Postpartum Depression and the Motherhood Penalty*

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Abstract

Using Danish administrative data linked to two independent, validated postpartum depression screenings, we study how postpartum mental health shocks shape women's labor market trajectories. Event-study estimates show no pre-birth differences in trends between depressed and non-depressed mothers, but persistent employment gaps that widen immediately after birth. Health-care utilization patterns indicate that these differences reflect acute mental health shocks rather than pre-existing trends. The penalties are concentrated among less educated mothers and those in less family-friendly jobs. Our results highlight postpartum depression as a meaningful and unequal contributor to the motherhood penalty.

Keywords: Postpartum depression, motherhood penalty, labor market inequality
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1 Introduction

The transition to parenthood is one of the most consequential periods in women's lives, with lasting implications for both economic trajectories and health. A large and growing literature documents that the arrival of children produces substantial and persistent reductions in women's employment and earnings, commonly referred to as the motherhood penalty (Kleven et al., 2025; Cortés and Pan, 2023; Kleven et al., 2019). Childbirth also coincides with heightened vulnerability in maternal mental health. Clinical evidence indicates that 10–15 percent of mothers in high-income countries experience postpartum depression, with many more reporting elevated depressive symptoms that do not meet diagnostic thresholds (Wang et al., 2021). Despite the prominence of both phenomena, relatively little is known about how postpartum mental health contributes to the motherhood penalty.

In this paper, we provide the first causal evidence on the impact of postpartum depression on the motherhood penalty. Addressing this question requires the joint availability of validated measures of postpartum depression and longitudinal labor market outcomes. Such data are rare. We overcome this limitation by linking population-wide Danish administrative registers to two independent sources that measure postpartum depression using validated psychometric instruments. We use survey data from the Danish National Birth Cohort (DNBC), covering 30% of births in 1998–2002, and screening data from the municipal Nurse Home Visiting (NHV) program, covering births in 60 (out of 98) municipalities during 2012–2017. Importantly, our measures of postpartum depression capture mild to moderate cases rather than severe clinical illness, as they rely on reported symptoms rather than diagnoses or treatment. As a result, the labor market penalties we document arise among mothers at the margin targeted by population-wide screening and early-intervention programs in preventive maternal care.

We link these data containing mental health measures to administrative data on earnings, employment, and hours worked, tracing trajectories from four years before to four years after first birth. Using an event-study design in the spirit of Kleven et al. (2019), we estimate dynamic responses separately for mothers who do and do not screen positive for postpartum depression symptoms. To improve comparability between these groups, our baseline specifications implement propensity-score reweighting of non-depressed mothers based on pre-birth characteristics, following Kleven et al. (2021).[1]

We find that postpartum depression is associated with a persistent amplification of the motherhood penalty. In both the DNBC and NHV data, mothers who experience postpartum depression symptoms exhibit larger and more persistent declines in labor market outcomes following childbirth than mothers without such symptoms. While we document corresponding losses in earnings,

[1] We show that our results are robust to estimating unweighted specifications and to alternative weighting schemes.

the most robust and precisely estimated effects operate through employment (the extensive margin). Four years after childbirth, the employment penalty among depressed mothers is roughly three percentage points larger than among non-depressed mothers, a magnitude that is strikingly similar across the two samples despite their separation by more than a decade and their use of distinct mental health measures. This difference is economically meaningful and corresponds to approximately one third of the employment penalty among non-depressed mothers.

To assess whether these patterns reflect postpartum mental health shocks rather than broad pre-existing differences, we examine health care utilization around childbirth. In both samples, total general practitioner (GP) fees for depressed and non-depressed mothers follow closely parallel trajectories, remaining near the counterfactual up to about one year before birth, when fees begin to rise for both groups. After delivery, GP fees remain elevated for both groups, with a persistent positive differential for mothers who screen positive for postpartum depression. In contrast, mental health specific care rises sharply at childbirth among mothers who screen positive for postpartum depression, while remaining close to the counterfactual for other mothers. These patterns suggest that postpartum depression is a shock that persists well beyond the conventional six month period over which it is often defined. The concentration of this divergence around birth is consistent with an acute deterioration in mental well being around childbirth rather than the continuation of long run differences in underlying health or care seeking.

We next turn to factors that may mitigate the postpartum depression penalty. We hypothesize that the magnitude and persistence of the postpartum depression penalty depends on mothers' resources and the environments in which they work. More educated mothers may be better positioned to buffer a postpartum mental health shock through greater economic resources and access to market substitutes for household production (Aguiar and Hurst, 2007), as well as better health literacy and more timely engagement with care (Santos and Pinheiro, 2025; Cutler and Lleras-Muney, 2010; Currie and Moretti, 2003). The postpartum penalty may also be attenuated among women employed in more family-friendly job environments given the existing evidence that occupation characteristics and sector of employment are closely linked to the size and persistence of motherhood-related labor market losses (Cortés and Pan, 2023; Zucco, 2019; Bütikofer et al., 2018; Goldin and Katz, 2016; Bertrand et al., 2010; Hardoy and Schøne, 2008). Consistent with these ideas, we find that the postpartum depression penalty on employment is concentrated among mothers with at most a high school degree. The penalty is also driven by less family-friendly pre-birth job environments, proxied by high occupation-level gender wage gaps, low female representation among top earners within the occupation, and employment in the private sector.

Finally, we examine whether maternal postpartum depression generates spillovers within the household by studying fathers' labor market outcomes. We find limited evidence of systematic effects on fathers' employment, but some suggestive reductions in hours worked.

Our work relates to two strands of research. First, we add to the small economics literature on how maternal depression affects mothers' labor market outcomes in high-income settings, where depression is rarely observed consistently in administrative data or large representative surveys. Existing work often relies on variation in depression *treatment* for women who are on the margin of treatment and typically finds limited effects on employment (Currie and Zwiers, 2025; Laird and Nielsen, 2016). Because such designs jointly test treatment efficacy and the effect of depression itself, they may understate the labor market consequences of depressive episodes.[2] Second, we contribute to the literature on the labor market consequences of parenthood (Kleven et al., 2025; Cortés and Pan, 2023; Kleven et al., 2019). In a recent study, Ahammer et al. (2023) show that childbirth is followed by large and persistent gender gaps in antidepressant use in Austria and Denmark. Our results complement their evidence by showing that birth-related mental health shocks are associated with persistent losses in mothers' labor market attachment, providing a link between postpartum mental health and the economic component of the motherhood penalty.

Overall, our results suggest that postpartum depression can have large and lasting effects on labor market outcomes, even when symptoms are mild to moderate. We document these penalties in Denmark, a setting with universal health care, high labor force participation of women, generous parental leave, strong employment protections for new mothers, and subsidized childcare, indicating that existing institutions do not fully insure families against maternal mental health shocks. Our estimates are likely conservative relative to most countries, where protections for new parents are substantially weaker. The concentration of penalties among less educated mothers and among those in less family-friendly environments suggests that postpartum depression interacts with economic and institutional buffers that support labor market attachment. More broadly, our findings highlight postpartum depression as not only a health concern but also an important determinant of women's economic trajectories after childbirth, pointing to potential gains from timely mental health support and workplace accommodations in reducing persistent gender gaps in the labor market.

2 Institutional Background

We study child penalties in Denmark, a setting characterized by extensive public provision of health care and childcare and generous parental leave legislation. Health care is publicly financed and universally accessible, with no user fees for GP visits. All pregnant women are entitled to standardized prenatal and postnatal care, including routine contacts with GPs, midwives, and municipal health

[2] A number of papers also study associations between postpartum depression and material hardship, including food and housing insecurity (Corman et al., 2016; Noonan et al., 2016), while a large multidisciplinary literature focuses on early parenting and maternal well-being (Slomian et al., 2019; Netsi et al., 2018).

visitors. Health visitors offer up to five home visits during the first year after childbirth to assess maternal well-being, infant development, and broader family needs, with additional visits scheduled when concerns arise. GPs serve as the primary point of entry for mental health care and can initiate counseling, prescribe medication, or refer patients to psychologists or psychiatrists. Psychiatric services are free of charge with a GP referral, and psychotherapy for postpartum depression is partially subsidized in both periods we study. These institutional features substantially reduce financial and administrative barriers to accessing care. At the same time, awareness and recognition of postpartum mental health issues likely increased over time, and stigma may have declined, particularly for the more recent NHV cohorts. Denmark also offers generous parental leave benefits, strong employment protections for pregnant workers and new parents, and publicly subsidized childcare, with children guaranteed access to a publicly supported childcare placement from around their first birthday.[3] Taken together, Denmark's institutional environment provides strong support for combining parenthood and employment. The postpartum-depression-related employment penalties we document therefore arise despite generous health care access, parental leave, and childcare provision, and may be conservative relative to less supportive institutional settings.

3 Data

We use survey and register data from Denmark covering the period 1993–2022. These data contain individual-level records with unique personal identifiers that allow us to follow individuals over time and to link family members.

Maternal Depression. We draw on two complementary data sources to measure postpartum depression, described in detail in Appendix A.[4] First, we use survey data from the *Danish National Birth Cohort* (DNBC), which covers approximately 30 percent of all births in Denmark between 1998 and 2002. Postpartum depression is measured using survey responses from Interview 3, administered around six months after delivery. The interview includes nine questions: six drawn from the Symptoms Checklist-92 (depression and anxiety) and three from the General Health Questionnaire-60 (stress), each answered on a three-point Likert scale with higher values indicating more frequent

[3] While Denmark's family policies evolved over the period we study, the core institutional framework remained stable. Throughout, dismissal during pregnancy and parental leave was prohibited and parents retained the right to return to their pre-birth job (or an equivalent position). Paid parental leave expanded over time, from substantially shorter entitlements prior to the 2002 reform to 46 weeks of paid leave by 2012, with two weeks reserved for fathers and the remainder allocated flexibly within the household. Over the same period, municipalities shifted toward greater use of institutional daycare, but universal access, capped parental fees, and full-day availability remained in place across both cohorts.

[4] Due to data access restrictions, the two data sources are not linked to each other and are merged with other Danish registers under separate project protocols. As a result, some supplemental variables are available in one sample but not the other.

or severe symptoms. Following Anderson (2008), we standardize each item, construct a weighted index using the inverse covariance matrix, and re-standardize the resulting index. We classify mothers with index values above the 90th percentile as experiencing postpartum depression, consistent with prevalence estimated in other high-income countries (Wang et al., 2021).

Second, we use administrative data from the municipal *Danish Nurse Home Visiting* (NHV) program, which includes children born between 2012 and 2017. We were able to obtain screening data from 60 (out of 98) municipalities. The NHV program offers up to five universal nurse visits during the first year after childbirth, with additional visits provided as needed. Postpartum depression is assessed using the Edinburgh Postnatal Depression Scale (EPDS), typically administered around two months after birth. The EPDS ranges from 0 to 30, with higher scores indicating worse mental health. Following the Danish validation study by Smith-Nielsen et al. (2018), we classify mothers as being at risk of depression if their EPDS score is 11 or higher.

Our measures of postpartum depression are based on screening instruments rather than diagnoses, health-care utilization or medication use, and therefore primarily capture variation in mild to moderate depressive symptoms.[5] This margin is particularly policy-relevant, as it corresponds to the population targeted by large-scale screening and early-intervention efforts in preventive maternal care. Together, these two sources allow us to study maternal depression risk across cohorts and institutional settings: the DNBC provides rich survey-based measures in the early 2000s, while the NHV data offer more recent coverage using a clinically validated screening instrument. The combination strengthens both the validity and robustness of our analysis, ensuring that results are not specific to one period, measurement, or context.

Outcomes. We measure parental labor market outcomes using the *Income Statistics Register*. Our main outcomes are annual labor earnings (including zero earnings), an indicator for employment defined as having any positive labor income, and hours worked conditional on employment.[6] All monetary variables are expressed in 2015 DKK and converted to euros.

Additional Variables. We use several registers to obtain information on parents and their children. Information on year of birth comes from the *Population Register*, which we use to construct mothers' age fixed effects. Parental educational attainment is measured using the *Education Register*, from which we construct indicators for having less than a high school degree and for having at least some college education. Health care utilization around first birth is measured using the *National*

[5] Women experiencing severe depression are less likely to participate in the DNBC survey, and women who have already been diagnosed with depression are not screened in the NHV program.

[6] Hours worked are measured following Kleven et al. (2019). The measure is derived from mandatory contributions to the labor market pension scheme (ATP), which are based on reported hours worked and recorded in discrete bins. We map these bins into an annual measure of hours, yielding a step-function measure with 37 possible values.

