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Parenthood and gender inequality: Population-based evidence on the child penalty in Finland

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HIGHLIGHTS

- Women experience a large child penalty in gross labor earnings.
- The child penalty is associated with employment participation.
- The child penalty varies by the number of children.
- Social security transfers and progressive taxation reduce the penalty considerably.

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ABSTRACT

This study presents evidence on the effect of parenthood on labor market outcomes in Finland. We use population-based data drawn from administrative registers and an event study design centered around the birth of the first child using the specification proposed in Kleven et al. (2019b). The study confirms that women encounter large short- and long-term child penalties in gross labor earnings and that penalties are associated with employment participation. Taxes and social security transfers considerably reduce the child penalty, which also varies by the number of children.

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1. Introduction

Empirical literature reports persistent gender differences in labor market earnings across the world (Olivetti and Petrongolo, 2016; Blau and Kahn, 2017). The so-called child penalty, i.e., the gap in labor market outcomes of women relative to men caused by childbearing, is often considered a major source of persistent inequality (Waldfogel, 1998; Angelov et al., 2016). This view is supported by recent research, particularly Kleven et al. (2019a), who exploit data on administrative registers and longitudinal sur-

veys from several countries with different institutional settings. Their study shows that the child penalty in gross labor earnings is a widespread phenomenon and that the magnitude of the long-run penalty is associated with attitudes towards working women when they have young children.

This study investigates the effect of parenthood on later-life labor market outcomes in Finland by using comprehensive administrative registers and population-based data. Our study contributes to the research in three ways. First, by using data for Finland, we supplement recent research that provides evidence on the child penalty in Denmark and Sweden. Second, we extend the analysis by examining the effect of parenthood on net income that accounts for social security transfers. Third, we allow for heterogeneous effects by examining the child penalty by the number of children. Both extensions are warranted because Finland, along

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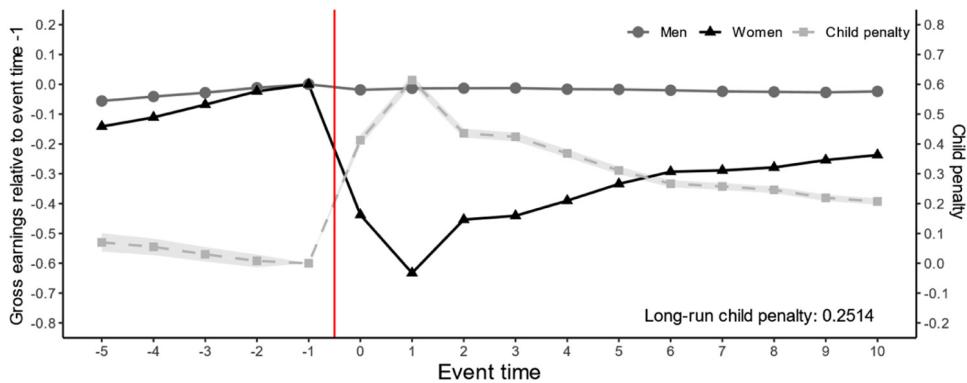


Fig. 1. Impact of children on gross earnings.

with other Nordic countries, exerts progressive taxation on labor earnings and simultaneously provides benefits that support parenthood and subsequent non-participation in the labor market. Consequently, our study provides a basis for further empirical comparison.

Our study produces three findings. First, the long-term child penalty in gross earnings for women, defined as the average earnings relative to men in the five-year period after childbearing, is 25 percent. The estimate falls within the range of Sweden (26 percent) and Denmark (21 percent) reported in Kleven et al. (2019a). Second, the child penalty is associated with labor market participation. On average, the long-term penalty in employment is 17 percent. Third, social security transfers considerably reduce the penalty, which varies by the number of children: gross and net long-term child penalties are substantial only for mothers of four children or more.

