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Job loss and births. A couple-level study of Norwegian plant closures

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ABSTRACT

In dual-earner settings, whether fertility responses to job loss reflect gendered mechanisms is not theoretically unambiguous. This paper examines how job loss due to plant closures – a plausibly exogenous employment shock – affects couples' fertility in Norway. Using Norwegian register data (2005-2017) linked to private-sector employment records (2005-2014), we estimate discrete-time event history models of first- and second-birth transitions within three years after a plant-closure job loss experienced by either partner. Norway is a theoretically relevant case because welfare-state buffering limits short-run income losses, and the Great Recession hit relatively mildly, helping explore the role of uncertainty in shaping fertility responses to job loss. Results indicate that job loss disrupts childbirth in gendered and stratified ways. Female partner's job loss in a couple reduces entry into parenthood, and this effect persists net of household income at the time of job loss. Male partner job loss in a couple reduces progression to a second child and is partly mediated by income, and is strongest after the Great Recession. Moreover, couples with fewer resources are more exposed to fertility penalties, especially for second births following male displacement. The limited role of income suggests that fertility responses to job loss are not reducible to short-run financial constraints. Instead, they reflect how employment structures couples' life-course planning and perceived readiness for parenthood. That female job loss deters entry into parenthood while male job loss deters expansion implies that economic-role convergence has not paralleled convergence in the social meaning of job loss.

1. Introduction

Employment instability has become a defining feature of contemporary labor markets, with far-reaching consequences for life-course trajectories and family formation. A growing body of demographic and sociological research documents how unstable employment conditions reshape fertility behavior, contributing to delayed and foregone parenthood (e.g., Alderotti et al., 2021; Scherer and Brini, 2023; Matysiak and Vignoli, 2024). Among the various forms of instability, job loss represents a particularly consequential shock. By abruptly reducing household resources, it generates financial constraints that are increasingly incompatible with the rising economic prerequisites of parenthood (Buh, 2023; van Wijk, 2024; van Wijk and Billari, 2024). Yet the fertility

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consequences of job loss extend beyond material deprivation. Employment disruptions may undermine the sense of stability, control, and predictability that underpins long-term commitments such as childbearing (Vignoli et al., 2020a, 2020b). Studying the consequences of job loss, therefore, offers a critical lens for understanding how economic insecurity and uncertainty shape fertility in contemporary societies. In this study, we examine how job loss due to plant closure affects couples' childbearing behavior, and whether these effects differ depending on whether the employment shock is experienced by the male or the female partner.

A couple-level perspective is essential for understanding these dynamics, as fertility decisions are embedded in relational contexts rather than driven solely by aggregate household resources. Yet existing theoretical perspectives offer no unambiguous predictions. Classical economic models predict asymmetric effects depending on which partner is displaced, reflecting gendered specialization in paid work and care (Becker, 1993). In contrast, contemporary demographic and sociological perspectives argue that in dual-earner and gender-egalitarian societies, fertility decisions increasingly depend on couples' joint economic security (Oppenheimer, 1988; Esping-Andersen and Billari, 2015; van Wijk and Billari, 2024; Sánchez-Mira and O'Reilly, 2019). This shift should imply more convergent responses to male and female job loss. However, persistent norms regarding male breadwinning and provider roles may render male job loss particularly consequential, even in contexts where women's employment is well established (Christiansen and Palkovitz, 2001; Gonalons-Pons and Gangl, 2021).

Three main gaps in existing research limit our understanding of the gendered impact of job loss on fertility. First, most studies analyze men and women separately, even though fertility is a joint decision (Singley and Hynes, 2005), shaped by combined resources and their distribution between partners. Ignoring these interdependencies risks misattributing effects to individual characteristics when they may in fact stem from the other partner's situation (Matysiak and Vignoli, 2008). Second, many studies focus narrowly on employment status, without directly considering the economic resources available at the individual and couple level. This approach downplays the direct role of income in shaping fertility behavior and can lead to an incomplete understanding of how economic resources relate to reproductive behavior. Third, causal inference is complicated by the endogeneity of job loss and the interdependence of employment and fertility outcomes.

Leveraging high-quality population register data, this study addresses these challenges by combining a couple-level and life-course perspective with a quasi-experimental design. We make three main contributions to the literature on fertility, employment instability, and economic uncertainty. First, we adopt a couple-level and parity-specific approach for first and second childbirths, distinguishing the effect of job loss due to firm closure experienced by either partner on family formation versus family expansion. Whereas most studies focus on completed fertility (Del Bono et al., 2012, 2015; Huttunen and Kellokumpu, 2016) or aggregated birth risks (Di Nallo and Lipps, 2023), we re-anchor the analysis of the effects of job loss on fertility within life-course research, viewing fertility choices as a succession of transitions in an individual's life course (Kravdal, 2002; Huinink and Kohli, 2014) and model fertility as a parity-specific transition. Second, we explicitly test the mediating and moderating roles of household income, rather than treating income as a background control (Huttunen and Kellokumpu, 2016; Andersen and Özcan, 2021). By analyzing income heterogeneity both within and between couples, we clarify whether fertility responses to job loss are primarily driven by income loss or by non-financial mechanisms not directly captured in our data, such as heightened perceptions of future uncertainty. Third, we exploit the Norwegian context during the Great Recession. Norway offers a crucial case because a generous welfare state buffers the immediate financial consequences of job loss. Comparing pre- and post-recession periods, therefore, helps assess whether fertility responses to job loss reflect financial strain or recession-induced uncertainty (Lappegård et al., 2022, 2025). Moreover, if economic shocks such as job loss due to plant closure reduce fertility even in Norway's highly protective institutional context, this suggests that the fertility consequences of involuntary displacement cannot be explained by income losses alone. Employment disruptions appear to strain life-course planning in ways that generous welfare systems can buffer, but not fully offset.

2. Theoretical background and hypotheses

2.1. Gendered dynamics of job loss and fertility

Socio-demographic literature drawing on the New Home Economics (Becker, 1960, 1993) interprets fertility responses to employment shocks through two main mechanisms, which are predicted to be gender-specific under the assumption of a male-breadwinner/female caregiver model. The *income effect* posits that a reduction in the male partner's economic resources increases the relative cost of children and therefore depresses fertility. In contrast, the *substitution effect* suggests that a loss of the female partner's job reduces the opportunity costs associated with motherhood (e.g., the time taken away from paid work), potentially encouraging fertility. Nonetheless, empirical support for these predictions is inconsistent, particularly in contexts with high female labor force participation and generous family policies, where substitution effects appear to have weakened over time (Alderotti et al., 2021; Matysiak and Vignoli, 2026).

Emerging perspectives argue that fertility decisions are shaped not only by current or past employment and income, often partly buffered by welfare states (Ehlert, 2012), but also by subjective expectations and the broader social climate in which individuals imagine their futures (Vignoli et al., 2020a, 2020b; Guetto et al., 2022; Lappegård et al., 2022; Comolli, 2023). This interpretation is consistent with evidence that fertility continued to decline well after the macroeconomic recovery from the Great Recession and in some contexts even accelerated after, including in countries only marginally hit by the crisis (Matysiak et al., 2021), patterns that are hard to explain with objective economic conditions alone and instead point to persistent uncertainty and more pessimistic expectations about the future (Comolli, 2023; Comolli and Vignoli, 2021).

In addition to that, gender dynamics and gender roles have undergone a significant evolution over the past century. On the one hand, men's labor market position has deteriorated, along with their ability to serve as the sole breadwinner (Oppenheimer, 1988),

while women's workforce participation has increased, fostering their economic independence and labor market attachment. On the other hand, societal values today prioritize career advancement and personal fulfillment over family and childbearing, particularly among women, in line with the Second Demographic Transition (Lesthaeghe, 2010, 2020; van de Kaa, 1987) and the Gender Revolution (Esping-Andersen and Billari, 2015; Goldscheider et al., 2015). These structural and societal changes have made both partners' employment central to household economic security and life-course planning (Sánchez-Mira and O'Reilly, 2019), likely redefining the relationship between employment and fertility, especially for women.