Health Insurance Register, which records reimbursements to primary care physicians for all services covered by the national health insurance system. We compute total GP fees and indicators for psychological counseling in primary care (DNBC), depression diagnostic tests in primary care (NHV), and for any consultation with privately practicing psychologists or psychiatrists.[7]

We use the *Employment Classification Module* and the *Register-Based Labor Force Statistics* to characterize mothers' pre-birth job characteristics, based on their last job in the two to four years before the birth. For the DNBC sample, we use 3-digit ISCO codes to classify mothers' pre-birth occupations. For each occupation in which at least 10 women and 10 men are employed, we compute the ratio of women's average wages to men's average wages and define an indicator for high gender wage gap occupations as those with a ratio below the median across occupations. We also calculate, by occupation, the share of women among workers in the top 20 percent of the earnings distribution within the occupation and define an indicator for low female representation among top earners as occupations where this share falls below the median across occupations. For the NHV sample, we create an indicator for public versus private sector employment.

Analysis sample and descriptive statistics. We begin with the universe of first-time mothers who gave birth between 1998–2002 (DNBC) or 2012–2017 (NHV) and who are observed in the medical birth registry. We impose two restrictions. First, we require that mothers are observed in the labor market data each year from four years before to four years after first birth, regardless of their employment status. Second, we restrict the sample to native-born mothers to reduce heterogeneity in attitudes toward mental health. Finally, we limit the sample to mothers who completed the DNBC survey or participated in the NHV postnatal depression screening. The final samples include 30,270 DNBC mothers and 45,612 NHV mothers.

Appendix Table B1 compares our analysis samples to the families who gave birth in the same years but were not included in the DNBC or NHV data. Because sample sizes differ across groups, we assess balance using standardized (normalized) differences rather than t-tests, following best practice to emphasize effect sizes rather than statistical significance when evaluating covariate balance (McKenzie, 2017; Imbens and Rubin, 2015).[8] Across both periods, observable characteristics are closely aligned, with nearly all standardized differences close to or below the conventional 0.1 threshold for imbalance. The only variable substantially exceeding this threshold is maternal years of schooling in both cohorts, indicating modest positive selection on education into the survey and screening samples. Overall, the analysis samples appear broadly representative of their respective birth cohorts. If anything, since higher maternal education is associated with a lower prevalence of postpartum de-

[7] We do not observe prescription drug use in our data.

[8] The standardized difference is defined as $\frac{\overline{X}_A - \overline{X}_B}{\sqrt{\frac{1}{2}\left(s_A^2 + s_B^2\right)}}$, where $\overline{X}_A$, $\overline{X}_B$ are group means and s_A^2, s_B^2 are variances. This provides a scale-invariant measure of the magnitude of imbalance.

pression (Cena et al., 2021; Matsumura et al., 2019) and smaller child penalties (Bazen et al., 2025; Doren, 2019), this positive selection suggests that our estimates likely represent a lower bound on the true effects in the full population.

Appendix Figure A1 presents the distributions of the two postpartum-depression measures used in the analysis. The gray bars show the standardized DNBC mental health index, while the red line displays the standardized EPDS scores from the NHV screening data. The two distributions are similar: both are smooth and approximately unimodal, with long right tails reflecting a small share of mothers reporting elevated symptom levels. The thresholds (the top 10 percent of the DNBC index and EPDS ≥ 11) capture comparable portions of the upper tail (10 and 8.4 percent, respectively), without any evidence of mass points or discontinuities around the cutoffs. These patterns provide reassurance that the depression indicators are well behaved and that the classification of mothers as "depressed" versus "non-depressed" primarily distinguishes those in the high-symptom range rather than a separate subgroup.

Appendix Table B2 compares pre-birth characteristics of mothers classified as depressed and non-depressed in the DNBC and NHV samples. The table shows that mothers classified as depressed and non-depressed are generally similar in both the DNBC and NHV samples, with small standardized differences. However, a few characteristics do display meaningful imbalance across both datasets. In particular, depressed mothers have lower educational attainment, higher baseline GP fees, and lower labor earnings measured two years prior to birth, indicating differences in both socioeconomic status and pre-birth health-care utilization. To address these imbalances, we implement inverse probability weighted regressions that reweight the comparison group to match depressed mothers on key pre-birth characteristics. We detail the empirical strategy in the next section.

4 Empirical Strategy

To describe how mothers' labor-market outcomes evolve around the arrival of the first child, we follow Kleven et al. (2019) and estimate event-study specifications separately by postpartum mental health status $d \in \{0,1\}$, where $d = 1$ indicates that the mother is classified to have postpartum depression. We track labor market outcomes for four years before and after childbirth. The baseline specification is:

$$y_{it}^{d} = \sum_{\substack{j=-4 \\ j\neq -2}}^{4} \beta_{j}^{d} \mathbf{1}\left[j = t - b_i \right] + \theta_{t}^{d} + \gamma_{a(it)}^{d} + \varepsilon_{it}^{d}, \tag{1}$$

where y_{it}^{d} denotes the labor market outcome for person i in calendar year t, b_i is the year when i first becomes a parent, θ_{t}^{d} are calendar-year fixed effects, and $\gamma_{a(it)}^{d}$ are age fixed effects. Indicators

are included for all $j \in \{-4, \ldots, 4\}$ except $j = -2$, which serves as the omitted (baseline) year.

Interpretation and identification. The coefficients β_j^d trace mean outcomes at event time j relative to the baseline year $j = -2$, conditional on age and calendar-year effects. We test for parallel pre-birth trends within each group. The absence of differential pre-trends supports the event-study design. Comparing estimates across groups additionally requires that pre-birth observables (measured two years before first birth) are balanced. As documented in Appendix Table B2, mothers with and without postpartum depression are broadly similar, though some differences in pre-birth characteristics remain, motivating the use of propensity-score weighting. A causal interpretation of the post-birth depression gap therefore rests on the assumption that, conditional on the weighting covariates, mothers' labor market trajectories would have evolved similarly in the absence of postpartum depression. This assumption could be violated if unobserved factors, such as prior mental health history or socioeconomic stressors, are correlated with both postpartum depression and later labor market outcomes. We therefore interpret the weighted estimates as informative evidence on the magnitude of the depression gap and, if anything, as likely lower bounds on the causal effects.

Propensity-score weighting. Following Kleven et al. (2021), we address imbalances between depressed and non-depressed mothers by reweighting the comparison group of non-depressed mothers. Let x denote a vector of pre-birth covariates. We estimate the propensity score $p(x) = \Pr(d = 1 \mid x)$ and assign weight $p(x_i)/(1 - p(x_i))$ to non-depressed mothers, while mothers with postpartum depression receive unit weight. In our main analyses, we construct weights using a parsimonious set of characteristics measured at $t - 2$: maternal earnings, maternal GP fees, and an indicator for any maternal contacts with a psychologist or psychiatrist. In robustness checks, we construct weights using a broader set of covariates that additionally includes maternal years of schooling, maternal employment, and maternal mental health-related GP and psychologist/psychiatrist contacts. Table 1 and Appendix Table B3 report summary statistics by depression status in the weighted samples under the baseline and extended weighting schemes. The tables confirm that, after applying weights, depressed and non-depressed mothers are highly comparable in pre-birth characteristics, as virtually all the standardized differences are smaller than 0.1.

Normalization. For presentation, we convert the level coefficients into percentage deviations,

$$P_j^d \equiv \frac{\hat{\beta}_j^d}{\mathbb{E}\left[\tilde{y}_{it}^d \mid j\right]}, \qquad \tilde{y}_{it}^d = \theta_t^d + \gamma_{a(it)}^d, \tag{2}$$

which expresses the event-time effect as a share of the predicted counterfactual outcome. This normalization highlights the dynamic path of outcomes before and after first birth for each mental

health subgroup without imposing log-linearity and while retaining zeros in the data. We plot P_j^d to illustrate how labor market outcomes evolve around first birth across women with and without postpartum depression.

5 Results

Postpartum Depression and the Motherhood Penalty. Figure 1 plots event-time profiles of mothers' yearly earnings, employment, and working hours (conditional on employment) around first birth, separately for mothers classified as depressed and non-depressed. Appendix Figure B1 and Appendix Figure B2 show that the estimated event-study profiles are very similar in the unweighted sample and under the full weighting specification. Consistent with prior work on the child penalty, labor market outcomes decline sharply at childbirth and recover only partially over the subsequent years.

The first panel presents effects on yearly earnings. In both the DNBC and NHV samples, earnings decline sharply at the time of birth and remain persistently below the pre-birth counterfactual throughout the follow-up period. Pre-birth trajectories are nearly identical for depressed and non-depressed mothers, supporting a clean comparison of post-birth dynamics. Confidence intervals around the earnings estimates of depressed mothers are sizable due to smaller sample size and generally overlap with those of non-depressed mothers, but the point estimates in both datasets consistently suggest larger post-birth earnings losses among mothers classified as depressed. In the DNBC, the earnings penalty associated with postpartum depression is relatively stable over the four years following childbirth. Four years after birth, earnings are approximately 16.5% lower for depressed mothers, compared with 14.0% for mothers without postpartum depression. In the NHV sample, the earnings gap appears to widen over time, with earnings declines of XX% for depressed mothers and XX% for non-depressed mothers by the end of the observation window.

The second panel turns to employment. In both datasets, employment trajectories are virtually identical prior to birth, with no evidence of differential pre-trends between depressed and non-depressed mothers. After childbirth, employment falls sharply for all mothers, but the decline is larger for mothers classified as depressed and the gap persists throughout the follow-up period. The confidence intervals indicate that this post-birth employment gap is estimated with meaningful precision over much of the post-birth horizon. Four years after birth, the employment penalty in the DNBC is approximately 7.8% for non-depressed mothers and 10.8% for depressed mothers. The NHV sample shows a comparable pattern, with corresponding declines of around XX% and XX%.

The last panel examines intensive-margin responses. In the DNBC, hours worked conditional on employment decline after birth for both groups, and point estimates suggest somewhat larger post-birth reductions among mothers classified as depressed, although the confidence intervals generally

overlap. In the NHV sample, the hours profiles for depressed and non-depressed mothers are very similar and the confidence intervals overlap throughout, indicating no statistically distinguishable differences in hours conditional on employment.

Overall, the results indicate that postpartum mental health shocks have lasting consequences for mothers' labor market attachment, rather than reflecting short-lived disruptions around the time of childbirth.

Role of Unobserved Health. Could underlying health differences explain the post-birth employment gaps between mothers with and without postpartum depression? To shed light on this, we investigate in Figure 2 the evolution of overall and mental health-related health-care utilization around childbirth. In both the DNBC and NHV samples, total GP fees evolve similarly for depressed and non-depressed mothers prior to birth, staying close to the counterfactual. GP fees increase for both groups in the year preceding childbirth, consistent with standard prenatal care. The increase is somewhat larger among mothers who later screen positive for postpartum depression, suggesting some of these women may start experiencing depression during pregnancy. After delivery, overall GP utilization remains elevated for both groups and continues to track broadly in parallel.

In contrast, measures of mental health–related care show a sharp and discrete divergence at childbirth. The probability of receiving depression-related counseling or screening by a GP rises abruptly for depressed mothers in the year of birth by roughly 47.1% in the DNBC and XX% in the NHV, while remaining close to baseline for non-depressed mothers. Similarly, contacts with psychologists or psychiatrists increase sharply at birth for depressed mothers and persist thereafter, with no corresponding increase among non-depressed mothers. The timing and concentration of these differences strongly support the interpretation that postpartum depression reflects an acute deterioration in mental well-being around childbirth that persists throughout the follow-up period, rather than the continuation of pre-existing differences in health status or care-seeking behavior.

Benchmarking the Employment Effects. How large is the estimated effect of postpartum depression on the motherhood penalty? Our results indicate that mothers with postpartum depression experience an additional 2.9 percentage point reduction in employment in the four years following childbirth, relative to mothers without postpartum depression. This translates to a 3.1% reduction when compared to the counterfactual employment rate of depressed mothers in the absence of the birth. To gauge the magnitude of this effect, we compare it to the employment consequences of other health shocks. Bradley et al. (2002) find that women diagnosed with breast cancer in the US experience a 7 percentage point (11%) decline in employment during the 2–3 years after diagnosis. García-Gómez et al. (2013) document comparable impacts of acute health shocks: an acute hospitalization reduces women's employment in the Netherlands by 8.4 percentage points (9.6%) two

years later. Conti et al. (2025) find that the average employment decline due to menopause over the four years after onset is 0.3–0.7 percentage points (around 1%). Our estimates suggest that the employment losses associated with postpartum depression are roughly one third of the size of those stemming from major health shocks such as breast cancer or acute hospitalization, yet substantially larger than the effects typically attributed to menopause-related symptoms, underscoring the importance of postpartum depression as a contributor to the motherhood penalty.

