leave, they spend about four more days on leave. Their wives move in the opposite direction, taking about 5.0 fewer leave days per child in total, or 2.2 percent relative to the mean of 232 days, largely because conditional leave falls by roughly 10 days. The pattern reverses for daughters. Exposed daughters take about 4.2 fewer leave days per child, or 2.2 percent relative to the mean of 194 days, and are around 2 percentage points less likely to take any leave. Their husbands are also somewhat less likely to take leave, but, conditional on taking leave, they spend about 6 more days on leave, yielding a net increase of about 3.6 leave days per child, or 7.5 percent relative to the sample mean of 48 days.

Overall, these estimates point to a more gender-equal allocation of childcare in the next generation. Exposure to maternal employment raises paternal leave-taking among sons and among the husbands of daughters, while reducing maternal leave-taking among sons' wives and among daughters themselves. Combined with the absence of effects on completed fertility, this results suggests that the main legacy of the reform for family life is a reallocation of childcare within the household rather than any change in family size.

6.5 Transmission to the Third Generation

Figure 10 provides suggestive evidence that the consequences of maternal labor supply persist into the third generation, i.e., grandchildren. Since this generation is still young and has not yet completed education or entered the labor market, we study school performance, measured using results from national exams taken at the end of compulsory schooling. All Swedish students complete these exams in the spring term of 9th grade, at age 16. These exams are high-stakes: GPA determines eligibility for oversubscribed secondary programs and ultimately affects college admission (Ramstedt, 2005).

Children of the generation that was exposed to maternal labor supply during preschool ages performed worse in school. The negative effects appear for the children of both affected sons and affected daughters, but they are larger through sons: the standardized score falls by about 0.045 standard deviations and the probability of obtaining a passing grade (E or higher) declines by 1.5 percentage points for children of affected sons, compared with 0.018 standard deviations and 1.1 percentage points for children of affected daughters. By contrast, when exposure in the first generation begins only at primary school age, the estimates are small and slightly positive. The adverse effects of maternal employment under childcare scarcity thus extend beyond the directly exposed cohort, propagating into the third generation primarily through the preschool exposure channel and most strongly through the paternal line.

The weaker school performance of grandchildren is naturally related to the lower human capital of the parent generation. Exposure to maternal employment reduces the education and skills of sons and daughters who later become parents, likely lowering both the quality of the cognitive and non-cognitive inputs they provide to their own children and the material resources available in the home. This mechanism also connects our findings to the literature on intergenerational returns to schooling: Oreopoulos et al. (2006) show that additional parental schooling reduces grade repetition and dropout among children, Currie and Moretti (2003) find that higher maternal education improves parental behavior, Carneiro et al. (2013) show that maternal education improves children's cognitive achievement partly through the home environment, and Lundborg et al. (2014) find positive effects of maternal education on sons' skills in Sweden.

Since schooling also has well-documented labor-market returns (Heckman et al., 2006) and family resources can themselves improve children's outcomes (Page, 2024), lower human capital is likely to reduce both investments and household resources available to the third generation. This interpretation is reinforced by the fact that affected households have lower total income even

though parental leave is reallocated in a more gender-equal way, suggesting that the gains from a more equal division of childcare do not fully offset the losses in parental human capital and family resources. Because the broader evidence on causal intergenerational effects of parental schooling is mixed, however, our results are best interpreted as consistent with—rather than a direct estimate of—this transmission mechanism (Holmlund et al., 2011).

7 Conclusion

This paper studies the long-run consequences of a large and permanent increase in maternal labor supply for children and the next generation's households. In Sweden in the early 1970s, the move to individual taxation substantially raised mothers' labor supply at a time when public childcare was scarce. Our estimates show that the effects on children are large, persistent, and highly heterogeneous: the main costs were borne by sons exposed during the preschool years, who experienced lower lifetime earnings, weaker cognitive and non-cognitive skills, and reduced educational attainment. These losses were attenuated when grandparents were available as an alternative source of care, and larger in municipalities with greater availability of formal and informal childcare—a pattern consistent with the quality of substitute care being low relative to care provided by parents or grandparents. At the same time, exposure to maternal employment shifted the within-household division of childcare toward greater gender equality in the next generation, raising paternal leave-taking among sons and the husbands of daughters.

The central lesson is that the child welfare consequences of policies that raise maternal employment depend critically on the care environment that replaces maternal time. When high-quality substitute care is unavailable, expansions in maternal employment can generate persistent losses in child human capital that offset or outweigh the household income and gender-equality gains. This finding speaks directly to a broader and ongoing policy debate. Boneva et al. (2025) document that individuals perceive childcare availability and quality as among the most important determinants of maternal labor supply decisions, and that labor supply intentions respond strongly to hypothetical improvements in childcare access. Our results provide the other side of that equation: the returns to maternal employment for children are themselves contingent on childcare quality, so that expansions in female labor supply and investments in high-quality childcare are complements rather than substitutes from a child welfare perspective.

Several important questions remain open and cannot be resolved with the present data. Because we do not observe the exact childcare arrangement that replaced maternal time, nor the quality of those arrangements, we cannot fully separate the roles of formal care, private home-based care, grandparental care, and changes in fathers' caregiving. This gap is especially important in light of recent evidence that grandparents materially shape the multigenerational incidence of childcare policy (Karademir et al., 2026), that childcare quality matters for both take-up and mothers' labor-market responses (Cobb-Clark et al., 2025), and that beliefs about post-birth work and childcare can diverge systematically from realized paths (Caplin et al., 2025). We also observe

the third generation only early in life, so we can study school performance but not yet adult education, earnings, health, or family formation. Future work should therefore link labor-supply reforms to direct measures of childcare use, parental time investments, beliefs, and work schedules, and should test whether father-targeted leave reforms and other norm-shifting policies can offset the human-capital losses documented here, as suggested by recent evidence on earmarked paternal leave and cultural change (Albrecht et al., 2024).

References

Albagli, P. and Rau, T. (2019). The effects of a maternity leave reform on children's abilities and maternal outcomes in chile. *The Economic Journal*, 129(619):1015–1047.

Albanesi, S., Olivetti, C., and Petrongolo, B. (2023). Families, labor markets, and policy. In *Handbook of the Economics of the Family*, volume 1, chapter 5, pages 255–326. North-Holland, Amsterdam.

Albrecht, J., Edin, P.-A., Fernández, R., Lee, J., Thoursie, P., and Vroman, S. (2024). Parental leave: Economic incentives and cultural change. NBER Working Paper 32839, National Bureau of Economic Research.

Baker, M., Gruber, J., and Milligan, K. (2008). Universal child care, maternal labor supply, and family well-being. *Journal of Political Economy*, 116(4):709–745.

Baker, M., Gruber, J., and Milligan, K. (2019). The long-run impacts of a universal child care program. *American Economic Journal: Economic Policy*, 11(3):1–26.

Baker, M. and Milligan, K. (2015). Maternity leave and children's cognitive and behavioral development. *Journal of Population Economics*, 28(2):373–391.

Baker, M. and Milligan, K. S. (2010). Evidence from maternity leave expansions of the impact of maternal care on early child development. *Journal of Human Resources*, 45(1):1–32.

Baum, C. L. (2004). The long-term effects of early and recent maternal employment on a child's academic achievement. *Journal of Family Issues*, 25(1):29–60.

Berger, L. M., Hill, J., and Waldfogel, J. (2005). Maternity leave, early maternal employment and child health and development in the us. *The Economic Journal*, 115(501):F29–F47.

Bernal, R. (2008). The effect of maternal employment and child care on children's cognitive development. *International Economic Review*, 49(4):1173–1209.

Bernal, R. and Keane, M. P. (2011). Child care choices and children's cognitive achievement: The case of single mothers. *Journal of Labor Economics*, 29(3):459–512.

Bettinger, E., Hægeland, T., and Rege, M. (2014). Home with mom: The effects of stay-at-home parents on children's long-run educational outcomes. *Journal of Labor Economics*, 32(3):443–467.

Black, S. E., Devereux, P. J., Løken, K. V., and Salvanes, K. G. (2014). Care or cash? the effect of child

care subsidies on student performance. *The Review of Economics and Statistics*, 96(5):824–837.

Boneva, T., Golin, M., Kaufmann, K., and Rauh, C. (2025). Beliefs about maternal labour supply. *The Economic Journal*, 136(674):373–401.

Bütikofer, A. (2013). Revisiting 'Mothers and Sons': Preference formation and the female labor force in Switzerland. *Labour Economics*, 20:82–91.

Canaan, S. (2022). Parental leave, household specialization and children's well-being. *Labour Economics*, 75:102127.

Caplin, A., Leth-Petersen, S., and Tonetti, C. (2025). Beliefs and realities of work and childcare after childbirth. NBER Working Paper 34289, National Bureau of Economic Research.

Carneiro, P., Meghir, C., and Parey, M. (2013). Maternal education, home environments, and the development of children and adolescents. *Journal of the European Economic Association*, 11(S1):123–160.

Chetty, R. (2012a). Bounds on elasticities with optimization frictions: A synthesis of micro and macro evidence on labor supply. *Econometrica*, 80(3):969–1018.

Chetty, R. (2012b). Bounds on elasticities with optimization frictions: A synthesis of micro and macro evidence on labor supply. *Econometrica*, 80(3):969–1018.

Cobb-Clark, D. A., Dang, T., and Fisher, H. (2025). Daycare accessibility and maternal labor market outcomes: Do quality ratings matter? IZA Discussion Paper 18300, IZA Institute of Labor Economics.

Cornelissen, T., Dustmann, C., Raute, A., and Schönberg, U. (2018). Who benefits from universal child care? estimating marginal returns to early child care attendance. *Journal of Political Economy*, 126(6):2356–2409.

Crossley, T. F. and Jeon, S.-H. (2007). Joint taxation and the labour supply of married women: Evidence from the canadian tax reform of 1988. *Fiscal Studies*, 28(3):343–365.

Currie, J. and Moretti, E. (2003). Mother's education and the intergenerational transmission of human capital: Evidence from college openings. *The Quarterly Journal of Economics*, 118(4):1495–1532.

Dahl, G. B., Løken, K. V., Mogstad, M., and Salvanes, K. V. (2016). What is the case for paid maternity leave? *Review of Economics and Statistics*, 98(4):655–670.

Danzer, N., Halla, M., Schneeweis, N., and Zweimüller, M. (2022a). Parental leave, (in)formal childcare, and long-term child outcomes. *Journal of Human Resources*, 57(6):1826–1884.

Danzer, N., Halla, M., Schneeweis, N., and Zweimüller, M. (2022b). Parental leave, (in)formal childcare, and long-term child outcomes. *Journal of Human Resources*, 57(6):1826–1884.

Danzer, N. and Lavy, V. (2018). Paid parental leave and children's schooling outcomes. *The Eco-*

nomic Journal, 128(608):81–117.

Datta Gupta, N. and Simonsen, M. (2016). Academic performance and type of early childhood care. *Economics of Education Review*, 53:217–229.

Drange, N. and Havnes, T. (2019). Early childcare and cognitive development: Evidence from an assignment lottery. *Journal of Labor Economics*, 37(2):581–620.

Dustmann, C. and Schönberg, U. (2012). Expansions in maternity leave coverage and children's long-term outcomes. *American Economic Journal: Applied Economics*, 4(3):190–224.

Eissa, N. and Hoynes, H. W. (2004). Taxes and the labor market participation of married couples: The earned income tax credit. *Journal of Public Economics*, 88(9–10):1931–1958.

Eissa, N. and Liebman, J. B. (1996). Labor supply response to the earned income tax credit. *Quarterly Journal of Economics*, 111(2):605–637.

Elvander, N. (1972). *Svensk skattepolitik 1945–1970: En studie i partiers och organisationers funktioner*. Rabén & Sjögren, Stockholm.

Ermisch, J. and Francesconi, M. (2013). The effect of parental employment on child schooling. *Journal of Applied Econometrics*, 28(5):796–822.

Felfe, C. and Lalive, R. (2018). Does early child care affect children's development? *Journal of Public Economics*, 159:33–53.