2. Data and methodology

We exploit event studies around the birth of the first child. The data are drawn from administrative registers of Statistics Finland. The FLEED-FOLK (Finnish Longitudinal Employer-Employee Data) database provides data for the full population over the 1987–2017 period. We restrict the sample to parents who are observed every year for 5 years before and 10 years after the birth of their first child. This process yields 718 575 parents whose first child was born between 1992 and 2007.¹ Following Kleven et al. (2019b), we estimate models of the following form:

$$Y_{ist}^g = \sum_{j \neq -1} \alpha_j^g \cdot I[j = t] + \sum_k \beta_k^g \cdot I[k = age_{is}] + \sum_y \gamma_y^g \cdot I[y = s] + \nu_{ist}^g$$

The outcome is denoted by Y_{ist}^g for parent i of gender g in year s and at event time t . The event time t for each parent is indexed relative to the year of the firstborn child. The terms on the right-hand side are event time, age, and year dummies. The event time dummy for $t = -1$ is omitted so that the coefficients for the other time dummies measure the effect of the first child relative to one year before the birth. We convert the estimated level effects into percentages by calculating for each t from -5 to 10 $P_t^g \equiv \hat{\alpha}_t^g / E[\tilde{Y}_{ist}^g | t]$, where \tilde{Y}_{ist}^g is the prediction of the model omitting the effects of the event time dummies. To

measure the percentage of women below men in the outcome variable, we calculate $P_t = \frac{\hat{\alpha}_t^m - \hat{\alpha}_t^w}{E[\tilde{Y}_{ist}^g | t]}$ for each t . The estimate for the long-run child penalty is defined as the average of this variable from event times 5 to 10. According to Kleven et al. (2018), the approach provides a plausible method to identify the causal effect of parenthood.

3. Results

Figs. 1–4 report the effects of parenthood on later-life outcomes in the labor market, with the effect on labor market outcome for men and women on the left axis and the child penalty and a 95% confidence interval on the right axis. The presence of parallel pre-trends in outcomes provides robustness for the analysis that uses men as a control group for women (Kleven et al.). The results imply that women encounter a substantial long-term child penalty in gross earnings and that the penalty is associated with employment participation (Figs. 1 and 2); the penalty is reduced considerably when gross earnings account for social security transfers (Fig. 3); and the penalty varies across family types (Fig. 4).

Fig. 1 shows that the gross earnings of women sharply decrease following the birth of their first child. The short-run child penalty, measured at $t + 1$, is 61.4 percent. Although there is a substantial rebound afterwards, the long-run child penalty is substantial, approximately 25 percent. The estimate is similar to those reported in Kleven et al. (2019a) for Sweden and Denmark (26 and 21 percent, respectively).

Fig. 2 shows the effect of parenthood on labor market participation, measured by non-zero annual labor earnings. The results indicate that the penalty in gross earnings is associated with women's lower attainment in the labor market. The short-run effect at $t + 1$ (26.7 percent) is higher than that for Sweden and Denmark (approximately 15 percent). Similarly, the long-term effect (16.7 percent) exceeds that for Denmark (approximately 13 percent) and Sweden (approximately 5 percent).

The result of a stronger penalty in employment is consistent with survey information on public attitudes towards labor market participation after the birth of a child.² In Finland, 12.2 percent

¹ See Appendix A.

² The estimates are based on the ISSP survey data for waves 2002 and 2012. See data and questions at <http://www.issp.org/data-download/archive/>.

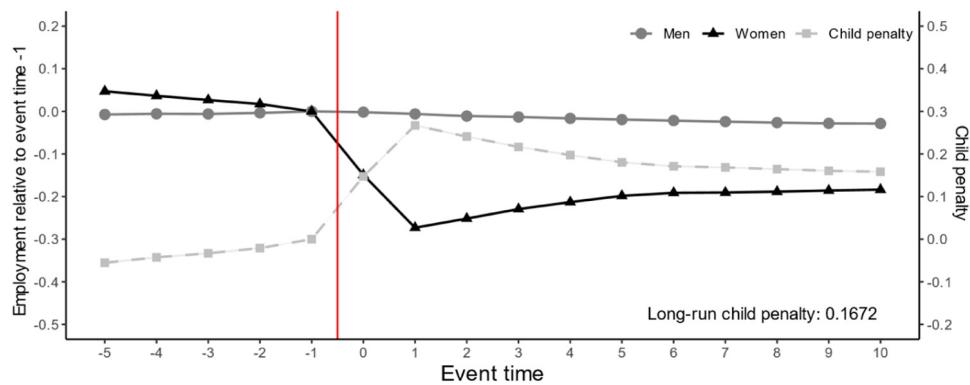


Fig. 2. Impact of children on labor market participation.