Reflecting these transformations, the macro-level correlation between female employment and fertility has shifted since the 2000s from negative to positive for high-income countries (Doepke et al., 2023). Growing evidence also suggests that the income prerequisites to meet the rising material and normative costs of children have risen (van Wijk and Billari, 2024), that female employment is no longer incompatible with family formation (e.g., Matysiak and Vignoli, 2026) and that the income-fertility gradient is now positive for women as well (Brini et al., 2025). Against this backdrop, job loss plausibly operates less as a gendered shift in women's opportunity costs and more as a couple-level shock to joint current and expected economic situation. Consequently, the fertility responses to male and female job loss may be similar rather than follow the asymmetric pattern predicted by classical models.

Crucially, however, convergence in economic roles does not imply a convergence in the social meaning of job loss. Employment carries deep symbolic significance, and its meaning is gendered and shaped by societal norms and expectations that influence how men and women perceive their roles in relation to family and work (West and Zimmerman, 1987, 2009). For men, being employed and serving as a provider constitutes the essence of traditional notions of masculinity and the ideal of being a "good father" (Townsend, 2002). Such breadwinning norms attaching strong symbolic weight to male employment persist even in dual-earner settings (Christiansen and Palkovitz, 2001). Employment uncertainty reduces men's desirability as partners (Kalmijn, 2011), while male unemployment increases the risk of separation – more strongly where male-breadwinner norms dominate, but also where they are less pronounced (Gonalons-Pons and Gangl, 2021) – and undermines men's well-being more severely than women's unemployment (Kowalewska and Vitali, 2024). For women, by contrast, inactivity is often framed within the societal ideals of a "good mother" (Demantas and Myers, 2015), where withdrawal from the labor market to focus on caregiving is socially acceptable, if not encouraged. Hence, although the convergence in economic roles should reduce gender differences in how job loss affects fertility, symbolic norms may maintain asymmetry, making male job loss more consequential because it threatens the normative provider role. As a result, asymmetric effects of job loss on fertility may persist even in gender-egalitarian contexts.

Research using firm closures to estimate the effects of job loss on fertility in Europe yields mixed results, partly due to difference in fertility measures – e.g., completed fertility, any childbirth, parity-specific transitions (Del Bono et al., 2012, 2015; Huttunen and Kellokumpu, 2016; Hofmann et al., 2017; Andersen and Özcan, 2021; Di Nallo and Lipps, 2023). Early research examined men and women separately (e.g., Del Bono et al., 2012, 2015; Hofmann et al., 2017), while more recent studies adopt a couple-level approach (Di Nallo and Lipps, 2023). Overall, most findings challenge the traditional substitution hypothesis, though notable exceptions remain. Evidence from Austria and Germany shows that job loss due to plant closure reduces fertility – both completed and entry into parenthood – particularly among women (Del Bono et al., 2012, 2015; Hofmann et al., 2017). Studies focusing on couples also find generally negative fertility responses, often stronger when the female partner loses her job (Di Nallo and Lipps, 2023). However, results from Nordic countries are less consistent. In Finland, female job loss reduces completed fertility while male job loss has no effect, suggesting limited substitution effects (Huttunen and Kellokumpu, 2016). In contrast, evidence from Denmark indicates that some substitution effects mechanisms may persist: male unemployment slightly lowers first-birth risks, whereas female job loss slightly increases them (Andersen and Özcan, 2021).

2.2. *The role of income and other non-financial channels*

The consequences of job loss extend beyond financial strain (Brand, 2015; Pearlman, 2015), and a key theoretical question is whether it affects fertility mainly through household income losses or through non-financial channels, such as uncertainty and career disruption.

On the one hand, a higher household income encourages family formation (Hart, 2015; Bolano and Vignoli, 2021), so if income is the dominant mechanism, fertility responses to job loss should attenuate once post-displacement income dynamics are accounted for. On the other hand, displacement often entails unemployment spells, human capital depreciation, and a higher risk of recurrent joblessness over the life course (Brand, 2015; Del Bono et al., 2015; Eriksson and Rooth, 2014). Especially in generous welfare states, where replacement rates cushion the short-run income losses, the fertility responses to job loss may be driven less by immediate deprivation and more by feelings of uncertainty, longer-term career prospects, and psychological distress (Brand, 2015). Plant closures are relevant here because, unlike conventional dismissals, where job loss can be attributed to low performance, they can generate significant economic uncertainty, as they leave workers without a clear signal regarding their productivity, leading them to blame external factors such as managerial missteps or broader economic conditions (Tyagi, 2024). This lack of clarity may fuel negative narratives about the future, prompting displaced individuals to postpone long-term commitments, such as family planning, until they secure a new job (Gatta et al., 2022; Vignoli et al. 2020a, 2020b). Moreover, job loss has negative consequences for social roles and psychological well-being (Brand, 2015), both of which can discourage fertility.

Macroeconomic conditions may amplify these non-financial channels (Schneider, 2015). Since uncertainty operates both as an individual perception and as a collective climate, when aggregate conditions deteriorate, couples update their expectations about their own future by drawing inferences from the broader context (Comolli and Vignoli, 2021; Comolli, 2023; Kreyenfeld et al., 2012; Sobotka et al., 2011; Vignoli et al., 2020b). This implies that if displacement affects fertility mainly through income losses, the fertility response should be similar across macroeconomic contexts. Instead, if uncertainty is central, the response should be stronger during

recessionary periods, when recovery is perceived as more uncertain.

2.3. Stratified fertility responses to job loss across income and parity

Although plant closure is a sudden shock in the lives of all affected workers (Huttunen et al., 2011), not all couples are equally vulnerable to disruptive events (Aquino et al., 2022; Brand, 2015). Socioeconomic resources shape fertility responses to job loss by structuring couples' capacity to absorb economic shocks and the meanings they attach to employment instability (Kreyenfeld, 2010; Kreyenfeld and Andersson, 2014; Yu and Sun, 2018).

From a stratification perspective, economic shocks such as job loss tend to amplify pre-existing inequalities through cumulative disadvantage (DiPrete and Eirich, 2006). Couples with greater socio-economic resources can better absorb employment shocks through savings, higher earnings, and more extensive welfare entitlements (DiPrete and McManus, 2000), whereas more disadvantaged couples face both fewer buffers and more persistent income instability (Grotti, 2022). Prior research shows that household resources can buffer the consequences of job loss across different domains such as children's outcomes (Kalil and Wightman, 2011; Mari et al., 2024) and subjective well-being (Müller et al., 2021). Applied to fertility, this suggests that economically vulnerable couples are more likely to scale back childbearing plans following job loss. At the same time, for higher-income and more educated couples, job loss may represent an unexpected disruption to career trajectories, increasing the opportunity costs of parenthood (Becker, 1965, 1993) and leading to postponement until stability is restored (Kreyenfeld, 2010; Kreyenfeld and Andersson, 2014). By contrast, among individuals with limited labor market prospects, parenthood may serve as an alternative source of structure and meaning (Friedman et al., 1994; Kreyenfeld, 2010). Empirical evidence reflects these competing mechanisms. In Germany and the U.K., Di Nallo and Lipps (2023) find stronger fertility declines among lower- and middle-income couples, supporting a resource-buffering interpretation. In contrast, other studies show more negative effects among higher educated women, consistent with an opportunity-cost perspective in Germany (Kreyenfeld, 2010) and Finland (Huttunen and Kellokumpu, 2016).

Fertility decisions are also embedded in normative schedules (Huinink and Kohli, 2014), which might create heterogeneity in the fertility consequences of job loss by parity. The first-birth decision is more often about *when* rather than *whether* to enter parenthood (Kravdal, 2002). The transition to first birth is a highly normative life-course event and may be less responsive to temporary economic shocks, especially in contexts where parenthood is widespread (Andersen and Özcan, 2021; Huttunen and Kellokumpu, 2016). By contrast, higher-order births entail greater marginal costs and demand stronger financial stability, which may be more strongly conditioned by household resources and perceptions of economic security, making them more sensitive to employment shocks (Di Nallo and Lipps, 2023).

