The Child Penalty and an Age-Old Problem

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1 Extended abstract

The impact of children has become a central focus in recent research on the persistent gender gap in labor market outcomes (Cortés and Pan, 2023). The child penalty, defined as the change in labor market outcomes following the birth of a child, has gained recognition as a key measure of children's influence on gender disparities. Using the event study method popularized by Kleven, Landais and Søgaard (2019), recent research consistently finds that the child penalty is large and shows limited convergence in the long run. Against this backdrop, it has become a new benchmark for comparisons across time, geography, socioeconomic environments, and policy frameworks (Kleven et al., 2019; Andresen and Nix, 2022; Rabaté and Rellstab, 2022; Kleven, 2022; Kleven, Landais and Leite-Mariante, 2024), with the goal to help identify the factors driving its magnitude and persistence. A clearer understanding of how the child penalty is measured and potential factors influencing its comparison across different contexts is thus important for meaningful analysis and effective policy design.

The paper begins by examining the standard framework for measuring the child penalty, drawing insights from the classic challenge of estimating life-cycle wage profiles. In the event study framework, which has become the standard for constructing the child penalty following Kleven, Landais and Søgaard (2019), an outcome is regressed on time relative to the birth of a child while non-parametrically controlling for age and calendar time trends. Given that age and time relative to childbirth fully determine cohort–defined as the age at which the child is born–there is no independent variation in cohort, highlighting the well-known age-period-cohort problem. This may explain why the standard child penalty event study does not explicitly account for childbirth cohort effects. If individuals who have children at different ages are systematically different in their labor market potential, then the child penalty may be confounded when cohort effects are not accounted for.

We provide a general proof that when relative time, age, and cohort fixed effects are all included in the event study framework, these fixed effects are identified up to a single linear trend, as long as the data consist of consecutive cohorts and age groups–conditions met in standard datasets. In this case, imposing one linear restriction on any set of fixed effects is sufficient to fully identify the model.

In the context of the child penalty, several natural restrictions offer potential solutions. First, if individuals do not adjust their labor market outcomes in anticipation

of having children, a reasonable restriction is to set the child penalty at some pre-birth period equal to that of a normalized reference period, often chosen as the year before childbirth. Second, economic theory suggests that while the impact of having children is significant during early prime working years–when human capital accumulation is high–the effect of delaying childbirth by an additional year diminishes and vanishes beyond a certain threshold. Imposing a flat slope on cohort fixed effects after a specific age provides an alternative identification strategy. Third, as in the case of measuring the life-cycle wage profile, one can impose a flat slope on age fixed effects after a certain age, capturing the common theoretical prediction that work experience has little to no impact on wages near the end of the life cycle (Lagakos et al., 2018).

Accounting for cohort fixed effects reverse the child penalty comparison across US regions and over the decades.

References

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Figure 1: Earnings penalty by US region: no cohort fixed effects