Felfe, C., Nollenberger, N., and Rodríguez-Planas, N. (2015). Can't buy mommy's love? universal childcare and children's long-term cognitive development. *Journal of Population Economics*, 28(2):393–422.

Fernández, R., Fogli, A., and Olivetti, C. (2004). Mothers and sons: Preference formation and female labor force dynamics. *Quarterly Journal of Economics*, 119(4):1249–1299.

Fernández, R. (2013). Cultural change as learning: The evolution of female labor force participation over a century. *American Economic Review*, 103(1):472–500.

Fogli, A. and Veldkamp, L. (2011). Nature or nurture? learning and the geography of female labor force participation. *Econometrica*, 79(4):1103–1138.

Fort, M., Ichino, A., and Zanella, G. (2020). Cognitive and noncognitive costs of day care at age 0–2 for children in advantaged families. *Journal of Political Economy*, 128(1):158–205.

Fox, L., Han, W.-J., Ruhm, C., and Waldfogel, J. (2013). Time for children: Trends in the employment patterns of parents, 1967–2009. *Demography*, 50(1):25–49.

Galassi, G., Koll, D., and Mayr, L. (2024). The intergenerational correlation of employment: Mothers as role models? *Labour Economics*, 90:102596.

Ginja, R., Jans, J., and Karimi, A. (2020). Parental leave benefits, household labor supply, and children's long-run outcomes. *Journal of Labor Economics*, 38(1):261–320.

Gromada, A. and Richardson, D. (2021). Where do rich countries stand on childcare? Technical report, UNICEF Office of Research – Innocenti, Florence.

Gruber, J. and Saez, E. (2002a). The elasticity of taxable income: Evidence and implications. *Journal of Public Economics*, 84(1):1–32.

Gruber, J. and Saez, E. (2002b). The elasticity of taxable income: evidence and implications. *Journal of public Economics*, 84(1):1–32.

Gustafsson, S. and Lantz, P. (1985). *Arbete och löner: Ekonomiska teorier och fakta kring skillnader mellan kvinnor och män*. Industriens Utredningsinstitut och Arbetslivscentrum, Stockholm.

Havnes, T. and Mogstad, M. (2011). No child left behind: Subsidized child care and children's long-run outcomes. *American Economic Journal: Economic Policy*, 3(2):97–129.

Havnes, T. and Mogstad, M. (2015). Is universal child care leveling the playing field? *Journal of Public Economics*, 127:100–114.

Heckman, J. J., Lochner, L. J., and Todd, P. E. (2006). Earnings functions, rates of return and treatment effects: The Mincer equation and beyond. In Hanushek, E. A. and Welch, F., editors, *Handbook of the Economics of Education*, volume 1, chapter 7, pages 307–458. Elsevier.

Heisig, K. and Zierow, L. (2025). Paid parental leave and long-term outcomes of children—quasi-experimental evidence from former east germany. *Labour Economics*, 96:102740.

Herbst, C. M. (2017). Universal child care, maternal employment, and children's long-run outcomes: Evidence from the U.S. lanham act of 1940. *Journal of Labor Economics*, 35(2):519–564.

Holmlund, H., Lindahl, M., and Plug, E. (2011). The causal effect of parents' schooling on children's schooling: A comparison of estimation methods. *Journal of Economic Literature*, 49(3):615–651.

Houmark, M. A., Jørgensen, C. M. L., Kristiansen, I. L., and Gensowski, M. (2024). Effects of extending paid parental leave on children's socio-emotional skills and well-being in adolescence. *European Economic Review*, 170:104880.

Huber, K. (2019). Changes in parental leave and young children's non-cognitive skills. *Review of Economics of the Household*, 17(1):89–119.

Huebener, M., Kuehnle, D., and Spiess, C. K. (2019). Parental leave policies and socio-economic gaps in child development: Evidence from a substantial benefit reform using administrative data. *Labour Economics*, 61:101754.

James-Burdumy, S. (2005). The effect of maternal labor force participation on child development. *Journal of Labor Economics*, 23(1):177–211.

Kalíšková, K. (2014). Labor supply consequences of family taxation: Evidence from the czech republic. *Labour Economics*, 30:234–244.

Karademir, S., Laliberté, J.-W., and Staubli, S. (2026). The multigenerational impact of children and childcare policies. *Journal of Labor Economics*, 44(1):189–227.

Kleven, H. (2024). The EITC and the extensive margin: A reappraisal. *Journal of Public Economics*, 236:105135.

Kline, P. and Walters, C. R. (2016). Evaluating public programs with close substitutes: The case of head start. *The Quarterly Journal of Economics*, 131(4):1795–1848.

LaLumia, S. (2008). The effects of joint taxation of married couples on labor supply and non-wage income. *Journal of Public Economics*, 92(7):1698–1719.

Lindbeck, A. (2001). Changing tides for the welfare state: An essay. Seminar Paper 694, Institute for International Economic Studies, Stockholm University.

Liu, Q. and Nordström Skans, O. (2010). The duration of paid parental leave and children's scholastic performance. *The B.E. Journal of Economic Analysis & Policy*, 10(1):1–35.

Lo Bue, M. C., Perova, E., Reynolds, S., et al. (2023). Maternal work and children's development. examining 20 years of evidence. *World Bank Policy Research Working Paper*, 10305:1–25.

Løken, K. V., Lommerud, K. E., and Reiso, K. H. (2018). Single mothers and their children: Evaluating a work-encouraging welfare reform. *Journal of Public Economics*, 167:1–20.

Lundborg, P., Nilsson, A., and Rooth, D.-O. (2014). Parental education and offspring outcomes: Evidence from the Swedish compulsory school reform. *American Economic Journal: Applied Economics*, 6(1):253–278.

Meyer, B. D. and Rosenbaum, D. T. (2001). Welfare, the earned income tax credit, and the labor supply of single mothers. *Quarterly Journal of Economics*, 116(3):1063–1114.

Mood, C., Jonsson, J. O., and Bihagen, E. (2012). Socioeconomic persistence across generations: The role of cognitive and noncognitive processes. In Ermisch, J., Jäntti, M., and Smeeding, T. M., editors, *From Parents to Children: The Intergenerational Transmission of Advantage*, pages 53–84. Russell Sage Foundation, New York.

Mosca, I., O'Sullivan, V., and Wright, R. E. (2021). The educational attainment of the children of stay-at-home mothers: Evidence from the Irish Marriage Bar. *Oxford Economic Papers*, 73(2):534–560.

Nekoei, A. and Sinn, F. (2021). Social inclusion: Definition and measurement. Ssrn research paper series, Stockholm University, Institute for International Economic Studies. July 26, 2021.

Nicoletti, C., Salvanes, K. G., and Tominey, E. (2023). Mothers working during preschool years and child skills: Does income compensate? *Journal of Labor Economics*, 41(2):389–429.

Nyberg, A. (2017). The impact of individual taxation on gender equality in Sweden. Discussion paper, European Commission, EU Mutual Learning Programme in Gender Equality. Peer Review on "The Impact of Various Tax Systems on Gender Equality", Stockholm, 13–14 June 2017.

Olivetti, C., Patacchini, E., and Zenou, Y. (2020). Mothers, peers, and gender-role identity. *Journal of the European Economic Association*, 18(1):266–301.

Oreopoulos, P., Page, M. E., and Stevens, A. H. (2006). The intergenerational effects of compulsory schooling. *Journal of Labor Economics*, 24(4):729–760.

Page, M. E. (2024). New advances on an old question: Does money matter for children's outcomes? *Journal of Economic Literature*, 62(3):891–947.

Peter, F. (2016). The effect of involuntary maternal job loss on children's behaviour and non-cognitive skills. *Labour Economics*, 42:43–63.

Ramstedt, K. (2005). National assessment and grading in the Swedish school system. Technical report, The Swedish National Agency for Education, Stockholm.

Rasmussen, A. W. (2010). Increasing the length of parents' birth-related leave: The effect on children's long-term educational outcomes. *Labour Economics*, 17(1):91–100.

Rossin, M. (2011). The effects of maternity leave on children's birth and infant health outcomes in the united states. *Journal of Health Economics*, 30(2):221–239.

Selin, H. (2014). The rise in female employment and the role of tax incentives: An empirical analysis of the Swedish individual tax reform of 1971. *International Tax and Public Finance*, 21(5):894–922.

SOU (1967). Samhällets barntillsyn: Barnstugor och familjedaghem. Technical Report 1967:39, Statens Offentliga Utredningar, Stockholm.

SOU (1972). Förskolan: Betänkande avgivet av barnstugeutredningen. Technical Report 1972:27, Statens Offentliga Utredningar, Stockholm.

Statistics Sweden (1990). Folk- och bostadsräkningar.

Statistics Sweden (2017a). Multi-generation register 2016.

Statistics Sweden (2017b). Registret över befolkningens utbildning 1985–2017 (UREG, the education register).

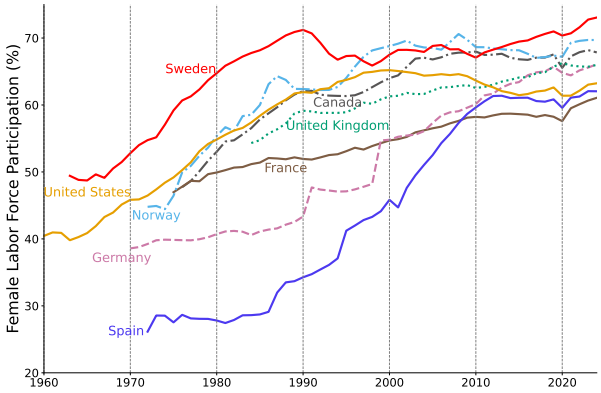
Statistics Sweden (2020). Longitudinell integrationsdatabas för sjukförsäkrings- och arbetsmarknadsstudier (LISA).

Swedish National Archives (2005). Inskrivningsarkivregistret 1969–2005 (INSARK, draft register).

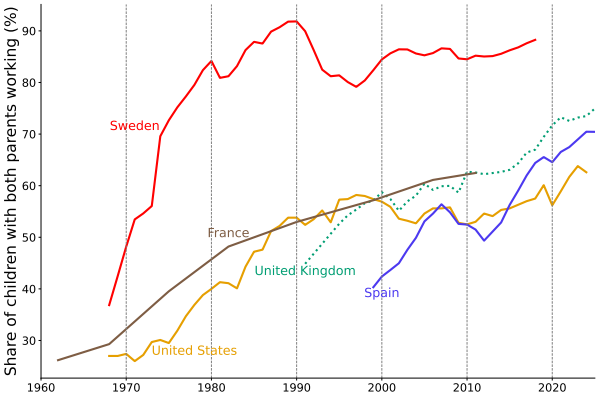
8 Figures and Tables

Figure 1: Labor Force Participation (LFP) of Women, Mothers, and Men 1960-2020

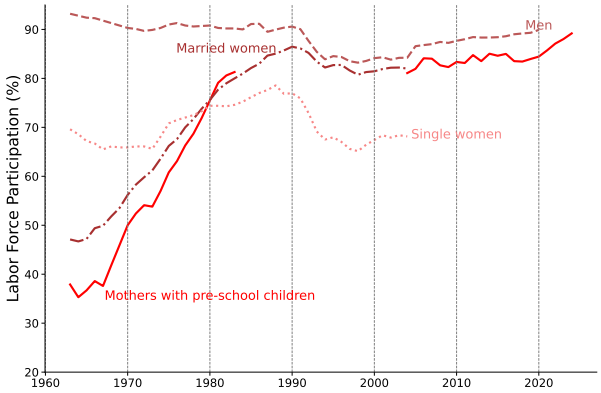
(a) Female LFP by Country



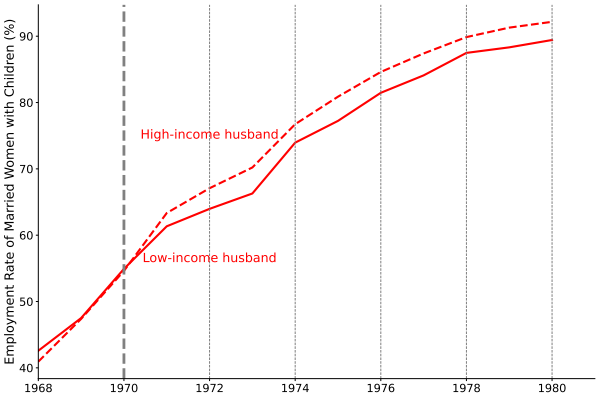
(b) Children with Working Parents by Country