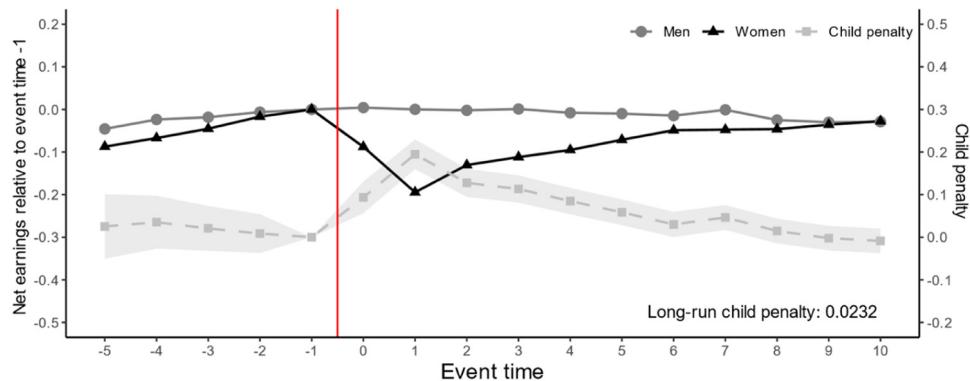


Fig. 3. Impact of children on net income.

of people believe that women of young children should stay at home. In Denmark and Sweden, the corresponding estimates are 5.1 and 5.9 percent.

Fig. 3 extends the analysis using a measure that accounts for social security transfers and taxation as the outcome variable. The investigation period is shorter, from 1995 to 2017, due to the availability of data on transfers. The finding of a lower child penalty is in line with *a priori* expectations; non-employment typically entitles individuals to income transfers and lower taxes due to progressive tax scales. The long-term penalty estimate (2 percent) suggest that while there is a substantial penalty in gross earnings, the child penalty in net income is negligible and materializes only in the first years after the birth of the first child.

In the short run, the child penalty in gross earnings is mitigated by allowances based on prior earnings; these allowances consist of up to 54 days of paternal allowance, 105 days of maternal allowance and 154 days of allowance for either parent, which is taken up mostly by mothers. In the long run, parents receive tax-free child benefits for all children under 17 years of age, with the amount per child increasing for each child, as well as child-care subsidies that are available after parental leaves. Furthermore, lower labor earnings are mitigated by progressive taxation and possible welfare subsidies.

Fig. 4 reports penalty estimates by family size. Consequently, they provide evidence on the total impact of parenthood on later-life incomes for parents with more than one child. There is marked heterogeneity across family types, with the penalty being highest for four-child mothers (12 percent). The findings

can be associated with differences in background characteristics. For example, future mothers of four or more children are 20 percentage points less likely to have a university degree, 15 percentage points less likely to be employed, and nine percentage points less likely to be employed in a high-skill job at $t = 0$ than future mothers of two children ([Appendix A](#)).³

4. Conclusions

The study reports the estimates of the child penalty in Finland using population-based register data over the 1987–2017 period. Our findings are consistent with those of [Kleven et al. \(2019a\)](#). The estimates for gross earnings fall within the range of gross earnings in other Nordic countries, and they show similar dynamic patterns. Similarly, the ISSP survey estimates for Finland regarding attitudes on whether women of young children should work confirm [Kleven et al.](#)'s findings on the correlation between general attitudes and the estimates of long-run child penalties, which are reported for two Nordic countries (Denmark and Swe-

³ [Appendix B](#), using supplementary data for 2005–2010, shows the effect of parenthood on hourly wages, working hours, and employment. Compared to [Kleven et al. \(2019b\)](#), our results, in general, indicate a larger decrease in participation and hourly wages but a smaller decrease in working hours. This can be explained by a lower share of part-time work amongst women in Finland compared to other Nordic countries (<https://data.oecd.org/emp/part-time-employment-rate.htm>).