The Mitigating Role of Education and Job Characteristics. In this section, we examine whether education and job characteristics can mitigate the labor market consequences of postpartum depression. There are several reasons why the postpartum penalty may vary systematically with maternal education. More educated mothers tend to have greater economic resources, which may allow them to purchase market substitutes for household production and allocate less time to non-market tasks (Aguiar and Hurst, 2007), reducing the need to exit employment when coping with mental health challenges. Education is also associated with better health literacy and greater engagement with preventive and treatment services (Cutler and Lleras-Muney, 2010; Currie and Moretti, 2003). In addition, there are well-documented socioeconomic gradients in treatment gaps and unmet needs for mental health care (Santos and Pinheiro, 2025).[9] These patterns suggest that higher education may facilitate earlier recognition of symptoms and more timely engagement with treatment, potentially shortening the duration or severity of postpartum depressive episodes. Finally, higher education is associated with sorting into occupations and firms that offer greater stability, benefits, and flexibility, and that impose smaller penalties for employment interruptions, which can help mitigate employment and earnings losses following health or family-related shocks (Blau and Kahn, 2017). Taken together, these channels suggest that the employment consequences of postpartum depression may be smaller and less persistent among mothers with higher education.

We assess this hypothesis by estimating event-study profiles separately by pre-birth educational attainment. As shown in Figure 3, employment declines following childbirth are substantially larger for depressed mothers with lower education relative to their non-depressed counterparts.[10] By contrast, among mothers with at least some college education, we find little evidence of a differential post-birth employment penalty associated with postpartum depression.

The postpartum penalty may also vary systematically with job characteristics. Prior work shows that occupational pay structures and work demands play a central role in gender wage gaps, particularly around childbirth (see Cortés and Pan, 2023, for a recent review). Women fall behind men the most in occupations that reward long and inflexible hours through non linear pay schedules

[9] Although Denmark has universal health insurance and broad access to services, more educated individuals may still be better able to navigate the health-care system and obtain timely or higher-quality care (Packness et al., 2021).

[10] Appendix Figure B3 and Appendix Figure B4 present the corresponding results for earnings and hours worked, respectively.

(Bütikofer et al., 2018; Goldin, 2014; Bertrand et al., 2010). In these occupations women are also less likely to reach the top of the earnings distribution (Bertrand et al., 2010) and new mothers are more likely to switch jobs or exit employment (Ishizuka and Musick, 2021). In contrast, gender gaps and motherhood related penalties are smaller in occupations with more flexible hours and more linear pay schedules (Goldin and Katz, 2016). Gender gaps also tend to be smaller in occupations with a larger share of public sector employees, and wage penalties after childbirth are markedly lower in the public sector than in the private sector (Zucco, 2019; Hardoy and Schøne, 2008). Against this backdrop, our hypothesis is that the labor market consequences of postpartum depression may be attenuated in job environments that are more family-friendly.

Figure 4 sheds light on the plausibility of this hypothesis. We assess whether the employment consequences of postpartum depression vary across occupations along three proxies for family-friendliness: (i) the occupation-level gender wage gap, defined as the women-to-men average wage ratio across 3-digit ISCO occupations in the DNBC, (ii) female representation among top earners, defined as the share of women in the top 20 percent of earners within each occupation in the DNBC, and (iii) employment in the public versus private sector in the NHV.[11] For each proxy, we split the sample into settings that are plausibly more supportive of mothers' labor market attachment (lower occupation-level gender wage gaps, higher female representation among top earners, and public-sector employment) versus less supportive settings (higher wage gaps, lower representation, and private-sector employment). Across these measures, the estimates consistently indicate larger and more persistent penalties for depressed mothers in less family-friendly job environments, while in more family-friendly occupations there is no evidence of a differential postpartum depression penalty.

Potential Spillovers to Fathers. Finally, we examine whether maternal postpartum depression is associated with changes in fathers' labor market outcomes. A growing economics literature documents spillovers from health shocks within families (Adhvaryu et al., 2024; Breivik and Costa-Ramón, 2024; Anand et al., 2022; Fadlon and Nielsen, 2021). Fathers may also play an important role in buffering the consequences of maternal postnatal health problems through adjustments in labor supply. Appendix Figure B7 plots fathers' outcomes around first birth by maternal postpartum depression status. In the DNBC sample, fathers partnered with mothers classified as depressed exhibit larger post-birth earnings declines, driven primarily by responses at the intensive margin. In the NHV sample, the patterns are noisier but point estimates similarly suggest reductions in fathers' hours worked when mothers screen positive for depression. While these estimates are imprecise, the direction of the responses is consistent with some reallocation of fathers' time toward caregiving in

[11] Appendix Figure B5 and Appendix Figure B6 present the corresponding results for earnings and hours worked, respectively.

response to maternal mental health challenges.

6 Conclusion

This paper examines the impact of postpartum depression on the motherhood penalty. We show that mothers who experience postpartum depression symptoms suffer larger and more persistent employment losses after childbirth, with effects that remain visible several years later. These penalties are highly unequal. They are concentrated among mothers with lower education and among those employed in less family-friendly jobs prior to birth, while we find little evidence of differential penalties in more supportive work environments.

Our results highlight that even mild to moderate postpartum depression may lead to substantial, persistent and unequal economic consequences. A key implication is that broad access to health care and family policies does not, by itself, eliminate the long-run employment consequences of maternal mental health shocks. This points to a potential role for interventions that link screening and timely treatment to policies that facilitate continued work attachment, such as workplace flexibility and accommodations in the post-birth period.

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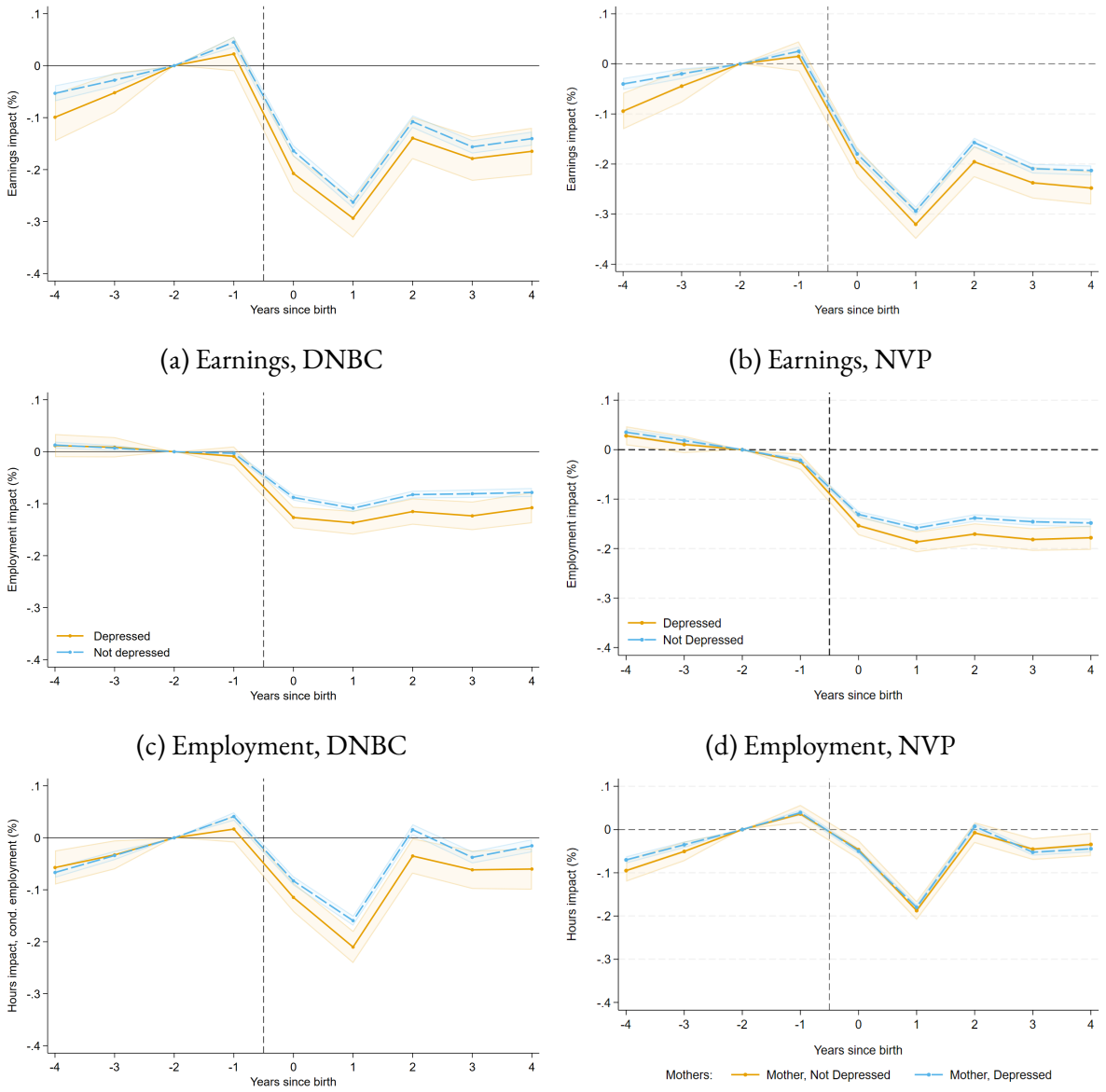


(a) Earnings, DNBC

(b) Earnings, NVP

(c) Employment, DNBC

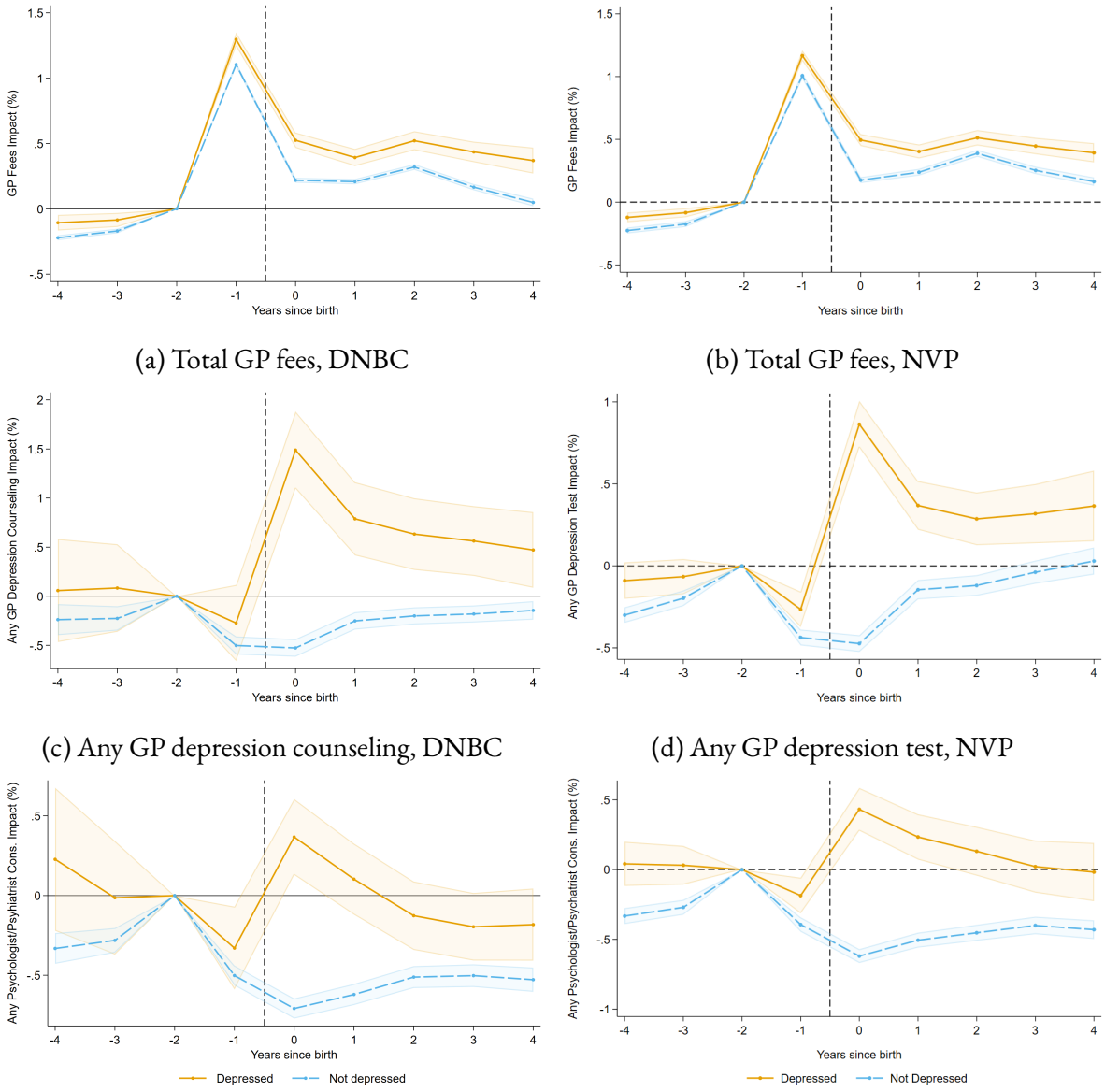
(d) Employment, NVP

(e) Hours | Working, DNBC

(f) Hours | Working, NVP

Figure 1: Effects of parenthood on mothers' labor market outcomes by postpartum depression status

Notes: Samples include first-time native born mothers observed from four years before to four years after first birth. Each panel plots event-time coefficients from Equation (1), shown as percentage deviations P_j^d defined in Equation (2). Outcomes are yearly earnings and employment probability (extensive margin), as well as yearly hours conditional on being employed. Left-hand panel classifies postnatal depression using DNBC self-reported survey responses, while right-hand panel uses the EPDS screening available in the NHV data (see Section 3). Event time is $j = t - b_i$, with b_i the year of first birth, and coefficients are normalized to $j = -2$ following the empirical strategy in Section 4. Orange solid lines plot the outcomes for mothers classified as depressed in the postnatal period, while blue dashed lines plot the outcomes of mothers not classified as depressed. Shaded areas show 95% confidence intervals based on robust standard errors. The sample of non-depressed mothers is weighted using inverse probability weights as described in Section 4.