3. The present study

3.1. Norwegian context

The Norwegian context promises to shed new light on mechanisms linking job loss to fertility. During the study period, from 2005 to 2014, Norway's unemployment rate ranged between 2.72% and 4.91% (Statistics Norway, 2024b), which is considerably lower than in most European countries (OECD Database, 2024). Moreover, the duration of unemployment in Norway is shorter than the European average, and the country's long-term unemployment rate is among the lowest in the European Union (Eurostat, 2024), reflecting a stable labor market.

At the same time, the Norwegian welfare state provides substantial protection in cases of job loss that theoretically mitigates the direct costs of displacement. Workers experiencing unemployment or a reduction in working hours of 50% or more receive substantial financial support. Family policies are also generous, mitigating the financial and opportunity costs of childbearing. Highly subsidized and widely available childcare services promote one of the highest female labor force participation rates in Europe (Eurostat, 2025). Parental leave schemes are extensive, including paid maternity and paternity leave, which promote mothers' return to work after childbirth. Although cash-for-care benefits are available for parents caring for children under three at home, their use has declined over time as maternal employment has become the norm (Bungum and Kvande, 2013). In this context, focusing exclusively on domestic production and childcare is generally less advantageous than participating in the labor market, potentially reducing the substitution effects of managing childcare responsibilities during periods of unemployment (Kreyenfeld, 2010).

Despite these protections and a strong two-child norm (Bazzani et al., 2025), fertility in Norway has declined since 2009 (Statistics Norway, 2024a), a trend coinciding with a modest increase in unemployment among men and women of prime working age (Statistics Norway, 2024b). Moreover, research suggests that economic uncertainty has become increasingly important in fertility decision-making, particularly since the Great Recession (Hart and Kravdal, 2020). Even though Norway outperformed its Nordic neighbors during the financial crisis by maintaining relatively low unemployment rates and experiencing a modest GDP decline of only 1.6% in 2009 (Dølvik and Oldervoll, 2019), since the crisis, Norwegians have been placing more emphasis on the need for stable employment as a prerequisite for starting a family (OECD, 2023).

Taken together, Norway's combination of economic stability, generous welfare policies, and strong family-oriented norms provides a highly protective institutional context in which to study the fertility consequences of job loss. If job loss due to plant closure depresses fertility in this context, its impact is likely to be amplified in countries with less stable labor markets and weaker social protection. Additionally, if employment shocks such as plant closures affect fertility timing even in highly protective institutional contexts, this indicates that their consequences extend beyond income loss alone. Rather, employment plays a broader role in structuring life-course expectations and readiness for parenthood – effects that welfare-state protections can mitigate, but not fully offset.

3.2. Research hypotheses

Based on the theoretical reasoning described above, and the characteristics of the Norwegian context, we derive four key hypotheses.

First, we consider gender asymmetries. While economic convergence suggests that female job loss should be increasingly detrimental to fertility, the social meaning of employment remains partly gendered. We therefore expect plant-closure-induced job loss to reduce couples' likelihood of having a (another) child, regardless of which partner experiences it, as both job losses lower household income and increase economic uncertainty. However, even in gender-egalitarian contexts like Norway, men's employment remains more closely tied to the breadwinner role and traditional notions of fatherhood. Also, the male partner's job loss results in a larger decline in household income, as shown in Appendix Figure A1. Male job loss, therefore, undermines not only the household's economic security but also men's symbolic role within the family. By contrast, although women's job loss is economically detrimental as well, it carries less social stigma and may be more easily reconciled with traditional caregiving roles, making its impact on fertility comparatively weaker. Hence, *we hypothesize that couples exposed to plant-closure job loss have a lower probability of a childbirth in the short run, with a larger decline following male job loss (H1).*

Second, we examine the mechanisms linking job loss to fertility by assessing the extent to which post-displacement household income accounts for this association. If income is an important pathway, *the negative effect of plant-closure-induced job loss on birth transitions should be substantially attenuated after adjusting for household income in the year of job displacement (H2a).* Conversely, if non-financial factors dominate, *the negative association should persist after adjusting for income in the year of job displacement (H2b).* The Great Recession is a critical moderator to adjudicate between these two mechanisms. Under a predominantly income-based mechanism, the effect of job loss should be similar across macroeconomic periods. Instead, if uncertainty is the central mechanism, macroeconomic deterioration should amplify the consequences of displacement even in a protected economy like Norway (Dølvik and Oldervoll, 2019). Hence, *we hypothesize that the negative effect of plant-closure job loss on birth risk is larger after the Great Recession than before (H2c).*

Third, we expect the fertility consequences of job loss due to plant closure to be stratified by socioeconomic position, as material and human resources condition both couples' capacity to buffer employment shocks and their perceptions of the costs and risks associated with combining unemployment and parenthood. In a context where generous welfare-state institutions broadly absorb the immediate income consequences of displacement, opportunity-cost mechanisms may represent the primary source of socioeconomic heterogeneity. Therefore, we hypothesize that *the negative fertility effect of plant-closure job loss is largest for couples in the middle and/or upper income tertiles than in the lowest tertile, among whom opportunity costs are lowest (H3).* This prediction is consistent with evidence from Finland, an institutionally comparable context where job displacement reduces fertility most strongly among highly educated women (Huttunen and Kellokumpu, 2016).

Finally, we anticipate heterogeneity by parity. In a context characterized by a strong two-child norm, entry into parenthood is normatively structured and may be relatively less responsive to temporary shocks, whereas progression to a second child requires greater confidence in longer-term stability. For this reason, we *hypothesize that the negative effect of plant-closure job loss is larger for second-birth transitions than for first-birth transitions (H4).*

4. Data and methods

4.1. Data and study population

Our analysis covers Norwegian couples observed between 2005 and 2017, with plant closures measured from 2005 to 2014 and fertility outcomes followed through 2017 (Fig. 1). We use high-quality Norwegian administrative data from employer-employee and population registers. All registers in Norway have an anonymised personal identification number, which allows us to link information from different registers. The employer-employee registers for a given year cover the population with active employment that year and who receive a wage in that year, from 2005 to 2014. Because the employer–employee registers capture only certain types of employment relations[1] some workers may be excluded from the study population. We retained only individuals who worked in private-sector plants at least once between 2005 and 2014 because of the distinct employment protection and transition support mechanisms provided to public-sector employees in Norway. These data are then linked to the population register, which provides detailed information on economic activity, educational attainment, marital status, and childbirth records. We focus on partnered men and women aged 15 to 50 and registered as residents in Norway during the study period, excluding those who emigrated or died in a given year.

We construct a longitudinal panel containing all person-years from 2005 to 2014 for each individual, including years in which they are not employed in the private sector. Retaining non-employment years is necessary to correctly capture fertility outcomes – a birth occurring after one or both partners are not in private-sector employment, for instance, following a plant closure, would otherwise be missed, leading to underestimation of the fertility consequences of displacement. Employment status in a given year is determined by whether the individual held a main employment spell as of November 1st of that year. Partners were linked using the personal identification number of the cohabiting or married partner from the population register, which records cohabiting and married partners from 2005 onwards. We merge partners' socio-demographic and economic characteristics and then only retain couple-years

[1] Some forms of employment are not in the employment register, such as short-term employment, jobs performed by freelancers or contractors, and paid care work.