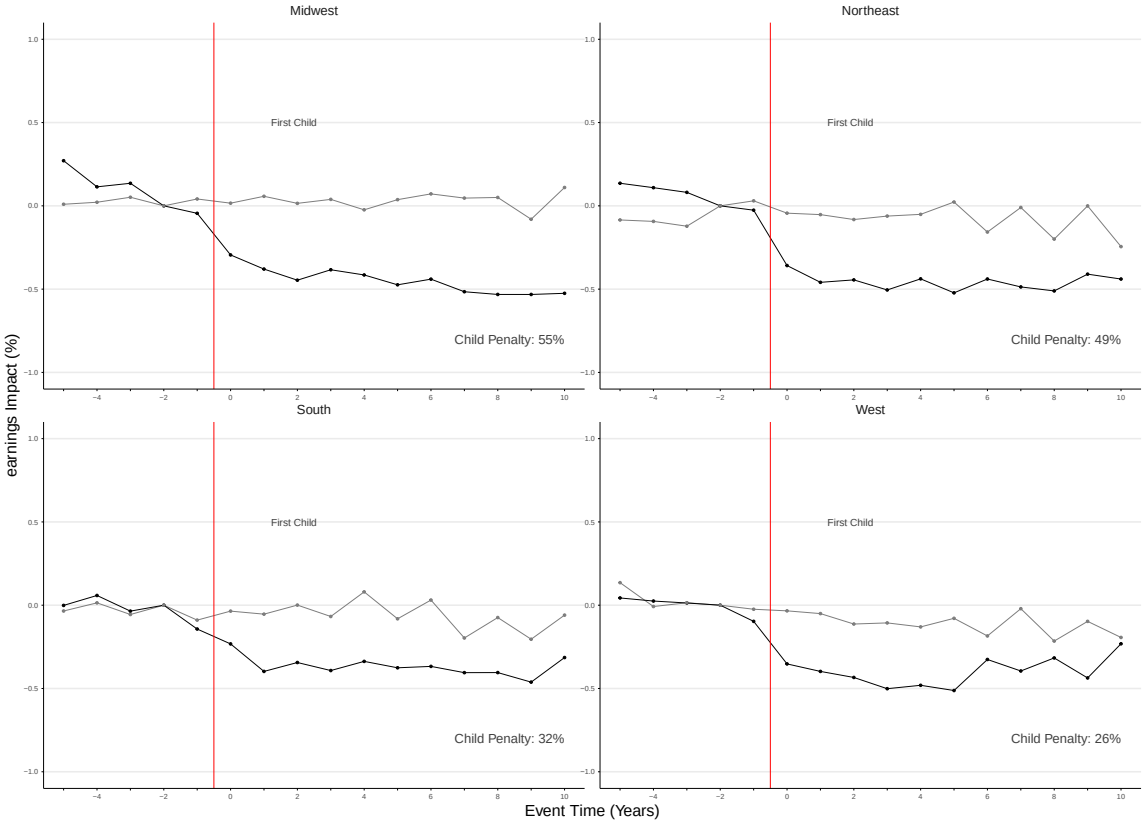


Figure 2: Earnings penalty by US region: with cohort fixed effects

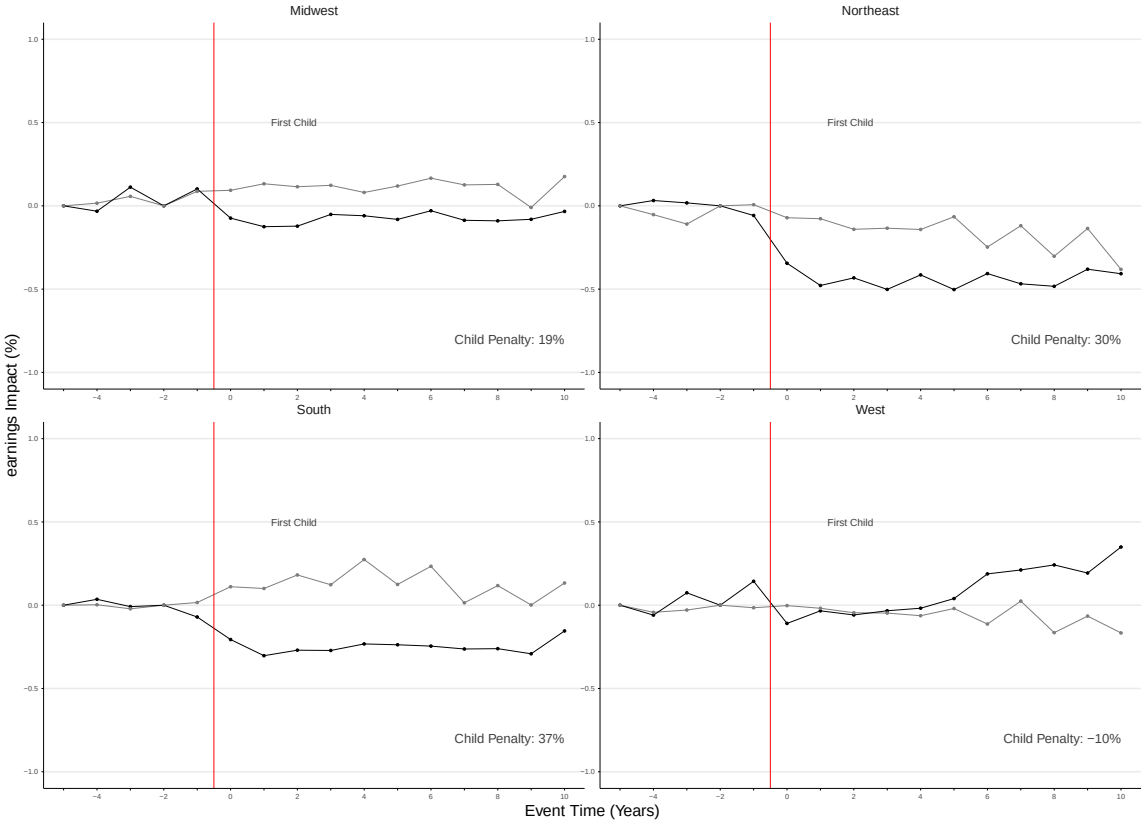


Figure 3: Annual employment penalty by US