(a) Total GP fees, DNBC

(b) Total GP fees, NVP

(c) Any GP depression counseling, DNBC

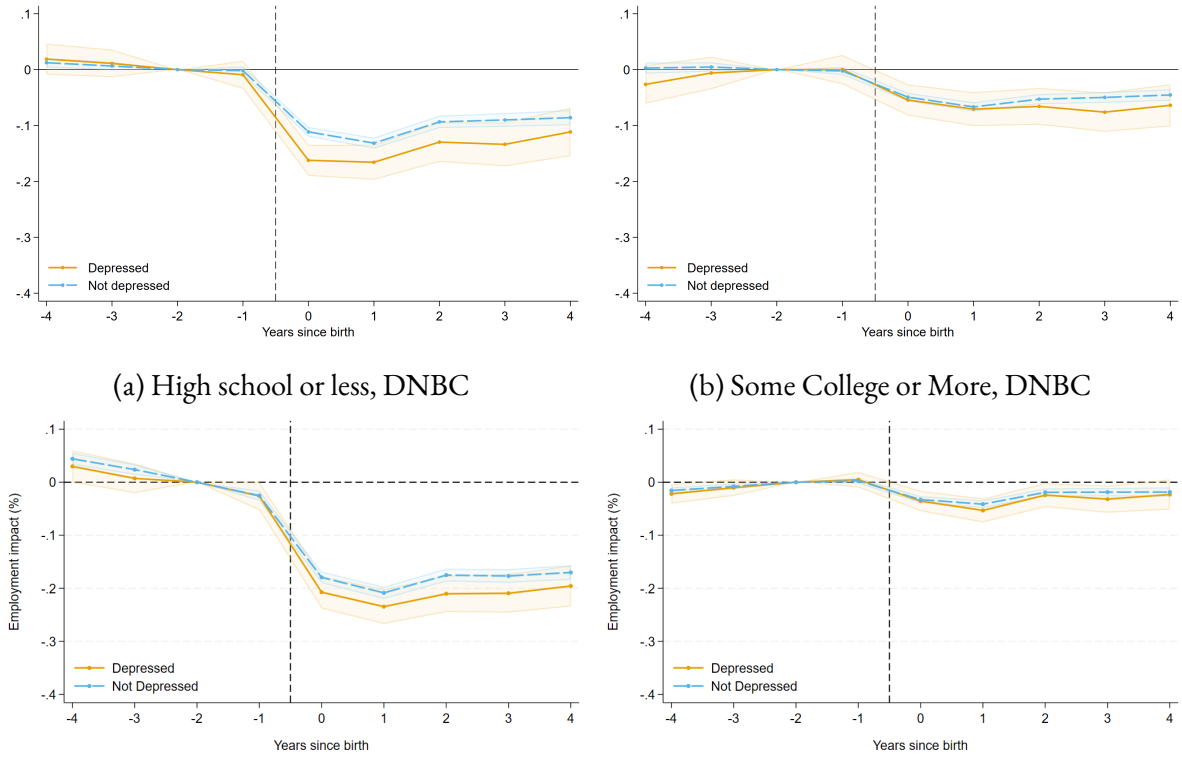
(d) Any GP depression test, NVP

(e) Any psychological contact, DNBC

(f) Any psychological contact, NVP

Figure 2: Effects of parenthood on mothers' health care utilization by postpartum depression status

Notes: See notes to Figure 1. Outcomes are: total GP fees, an indicator for receiving psychological counseling (DNBC sample) or being administered a depression test (NHV sample) by a GP, and an indicator for any contact with a psychiatrist or psychologist.



(a) High school or less, DNBC

(b) Some College or More, DNBC

(c) High school or less, NHV

(d) Some College or More, NHV

Figure 3: Effects of parenthood on mothers' employment by education and postpartum depression status

Notes: See notes to Figure 1. Education is defined as the highest degree attained 2 years before birth. Left-hand panel restricts the sample to women with at most a high school degree, right-hand panel to women who obtain post-secondary education.

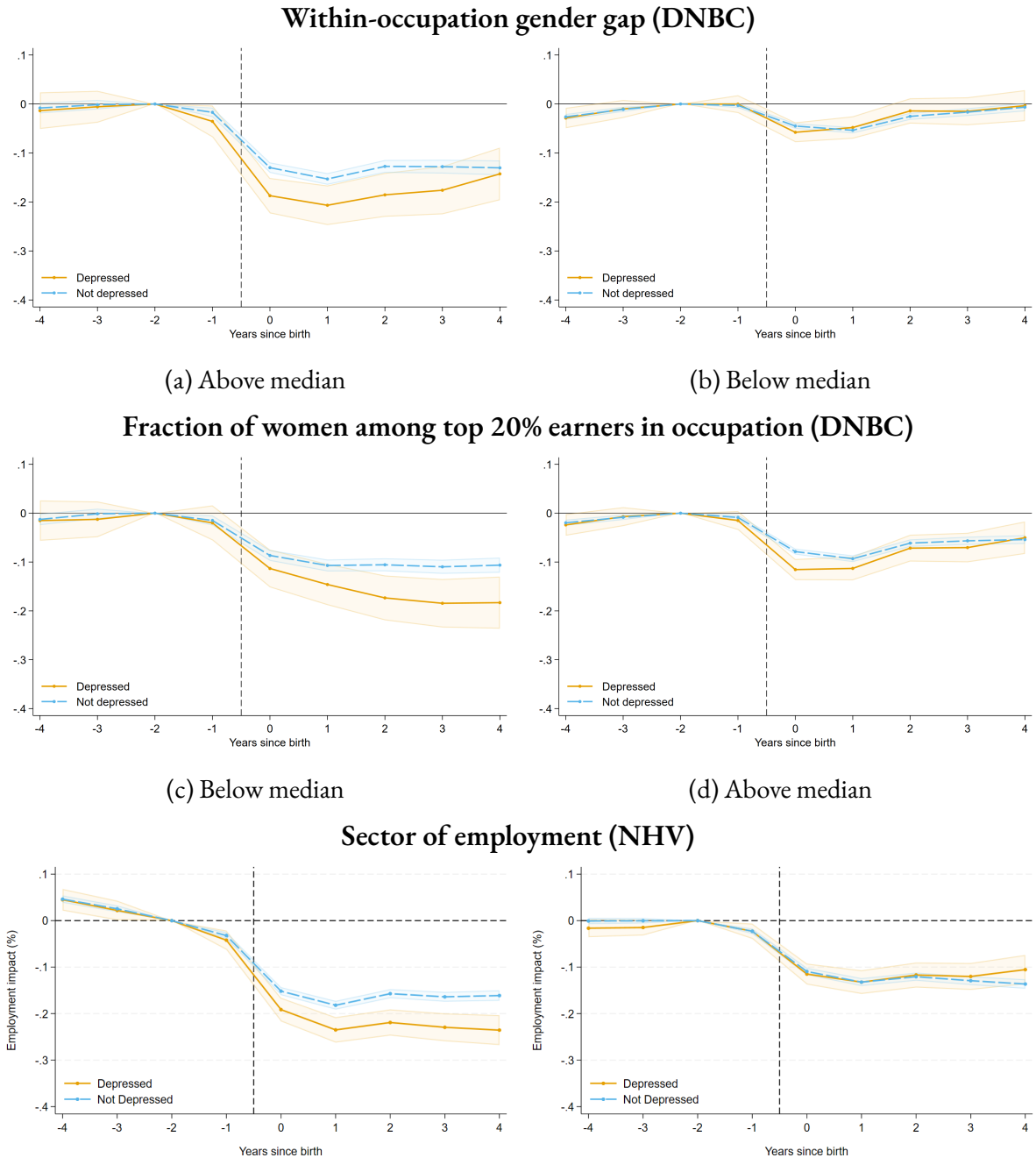


Figure 4: Effects of parenthood on mothers' employment by job characteristics and postpartum depression status

Notes: See notes to Figure 1. Left-hand panel refers to less family-friendly job characteristics, right-hand panel to more family-friendly job characteristics. Top two Figures split the DNBC sample based on whether the gender wage gap within the last occupation held 2–4 years before birth is above (a) or below (b) the median gender wage gap, with the gender gap defined as the ratio of women to men earnings. Middle two Figures split the DNBC sample based on whether the fraction of women among the top 20 percent earners in the last occupation held 2–4 years before birth is below (c) or above (d) the median. The bottom tow Figures split the NHV sample based on whether the last job held 2–4 years before birth was in the private (e) or public (f) sector.

Table 1: Descriptive Statistics of the Analysis Samples: Mothers with and without Postpartum Depression (Baseline Weights)

	DNBC sample (birth cohorts: 1998–2002)			NHV sample (birth cohorts: 2012–2017)		
	Mother not depressed (N = 27,305) (1)	Mother depressed (N = 2,965) (2)	Std. diff. (3)	Mother not depressed (N = 40,408) (4)	Mother depressed (N = 3,704) (5)	Std. diff. (6)
A. Child characteristics						
Female child	0.49	0.49	0.004	0.48	0.48	0.000
B. Mother's characteristics						
Years of schooling	13.92	13.76	0.077	14.30	14.22	0.030
Age at birth	26.34	26.47	−0.032	28.23	28.65	−0.087
Employed	0.93	0.93	0.032	0.90	0.89	0.032
Labor earnings (1,000EUR)	25.90	25.90	0.000	26.68	26.72	−0.002
GP fees (1,000EUR)	0.14	0.14	0.016	0.17	0.17	0.000
GP depression counseling (DNBC)/test (NHV)	0.03	0.03	−0.018	0.12	0.15	−0.087
Psychologists/psychiatrists consultation	0.04	0.04	0.002	0.11	0.11	0.000
C. Father's characteristics						
Years of schooling	14.07	13.85	0.102	13.98	13.87	0.035
Age at birth	28.92	28.88	0.010	30.58	30.97	−0.069
Employed	0.92	0.93	−0.008	0.90	0.90	0.000
Labor earnings (1,000EUR)	37.45	37.44	0.000	37.59	37.51	0.003
GP fees (1,000EUR)	0.06	0.06	0.002	0.06	0.06	0.000
GP depression counseling (DNBC)/test (NHV)	0.01	0.01	−0.027	0.06	0.07	−0.024
Psychologists/psychiatrists consultation	0.01	0.01	0.001	0.08	0.10	−0.029

Notes: Samples include first-time native born mothers observed from four years before to four years after first birth, their first-born children, and the fathers of these children. Columns 1–3 present, for the DNBC sample, means for the sample of mothers classified as not depressed (Column 1) and as depressed (Column 2), as well as the standardized difference between these means. Columns 4–6 present, for the NHV sample, means for the sample of mothers classified as not depressed (Column 4) and as depressed (Column 5), as well as the standardized difference between these means. All parental characteristics are measured 2 years before the birth unless noted otherwise. All monetary variables are expressed in 2015 DKK and converted to euros. The sample of non-depressed mothers is weighted using inverse probability weights as described in Section 4.

Postpartum Depression and the Motherhood Penalty

Online Appendix

Appendix A

Data Sources

A.1 The Danish National Birth Cohort Data

The Danish National Birth Cohort (DNBC) is a nationwide longitudinal study that enrolled more than 90,000 pregnancies between 1996 and 2002, corresponding to roughly 30 percent of all births in Denmark during this period. Women were recruited at their first prenatal visit with a general practitioner and subsequently participated in a series of structured telephone interviews conducted by trained interviewers using a standardized protocol. For our analysis, we focus on first births from the 1998–2002 cohorts, for whom both pregnancy interviews and the postpartum interview were consistently administered.