(c) LFP by gender & marital status in Sweden



(d) Emp. of Swedish women by husband's income



Notes: The figure shows long-run trends in labor force participation (LFP) of women and men, and the rising share of children in dual-earner households. **Panel (a)** plots LFP rates of women aged 15–74 across a selection of countries, illustrating a broad upward trend. Data are from the OECD. **Panel (b)** plots the share of children aged 0–6 with both parents employed full- or part-time across countries. The share rises markedly over the period in all countries, reflecting the increase in labor force participation among mothers. For Sweden, data are drawn from the Income and Taxation Register (IoT) and the Multigenerational register. For the United Kingdom, data come from microdata accessed via the UK Data Service, supplemented by IPUMS International. For France and Spain, data are from IPUMS International and the Encuesta de Población Activa (EPA), respectively. For the United States, data are from the IPUMS Current Population Survey (CPS). **Panel (c)** plots LFP by gender and marital status in Sweden, showing a rapid rise in participation among married women—especially mothers—during the late 1960s and 1970s. The series are constructed from three sources: (Gustafsson and Lantz, 1985), Swedish Statistical Yearbooks published by Statistics Sweden (SCB), and population records from SCB. See Appendix A for details. **Panel (d)** plots employment of married women in Sweden around the 1971 tax reform, showing that the rise in employment was faster after the reform among women married to above-median-earning husbands than among those married to below-median-earning husbands. The series are constructed using the Income and Taxation Register (IoT).

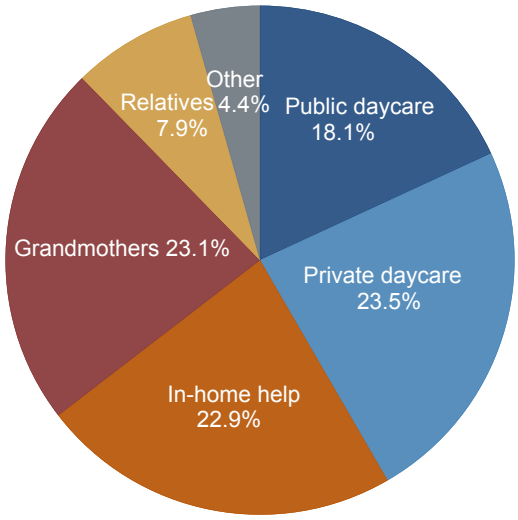
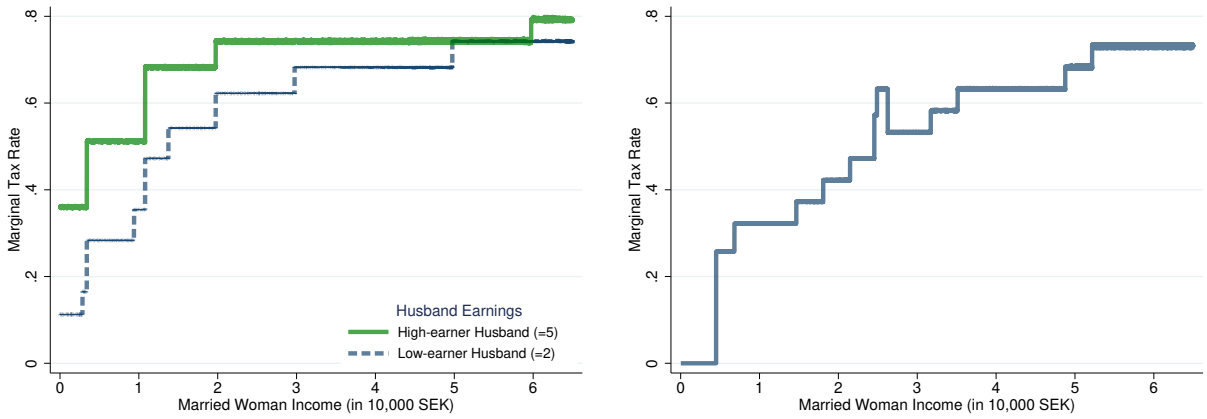


Figure 2: Pre-school Children with Working Parents by Primary Care Provider

Notes: The figure shows the primary care arrangements for pre-school-aged (0–7) children whose parents both worked over 15 hours per week in 1966–the year with the most accurate childcare data around the 1971 reform. *Public childcare* is organized, monitored, and subsidized by municipalities; *Private childcare* is outside municipal oversight or subsidy. *In-home help* refers to nannies or domestic staff in the child's home. *Grandmothers* means care by a grandmother, while *Relatives* covers other family members, including siblings. *Other* includes neighbors, friends, or children left on their own. For further details and survey breakdowns, see Section 2.2 and Appendix C. *Source:* Authors' calculations based on SOU (1967).

Figure 3: Labor Income Tax Schedule of Married Women

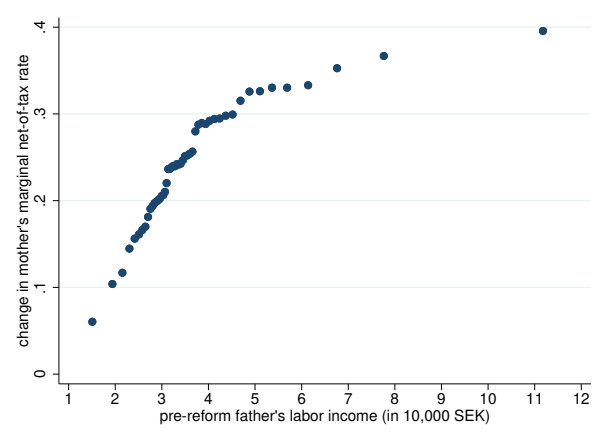
(a) Pre-reform in 1970 (b) Post-refrom in 1975



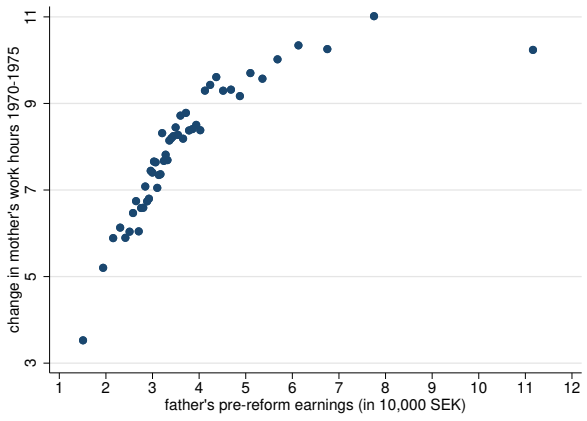
Notes: This figure shows the marginal labor income tax schedules for married women in Sweden before and after the 1971 reform. Under joint taxation in 1970 (**Panel (a)**), married women's marginal tax rate depended on husbands' income. Under individual taxation in 1975 (**Panel (b)**), her tax rate depended only on her own income, lowering the marginal tax rate for almost everyone. Comparing the two panels shows that most (above 99%) of all mothers face a tax reduction due to the reform. Our empirical design leverages the treatment heterogeneity of this reform, i.e., the difference across lines in panel a (see Section 4). Low- and high-earner husbands correspond to P10 and P90. In 1970, median incomes of married women and men were about 4586 and 27505, respectively (5.2 SEK/USD). In 1975, the corresponding figures were 7209 and 29701 (4.1 SEK/USD). All numbers are in SEK of 1970. There have been minor changes in the tax schedule between the 1971 reform and 1975—the year we are able to measure mothers' labor supply.

Figure 4: Reform-induced Tax Incentives and Mothers' Labor Supply

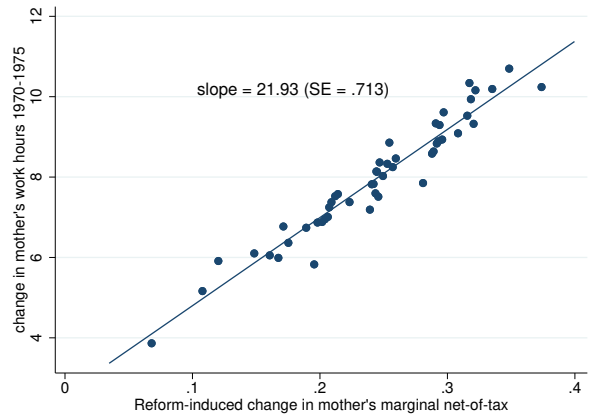
(a) Change in Net-of-Tax Rate



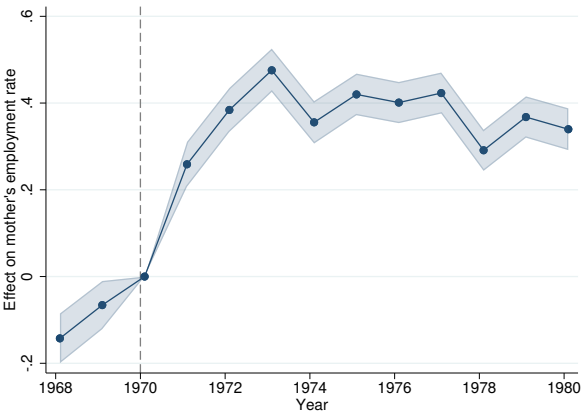
(b) Change in Mothers' Labor Supply



(c) Mothers' Labor Supply Response to Tax Reform

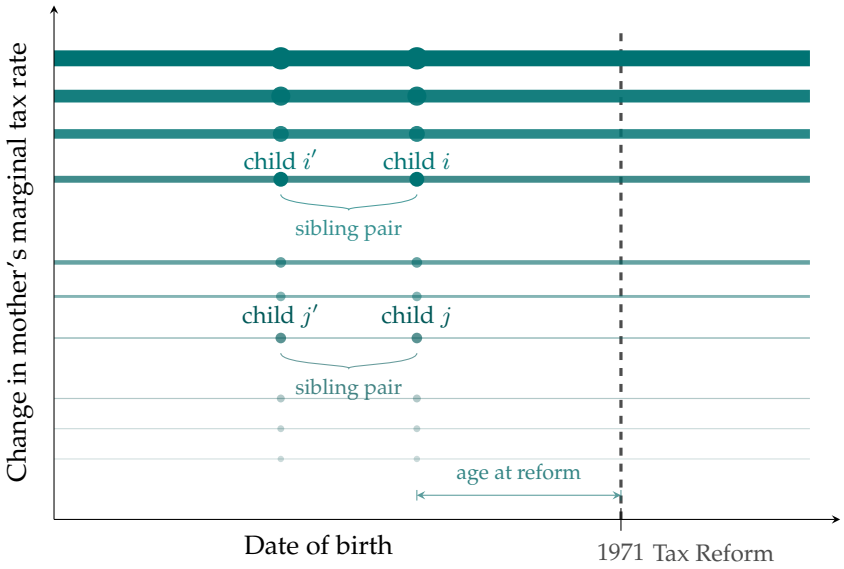


(d) Event Study: Employment Effect of Tax Reform



Notes: This figure documents the labor-supply response of married women to Sweden's transition from joint to individual taxation in 1971. Under the pre-reform system, a married woman's marginal tax rate depended on her husband's earnings as described by Figure 3. **Panel (a)** plots the change in the mother's marginal net-of-tax rate against the father's pre-reform labor income: women married to higher-earning husbands experienced larger gains in the net return to work because the reform removed the secondary-earner tax penalty embedded in joint taxation. The post-reform marginal net-of-tax rate is computed holding labor supply fixed, i.e. by applying the 1975 tax schedule to individuals' pre-reform (1970) labor income. **Panel (b)** plots the change in mothers' weekly working hours between 1970 and 1975 against the father's pre-reform earnings. Maternal labor supply rises with husband's income, mirroring the pattern in Panel (a). **Panel (c)** relates the change in mothers' weekly working hours to the reform-induced change in the marginal net-of-tax rate. **Panel (d)** estimates the effect of a change in marginal tax rate due to the tax reform on employment.