region: no cohort fixed effects

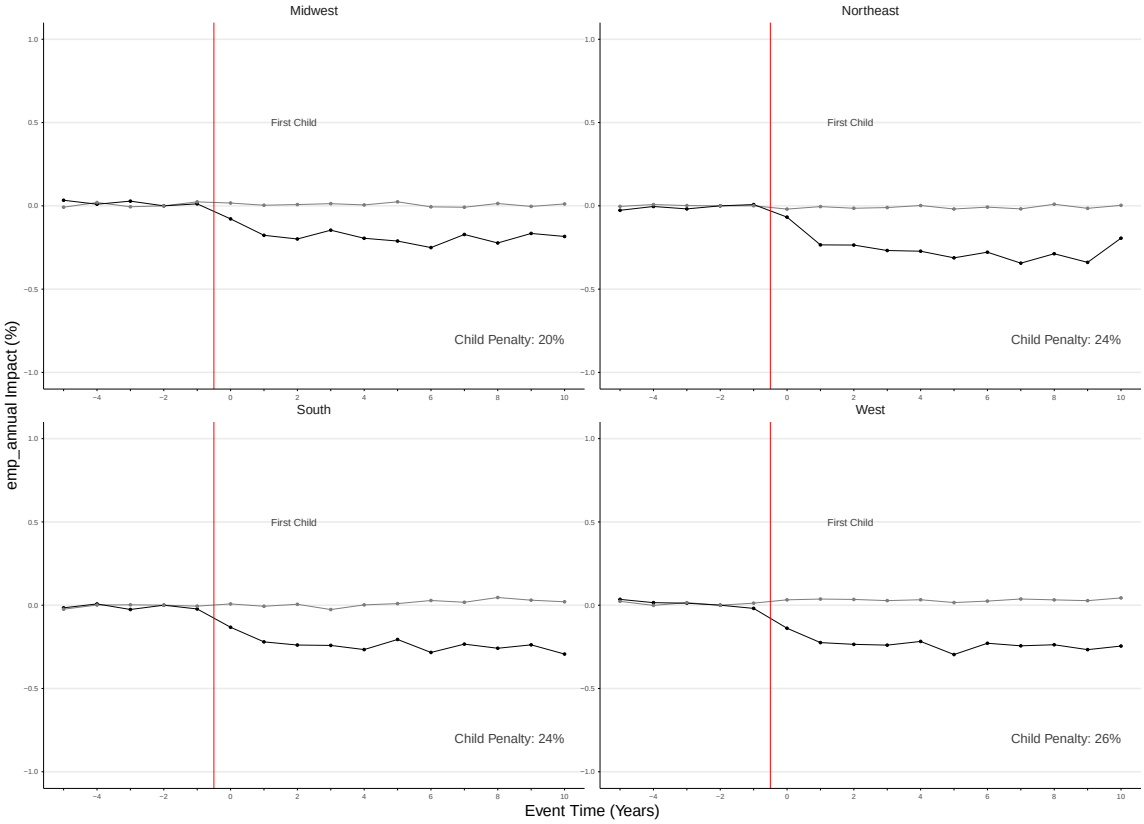


Figure 4: Annual employment penalty by US region: with cohort fixed effects

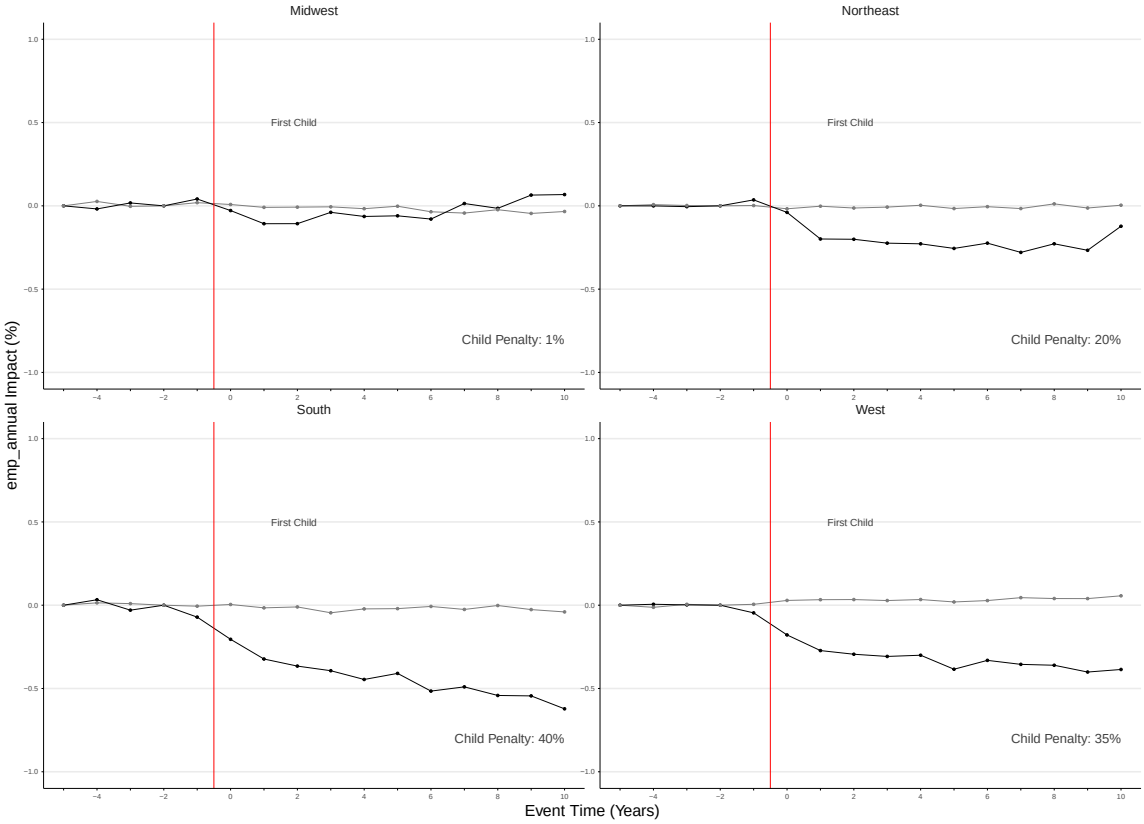