The DNBC collects detailed information on mothers' health, behaviors, and socioeconomic characteristics during pregnancy. Maternal mental health is assessed through self-reported symptom questions included in the postpartum interview conducted approximately six months after childbirth. These questions cover symptoms of anxiety, depression, and stress and are derived from validated instruments—the Symptoms Checklist-92 (SCL-92) and the General Health Questionnaire (GHQ-60)—adapted to a three-point response scale ("not at all," "a little," "a lot"). The postpartum interview includes three items each for anxiety, depression, and stress, as well as a combined summary score ranging from 0 to 18.

Prior studies based on DNBC classify mothers as having elevated postpartum symptoms using the cutoff closest to the 90th percentile of the combined emotional-distress score (Skov et al., 2022). We follow a similar approach where we construct a standardized index for mental health and classify mothers with index values above the 90th percentile as depressed.

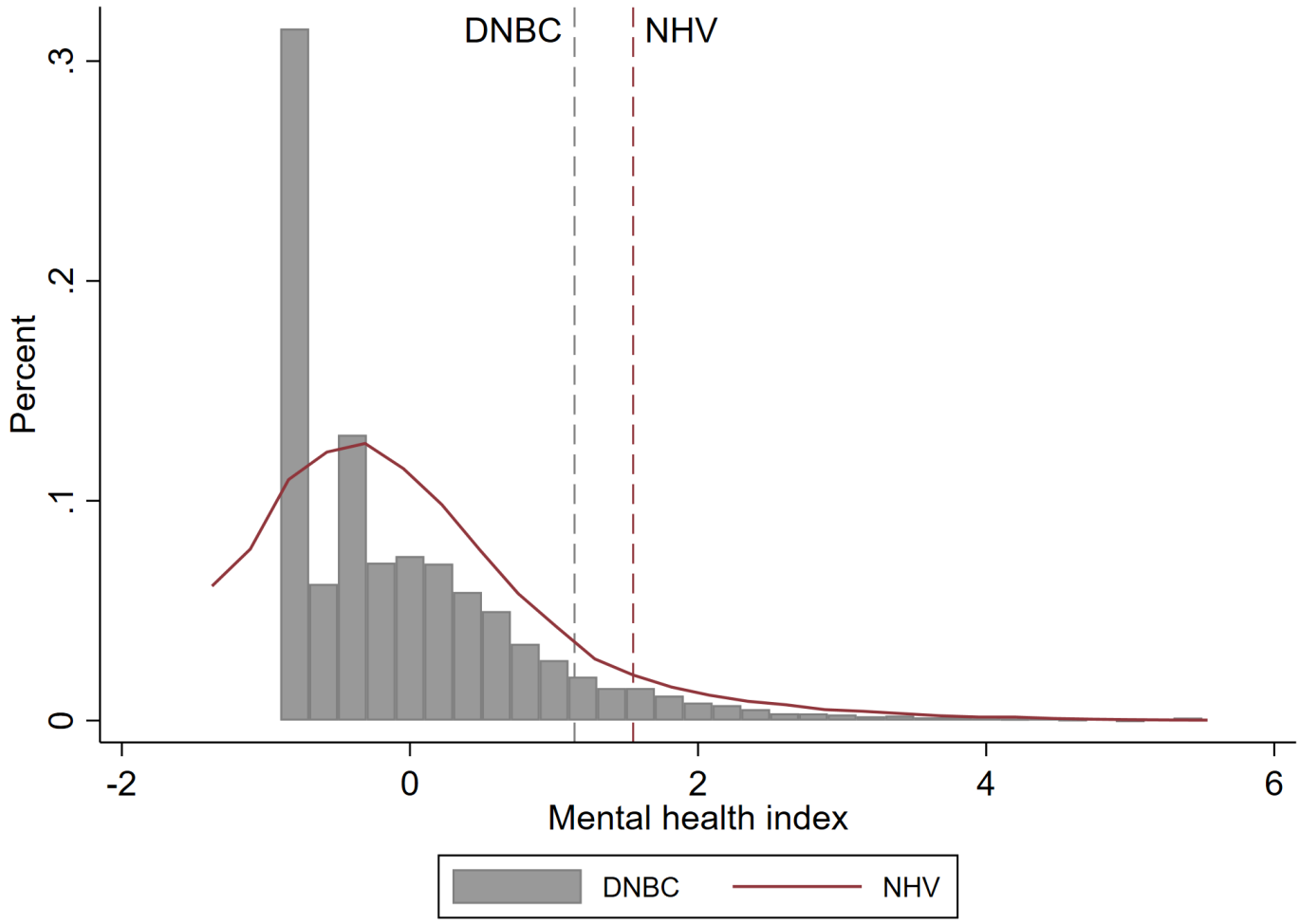
A.2 The Universal Mental Health Screenings

The Danish nurse home visiting program (NHV) provides structured postnatal support to all families with newborns. The program includes up to five universal home visits during the child's first year of life, with additional targeted visits offered at the discretion of the family nurse. Targeted visits may occur during pregnancy, after the first year, or whenever concerns arise, and nurses can refer families to other health professionals when needed. Nurses also organize mother groups for families who consent, providing opportunities for peer support during the first year after birth. The overarching goals of NHV are to monitor family health and well-being, support infant development, and identify families who may benefit from additional services.

In recent years, an increasing share of Danish municipalities has adopted standardized mental health screening within NHV. The most widely used instrument is the Edinburgh Postnatal Depression Scale (EPDS) (Smith-Nielsen et al., 2018; Cox and Holden, 2003), a validated 10-item questionnaire that produces a score from 0 to 30, with higher scores indicating worse underlying mental health. EPDS screenings are conducted by nurses during a routine home visit, typically around two months after birth. Screenings are recorded electronically in the family home alongside other nurse registrations, including the timing of the visit, infant feeding mode, general observations of infant development and well-being, and any referrals to other providers. Based on the EPDS score and their clinical assessment, nurses determine whether follow-up is needed. Follow-up options include additional nurse visits, group-based support within the NHV program, or referrals to general practitioners and mental health specialists. These decisions are guided by municipal procedures and the nurse's professional judgment.

During our study period (2012–2017), municipalities used locally determined EPDS thresholds and guidelines. After 2017, Danish municipalities adopted a national policy recommending further assessment or referral for moth-

ers scoring 11 or above, based on a Danish validation study of the EPDS instrument (Smith-Nielsen et al., 2018). Consistent with this national guidance, we use an EPDS cutoff of 11 to identify mothers with elevated postpartum depressive symptoms in our analysis.

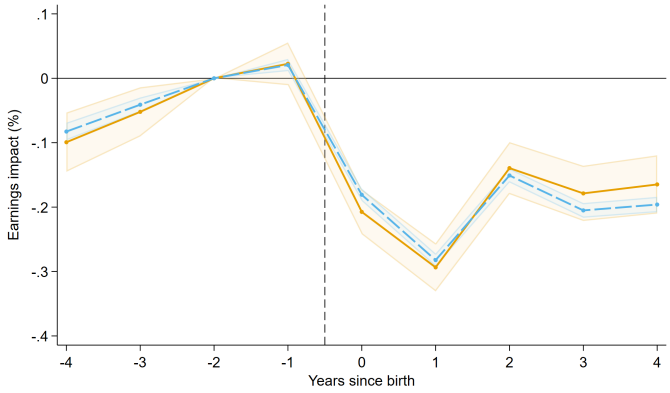


Appendix Figure A1: Histogram of the standardized maternal mental health index (DNBC) and standardized EPDS screening score (NVP)

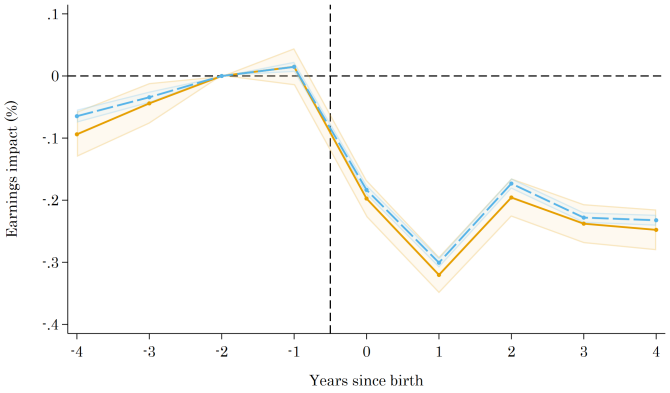
Notes: Samples include first-time native born mothers observed from four years before to four years after first birth. The gray bars plot the distribution of the standardized mental health index in the DNBC sample, while the red line displays the distribution of the EPDS scores from the NHV sample standardized to have mean zero and variance one. The vertical dashed lines indicate the threshold for classifying women as depressed in the DNBC sample (gray) and in the NHV sample (red).

Appendix B

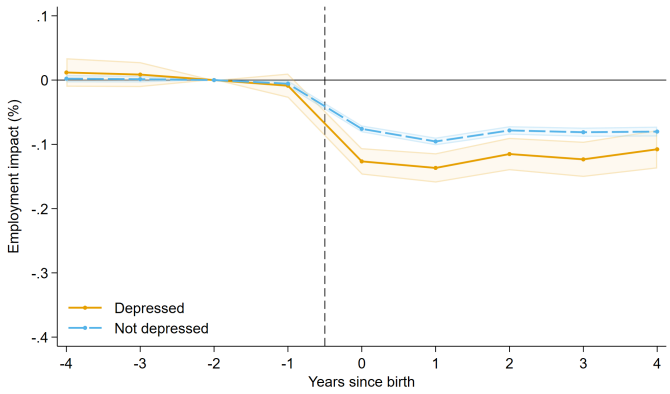
Additional Results



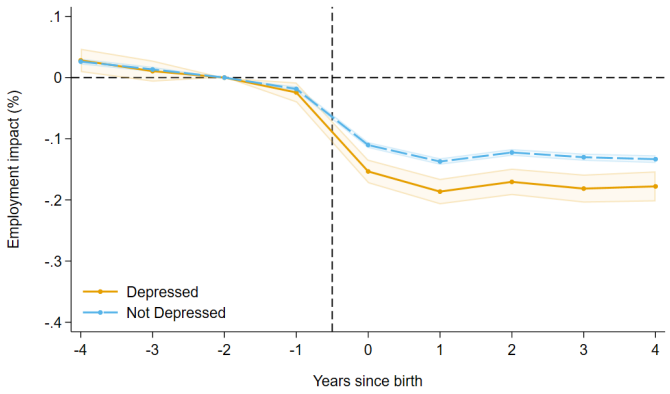
(a) Earnings, DNBC



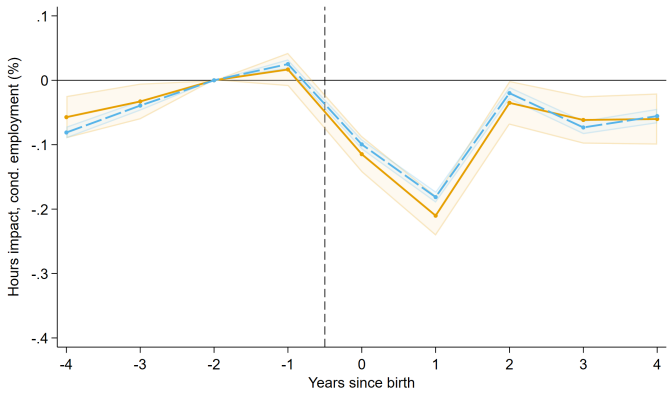
(b) Earnings, NVP



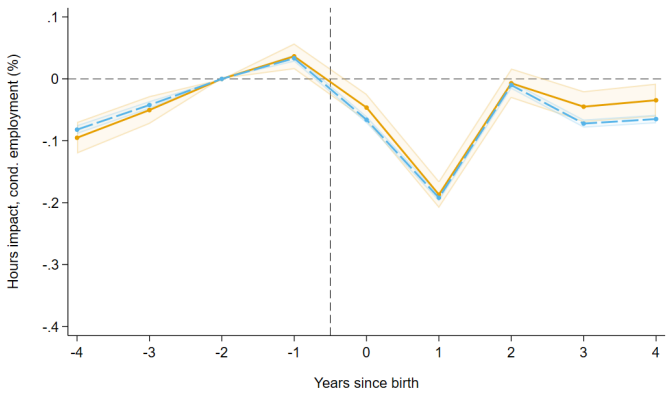
(c) Employment, DNBC



(d) Employment, NVP



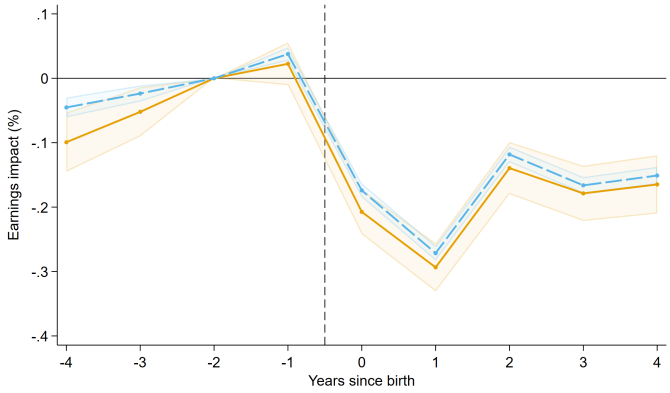
(e) Hours | Working, DNBC



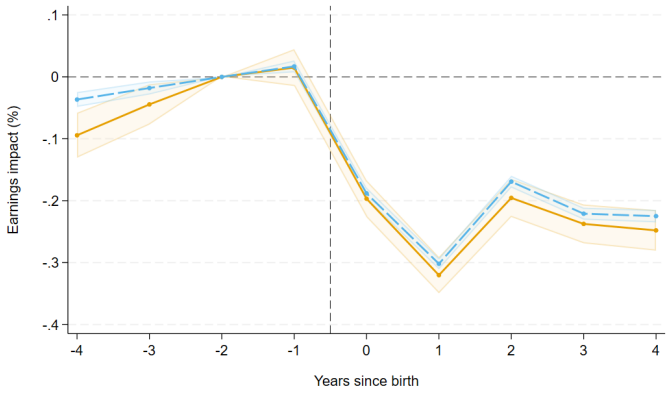
(f) Hours | Working, NVP

Appendix Figure B1: Effects of parenthood on maternal labor market outcomes by postpartum depression status, unweighted results