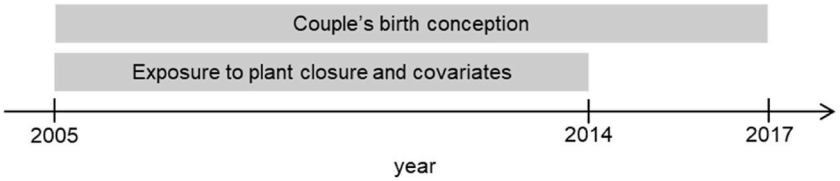

Fig. 1. Observation windows for exposure, covariates, and conception outcomes (2005–2017).

in which both partners were recorded as married to each other or cohabiting on January 1st of a given year. Changes in partnership status later in the year are not captured, which introduces a source of measurement error.[2]

We restrict estimation to couple-years in which both partners had positive labor income in the year prior to observation, ensuring that both were attached to the labor market and at risk of experiencing a plant closure. Couple-years not meeting this condition are excluded from estimation but retained in the panel, so that births occurring after one partner has left employment (for instance, in the years following a plant closure) are still observed as outcomes. The analysis of first births includes 159,104 childless couples observed for 334,068 couple-years, whereas the analysis of second births includes 182,981 couples with one child observed for 431,591 couple-years (Appendix Table A1).

4.2. Outcomes: first and second births

Our main outcome variable captures birth conception within the next three years from year t (i.e. from *year t to year t+3)*, further distinguishing between first and second parity.[3] We follow couple-years where they are childless (one child) and have work income in the year before closure (i.e. they are at risk of experiencing plant closure) and follow them until the year they experience the first (second) birth conception or the end of our follow-up period in 2014.

We infer the year of conception by lagging the children's birth date by nine months. Since our analysis is conducted on an annual basis, for each couple observed in year t, we define a couple-level outcome indicator Y_t that equals 1 if a conception leading to a live birth occurred between t and $t+3$, and 0 otherwise. This approach ensures that plant closure precedes conception, thus avoiding reverse causation, in which individuals who plan to have a child might voluntarily leave their jobs before the birth, even before conception. In cases of multiple births, we consider only the first parity.[4] Children born abroad, abortions, and stillbirths are not captured. In a robustness check, we redefine the outcome using births within the next 1-, 3-, and 5-year windows (see Supplementary analyses paragraph).

4.3. Treatment: plant closures

The treatment variable is defined as a couple experiencing job loss due to a plant (or establishment) closure in 2005–2014. Plant closures provide a relatively exogenous source of variation in job loss (Del Bono et al., 2012, for Austria; Huttunen et al., 2011, for Finland; Rege et al., 2007, for Norway), thereby reducing concerns about reverse causality and confounding due to unobserved worker characteristics affecting both job loss and fertility.

A plant is classified as closed in year t if its establishment identifier appears in the register for year t but is absent in year $t+1$ or later (Huttunen and Kellokumpu, 2016). This method may occasionally lead to misclassification, such as when a plant is temporarily shut down or relocated without formally closing. To address these issues, and in line with previous studies that use plant closure as an employment shock (e.g., Baranowska-Rataj et al., 2024), we refine the definition of plant closure to include only cases where more than two-thirds of the workforce relocate to a single new plant in the following year within the same firm. We also limit the definition to include plants with a workforce of at least five people to prevent considering closures of self-employed enterprises or small family businesses, as in such cases, the closure may not qualify as an exogenous shock. However, we do not have specific information on plant closures due to the end of the seasonal activity, and we were unable to exclude them.

Our analysis focuses only on private sector plants, as public sector workers could receive special government support following a closure, which could introduce confounding factors that might obscure the effects of the plant closure. Studies using plant closure as an indicator of job displacement are often seen as having high internal validity but low external validity, because plant closures mainly occur in industrial areas and predominantly affect blue-collar workers, and may thus apply to specific populations only.

[2] A couple recorded as partnered on January 1st may separate following a job loss later in the same year, yet the observation will still be treated as a couple-year in the analysis.

[3] For example, if a person had a first birth conception in 2017, this first birth outcome variable will show the first birth conception as occurring in 2014, as it is within three years of 2014. Similarly, we create indicators for the second birth conception that capture the second birth conception within three years of the given year.

[4] For the first-birth transition, the event (first birth conception) time is nine months before the first delivery resulting in at least one live birth. If the first delivery is a multiple birth, it is coded as one first-birth event and the couple is excluded from the second-birth risk set. Similarly, for the second birth transition the event time (second birth conception) is nine months before the second delivery resulting in at least one live birth. If the second delivery is a multiple birth, it is coded as 1 s-birth event.

Appendix Figure A3 addresses this concern by comparing the distribution of plant closures across industries (panel A) with the industry composition of the study population (panel B). It shows that closures in our data are not confined to manufacturing or disproportionately concentrated in a single industry, but instead broadly reflect the composition of the private-sector workforce in our sample, thereby strengthening the generalizability of our findings. Appendix Figure A4 further shows that closures are geographically dispersed across counties and not concentrated in a small number of regions.

A couple is included in the treatment group in a given year if either partner experienced a plant closure, with a further distinction being made between cases in which the male partner or the female partner experienced the plant closure. We exclude couples in which both partners experienced a plant closure (N = 1369) from the analytical sample because this is a distinct treatment category and the corresponding fertility estimates are highly imprecise (Appendix Figure A5). We identify 30,219 unique couples in which one partner experienced a plant closure between 2005 and 2014 (17,547 where the male partner experienced closure; 12,672 where the female partner did). Some couples experienced multiple closures during 2005–2014, contributing additional couple-years in the post-closure follow-up window.[5] A couple is included in the control group in a given year if neither partner experienced a plant closure in year *t*. In our analysis, we focus only on exposure to the shock of a plant closure, regardless of whether it led to unemployment in the year of the plant closure (Del Bono et al., 2012, for Austria; Huttunen et al., 2011, for Finland; Rege et al., 2007, for Norway). Although plant closures can be considered exogenous shocks, unemployment in the year of closure could be influenced by factors such as an individual's education, skills, and motivation to secure reemployment in a different firm. Therefore, while our sample consists of individuals who were employed at a plant that closed during the study period, not all of them necessarily became unemployed, as some may have left the plant before the closure or found new employment elsewhere immediately thereafter.

4.4. Covariates

Plant closure here is considered an exogenous measure of job loss, minimizing the risk of omitted variable bias or reverse causation. Nonetheless, the non-random selection of individuals into occupations with varying risks of plant closure could still introduce selection bias when comparing those who experienced closures with those who did not. We adjust for various individual and couple characteristics measured yearly to address these potential confounding factors. Year fixed effects are included to account for overarching fertility trends and the risk of plant closure over time. Baseline covariates include both partners' age, modelled linearly (with substantively identical results when age is modelled quadratically), place of birth (Norway vs. abroad), educational homogamy (both partners have primary or secondary education only, the male partner has higher education, the female partner has higher education, both partners have tertiary education), and partnership type (cohabiting vs. married). We further include the couple's annual household net income tertile, defined from joint net income relative to other couples in the same year. Household net income is the sum of both partners' taxable net income as reported to the Norwegian Tax Administration, encompassing labor income from employment and self-employment, social and welfare benefits, rental income, dividends, and other capital income. This measure does not include net wealth, as data on total capital assets are not available to us. We also define a pre-and post-Great Recession period (2005–2009 vs. 2010–2017) to examine whether fertility responses to plant closure differ across macroeconomic contexts.

In supplementary analyses, we examine heterogeneity by household income quartiles and by the female partner's age at plant closure (modelled with an age-squared term). Finally, each partner's municipality of residence in each year is accounted for. Appendix Table A1 provides descriptive statistics on characteristics of couples included in the main analysis, stratified by exposure to plant closure. Appendix Figure A1 shows that the most common type of couple in our data is one in which the male partner's share of the household income is 60%.