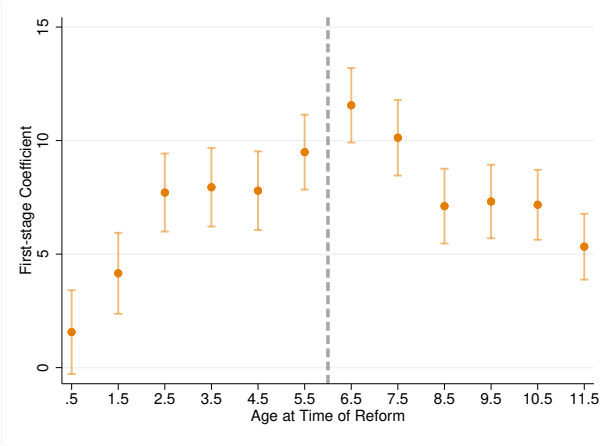
Figure 5: Research Design



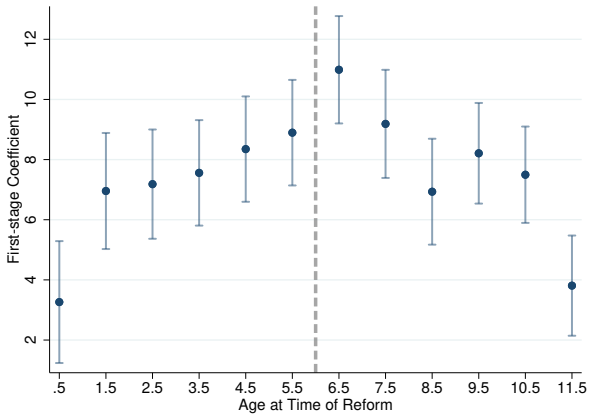
Notes: This figure illustrates how two sources of variation jointly determine our instrumental variable: (i) *between-family variation in treatment intensity* (y-axis): the reform affects mothers' marginal tax rate as a function of husbands' income (see Figure 3); (ii) *within-family variation in age at reform* (x-axis), where a younger sibling is exposed to a working mother over a longer share of childhood.

Figure 6: Effects of Mother's Labor Supply on Next Generation's Lifetime Income

(a) First-stage Coefficients: Sons



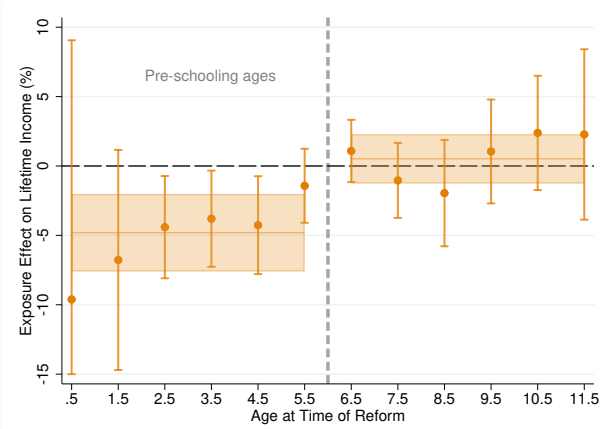
(b) First-stage Coefficients: Daughters



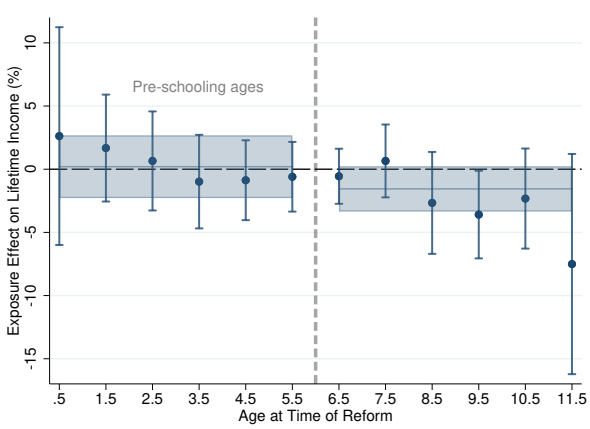
(c) Average Effect on Lifetime Income: Sons

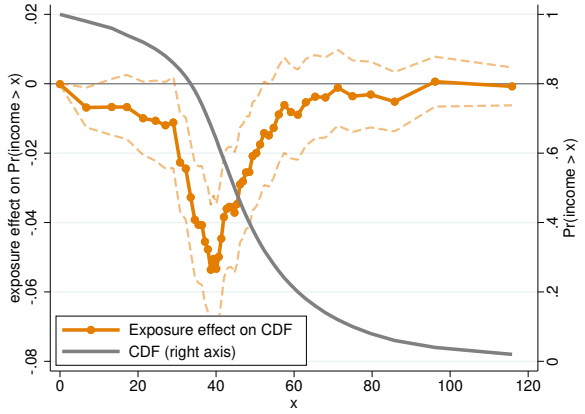
(d) Average Effect on Lifetime Income: Daughters

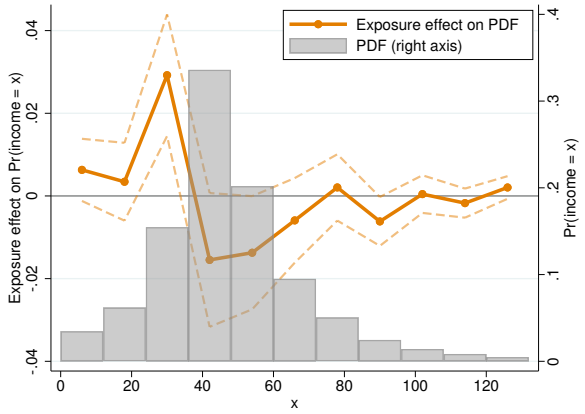
(e) Distributional Effect on Preschool Sons: CDF



(f) Distributional Effect on Preschool Sons: PDF



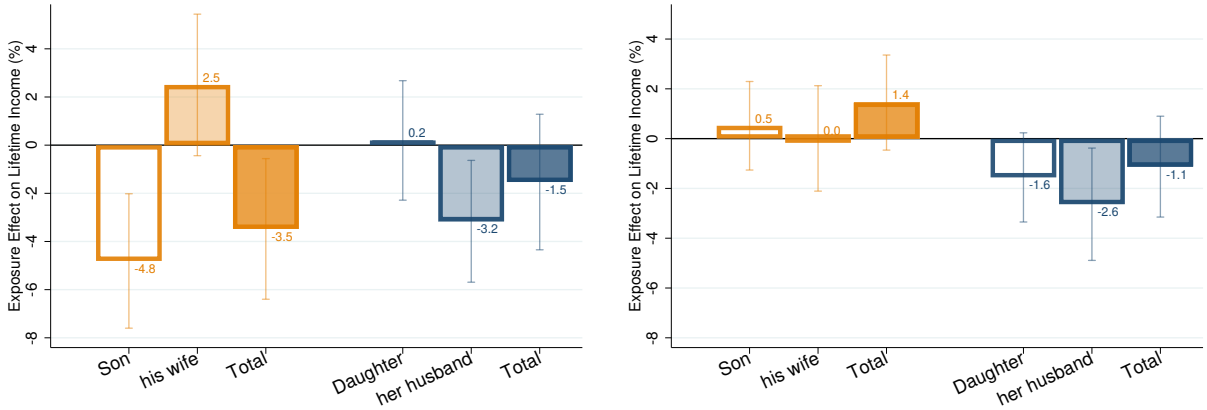




Notes: **Panels (a)-(b)** shows the mothers' labor supply increases by child age (first stage), while other panels present the effect of that increase on children's income: average effect by age and gender in **Panels (c)-(d)** and distributional effect for sons exposed at preschool age in **Panels (e)-(f)**. Panels c-f report the estimated effect of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours (i.e., γ_a defined in equation (8) and estimated using the sibling-difference IV design described in equation (11)). The shaded region reports the average effect separately for pre-school and primary school-aged children. Vertical bars represent 95 percent confidence intervals based on robust standard errors.

Figure 7: Effects of Mother's labor Supply on Next Generation's Individual & Household Income

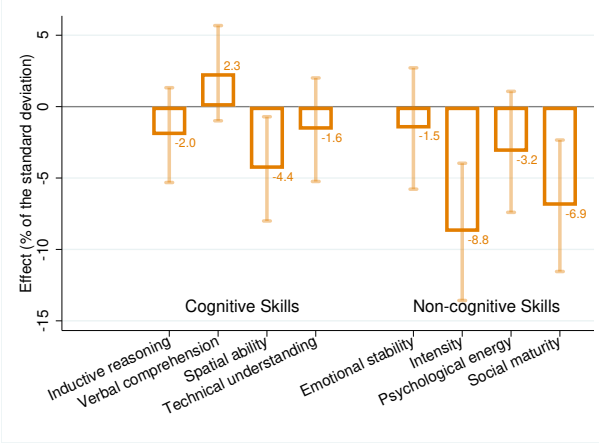
(a) Exposed while in Preschool Age (b) Exposed while in Primary School Age



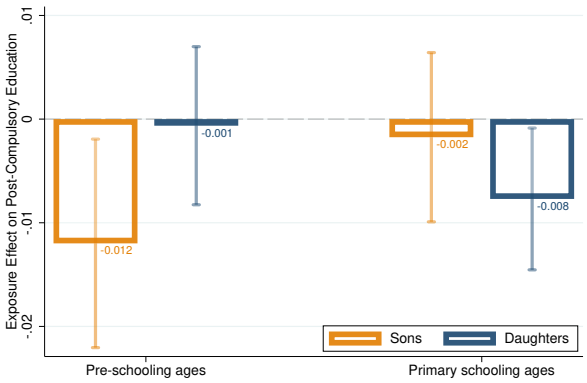
Notes: This figure presents the effect of an increase in mothers' labor supply on income of her children and their spouses. Estimates are separated by children exposed while at preschool age (**panel (a)**) and primary school age (**panel (b)**). Estimates are effects of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours (i.e., γ_a defined in equation (8) and estimated using the sibling-difference IV design described in equation (11)). Vertical bars represent 95 percent confidence intervals based on robust standard errors.