Figure 5: Weekly employment penalty by US region: no cohort fixed effects

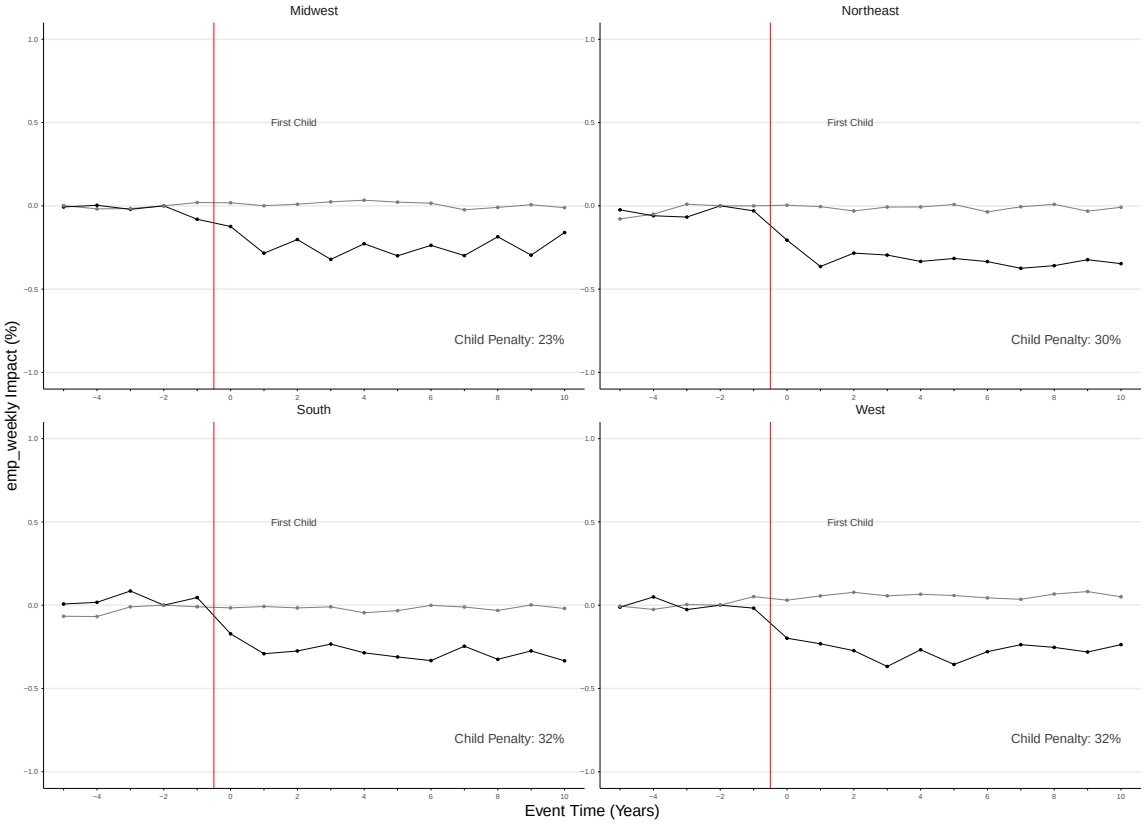


Figure 6: Weekly employment penalty by US region: with cohort fixed effects