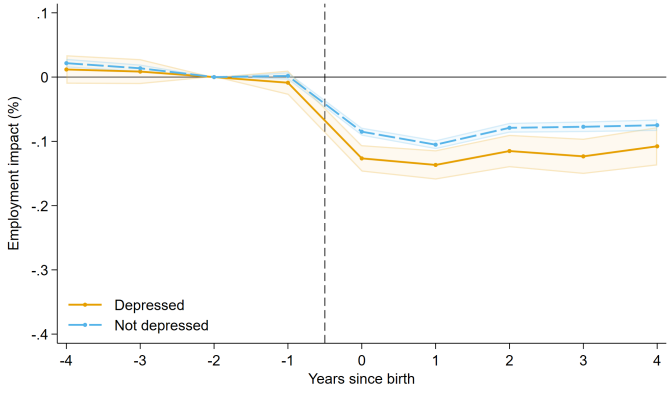
Notes: See notes to Figure 1. The sample of non-depressed mothers is weighted using weights equal to one.



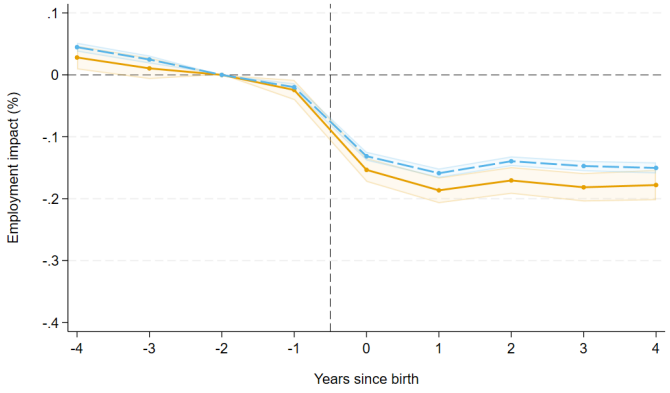
(a) Earnings, DNBC



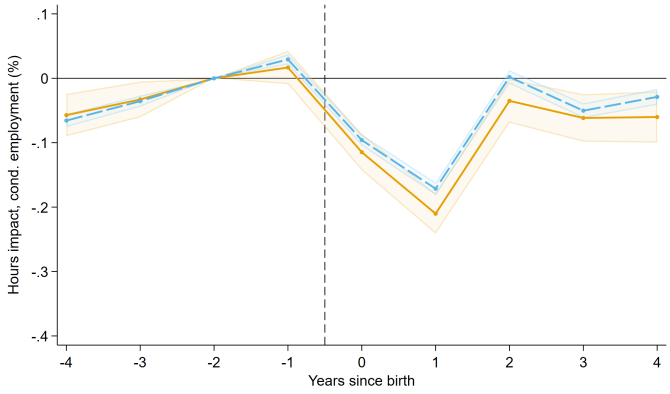
(b) Earnings, NVP



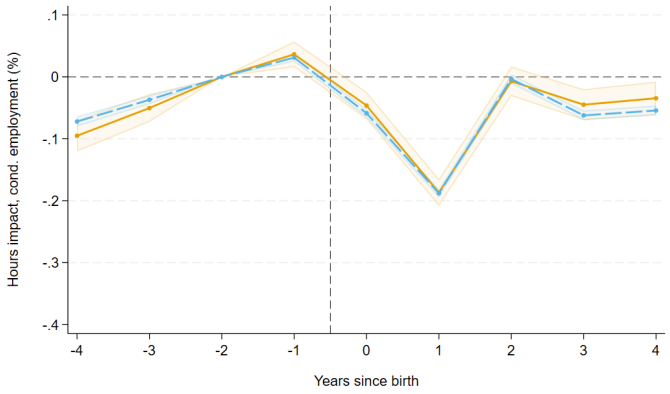
(c) Employment, DNBC



(d) Employment, NVP



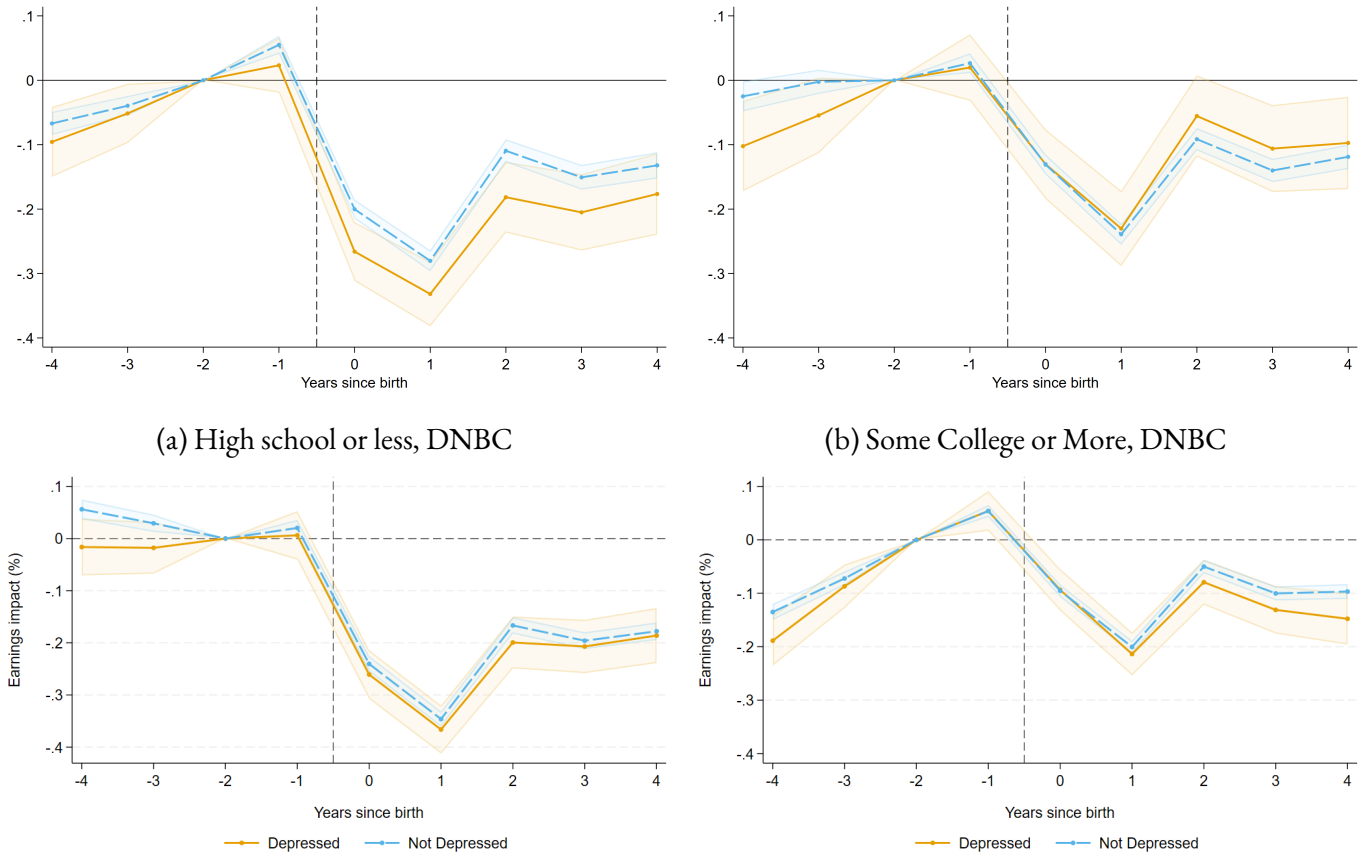
(e) Hours | Working, DNBC



(f) Hours | Working, NVP

Appendix Figure B2: Effects of parenthood on maternal labor market outcomes by postpartum depression status, extended weights

Notes: See notes to Figure 1. The sample of non-depressed mothers is weighted using inverse probability weights as described in Section 4, based on the extended set of mother's characteristics that additionally includes maternal years of schooling, maternal employment, and maternal mental health-related GP and psychologist/psychiatrist contacts.



(a) High school or less, DNBC

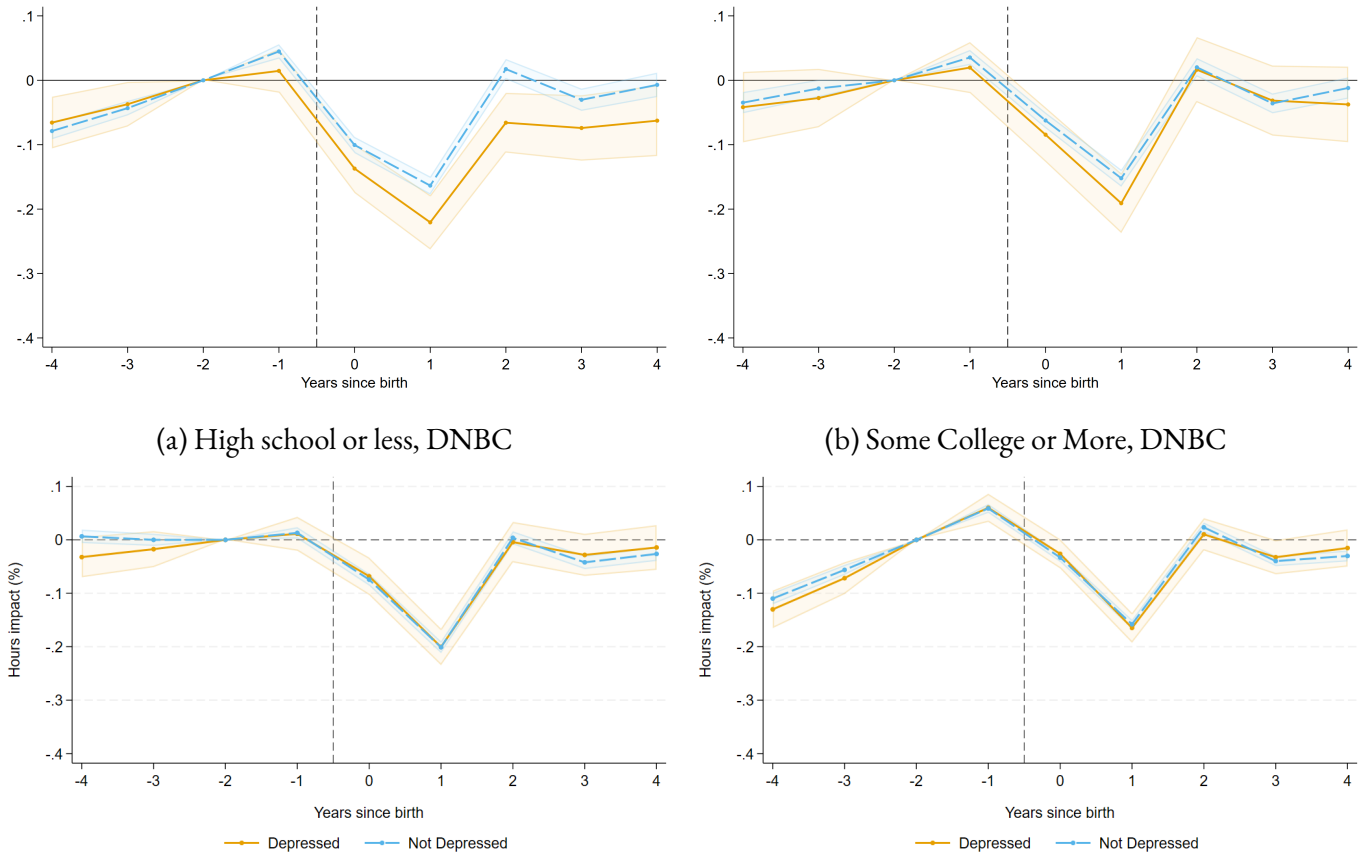
(b) Some College or More, DNBC

(c) High school or less, NHV

(d) Some College or More, NHV

Appendix Figure B3: Effects of parenthood on mothers' labor income by education and postpartum depression status

Notes: See notes to Figure 1. Education is defined as the highest degree attained 2 years before birth. Left-hand panel restricts the sample to women with at most a high school degree, right-hand panel to women who obtain post-secondary education.