Figure 8: Human Capital: Quantifying the Role of Skills and Education

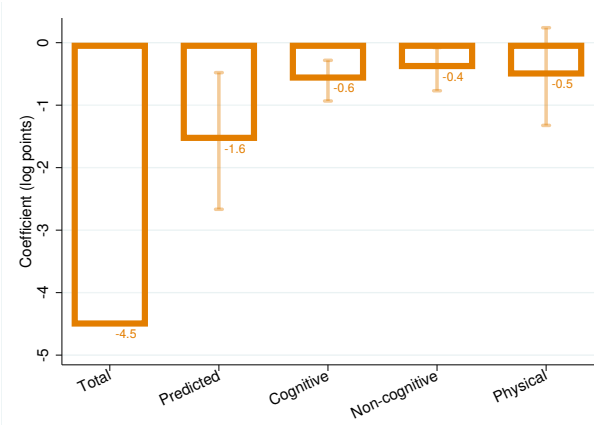
(a) Skills



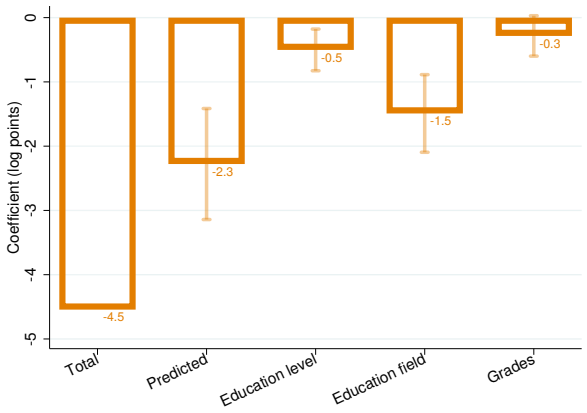
(b) Educational Attainment



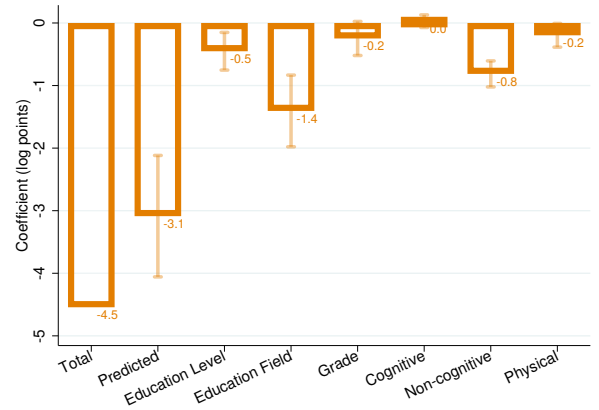
(c) Skill Decomposition: Sons



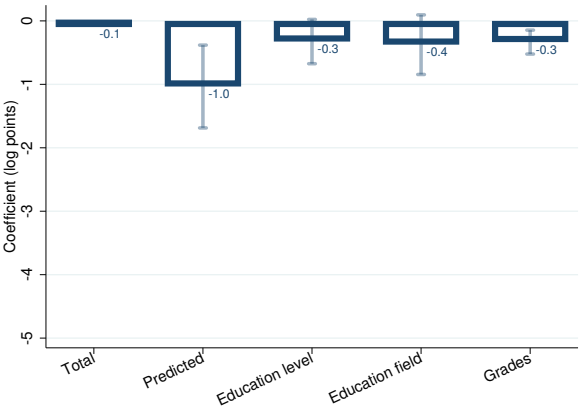
(d) Education Decomposition: Sons



(e) Decomposition for Sons — Education & Skills



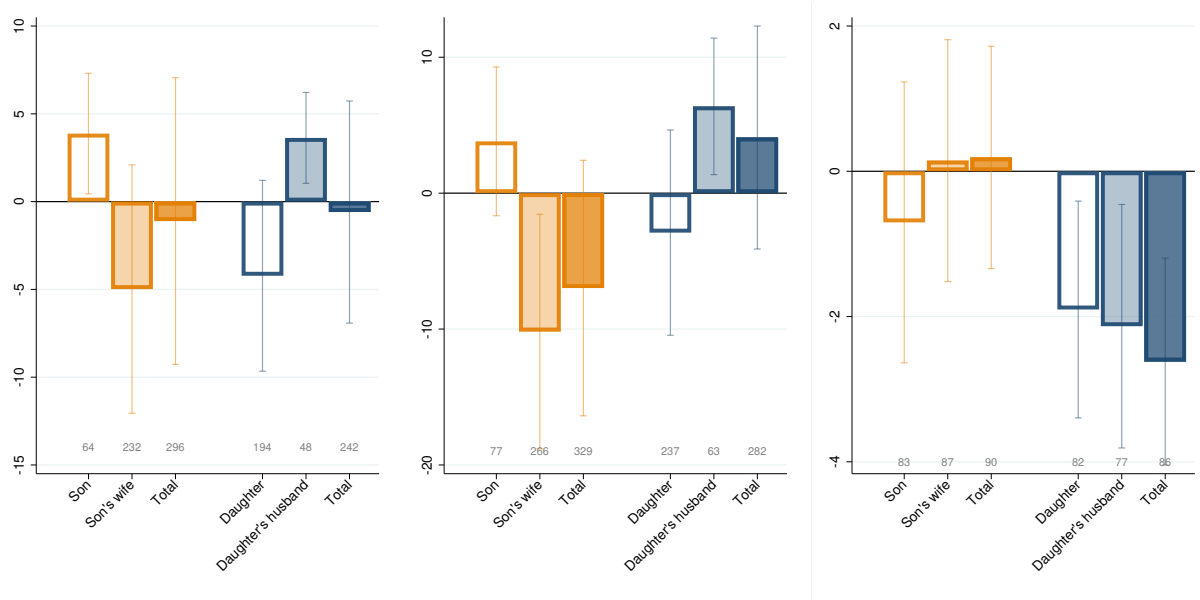
(f) Decomposition for Daughters



Notes: This figure reports the effect of mother's labor supply on skills and educational attainment, and then quantifies the effects of a broad set of measures of human capital on lifetime income. Human capital is measured by cognitive, non-cognitive, and physical skills, education level, fields, and school grades. Prior to using these measures as outcomes in our IV design, we harmonize them to a common scale for each figure separately by mapping each to predicted lifetime-income using a Mincerian regression (see Section 6.3). Estimates are effects of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours (i.e., γ_a defined in equation (8) and estimated using the sibling-difference IV design described in equation (11)). Vertical bars represent 95 percent confidence intervals based on robust standard errors.

Figure 9: Effect of Mother's Labor Supply on Next Generation's Parental Leave

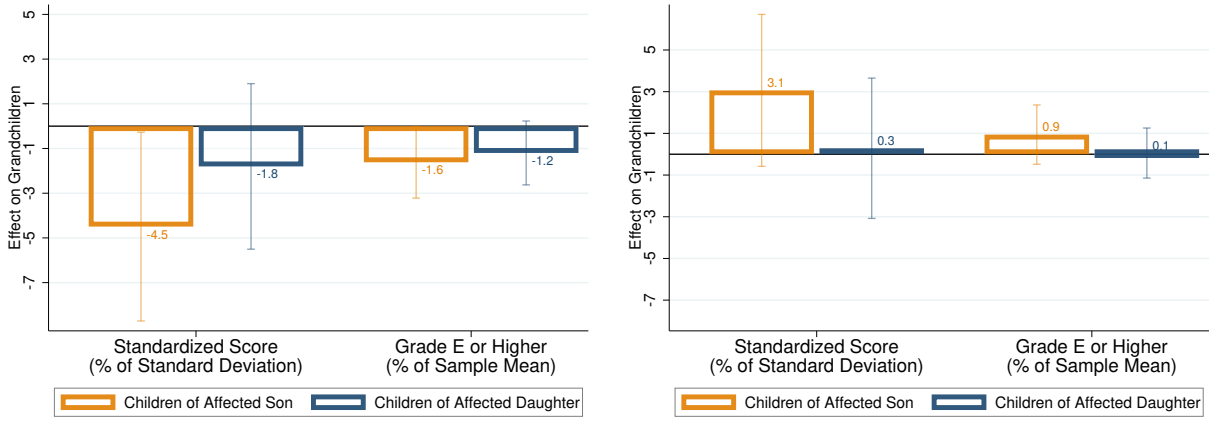
(a) Parental leave (days) (b) Intensive Margin (days) (c) Extensive Margin (p.p.)



Notes: This figure presents the intergenerational effect of mothers' labor supply on children's parental leave uptake in adulthood. Each bar reports the effect of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours (i.e., γ_a defined in equation (8) and estimated using the sibling-difference IV design described in equation (11)). The sample is restricted to individuals who have a partner in adulthood. The dependent variable is total parental leave days per child in **Panel (a)**, the number of leave days per child conditional on taking any leave in **Panel (b)**, and the probability of taking any parental leave in **Panel (c)**. The numbers reported below each set of bars denote the sample means of the corresponding outcomes. Vertical bars represent 95 percent confidence intervals based on robust standard errors.

Figure 10: Effect on School Performance of 3rd Generation by timing of 2nd Generation exposure

(a) 2nd Gen. Exposed while in Preschool Age (b) 2nd Gen. Exposed while in Primary School Age



Notes: This figure shows the effect on school performance of children of those exposed to a working mother, i.e. grandchildren, depending on whether their parents were exposed at preschool age **(Panel (a))** or primary-school age **(Panel (b))**. School performance is measured by grades on exams in the spring term of 9th grade, at age 16. We define two outcomes: test score, standardized within birth cohort and an indicator for scoring an average grade of E or higher, corresponding to an average passing grade. Effects are presented as percentages of standard deviation and percent of sample mean, respectively. The figure reports the estimated effect of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours (i.e., γ_a defined in equation (8) and estimated using the sibling-difference IV design described in equation (11)). The sample includes the first child of each sibling in the first generation. The sample is limited to siblings who both have at least one child.

Table 1: Effect of Mother's labor Supply on Family Formation and Spousal Characteristics

	(1) Having Spouse	(2) Spouse Age	(3) Spouse Education	(4) Any Child	(5) Completed Fertility	(6) Age First Child
Effect on sons	-0.00351	-0.0165	0.00570	-0.00388	-0.00242	-0.406***
	(0.00780)	(0.100)	(0.00534)	(0.00797)	(0.0233)	(0.147)
Effect on daughters	0.00375	-0.0260	-0.0201***	-0.00506	-0.00858	0.0560
	(0.00668)	(0.0884)	(0.00677)	(0.00649)	(0.0205)	(0.102)
Mean dep. var. sons	0.794	50.12	0.955	0.779	1.708	30.06
STD dep. var. sons	0.404	4.346	0.208	0.415	1.194	5.741
Mean dep. var. daughters	0.845	54.25	0.898	0.863	1.901	27.66
STD dep. var. daughters	0.362	4.601	0.303	0.344	1.090	5.267
Siblings' Age FE	✓	✓	✓	✓	✓	✓
Siblings' Gender FE	✓	✓	✓	✓	✓	✓
Mother Education FE	✓	✓	✓	✓	✓	✓
F-stat sons	121.0	73.61	74.93	121.0	121.0	69.97
F-stat daughters	136.1	112.8	109.8	136.1	136.1	92.06
Sample Size	93781	65345	65164	93781	93781	65090

Notes: This table reports the effect of maternal labor supply on family formation and spousal characteristics, estimated separately for sons and daughters. Each column reports IV estimates from the sibling-difference design described in equation (11), where estimates are effects of a one-year earlier exposure to a 10-hour increase in maternal weekly working hours. A Spouse is defined as the first partner (either married or cohabiting with a child) observed between ages 30 and 50. The dependent variables are as follows. **Column (1)**: an indicator for having a spouse; individuals without a spouse are those with no observed partner between ages 30 and 50. **Column (2)**: spouse age in 2020, conditional on having a spouse. **Column (3)**: indicator for whether spouse has post-compulsory education, conditional on having a spouse. **Column (4)**: an indicator for having any child. **Column (5)**: completed fertility, measured as the total number of children. **Column (6)**: age at first childbirth, conditional on having any. All fertility outcomes are measured through 2020. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2: Heterogeneity of the Effect of Mother's Labor Supply on Life-time Income

	Mother's Characteristics		Childcare Availability		
	(1) Employment	(2) Education	(3) Grandparents Availability	(4) Childcare Availability	(5) Childcare No Grandparent Access
Effect – Low	-0.0272*	-0.0168**	-0.0273**	-0.0228*	-0.0185
	(0.0139)	(0.00831)	(0.0114)	(0.0128)	(0.0173)
Effect – High	-0.0283**	-0.0529**	-0.0201	-0.0239*	-0.0311*
	(0.0135)	(0.0246)	(0.0155)	(0.0139)	(0.0183)
F-stat – Low	136.0	120.3	86.09	59.84	39.86
F-stat – High	70.77	85.85	40.34	64.98	51.87
Siblings' Age FE	✓	✓	✓	✓	✓
Siblings' Gender FE	✓	✓	✓	✓	✓
Mother Education FE	✓	✓	✓	✓	✓
Sample Size	92697	92697	92697	92697	60144

Notes: This table presents estimates of the effect of mother's labor supply on children's log lifetime income, by mothers' characteristics (Columns 1-2) and childcare availability (Columns 3-5). Sample includes children at preschool age at the time of the reform. **Column (1)** distinguishes between mothers with positive labor income in 1970 (High) and those with no labor income (Low). **Column (2)** separates mothers with at least high school degree from those with lower education. In **Column (3)**, grandparent availability (High) is defined by whether at least one grandmother resides in the same municipality as the child and is either not employed in 1970 or works in childcare; children without such a co-resident grandparent are classified as having limited access (Low). In **Column (4)** and **Column (5)**, access is measured at the municipality level using the share of preschool teachers and family childcare workers per preschool age child with an employed mother (working at least 25 hours per week) in 1970; children in municipalities below (above) the median share are classified as having High (Low) access to childcare. The median child in our sample lives in a municipality with about 2.5 preschool and childcare workers per 10 preschool-aged children with working mothers. Each column reports IV estimates from the sibling-difference design described in equation (11), interacting mother's work hours with indicators for limited and better access to the child care alternative indicated in the column header. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix

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Thursday 26th March, 2026

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A Data Appendix

A.1 Labor Force Participation

Figure , panel (a). For 1963–1984, all series draw on Gustafsson and Lantz (1985). For 1984–2004, the series for married women, single women, and men are constructed as weighted indices using age-specific labor force participation rates from *Statistisk årsbok för Sverige* (Statistical Yearbook of Sweden) combined with population data from Statistics Sweden (SCB). For men, the series is extended through 2020 using SCB data. The series for women with pre-school-age children is drawn from Gustafsson and Lantz (1985) for 1963–1984 and from SCB for 2004–2024.