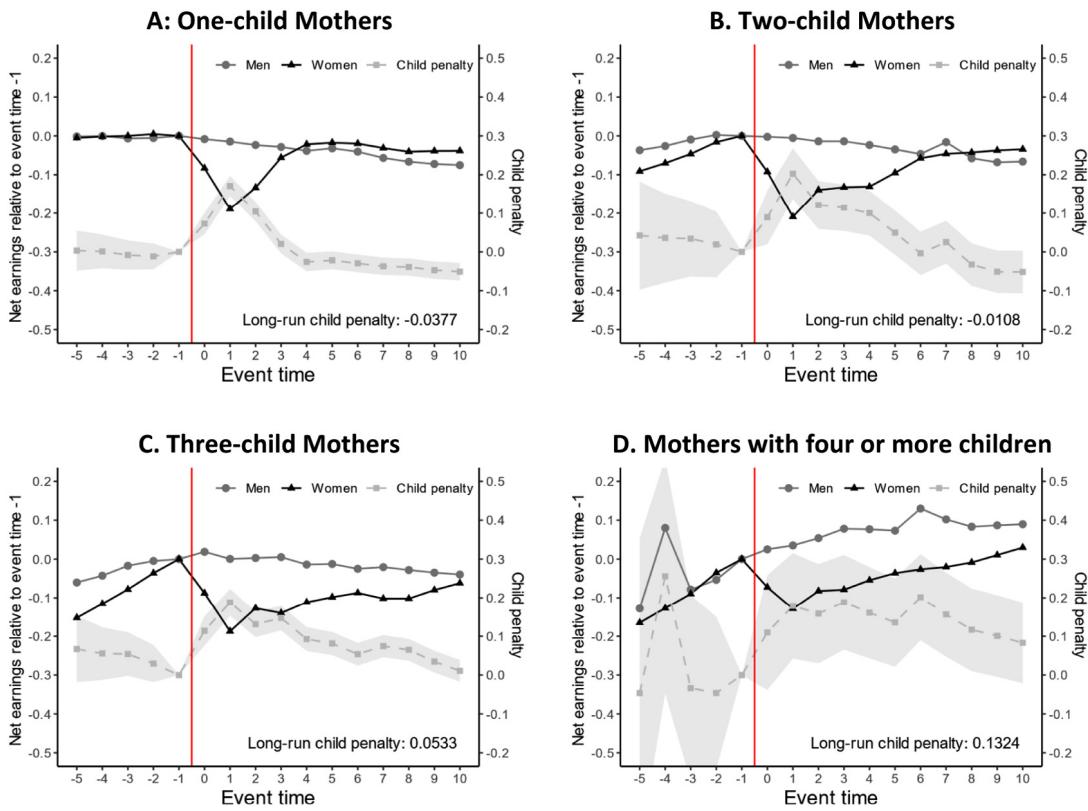


Fig. 4. Impact of children on net income.

den), two European countries (Germany and France), and two English-speaking countries (England and United States).

Our results indicate that social security transfers substantially mitigate the impact of parenthood on gender inequality. In the short run, the child penalty is diminished by allowances based on prior earnings, consisting of various forms of paternal allowance, which are mostly taken up by mothers. In the long run, alleviation is associated with tax-free child benefits and child-care subsidies that are available after parental leaves. Furthermore, possible lower gross earnings are mitigated by progressive taxation and welfare subsidies.

We suggest two extensions for future research. First, the effect of children on parental net income could be analyzed in the context of countries with different institutional settings. Second, the analysis could be separated for different types of income trans-

fers, and the effect of children could be investigated separately for low, middle and high earners. This would provide a more nuanced picture of the importance of social security transfers to gender inequality across the earnings distribution.