4.5. Analyses

Building on prior studies (Di Nallo and Lipps, 2023; Huttunen and Kellokumpu, 2016), we examine how exposure to plant closure affects first and second parity childbirths within the following three years, distinguishing by the partner who experienced the closure. We use binary logistic regression within a discrete-time event history analysis framework, tracking childless (one-child couple) couples from age 15 until the first childbirth (second childbirth) or until censoring events (turning 50, mortality, permanent emigration, or the end of the observation period in 2017, whichever occurs first). Our model specification, Eqn 1 is a logistic regression that takes the following form:

$$\ln\left(\frac{P(Y_{c,t0:t3}=1)}{1-P(Y_{c,t0:t3}=1)}\right)=\alpha+\beta_c X_{ct}+\beta_m X_{mt}+\beta_f X_{ft}+\beta_j X_{jt}+\epsilon_{ct} \quad (1)$$

where $Y_{c,t0:t3}$ is the couple's birth outcome (first or second childbirth) between year *t* and time *t*+*3*. The treatment indicator $\beta_c X_{ct}$ is a variable taking the value 0 if no partner in a couple loses their job due to plant closure in year *t*, 1 if only the male partner of the couple loses their job due to plant closure at time *t*, and taking the value 2 if only the female partner of the couple loses their job due to plant closure at time *t*. The vectors $\beta_m X_{mt}$ and $\beta_f X_{ft}$ contain characteristics of the male and female partners at time *t*, respectively, while $\beta_j X_{jt}$ includes the joint characteristics of both partners at time *t*. Standard errors are clustered at the couple level to account for the

[5] The total number of treated couples (31,148) exceeds the number of unique treated couples (30,219) because some couples experienced more than one closure during 2005–2014.

dependency between observations within the same couple. A couple is included in the control group in any given year if neither partner experienced plant closure in year *t*. We then estimate a logistic regression model to calculate the probability of a couple experiencing their first (second) birth with our main explanatory variable as a couple experiencing plant closure. Given the low baseline probability of conception leading to a live birth within the outcome window, we rely on logistic regression; however, linear probability models yield nearly identical results (Appendix Figure A6).

We then estimate the average marginal effect (AME) of couples experiencing plant closure on their first (second) birth conception. The AME calculates the effect on the probabilities of first (second) birth conception within the next three years for couples who experience plant closure (male partner/female partner) in year *t* compared to those who do not experience plant closure in year *t*.

We estimate several models to test our hypotheses. To test H1, Model 1 estimates the effect of either partner in a couple experiencing job loss due to plant closure on the likelihood of the couple transitioning to a first or a second childbirth relative to a situation in which neither partner experienced job loss due to plant closure. To test H2a and H2b, Model 2 introduces yearly-specific net household income tertiles in the year of the plant closure as a control to investigate whether income-related factors mediate the effect of plant closure on fertility. We assess whether the effect of plant closure on childbearing remains substantive after controlling for household income. The extent of the reduction in this effect indicates the degree to which income-related factors influence the impact of plant closure on fertility. To test H2c, Model 3 considers whether the timing of the plant closure – before the Great Recession (2005–2009) or after (2010–2017) – affects the strength of the plant closure's impact on a couple's fertility. A stronger negative response after the Great Recession is interpreted as indicative of uncertainty. Finally, to test H3, Model 4 examines the socioeconomic heterogeneity in the effect of job loss on fertility by interacting plant-closure exposure with the pre-displacement couple's income tertile (measured in the year prior to closure). This allows us to assess whether the fertility response is concentrated among couples for whom parenthood is more strongly conditioned on employment continuity and career stability, or whether it is more pronounced among couples with fewer resources. To test H4, models are conducted separately for the first and the second childbirth.

5. Results

5.1. The gendered impact of plant closures on couples' fertility

Fig. 2 shows the AME of job loss due to plant closure on the likelihood of having a first or a second childbirth within the next three years, depending on whether the male or the female partner experienced the plant closure, relative to that of couples in which neither partner experienced a closure.

For the first birth (green squares), male-partner job loss due to plant closure has no substantive effect on the couple's likelihood of having a first child. In contrast, if the female partner experiences job loss due to a plant closure, there is a negative effect of 1.82 percentage points (ppts) ($z = -1.87$, $p = 0.062$) (corresponding to a 4.6% decrease in relative terms). This effect is statistically significant at the 10% level.

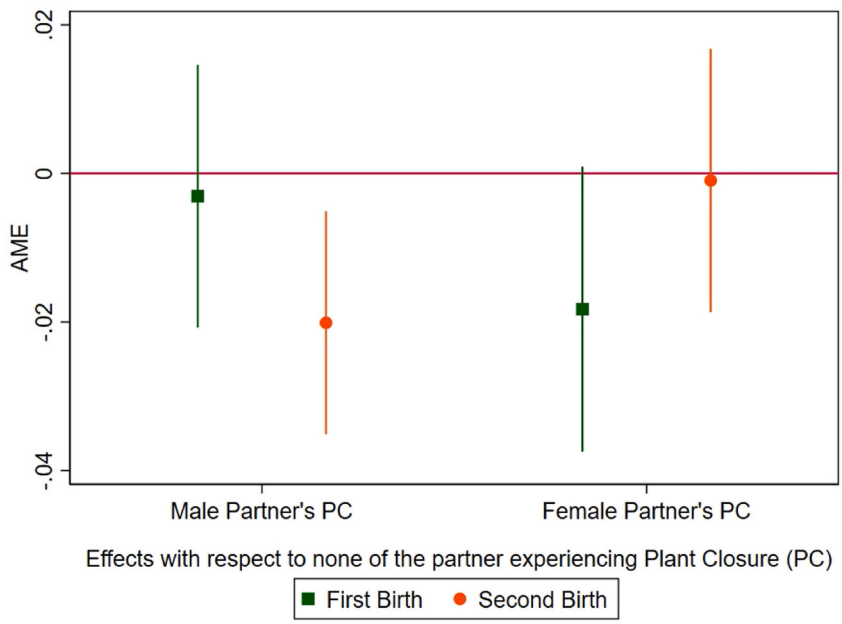

Fig. 2. Average marginal effect of plant closure on first and second childbirth (95% CI)
Note: Results from discrete-time logistic regressions of plant closure on the probability of having a first or a second childbirth within the next 3 years. Models control for year dummies, age and place of birth of both partners, educational homogamy and partnership type. *Source*: Norwegian population registers.

An almost opposite pattern emerges for the second birth (orange dots). The male partner experiencing a plant closure results in a 2.01 ppts reduction ($z = -2.62$, $p = 0.009$) in the likelihood of the couple having a second child (a decrease of 3.7% in relative terms), whereas the female partner experiencing a plant closure has no substantial effect on the couple's probability of expanding their family. These findings therefore indicate that plant closures negatively affect fertility, and highlight clear gender and parity distinctions. The male partner experiencing a plant closure does not influence the decision to initiate parenthood, whereas the female experiencing a plant closure does. Conversely, the male partner experiencing a plant closure reduces the couple's chances of having a second child, while the female partner experiencing a plant closure does not. Appendix Table A2 and Table A3 present the binary logistic regressions within a discrete-time event history analysis framework for the first- and second-birth analyses shown here, respectively.

5.2. To what extent is fertility decline due to income loss?

To explore whether the fertility decline due to plant closures can be traced back primarily to an income effect, we extend the baseline specification by including the couple's net household income tertile in the year of the plant closure as a covariate. If income loss were the main driver of the decline in fertility after job loss due to plant closure, the negative effect of the plant closure on childbirth should disappear or attenuate when controlling for the total household income in the year of closure. Fig. 3 shows that even after including the control for the total household income tertile in the year of closure, job loss continues to have a negative effect on childbearing. More specifically, the male partner experiencing a plant closure continues to have no substantial effect on the likelihood of having a first childbirth (green squares), while a slightly weaker negative effect on the likelihood of having a second childbirth (orange dots) of 1.85 ppts ($z = -2.43$, $p = 0.015$) is observed. By contrast, the female partner experiencing a plant closure continues to have a slightly stronger negative effect on the likelihood of having a first childbirth of 2.16 ppts ($z = -2.27$, $p = 0.023$), while it does not affect the chances of having a second childbirth. The persistence of these patterns, even when holding income constant, signals that the negative effects of job loss on fertility are not just the result of an income effect. Thus, these findings suggest that factors other than immediate financial constraints may be contributing to the fertility decline.