B Statutory Labor Income Tax Functions

This appendix documents the exact statutory labor income tax schedules used to construct marginal and average tax rates in 1970 (pre-reform) and 1975 (post-reform). All parameters correspond exactly to the tax functions implemented in the replication code.

Throughout, income is measured in SEK. Because municipality-specific tax rates are unavailable prior to 1974, we use the average local tax rate in each year.

B.1 Pre-Reform Taxation in 1970: Joint Assessment

In 1970, married couples were subject to joint taxation of labor income at the central-government level. Let y_f denote the wife's labor income, y_m the husband's labor income, and c the number of children under age 16.

B.1.1 Deductions

Basic deduction. Each spouse received a basic deduction of $D^{basic} = 2{,}250$.

Work deduction (*förvärvsavdrag*). For the wife, the work deduction was:

$$D_f^{work} = \begin{cases} 300 & \text{if } c = 0, \\ 300 + \min(0.25 y_f,\, 2{,}700) & \text{if } c > 0. \end{cases}$$

Thus, for mothers with children, the deduction phased in at 25% of earnings up to an additional maximum of 2,700 SEK.

B.1.2 Local Tax

Local taxable income for the wife is

$$y_f^{loc} = y_f - D^{basic} - D_f^{work}.$$

The average local tax rate in 1970 was $\tau^{loc}_{1970} = 0.2024$. The husband's local tax is computed analogously using his own income and the same basic deduction.

B.1.3 Deduction of Local Taxes from the State Base

Under the pre-reform system, local taxes paid were deductible from the state tax base, subject to a cap:

$$D^{loc} = \min(4{,}500,\ T^{loc}_f + T^{loc}_m).$$

B.1.4 State Tax Base and Progressive Schedule

State taxable income under joint assessment is

$$y^{state} = y_f + y_m - D^{basic} - D^{work}_f - D^{loc}.$$

The 1970 central-government marginal tax schedule for married couples was:

$$\begin{aligned}
10\% &\quad \text{above } 0,\\
15\% &\quad \text{above } 12{,}000,\\
22\% &\quad \text{above } 16{,}000,\\
27\% &\quad \text{above } 20{,}000,\\
34\% &\quad \text{above } 24{,}000,\\
42\% &\quad \text{above } 30{,}000,\\
48\% &\quad \text{above } 40{,}000,\\
54\% &\quad \text{above } 60{,}000,\\
59\% &\quad \text{above } 100{,}000,\\
65\% &\quad \text{above } 150{,}000.
\end{aligned}$$

Total state tax is computed on the joint base. The wife's state tax liability is assigned proportionally:

$$T^{state}_f = \frac{y_f}{y_f + y_m} \cdot T^{state}_{family}.$$

B.1.5 Total Tax Liability in 1970

$$T^{1970}_f = T^{loc}_f + T^{state}_f.$$

Because the state schedule applies to pooled income, the marginal tax rate on the wife's earnings depends explicitly on y_m.

B.2 Post-Reform Taxation in 1975: Individual Assessment

After 1971, labor income was taxed individually. Let y denote individual labor income.

B.2.1 Deductions

Basic deduction. $D^{basic} = 4{,}500$.

Work deduction. $D^{work} = \min(0.20y,\ 2{,}000)$.

B.2.2 Local Tax

Local taxable income:

$$y^{loc} = y - D^{basic} - D^{work}.$$

Average local tax rate in 1975: $\tau^{loc}_{1975} = 0.2523$.
Local tax liability:

$$T^{loc} = \tau^{loc}_{1975} \cdot \max(y^{loc}, 0).$$

Unlike 1970, local taxes are no longer deductible from the state tax base.

B.2.3 State Tax Base and Progressive Schedule

$$y^{state} = y - D^{basic} - D^{work}.$$

The 1975 marginal tax schedule was:

$$\begin{aligned}
7\% &\quad \text{above } 0,\\
12\% &\quad \text{above } 15{,}000,\\
17\% &\quad \text{above } 20{,}000,\\
22\% &\quad \text{above } 25{,}000,\\
28\% &\quad \text{above } 30{,}000,\\
33\% &\quad \text{above } 40{,}000,\\
38\% &\quad \text{above } 45{,}000,\\
43\% &\quad \text{above } 65{,}000,\\
48\% &\quad \text{above } 70{,}000,\\
52\% &\quad \text{above } 100{,}000,\\
58\% &\quad \text{above } 150{,}000.
\end{aligned}$$

B.2.4 Special Tax Reduction

A special tax reduction applied at low income levels:

$$STR = \begin{cases} 250 & \text{if } y < 36{,}000,\\ 250 - 0.10(y - 36{,}000) & \text{if } 36{,}000 \leqslant y \leqslant 38{,}500,\\ 0 & \text{otherwise.} \end{cases}$$

B.2.5 Spousal Tax Reduction

For secondary earners, the spousal tax reduction was:

$$SpousalReduction = \max(0,\ 1{,}800 - 0.4y).$$

B.2.6 Total Tax Liability in 1975

$$T^{1975} = T^{loc} + T^{state} - STR - SpousalReduction.$$

Tax liability is truncated at zero if negative.

B.3 Key Mechanical Differences

Relative to 1970, the reform introduced three mechanical changes that are central for our empirical design:

1. Labor income was taxed individually rather than jointly.
2. Local taxes were no longer deductible from the state tax base.
3. New tax reductions (spousal and special reductions) altered the effective schedule at low income levels.

The elimination of joint assessment is the first-order change: under individual taxation, the marginal tax rate on the wife's earnings no longer depends on the husband's income. This generates heterogeneous reductions in participation and marginal tax rates across households that vary systematically with pre-reform husband income.

C Childcare Institutions and Childcare Use

In the late 1960s and early 1970s, childcare in Sweden operated through a mixed system of formal and informal arrangements. Public provision was limited and highly rationed, and the majority of working parents relied on informal or semi-formal solutions to meet their childcare needs.

Formal childcare

Formal childcare—referred to collectively as *barnstugor*—comprised several distinct forms that differed in both time coverage and function. First, childcare centers (*daghem*) provided full-day care for children from infancy to school entry (approximately 6 months to 7 years). These centers were typically open 8–10 hours per day and were explicitly intended to support full-time employment.

Second, after-school centers (*fritidshem*) offered care for younger school-age children outside regular school hours, including afternoons, holidays, and school breaks. Third, play schools and part-day preschools (*lekskolor* or *halvdagshem*) provided part-day care—usually around three hours

per day—primarily for preschool-aged children. These institutions were not designed to cover a full working day and were often operated by voluntary organizations rather than municipalities. Finally, some municipalities ran combined institutions (*gemensamma barnstugor*) that integrated features of full-day and part-day care to accommodate heterogeneous care needs.

Across settings, children were organized in age-based groups. Typical group sizes ranged from 10–15 children for younger preschoolers to 15–20 children for older preschoolers, with regulated staff-to-child ratios. Municipalities were the dominant providers of formal childcare, though voluntary organizations played an important role in part-day provision. Access to institutional childcare was selective: priority was generally given to children of single parents, households in which both parents worked full time, or families with documented social or medical needs. There was no universal entitlement, and capacity constraints were severe.

Informal childcare

Given the limited availability of formal care, most working parents relied on informal arrangements. A central component of this system was municipal family childcare (*kommunala familjedaghem*), in which children were cared for in private homes by childminders (*dagbarnvårdare*) under municipal organization or supervision. Municipal family childcare expanded rapidly from the late 1940s onward and served as a flexible complement to institutional childcare, particularly in municipalities with limited childcare capacity. From the perspective of local governments, family childcare was attractive because it required no capital investment and could be scaled quickly. At the same time, it was widely regarded as a second-best alternative to formal care, reflecting concerns about pedagogical quality, continuity, and oversight.

In addition, many families relied on private family childcare (*privata familjedaghem*), which consisted of similar home-based arrangements operating outside municipal oversight or financial support. Family childcare settings—both municipal and private—typically involved small groups of three to five children. Another important alternative was care provided in the child's own home. This category encompassed a wide range of arrangements, including care by parents (often through staggered work schedules), grandparents or other relatives, siblings, domestic workers (*hembiträden*), or other helpers. Finally, a small share of families relied on shared arrangements, such as the so-called "three-family system," in which several households jointly employed a childcare worker.

Childcare use

To document the prevalence of different childcare arrangements prior to the tax reform, we use data from a nationally representative interview survey conducted in autumn 1966. To our knowledge, this is the best evidence of childcare use close before the tax reform. The childcare survey was implemented as a special supplement to Statistics Sweden's Labour Force Survey, which covered approximately 60,000 individuals, of whom about 50,000 formed the sampling frame for this study. The survey covers children under age 10 whose custodial parent(s) worked at least 15 hours

per week and records the main childcare arrangement in use at the time of interview.

The sampling design combined stratified sampling from the Labour Force Survey with administrative sampling of municipal family childcare providers, yielding a final sample of 2,517 children. Data were collected primarily via telephone interviews with parents and, where relevant, family childcare providers. Reported nonresponse was low (2.3 percent), and a small validation exercise found no evidence of systematic measurement error. Survey weights were used to extrapolate the results to a national population of approximately 317,000 children.

Table A.1 summarizes the distribution of childcare arrangements used by children of working parents, separately for all children aged 0–10 and for preschool children aged 0–7. Childcare is classified into institutional arrangements—full-time and part-time center-based care (*barnstugor*, including *daghem*, *fritidshem*, and *lekskola/halvdagshem*)—and non-institutional arrangements, including municipal and private family childcare (*familjedaghem*) and care provided in the child's own home.

Two patterns stand out. First, institutional childcare played a limited role: even among preschool children, fewer than one in seven were enrolled in full- or part-time center-based care. Second, non-institutional arrangements dominated, reflecting both capacity constraints in municipal provision and the importance of informal solutions. Among children in private family childcare, care was most commonly provided by non-relatives (57 percent), though a substantial share relied on grandparents (37 percent) or other relatives (6 percent). Care in the child's own home was similarly heterogeneous: in 38 percent of cases the child was cared for by the non-working spouse, while other arrangements included paid nannies (25 percent), grandparents (15 percent), siblings (6 percent), and other relatives or helpers (16 percent). Overall, these patterns underscore the extent to which families relied on diverse home-based arrangements in the absence of widely available institutional childcare.

Availability of childcare across regions

The report emphasizes that the availability of childcare options varied substantially across municipalities, and that the choice of arrangement was often shaped by limited local supply rather than parental preferences. Among families using family childcare (*familjedaghem*), the most frequently cited reason for this choice were logistical considerations, such as proximity to the home, which accounted for the majority of responses. However, capacity constraints in institutional childcare played a central role: lack of available places in childcare centers or after-school centers was reported as one of the main reasons for choosing family childcare. In addition, approximately 10 percent of families using family childcare reported that their working hours were incompatible with the opening hours of institutional childcare, suggesting that family childcare absorbed demand from parents with nonstandard schedules.