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Appendix A. Descriptive statistics of parents by gender at event time ($t = 0$) and by number of children at $t = 10$

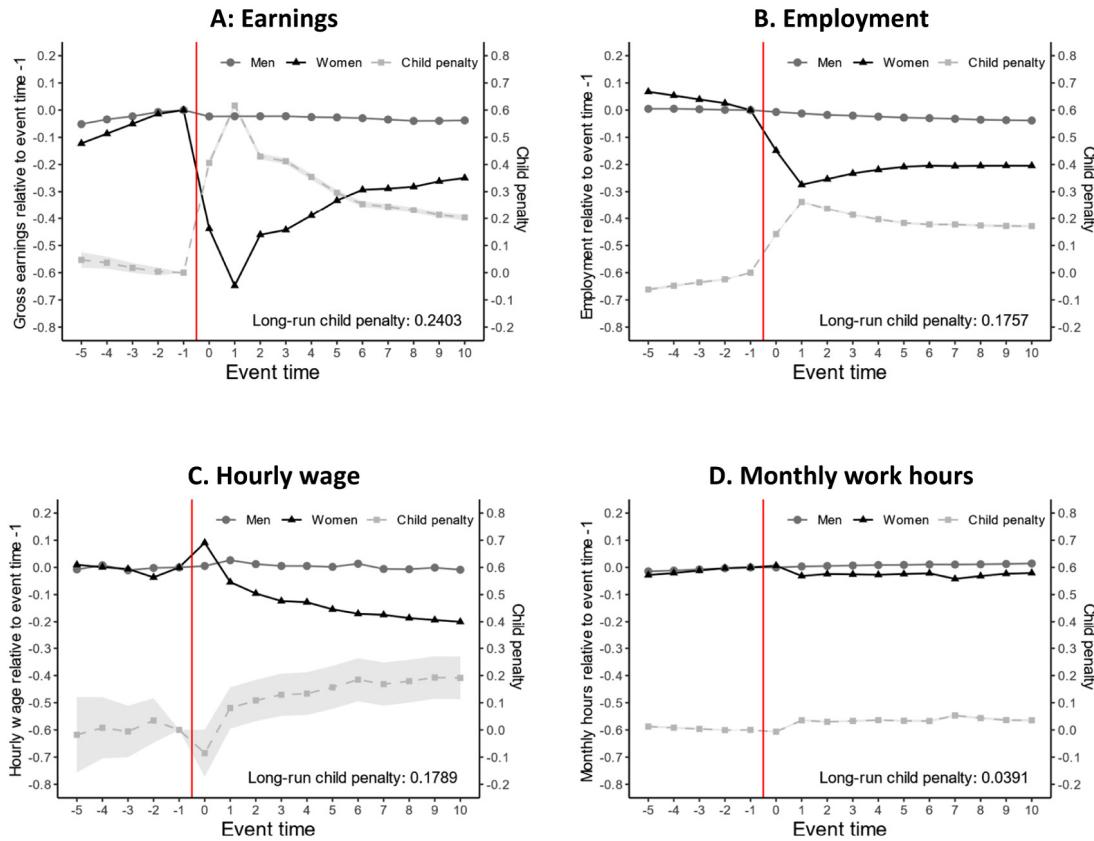
See Table A.1.

Appendix B. Impact of children on labor market outcomes

Table A.1

Parents' background at $t = 0$	All parents	Number of children at $t = 10$			
		1	2	3	4+
Age, years	29.8/27.6	31.9/30.2	29.9/27.8	28.3/25.9	26.6/24.1
Employment rate	0.93/0.79	0.91/0.78	0.94/0.82	0.94/0.77	0.92/0.67
University degree	0.31/0.44	0.25/0.40	0.35/0.49	0.33/0.43	0.23/0.29
High-skill job	0.20/0.15	0.16/0.15	0.22/0.17	0.20/0.14	0.14/0.08
No. of Obs.	356 029/362 546	84 107/78 834	169 684/17 520	77 474/82 204	24 764/25 988

Notes: Males/Females; High-skill job refers to ISCO08 1-digit occupations 1, 2 and 3.



Notes: First child born between 2000 and 2005; Earnings and employment are measured as in Figs. 1–4; Hourly wages and monthly work hours are measured in the last quarter of the year without full population coverage.

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