To explore mechanisms further, we explore whether the impact of job loss on couples' fertility varies depending on whether the job loss occurred before or after the Great Recession, testing whether the increased employment uncertainty following the recession plays a role in the relationship between job loss due to plant closure and fertility behavior. Fig. 4 indicates that the overall patterns of the effect of plant closure on a couple's fertility are broadly similar before and after the Great Recession. However, for second births (panel B), the effect of the male partner experiencing a plant closure on the likelihood of having a second child is slightly more negative after 2010, and it is statistically different from zero only in the post-recession period (2010–2017).

5.3. Heterogeneous effects of job loss on childbirth by couple's income

Fig. 5 extends the analyses by stratifying couples based on household income tertile in the year before the plant closure (constructed from couples' joint net income, where low/medium/high denote the bottom/middle/top tertile of the year-specific distribution). When examining the transition to the first childbirth (Panel A), the results indicate that there is no moderation effect by the couple's income level for first birth outcomes, regardless of whether the male or the female partner experiences the plant closure. In contrast, differences appear substantial for the transition to a second child (Panel B). The male partner's job loss due to a plant closure has a pronounced negative effect on the likelihood of having a second childbirth for couples in the low- and medium-income tertiles, whereas couples in the high-income tertile appear insulated from this effect. The female partner's job loss shows no substantial effect

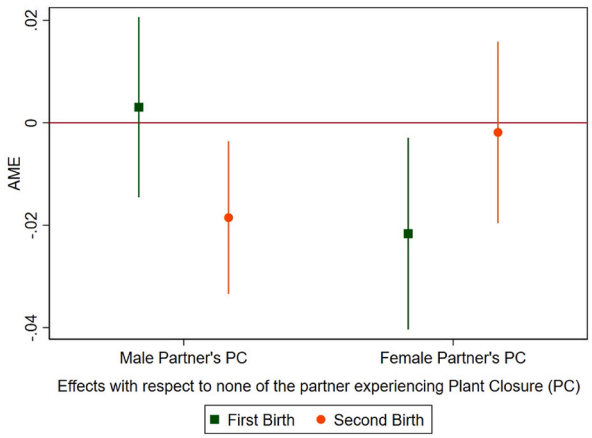

Fig. 3. Average marginal effect of plant closure on first and second childbirth (95% CI), net of the couple's income tertile in the year of closure
Note: Results from discrete-time logistic regressions of plant closure on the probability of having a first or second birth conception within the next 3 years. Models control for year dummies, age and place of birth of both partners, educational homogamy, partnership type, and household income tertile. *Source*: Norwegian population registers.

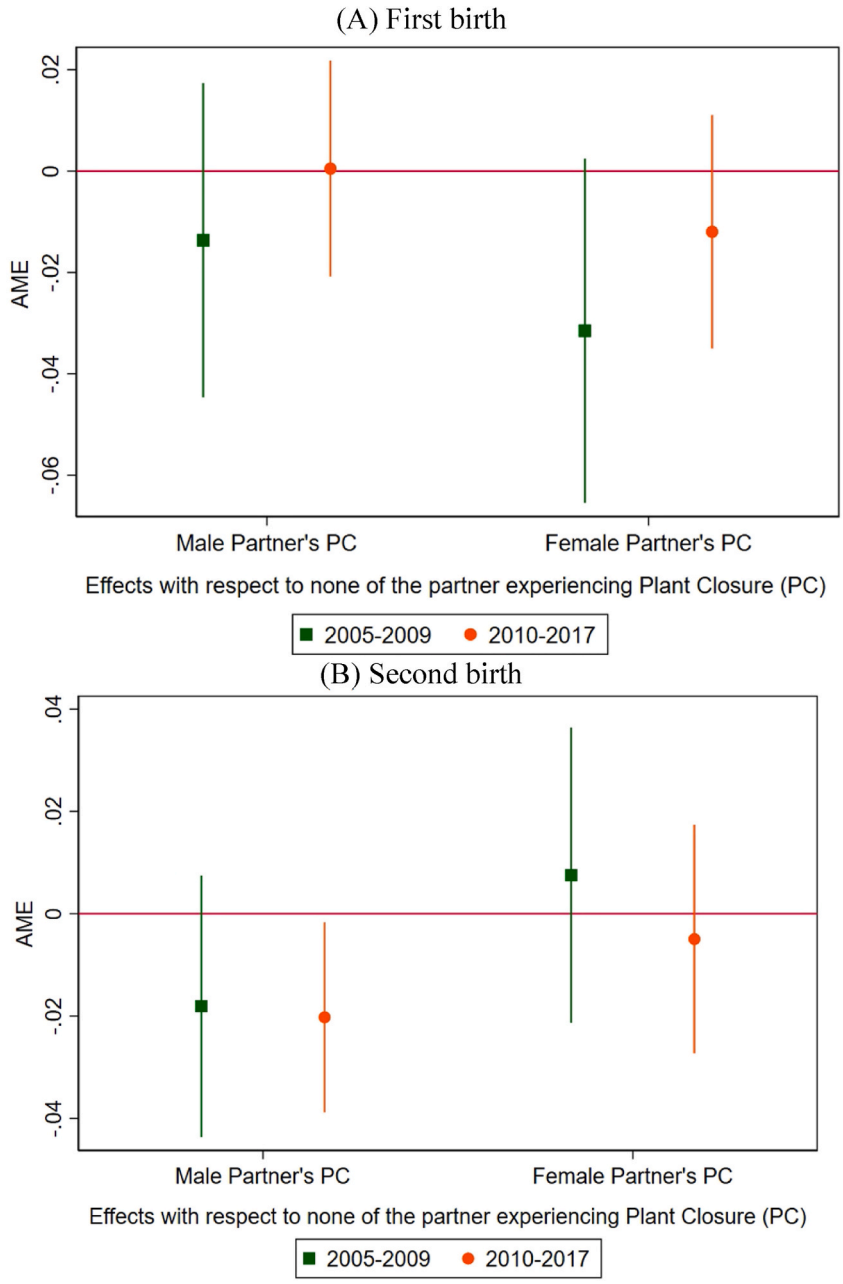

Fig. 4. Average marginal effect of plant closure on first and second childbirth before and after the Great Recession (95% CI) (A) First birth
Note: Results from discrete-time logistic regressions of plant closure on the probability of having a first or second birth conception within the next 3 years. Models control for year dummies, age and place of birth of both partners, educational homogamy, partnership type, and household income tertile. *Source*: Data from Norwegian population register.

on second-birth outcomes across any income group.

5.4. Supplementary analyses

We assessed robustness to alternative model specification and outcome definitions. Estimates are similar when using linear probability models (Appendix Figure A6) and when adding municipality fixed effects to account for local labor-market conditions, which may matter especially in small municipalities (Appendix Figure A7). Results are also similar when redefining the childbirth window to 1–, 3–, or 5-year periods after plant closure (Appendix Figure A8). However, for first births, the effect is concentrated in the immediate post-closure period and attenuates over a five-year horizon, consistent with tempo effects (postponement) rather than a