Selection into different childcare arrangements also varied systematically across regions. Of all children with working parents, 26 percent lived in metropolitan areas, 22 percent in medium-sized cities, and 52 percent in smaller municipalities. Institutional childcare was substantially more

prevalent in metropolitan areas, where 12 percent of children had access to *barnstugor*, compared with 6 percent in medium-sized cities and only 2 percent in smaller municipalities. By contrast, private family childcare was most prevalent outside the largest cities, reaching 25 percent in some regions, compared with 17–18 percent elsewhere.

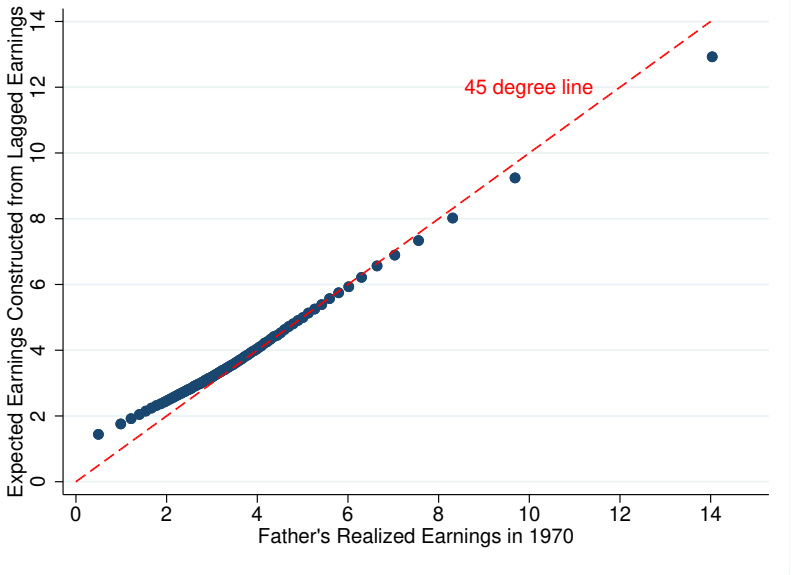
Table A.1: Childcare use by Care Type and Age Group in 1966

	Children aged 0–10				**Children aged 0–7**			
	At home	Private	Public	Total	At home	Private	Public	Total
Grandmothers	9.2	9.3	0.4	19.0	9.6	13.4	0.2	23.1
Other relatives	5.4	1.5	0.1	3.0	5.7	2.2	0.0	4.1
Non-relatives	23.8	15.9	10.3	54.0	24.8	23.5	18.1	70.3
Child on its own	24.1	0.0	0.0	24.1	2.5	0.0	0.0	2.5
Total	62.5	26.7	10.8	100.0	42.6	39.0	18.4	100.0

Notes: The table reports the distribution of children with parents working more than 15 hours per week in 1966, by care setting and caregiver other than they parent. "At home" refers to care provided in the child's own home; "Private" refers to private family childcare (privata familjedaghem); and "Public" refers to municipally organized childcare, including childcare centers (barnstugor) and municipal family childcare (kommunala familjedaghem). "Other relatives" refers to other relatives than grandmothers, including siblings. Percentages are shares of all children in the relevant age group and sum to 100 within each age group. The category "child on its own" captures children without adult supervision. *Source:* Authors' calculations based on SOU 1967:39.

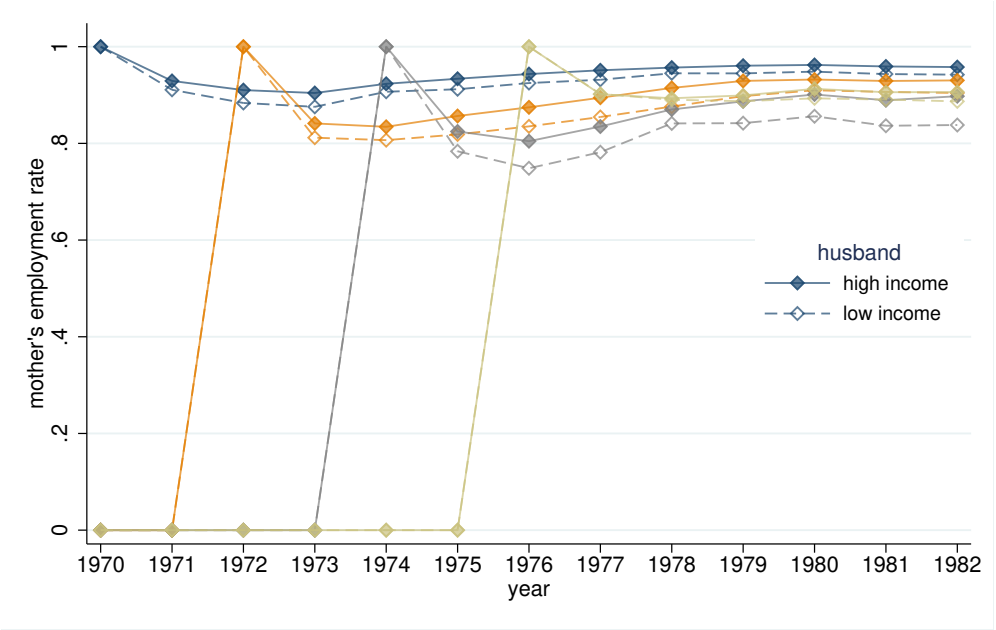
D Additional Tables and Figures

Figure A.1: Father's Expected vs Realized Income in 1970



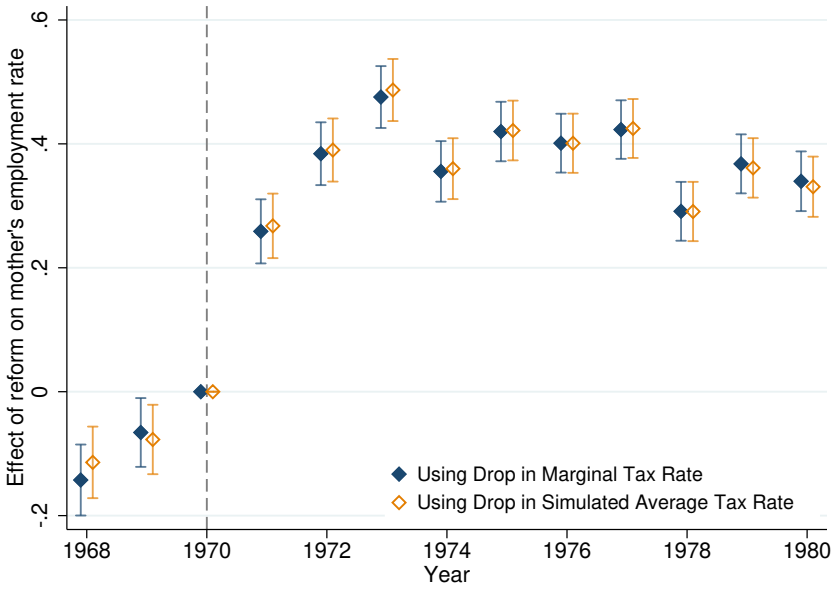
Notes: This figure shows the constructed expected labor income of fathers in 1970 using their lagged earnings against their actual income in 1970. The expected income is constructed in the following way: we first estimate a reduced-form income process in which fathers' earnings in 1970 are regressed on their lagged earnings in 1968 and 1969. To allow for heterogeneous income dynamics, we interact lagged earnings with indicators for the father's education category and year of birth. Then, the resulting fitted value serves as our measure of expected paternal earnings and is used throughout the analysis. For more information refer to Section 2.1.

Figure A.2: Employment Persistence Across Married Women Joining Labor Market



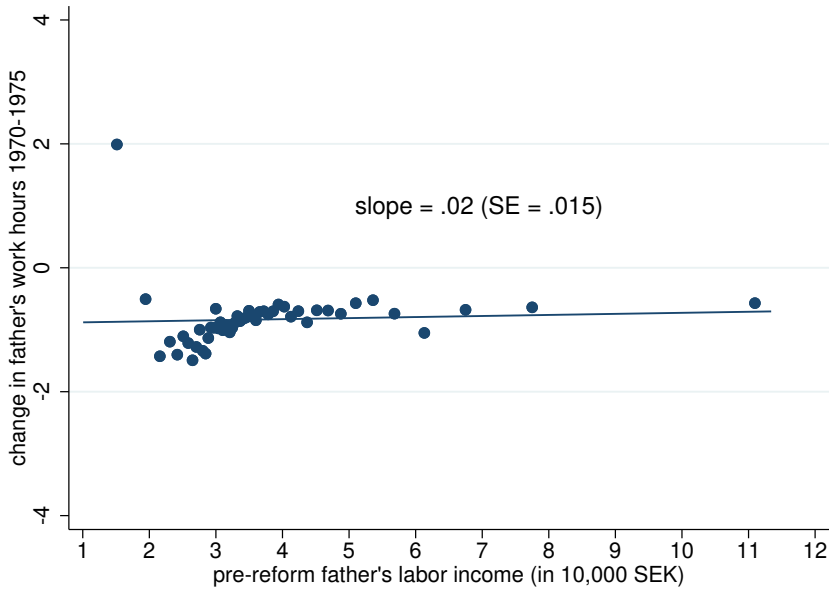
Notes: This figure plots mothers' employment rates by calendar year separately by the year in which the mother first enters employment and by whether the husband's 1970 labor income is above or below the sample median. The sample consists of mothers in our main estimation sample, corresponding to families with children at preschool and school ages. Employment is defined as positive annual labor earnings. For each entry cohort, the figure reports average employment rates from 1970 to 1982 for mothers whose first observed employment year is 1970, 1972, 1974, or 1976. Husband income groups are defined using pre-reform paternal labor income in 1970.

Figure A.3: Robustness Check- Employment Effect of Change in Simulated Average Tax Rate



Notes: This figure replicates the event-study specification in Figure 4d, estimating the effect of the tax reform on mothers' employment over time. The baseline specification (solid markers) uses the reform-induced change in the marginal tax rate as the source of variation (the same as Figure 4d), while the alternative specification (hollow markers) replaces this measure with the reform-induced change in the average tax rate. Each point corresponds to a year-specific coefficient, with vertical bars indicating confidence intervals. The vertical dashed line marks the year of the reform (1971).

Figure A.4: Change in Father's Weekly Work Hours



Notes: This figure plots the change in fathers' weekly work hours between 1970 and 1975 against pre-reform paternal labor income (measured in 10,000 SEK). The sample consists of fathers in our main estimation sample, corresponding to families with children at preschool and school ages. The binned scatter is constructed analogously to Figure 4b, which presents the corresponding relationship for mothers' labor supply.

Table A.2: Effect on Long-Run Employment Rate Between Ages 30 and 50

	Exposed while in Preschool Age			Exposed while in Primary School Age		
	(1) own	(2) spouse	(3) total	(4) own	(5) spouse	(6) total
Effect on sons	-0.000130	0.00136	0.000615	0.00346*	0.00823	0.00584*
	(0.00316)	(0.00727)	(0.00435)	(0.00207)	(0.00508)	(0.00301)
Effect on daughters	-0.000427	-0.00428	-0.00235	-0.00137	0.0108*	0.00472
	(0.00296)	(0.00677)	(0.00405)	(0.00216)	(0.00562)	(0.00324)
Mean for sons	0.957	0.567	0.762	0.960	0.573	0.766
STD for sons	0.155	0.385	0.227	0.145	0.391	0.226
Mean for daughters	0.959	0.620	0.789	0.965	0.631	0.798
STD for daughters	0.158	0.378	0.226	0.141	0.383	0.220
F-stat boy	61.39	61.39	61.39	175.7	175.7	175.7
F-stat girl	66.90	66.90	66.90	134.2	134.2	134.2
Siblings' Age FE	✓	✓	✓	✓	✓	✓
Siblings' Gender FE	✓	✓	✓	✓	✓	✓
Mother Education FE	✓	✓	✓	✓	✓	✓
Sample Size	93781	93781	93781	65937	65937	65937

Notes: This table reports the effect of maternal labor supply on children's long-run labor market attachment, measured as the share of years with positive earned income between ages 30 and 50 (normalized by the maximum of 21 years). The treatment corresponds to a one-year earlier exposure to a persistent increase in maternal weekly labor supply. Columns (1)–(3) restrict the sample to individuals exposed during preschool ages at the time of the reform, while Columns (4)–(6) include those exposed during primary school ages. Columns (1) and (4) report effects on individuals' own employment, Columns (2) and (5) report effects on their partners' employment, and Columns (3) and (6) report effects on total family employment, defined as the sum of own and partner employment. The partner outcome is measured over the same age range (30–50) and is defined as the share of years in which the individual has a partner and that partner has positive earned income. Standard errors are reported in parentheses.