(a) High school or less, DNBC

(b) Some College or More, DNBC

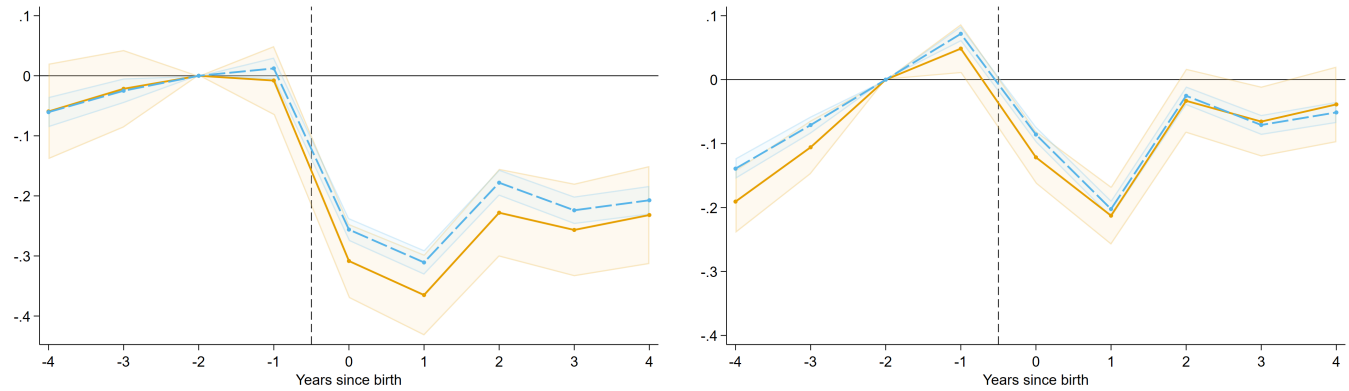
(c) High school or less, NHV

(d) Some College or More, NHV

Appendix Figure B4: Effects of parenthood on mothers' working hours by education and postpartum depression status

Notes: See notes to Figure 1. Education is defined as the highest degree attained 2 years before birth. Left-hand panel restricts the sample to women with at most a high school degree, right-hand panel to women who obtain post-secondary education.

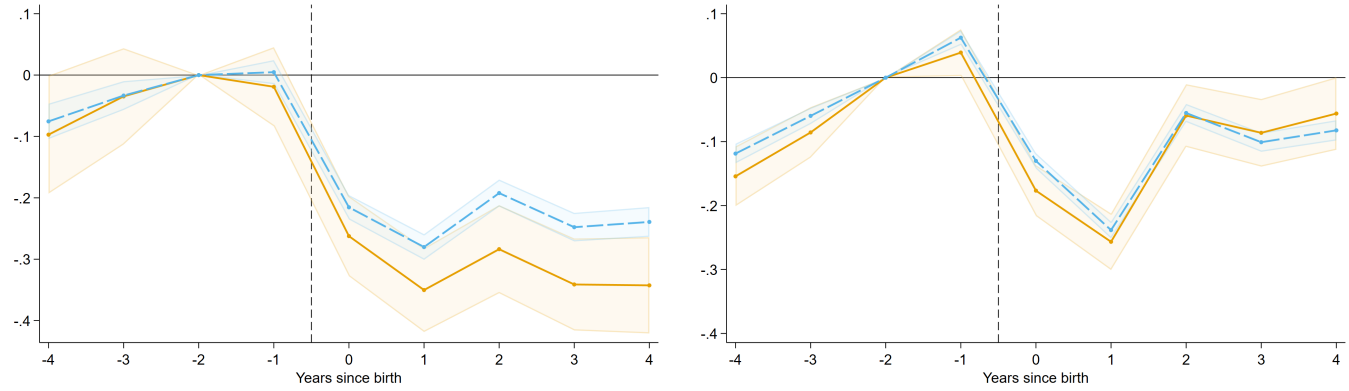
Within-occupation gender gap (DNBC)



(a) Above median

(b) Below median

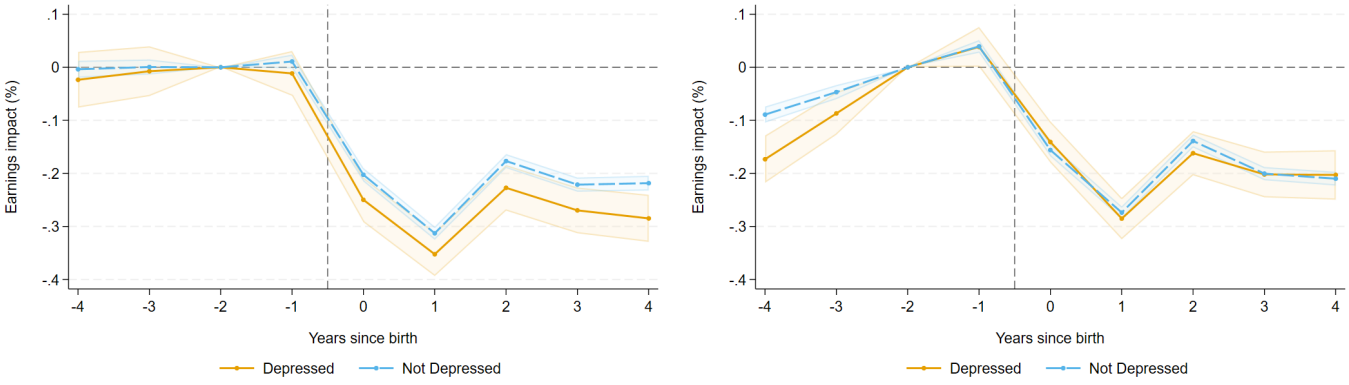
Fraction of women among top 20% earners in occupation (DNBC)



(c) Below median

(d) Above median

Sector of employment (NHV)

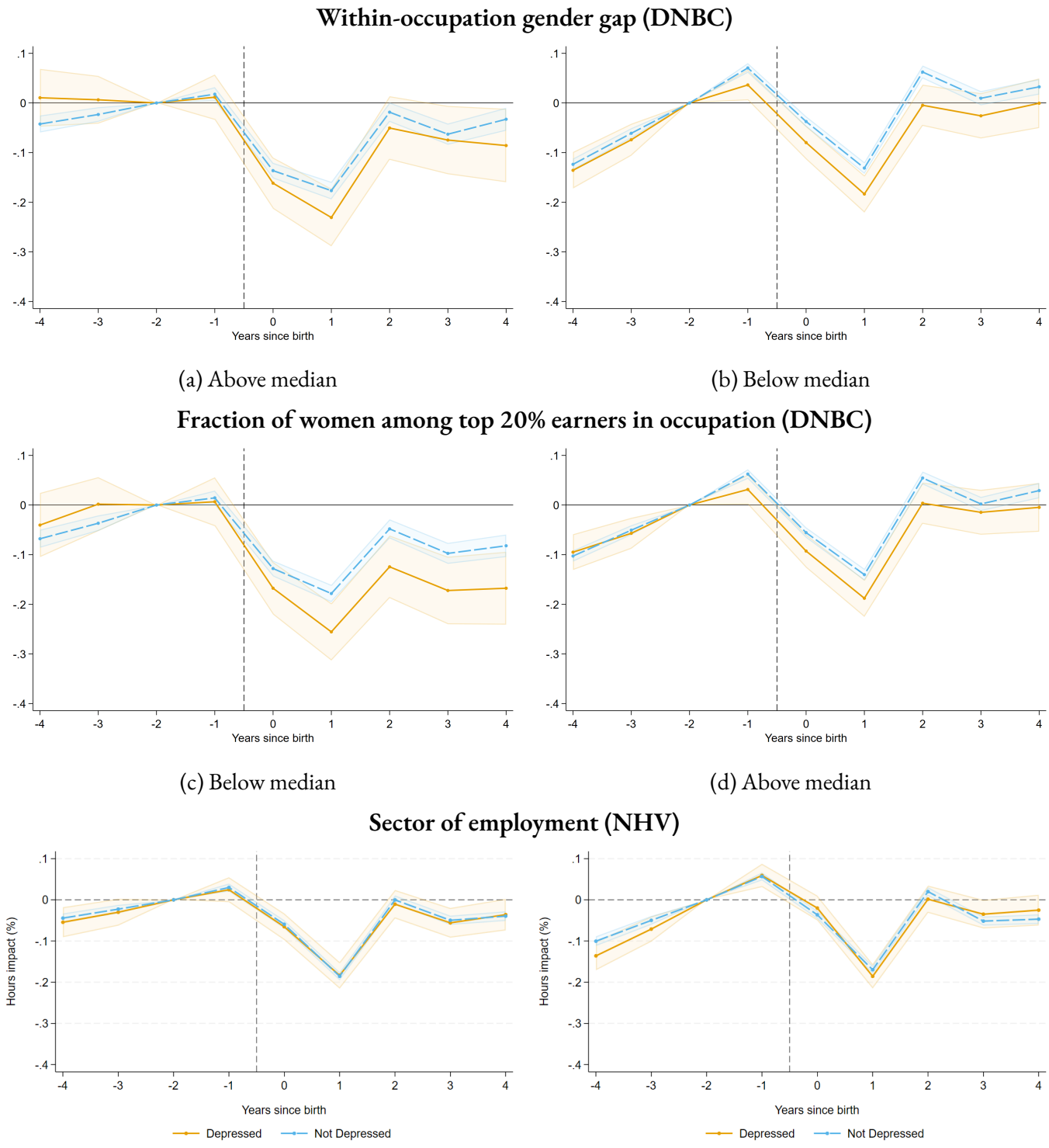


(e) Private

(f) Public

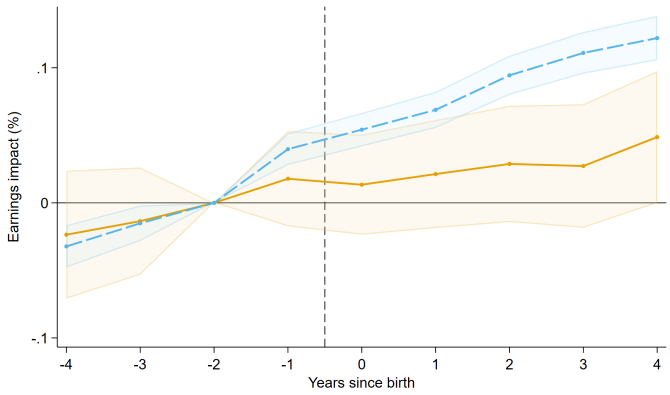
Appendix Figure B5: Effects of parenthood on mothers' labor income by job characteristics and postpartum depression status

Notes: See notes to Figure 1. Left-hand panel refers to less family-friendly job characteristics, right-hand panel to more family-friendly job characteristics. Top two Figures split the DNBC sample based on whether the gender wage gap within the last occupation held 2–4 years before birth is above (a) or below (b) the median gender wage gap, with the gender gap defined as the ratio of women to men earnings. Middle two Figures split the DNBC sample based on whether the fraction of women among the top 20 percent earners in the last occupation held 2–4 years before birth is below (c) or above (d) the median. The bottom tow Figures split the NHV sample based on whether the last job held 2–4 years before birth was in the private (e) or public (f) sector.