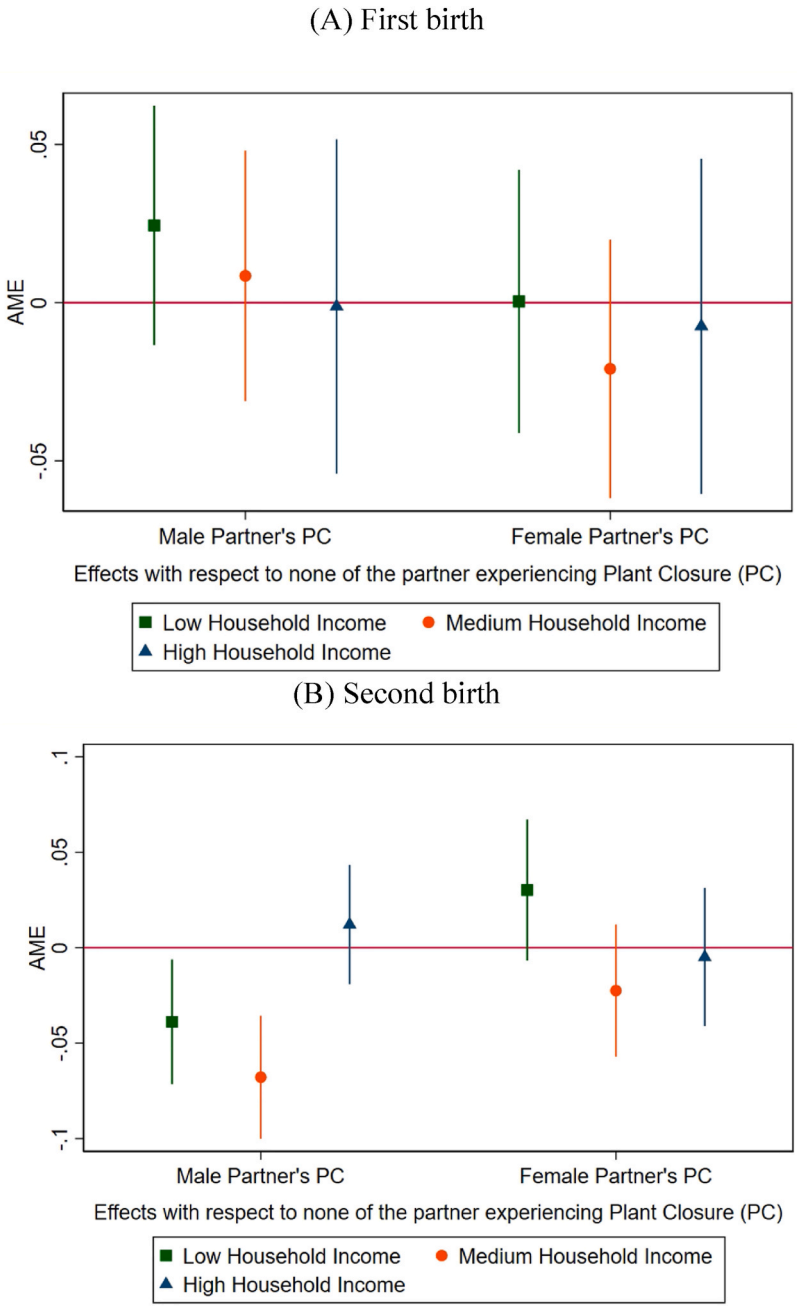

Fig. 5. Average marginal effect of plant closure on first and second childbirth by pre-displacement household income tertile (95% CI).
Note: Results from discrete-time logistic regressions of plant closure on the probability of having a first or a second birth conception within the next 3 years. Models control for year dummies, age and place of birth of both partners, educational homogamy, and partnership type, and they incorporate an interaction term with the household income tertile in the year before plant closure. *Source*: Norwegian population registers.

permanent reduction in completed fertility; for second births, the negative effect persists across all windows, indicating a more enduring parity-progression response.

We also assessed potential anticipation effects by conducting a time-to-event study for treated couples, which shows evidence of little anticipation for first births and none for second births, consistent with fertility responses occurring after displacement (Appendix Figure A9).

To explore the mechanisms further, we tested effects across household income quartiles in the year of plant closure and on couple's reliance on each partner's earnings. Results show that heterogeneity by income quartiles is limited, which confirms that income is not a major mediator of the main effects: for first births, we find no effect of men's job loss across quartiles, while the effect of women's job

loss is concentrated in the third quartile. For second births, men's job loss shows negative effects in all quartiles (slightly stronger in the second), whereas women's estimates display no meaningful income gradient (Appendix Figure A10). To capture the role of within-couple earnings balance – since childbearing in dual-earner settings often depends on two stable incomes – we modelled the male partner's income share (quadratic). We find no meaningful variation for first births (Appendix Figure A11, Panel A), but for second births the negative effect of male job loss is strongest when he contributed about 15–65% of household income before closure (Appendix Figure A11, Panel B), consistent with greater disruption when both earnings are important for household stability.

Finally, we examined life-course sensitivity by modelling female age (quadratic) at closure, given the relevance of biological and social timing for fertility. Effects, despite highly imprecise, are strongest when the female partner is in her 20s to early 30s (Appendix Figure A12).

6. Discussion

This study examined whether an exogenous employment shock – job loss due to plant closure – affects couples' fertility behavior in Norway. Drawing on high-quality, population register data from 2005 to 2017 linked with private-sector employment data from 2005 to 2014, we advance research on the employment instability/fertility nexus in three key respects. First, moving beyond individual-centered analyses (Andersen and Özcan, 2021), we adopt a dyadic, couple-level perspective, building on Huttunen and Kellokumpu (2016) and Di Nallo and Lipps (2023). We further estimate parity-specific risks for first and second births, re-embedding the analysis within a life-course framework that conceptualizes childbearing as a sequence of transitions rather than a single outcome (Kravdal, 2002), and highlighting that the mechanisms linking employment shocks to fertility differ across parity transitions. Second, we explicitly examine the mediating and moderating role of household income. This strategy allows us to assess whether fertility responses to job loss are driven primarily by changes in economic resources or by broader, non-financial dimensions of economic insecurity associated with involuntary displacement, and whether these effects are stratified by couples' socioeconomic position. Third, by focusing on Norway – a context characterized by extensive welfare-state buffering and low unemployment – we provide a stringent test of whether employment shocks shape fertility even where income losses are substantially mitigated.

6.1. Hypotheses revisited

The empirical results reveal that job loss due to plant closure negatively affects childbearing, but the pattern is neither gender-neutral (supporting H1) nor uniform across parities (supporting H4), pointing to gendered vulnerabilities at different stages of family formation. Female partner plant-closure job loss reduces couples' entry into parenthood, whereas male partner job loss primarily depresses second-birth transitions. This pattern yields little evidence for the classical New Home Economics framework that female job loss should increase fertility via reduced opportunity costs (Becker, 1993), while providing support for a gendered life-course perspective, in which the conditions couples require to enter parenthood are not the same as those that govern family expansion, and these conditions are structured by gender.

For couples in which the female partner experiences job loss due to plant closure, controlling for household income does not attenuate the negative effect on the couple's first-birth risks (contrary to H2a). This suggests that a couple's postponement of a first child after the female partner's plant-closure job loss operates through channels other than immediate income loss (supporting H2b). This finding is consistent with existing evidence (see Alderotti et al., 2021, for a meta-analysis), reflecting the greater salience of women's employment conditions for fertility timing. We find no significant heterogeneity in this effect across the pre- and post-recession periods (contrary to H2c). Moreover, the lack of heterogeneity across household-income tertiles indicates that this is not primarily a resource-constraint story (contrary to H3). Because the delay in first births following female displacement is not accounted for by income dynamics, macroeconomic context, or a clear stratification by resources, the pattern is consistent with a normative interpretation. In contemporary Norway's dual-earner setting, stable employment may have become integrated into the expectation of a "good mother" (Christopher, 2012; Dow, 2016; Schmidt et al., 2022), making job loss particularly disruptive at the point of entry into parenthood. We cannot, however, exclude an institutional explanation. Because eligibility for earnings-related parental leave is contingent on recent labor-market participation, couples may postpone childbearing after the female partner's plant-closure job loss until she has re-established employment and leave entitlements (Lappegård, 2010).

For couples in which the male partner experiences job loss due to plant closure, the negative association with second-birth progression is partly attenuated when controlling for household income, indicating that income-related mechanisms play some role (corroborating H2a). One reason male-partner plant closure job loss may be more consequential for a couple's progression to a second child than female-partner job loss is that male-partner job loss typically entails a larger immediate shock to the household's earnings. In our data, men contribute a somewhat larger share of household income (Appendix Figure A1), and male-partner job loss due to plant closure is associated with larger declines in household income than female-partner job loss due to plant closure (Appendix Figure A2). The attenuation is modest, implying that income dynamics account for only a limited part of the couple-level fertility penalty linked to male-partner displacement. Moreover, the penalty for second births is statistically detectable only in the post-recession period. Given that income protection cushions short-run earnings losses in Norway, this heterogeneity across macroeconomic contexts is coherent with an interpretation centered on job loss-induced uncertainty. In a more precarious macroeconomic climate, the male partner's job loss may weaken the couple's perceived economic security and thereby deter family expansion (in line with H2c).