E Theory: Omitted Derivations

E.1 First-order and Envelope conditions

Using hereditary law $\gamma_{+1} = \Gamma(E)$, FOCs of optimization (22) are

$$
\begin{aligned}
0 &= -\bar{u}' + \delta\Big[\eta\, v_w + \tilde{\eta}\, \tilde{v}_w\, m(w)\Big]\, W_h\, H_s, \\
0 &= \eta\, v_t - \tilde{\eta}\, \tilde{v}_t + \gamma\, (e_t - e_{\tilde{t}}) + \beta\, V_E\, (e_t - e_{\tilde{t}}), \\
0 &= \eta\, v_i - \tilde{\eta}\, \tilde{v}_i \\
0 &= \tilde{\eta}\, v_t + \gamma\, e_{\tilde{t}} + \beta\Big[V_T + V_E\, e_{\tilde{t}}\Big], \\
0 &= \delta\, \tilde{\eta}\, \tilde{v}_i + \beta\, V_I.
\end{aligned}
$$

and FOC of z is equivalent to i as they only enter through the same composites. Envelope coneitions

$$
\begin{aligned}
V_{T_{-1}} &= \delta\Big[\eta\, v_w + \tilde{\eta}\, \tilde{v}_{\tilde{w}}\, m(w)\Big]\, W_h\, H_{T_{-1}}, \\
V_{I_{-1}} &= \delta\Big[\eta\, v_w + \tilde{\eta}\, \tilde{v}_{\tilde{w}}\, m(w)\Big]\, W_h\, H_{I_{-1}}, \\
V_{E_{-1}} &= \delta\, \Gamma'(E_{-1})\, E.
\end{aligned}
$$

E.2 Implications of the Functional Form Assumptions

For an interior solution, the intratemporal problem in (21) becomes

$$
v(w, t, x) := \max_{l} \{w(1 - t - l) - x + \alpha \ln l\}\,. \tag{32}
$$

The first-order condition implies $l^* = \alpha/w$. Because utility is quasi-linear, leisure exhibits no income effect. By the envelope theorem,

$$
v_w(w, t, x) = 1 - t - \frac{\alpha}{w}. \tag{33}
$$

The resulting indirect utility function is

$$
v(w, t, x) = w(1 - t) - x - \alpha + \alpha \ln\Big(\frac{\alpha}{w}\Big)\,. \tag{34}
$$

The envelope condition for the adulthood problem (23) is

$$
\mathcal{U}_w = \frac{1}{2}\Big[(1 - t^*) + m(1 - \tilde{t}^*)\Big] - \frac{\alpha}{w}. \tag{35}
$$

The function $\mathcal{U}(\cdot, E_{-1})$ is convex in w. Indeed, for any feasible allocation, the objective is an

affine function of w plus the common convex term $-\alpha \ln w$. Hence $\mathcal{U}(\cdot, E_{-1})$, as the pointwise supremum of such functions, is convex. Therefore,

$$\mathcal{U}_{ww}(w) = \frac{\alpha}{w^2} - \frac{1}{2}\frac{\partial}{\partial w}\big(t^*(w) + m\tilde{t}^*(w)\big) \geqslant 0.$$

Equivalently,

$$\frac{\partial}{\partial w}\big(t^*(w) + m\tilde{t}^*(w)\big) \leqslant \frac{2\alpha}{w^2}.$$

Thus, convexity places an upper bound on how fast the weighted childcare term can increase with the wage; it does not, by itself, imply that this term is weakly decreasing.

In this setting, under the functional-form assumptions imposed above, the value function can be simplified, and the adulthood problem can be written as

$$\mathcal{U}(w, E_{-1}) := \max_{t,\, i,\, T,\, I,\, y} \Big[\eta\, v(w, t, i + y) + \tilde{\eta}\, v(\tilde{w}, T - t, I - i - y) + \Gamma(E_{-1})E\Big] + \beta\, \hat{V}(\hat{A}_{+1}, E), \quad (36)$$

where $E = e(t, T - t)$, $\tilde{w} = M(w)$ and $\hat{A}_{+1} = \omega A T^{\theta} I^{1-\theta}$. The childhood problem can then be written as

$$\hat{V}(\hat{A}, E_{-1}) := \max_{s} \underbrace{\bar{u}(1 - s) + \delta\, \mathcal{U}(\hat{A}s, E_{-1})}_{=:\, \mathcal{V}(s, \hat{A}, E_{-1})}. \quad (37)$$

Note that the adulthood problem contains $-\frac{w}{2}\big(t + m\tilde{t}\big)$ as the only part involving both w and $(t, \tilde{t})$. Hence a higher wage w raises the opportunity cost of $t + m\tilde{t}$, so

$$\frac{\partial(t^* + m\tilde{t}^*)}{\partial w} \leqslant 0. \quad (38)$$

E.3 Proof of Decomposition (26)

Proof. Using $w = \hat{A}s$, the first-order condition for an interior solution s^* in the childhood problem (24) is

$$\mathcal{V}_s = -\bar{u}_{\bar{l}} + \delta \hat{A} \mathcal{U}_w = 0. \quad (39)$$

Taking the partial derivative of (39) with respect to $\ln T_{-1}$, holding s fixed, gives

$$\begin{aligned}
\mathcal{V}_{s, \ln T_{-1}} &= \delta\, \frac{\partial(\hat{A}\mathcal{U}_w)}{\partial \ln T_{-1}} \\
&= \delta \hat{A} \left(\frac{\partial \ln \hat{A}}{\partial \ln T_{-1}} \mathcal{U}_w + \frac{\partial \mathcal{U}_w}{\partial \ln T_{-1}} \right) \\
&= \frac{\delta \hat{A}}{2} \left[\theta\Big((1 - t^*) + m(1 - \tilde{t}^*)\Big) - \frac{\partial(t^* + m\tilde{t}^*)}{\partial \ln T_{-1}} \right], \quad (40)
\end{aligned}$$

where the last equality uses (35) and $\partial w / \partial \ln T_{-1} = \theta w$, holding s fixed.

By the implicit function theorem,

$$0 = \mathcal{V}_{ss}\frac{ds^*}{d\ln T_{-1}} + \mathcal{V}_{s,\ln T_{-1}}, \tag{41}$$

so

$$\frac{ds^*}{d\ln T_{-1}} = \frac{\mathcal{V}_{s,\ln T_{-1}}}{-\mathcal{V}_{ss}}. \tag{42}$$

Finally, since $h = A\, s\, T_{-1}^{\theta} I_{-1}^{1-\theta}$, we have

$$\frac{d\ln h}{d\ln T_{-1}} = \theta + \frac{1}{s}\frac{ds^*}{d\ln T_{-1}}.$$

Using (43) and (45) gives (26) or (27). □

E.4 Proof of Decomposition (??)

Proof. Taking the partial derivative of (39) with respect to $\hat{A}$, holding s fixed, gives

$$\begin{aligned}\mathcal{V}_{s,\hat{A}} &= \delta\,\frac{\partial(\hat{A}\mathcal{U}_w)}{\partial\hat{A}} \\ &= \delta\left(\mathcal{U}_w + \frac{\partial\mathcal{U}_w}{\partial\hat{A}}\right) \\ &= \frac{\delta}{2}\left[\theta\Big((1-t^*) + m(1-\tilde{t}^*)\Big) - \frac{\partial(t^* + m\tilde{t}^*)}{\partial\hat{A}}\right],\end{aligned} \tag{43}$$

where the last equality uses (35) and $\partial w/\partial\ln T_{-1} = \theta w$, holding s fixed.

By the implicit function theorem,

$$0 = \mathcal{V}_{ss}\frac{ds^*}{d\hat{A}} + \mathcal{V}_{s,\hat{A}}, \tag{44}$$

so

$$\frac{ds^*}{d\hat{A}} = \frac{\mathcal{V}_{s,\hat{A}}}{-\mathcal{V}_{ss}}. \tag{45}$$

and

$$\frac{d\ln h}{d\ln\hat{A}} = 1 + \frac{1}{s}\frac{ds^*}{d\ln\hat{A}}.$$

Using (43) and (45) gives (**??**). □

E.5 Proof of Decomposition (29)

Proof. Since $\hat{A}$ does not depend on E_{-1}, taking the partial derivative of (39) with respect to E_{-1} gives

$$\mathcal{V}_{s,E_{-1}} = \delta\hat{A}\mathcal{U}_{w,E_{-1}}. \tag{46}$$

Under the functional forms,

$$\mathcal{U}_w = \frac{1}{2}\Big[(1-t^*) + m(1-\tilde{t}^*)\Big] - \frac{\alpha}{w},$$

so, holding w fixed,

$$\mathcal{U}_{w,E_{-1}} = -\frac{1}{2}\frac{\partial(t^* + m\tilde{t}^*)}{\partial E_{-1}}. \tag{47}$$

Applying the implicit function theorem to (**??**),

$$0 = \mathcal{V}_{ss}\frac{ds^*}{dE_{-1}} + \mathcal{V}_{s,E_{-1}},$$

hence

$$\frac{ds^*}{dE_{-1}} = \frac{\delta\hat{A}}{-2\mathcal{V}_{ss}}\left[-\frac{\partial(t^* + m\tilde{t}^*)}{\partial E_{-1}}\right]. \tag{48}$$

Finally,

$$\frac{d\ln h}{dE_{-1}} = \frac{1}{s^*}\frac{ds^*}{dE_{-1}},$$

and substituting (48) yields (**??**). Equation (29) follows from $\frac{dh}{dE_{-1}} = h\,\frac{d\ln h}{dE_{-1}}$. □

E.6 Mothers (30)

Assume that w is predetermined at this stage, and let all derivatives of V be evaluated at the optimum (T, I, E).

Response to the reform can be modeled as

$$\max_{t,\,i,\,T,\,I,\,y}\Big[\eta\, v(w,t,i+y) + \tilde{\eta}\, v(\tilde{w},T-t,I-i-y) + \Gamma(E_{-1})E\Big] + \beta\,\hat{V}(\hat{A}_{+1},E), \tag{49}$$

where $E = e(t, T-t)$ and $\hat{A}_{+1} = \omega A T^{\theta} I^{1-\theta}$.

$$\frac{d\ln\hat{A}_+}{d\tau} = \theta\frac{d\ln T^*}{d\tau} + (1-\theta)\frac{d\ln I^*}{d\tau}. \tag{50}$$

From the first-order conditions derived above,

$$\frac{I^*}{T^*} = \frac{1-\theta}{2\theta}\,w(m+1-\tau).$$

Therefore,

$$\frac{d\ln I^*}{d\tau} - \frac{d\ln T^*}{d\tau} = -\frac{1}{m+1-\tau}. \tag{51}$$

Combining (50) and (51) yields

$$\frac{d\ln\hat{A}_+}{d\tau} = \frac{d\ln T^*}{d\tau} - \frac{1-\theta}{m+1-\tau} = \frac{d\ln I^*}{d\tau} + \frac{\theta}{m+1-\tau}. \tag{52}$$

Thus, the effect of τ on $\hat{A}_+$ has two parts: (i) a composition effect, since a higher τ lowers I^*/T^*, and (ii) a scale effect, through the induced change in the overall level of investment. Without additional restrictions on the continuation value V, the sign of $\frac{d\hat{A}_+}{d\tau}$ is not pinned down.