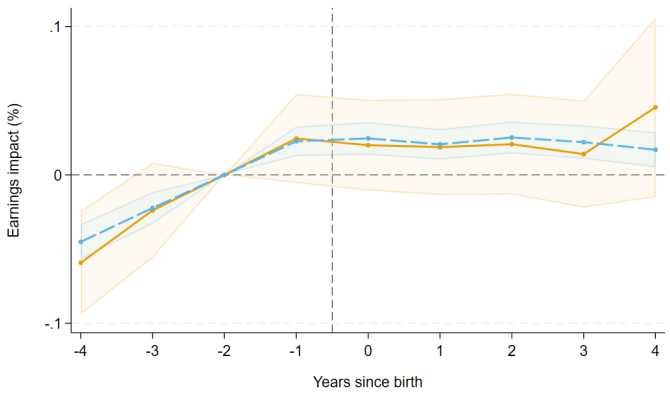


Appendix Figure B6: Effects of parenthood on mothers' hours worked by job characteristics and postpartum depression status

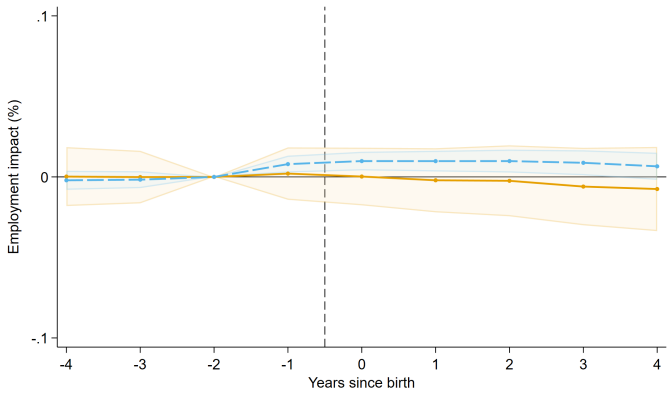
Notes: See notes to Figure 1. Left-hand panel refers to less family-friendly job characteristics, right-hand panel to more family-friendly job characteristics. Top two Figures split the DNBC sample based on whether the gender wage gap within the last occupation held 2–4 years before birth is above (a) or below (b) the median gender wage gap, with the gender gap defined as the ratio of women to men earnings. Middle two Figures split the DNBC sample based on whether the fraction of women among the top 20 percent earners in the last occupation held 2–4 years before birth is below (c) or above (d) the median. The bottom tow Figures split the NHV sample based on whether the last job held 2–4 years before birth was in the private (e) or public (f) sector.



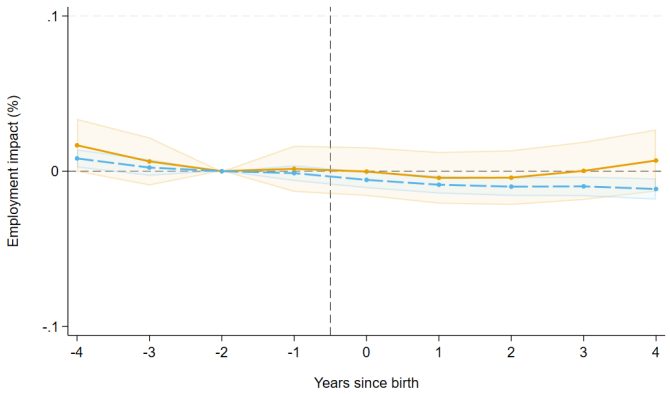
(a) Earnings, DNBC



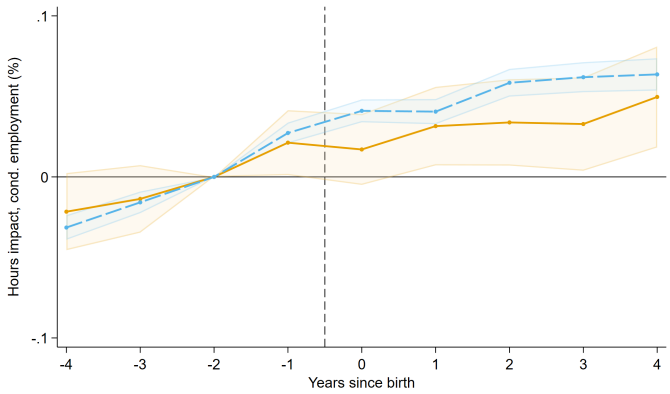
(b) Earnings, NVP



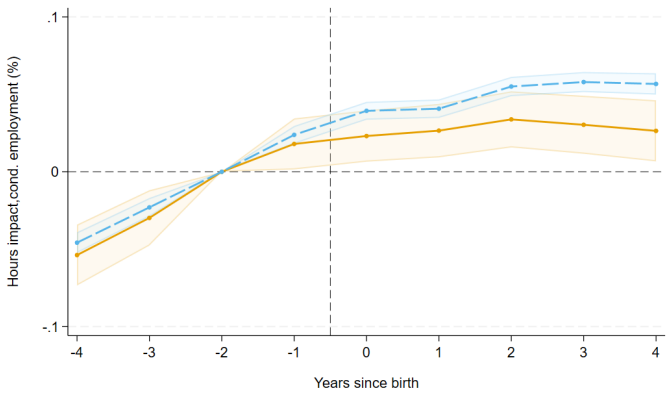
(c) Employment, DNBC



(d) Employment, NVP



(e) Hours | Working, DNBC



(f) Hours | Working, NVP

Appendix Figure B7: Effects of parenthood on fathers' labor income by mothers' postpartum depression status

Notes: See notes to Figure 1. Orange solid lines plot the outcomes for fathers of first-born children born to mothers classified as depressed in the postnatal period, while blue dashed lines plot the outcomes of fathers of first-born children born to mothers not classified as depressed.

Appendix Table B1: Descriptive Statistics: Analysis Samples versus the Full Population

	Birth cohorts: 1998–2002			Birth cohorts: 2012–2017		
	Mother not in DNBC (N = 93,431) (1)	Mother in DNBC (N = 30,270) (2)	Std. diff. (3)	Mother not screened (N = 82,079) (4)	Mother Screened (N = 45,612) (5)	Std. diff. (6)
A. Child characteristics						
Female child	0.49	0.49	0.002	0.49	0.49	−0.001
B. Mother's characteristics						
Years of schooling	13.55	14.09	−0.256	13.25	14.29	−0.258
Age at birth	26.18	26.69	−0.119	28.49	28.65	−0.033
Employed	0.92	0.95	−0.129	0.84	0.90	−0.198
Labor earnings (1,000EUR)	26.92	29.06	−0.118	27.02	29.43	−0.108
GP fees (1,000EUR)	0.12	0.11	0.058	0.13	0.13	−0.034
GP depression counseling (DNBC)/test (NHV)	0.02	0.02	0.020	0.08	0.08	0.000
Psychologists/psychiatrists consultation	0.02	0.02	0.038	0.06	0.06	−0.017
C. Father's characteristics						
Years of schooling	13.75	14.14	−0.173	13.45	13.99	−0.144
Age at birth	28.95	29.07	−0.024	30.97	30.96	0.001
Employed	0.92	0.94	−0.068	0.86	0.90	−0.113
Labor earnings (1,000EUR)	38.66	40.66	−0.080	36.89	38.89	−0.060
GP fees (1,000EUR)	0.05	0.05	0.021	0.06	0.06	0.011
GP depression counseling (DNBC)/test (NHV)	0.01	0.01	0.006	0.06	0.06	0.002
Psychologists/psychiatrists consultation	0.01	0.01	0.022	0.08	0.08	0.009

Notes: Samples include first-time native born mothers observed from four years before to four years after first birth, their first-born children, and the fathers of these children. Columns 1–3 present, for the period covered by the DNBC sample (1998–2002), means for the first births not included (Column 1) and included (Column 2) in the DNBC sample, as well as the standardized difference between these means. Columns 4–6 present, for the period covered by the NHV sample (2012–2017), means for the first births not included (Column 4) and included (Column 5) in the NHV sample, as well as the standardized difference between these means. All parental characteristics are measured 2 years before the birth unless noted otherwise. All monetary variables are expressed in 2015 DKK and converted to euros.

Appendix Table B2: Descriptive Statistics of the Analysis Samples: Mothers with and without Postpartum Depression (Unweighted)

	DNBC sample (birth cohorts: 1998–2002)			NHV sample (birth cohorts: 2012–2017)		
	Mother not depressed (N = 27,305) (1)	Mother depressed (N = 2,965) (2)	Std. diff. (3)	Mother not depressed (N = 40,408) (4)	Mother depressed (N = 3,704) (5)	Std. diff. (6)
A. Child characteristics						
Female child	0.49	0.49	0.002	0.49	0.48	0.020
B. Mother's characteristics						
Years of schooling	14.13	13.76	0.177	14.58	14.22	0.136
Age at birth	26.72	26.47	0.059	28.62	28.65	−0.004
Employed	0.95	0.93	0.114	0.92	0.89	0.101
Labor earnings (1,000EUR)	29.40	25.90	0.195	30.28	26.72	0.168
GP fees (1,000EUR)	0.11	0.14	−0.238	0.13	0.17	−0.307
GP depression counseling (DNBC)/test (NHV)	0.01	0.03	−0.100	0.14	0.30	−0.223
Psychologists/psychiatrists consultation	0.02	0.04	−0.141	0.21	0.44	−0.183
C. Father's characteristics						
Years of schooling	14.17	13.85	0.145	14.17	13.87	0.095
Age at birth	29.09	28.88	0.044	30.91	30.97	−0.011
Employed	0.94	0.93	0.057	0.91	0.90	0.033
Labor earnings (1,000EUR)	41.01	37.44	0.147	39.40	37.51	0.065
GP fees (1,000EUR)	0.05	0.06	−0.080	0.06	0.06	0.000
GP depression counseling (DNBC)/test (NHV)	0.01	0.01	−0.047	0.06	0.07	−0.024
Psychologists/psychiatrists consultation	0.01	0.01	−0.061	0.07	0.10	−0.045

Notes: Samples include first-time native born mothers observed from four years before to four years after first birth, their first-born children, and the fathers of these children. Columns 1–3 present, for the DNBC sample, means for the sample of mothers classified as not depressed (Column 1) and as depressed (Column 2), as well as the standardized difference between these means. Columns 4–6 present, for the NHV sample, means for the sample of mothers classified as not depressed (Column 4) and as depressed (Column 5), as well as the standardized difference between these means. All parental characteristics are measured 2 years before the birth unless noted otherwise. All monetary variables are expressed in 2015 DKK and converted to euros.

Appendix Table B3: Descriptive Statistics of the Analysis Samples: Mothers with and without Postpartum Depression (Extended Weights)

	DNBC sample (birth cohorts: 1998–2002)			NHV sample (birth cohorts: 2012–2017)		
	Mother not depressed (N = 27,305) (1)	Mother depressed (N = 2,965) (2)	Std. diff. (3)	Mother not depressed (N = 40,408) (4)	Mother depressed (N = 3,704) (5)	Std. diff. (6)
A. Child characteristics						
Female child	0.49	0.49	0.004	0.48	0.48	0.000
B. Mother's characteristics						
Years of schooling	13.76	13.76	0.000	14.21	14.22	−0.004
Age at birth	26.26	26.47	−0.049	28.21	28.65	−0.091
Employed	0.92	0.93	−0.003	0.89	0.89	0.000
Labor earnings (1,000EUR)	25.90	25.90	−0.001	26.82	26.72	0.005
GP fees (1,000EUR)	0.14	0.14	0.015	0.17	0.17	0.000
GP depression counseling (DNBC)/test (NHV)	0.03	0.03	0.009	0.15	0.15	0.000
Psychologists/psychiatrists consultation	0.04	0.04	0.004	0.11	0.11	0.000
C. Father's characteristics						
Years of schooling	13.85	13.85	0.001	13.94	13.87	0.022
Age at birth	28.86	28.88	−0.003	30.56	30.97	−0.073
Employed	0.93	0.93	0.000	0.90	0.90	0.000
Labor earnings (1,000EUR)	37.47	37.44	0.001	37.48	37.51	−0.001
GP fees (1,000EUR)	0.06	0.06	0.001	0.06	0.06	0.000
GP depression counseling (DNBC)/test (NHV)	0.01	0.01	−0.002	0.07	0.07	0.000
Psychologists/psychiatrists consultation	0.01	0.01	0.000	0.08	0.10	−0.029

Notes: Samples include first-time native born mothers observed from four years before to four years after first birth, their first-born children, and the fathers of these children. Columns 1–3 present, for the DNBC sample, means for the sample of mothers classified as not depressed (Column 1) and as depressed (Column 2), as well as the standardized difference between these means. Columns 4–6 present, for the NHV sample, means for the sample of mothers classified as not depressed (Column 4) and as depressed (Column 5), as well as the standardized difference between these means. All parental characteristics are measured 2 years before the birth unless noted otherwise. All monetary variables are expressed in 2015 DKK and converted to euros. The sample of non-depressed mothers is weighted using inverse probability weights as described in Section 4, based on the extended set of mother's characteristics that additionally includes maternal years of schooling, maternal employment, and maternal mental health-related GP and psychologist/psychiatrist contacts.