At the same time, while mediation by income dynamics is limited, socioeconomic heterogeneity in couples' responses to male-partner job loss is substantial. The negative effect on second births is concentrated among households with lower pre-displacement income, while higher-income households are less affected, supporting a resource-buffering mechanism rather than the opportunity-

cost prediction that the fertility penalty would fall most heavily on middle- and upper-income couples (contrary to H3). This pattern suggests that resources matter because they shape families' ability to absorb and ensure against uncertainty. Where buffers are limited, the stability of the male partner's earnings may remain more important for meeting the marginal costs and long-horizon commitments of a second child (e.g., housing adjustments and childcare arrangements), so plant-closure displacement triggers a sharper revision of fertility plans. These results align with a "modified breadwinner" mechanism under uncertainty, a situation in which the stability of male earnings carries particular weight for decisions about family expansion among couples with fewer financial reserves.

Placing the magnitude of our estimated effects in comparative perspective with analytically comparable studies helps to contextualize their substantive size and interpret them relative to existing evidence. We found a weaker negative effect of female job loss on first births of 1.82 ppts (4.6% decrease in relative terms) significant at 10% level, which is in line with couple-level studies from Finland (Huttunen and Kellokumpu, 2016). Di Nallo and Lipps (2023) likewise found that in the UK and Germany, women's job loss decreases the chances of birth by four ppts, while men's job loss also has a slightly negative effect on birth probabilities. Fig. A13 shows that the employment rate in the private sector following plant closure drops from 67% in the year before closure to almost 60% for women and from 72% to 68% for men in the year after closure, but recovers over the next three years. The Nordic countries' favorable employment conditions, gender-egalitarian attitudes, and robust welfare state provisions may explain the lower impacts and narrower differences in the fertility responses of male and female partners to plant closures.

6.2. Limitations

Several limitations should be acknowledged. First, even though plant closures are often treated as plausibly exogenous shocks, workers may observe signs of instability before the actual closure and adjust behavior prior to the formal closure, which complicates causal interpretation. Anticipation may also induce selection, as employees who remain until the closure year may differ systematically from those who leave earlier, and the same factors that affect staying may also affect fertility. Although our analyses controlled for a rich set of observed characteristics for both partners, unobserved factors may remain. The event-time evidence reduces concerns by showing only limited anticipation for first births and none for second births, but we cannot fully rule out residual bias from pre-closure dynamics and selection.

Second, despite the strengths of administrative data, our reliance on birth records excludes pregnancies not culminating in live births (e.g., miscarriages, abortions, and stillbirths), potentially underestimating the broader effect of job loss on reproductive behavior. Prior evidence from the UK indicates that job loss during pregnancy increases couples' risk of miscarriage or stillbirth (Di Nallo and Köksal, 2023), but comparable evidence for Norway is limited. Future studies should examine the relationship between job loss and pregnancy outcomes that result in non-live birth outcomes, as a proportion of live birth outcomes, and the moderation by length of unemployment spells to understand the broader impact of job loss on reproductive behavior and outcomes.

Third, couple-years are defined based on partnership status as recorded on January 1st, meaning that dissolution occurring later in the year is not captured. Because job loss deters union stability (e.g., Anderson et al., 2021), some separated couples may be incorrectly retained in the treated group, leading to a possible underestimation of the negative fertility effect. Existing evidence for Norway suggests that the effect on union dissolution is around 0.78 percentage points (Rege et al., 2007), so the resulting bias is likely to be small.

Fourth, the household income measure is drawn from the Norwegian tax registers and captures taxable net income, including labor income, social and welfare benefits, rental income, dividends, and other capital income. However, it does not capture net wealth, which we do not have access to. This means that the financial buffering capacity of higher-income households may be underestimated, as wealthier couples can draw on additional reserves not captured by our income measure. This likely attenuates differences across income groups, suggesting that we may underestimate how well higher-income couples are insulated from job loss and how exposed lower-income couples truly are. Our findings on socioeconomic heterogeneity are, in this sense, conservative, and the substantive conclusions of this study would likely be strengthened, rather than weakened, by future research with more complete measures of household wealth.

Finally, while our analyses suggest that the fertility effects of job loss are not fully explained by income dynamics, our data do not allow us to directly test non-financial mechanisms such as subjective uncertainty, perceived future prospects, or biographical disruption (Vignoli et al., 2020a, 2020b). These channels, therefore, remain indirectly inferred and should be interpreted as residual explanations rather than empirically identified mechanisms. Future research would benefit from integrating administrative data on plant closures with survey data capturing respondents' subjective expectations in order to more directly assess how these "soft" dimensions shape fertility responses to employment shocks.

7. Conclusions

This study demonstrates that job loss due to plant closure can depress fertility even in Norway, a setting characterized by low unemployment and extensive welfare-state buffering. The implication is that institutional protection against income loss does not fully shield couples' reproductive behaviors from the disruption generated by involuntary displacement. Fertility responses to job loss are therefore not reducible to short-run financial constraints. Instead, they also reflect how employment structures life-course planning, shapes perceived stability, and conditions readiness for parenthood within couples.

Our results further show that these effects are both parity-specific and gendered in ways that challenge simple substitution arguments. In a gender-equal society, women's employment stability appears particularly consequential for entering parenthood. Female displacement is associated with lower first-birth risks, and this penalty persists net of household income, consistent with mechanisms

such as biographical disruption, uncertainty about future prospects, and the institutional salience of women's labor-market attachment. At the same time, male displacement primarily affects family expansion. Second-birth risks decline following male job loss, partly through income dynamics and more strongly among lower-income couples and in the post-recession period, when uncertainty is likely to be more salient. Taken together, the findings suggest that convergence in economic roles has not produced full convergence in the social meaning of job loss across gender. Women's employment is central for initiating family formation, while men's employment continues to carry particular weight for moving from one to two children – pointing to lingering gendered expectations that operate at different stages of the family life course.

The stratification patterns reinforce this interpretation. Higher-income couples appear better able to maintain fertility plans despite employment setbacks, whereas couples with fewer resources are more exposed to fertility penalties, especially for second births after male displacement. This underscores how economic insecurity and unequal buffering capacity translate into diverging family trajectories, linking displacement to broader debates on rising income prerequisite of parenthood and inequality in life-course transitions.

Finally, finding negative fertility effects in a highly protective welfare state strengthens the case for comparative work. If plant-closure displacement affects fertility in Norway, its consequences are likely amplified where social protections are weaker and labor markets more precarious. Future research should therefore connect parity-specific fertility processes to institutional features that shape the costs of childbearing – such as leave eligibility rules tied to recent employment – and to the gendered organization of paid work and care. Such a perspective can clarify when job loss operates mainly through income, when it operates through uncertainty and disrupted biographies, and why its consequences differ for starting a family versus expanding it.

CRediT authorship contribution statement

Rishabh Tyagi: Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Elisa Brini:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Conceptualization. **Daniele Vignoli:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Conceptualization.

Ethical approval

This study was approved by the Regional Committees for Medical and Health Research Ethics (REK) in Norway (#2018/434).

Data availability statement

The data and materials necessary to reproduce the analyses presented here are not publicly accessible. The register data can be accessed by application to the Regional Committee for Medical and Health Research Ethics in Norway, Statistics Norway, and the Norwegian Directorate of Health.

Data deposition

Our ethical approval does not allow data to be stored individually in repositories or journals.

Disclosure statement

The author reports that there are no competing interests to declare.

Generative AI statement

The authors report no use of generative AI and AI-assisted technologies in scientific writing and in figures, images and artwork.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssresearch.2026.103358.

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