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A Systematic Review**

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ABSTRACT

Fertility, Pregnancy, and Parenthood Discrimination in the Labour Market: A Systematic Review

Disparities in labour market outcomes between parents and non-parents arise partly from discriminatory practices. Understanding these unfair practices is essential for fostering workplace equity. Our systematic review of the literature summarises employer discrimination based on various manifestations of parenthood in multiple labour market outcomes. Unlike previous studies, our review encompasses not only motherhood but also fatherhood and the stages preceding parenthood, namely fertility and pregnancy. In terms of labour market outcomes, we consider discrimination in hiring, remuneration, promotion, and dismissal. We also focus exclusively on experimental research, enabling causal conclusions about discrimination and its underlying mechanisms. Our synthesis suggests that employers consistently penalise women in the labour market when they have children, during pregnancy, and during their fertile years. In contrast, men often experience no adverse effects or even a premium when they have children. Researchers frequently find evidence of statistical discrimination as the primary explanation for their findings. Employers appear to rely predominantly on information based on norms and stereotypes to make decisions about parents in the labour market. We offer a roadmap for academics, policymakers, and employers to map and mitigate this phenomenon in the long term. In particular, we highlight fruitful directions for future research, including (i) more broadly assessing the effects of fertility, (ii) more effectively manipulating parenthood in experiments, (iii) more frequently investigating dismissal as a labour market outcome, and (iv) more profoundly examining the mechanisms of parenthood discrimination.

JEL Classification: J13, J16, J71

Keywords: parenthood, pregnancy, fertility, discrimination, labour market outcomes, systematic review

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1. Introduction

Understanding whether parenthood affects men's and women's labour market outcomes and the forces that shape these outcomes is crucial for achieving gender equity in the labour market (Goldin, 2014, 2021). Women, for example, often gravitate toward family-friendly occupations that provide greater flexibility but may offer lower pay or fewer promotion opportunities (Berniell et al., 2023). Moreover, career interruptions due to childbirth and childcare responsibilities can significantly impact their long-term career trajectories (McIntosh et al., 2012). In contrast, the availability and affordability of childcare services are critical factors in helping parents stay in or return to the workforce (Huber & Rolvinger, 2023). Yet, a significant driving force of gender disparities is discrimination, which we define as the unfair or unequal treatment of equally productive individuals based on personal characteristics—here, parental status (Arena et al., 2023; Blau & Kahn, 2017; Correll et al., 2007).

Discrimination is particularly concerning because it affects employees regardless of their choices or intentions. Depending on the context, this discrimination can manifest positively as a 'premium' or negatively as a 'penalty' (Arena et al., 2023; Correll et al., 2007). In light of this, this review addresses how employer-driven discrimination based on different forms of parenthood affects various labour market outcomes. Specifically, we want to answer three research questions. First, what is the empirical evidence for labour market discrimination based on fertility, pregnancy, and parenthood in hiring, remuneration, promotion, and dismissal (RQ1)? Second, what is the empirical evidence for the mechanisms explaining labour market discrimination based on fertility, pregnancy, and parenthood (RQ2)? Third, what are critical gaps in the current literature that future research should address (RQ3)?

We aim to synthesise the existing empirical research through a systematic literature review. In recent years, several scholars have attempted such a synthesis regarding parenthood in the labour market. For instance, Arena et al. (2023) reviewed the antecedents and outcomes of different biases against mothers at various career stages. Cukrowska-Torzewska and Matysiak (2020), Kunde and Lourenço (2022), and Kwak (2022) concentrated on motherhood and remuneration. Similarly, Lippens et al. (2023) examined unequal treatment by motherhood status, specifically in the context of hiring, measured through

correspondence experiments.

Our review, however, differs from the existing literature in several key aspects, as we introduce three significant improvements. First, prior reviews focus on motherhood in a strict sense, in isolation from the broader perspective of manifestations of parenthood. We consider all substantial manifestations of parenthood: female fertility, male fertility, pregnancy, motherhood, and fatherhood. Second, we distinguish ourselves by examining differential treatment by employers based on these different manifestations across all four classic labour market outcomes: hiring, remuneration, promotion, and dismissal (Veenman, 2010). Finally, our review integrates theories from both economic and non-economic fields, which have typically been examined independently, providing an integrated framework that unifies perspectives from across these fields.

The remainder of this article proceeds as follows. Section 2 synthesises the theoretical frameworks explaining labour market discrimination related to fertility, pregnancy, and parenthood. Section 3 outlines the methodological approach used in this systematic review. Section 4 presents (i) findings on labour market discrimination based on fertility, pregnancy, and parenthood, (ii) empirical evidence for the mechanisms driving these discriminatory practices, and (iii) recommendations for future research. Finally, Section 5 concludes the review.

2. Theoretical framework

To address the question of what empirical evidence exists for the mechanisms explaining labour market discrimination based on fertility, pregnancy, and parenthood (RQ2), it is crucial to first understand the potential (or theoretical) mechanisms discussed in peer-reviewed literature. Historically, scholars have explained this unequal treatment through two seminal economic theories: statistical discrimination and taste-based discrimination (Guryan & Charles, 2013; Lang & Kahn-Lang Spitzer, 2020; Neumark, 2018). These two theories address the role of stereotypes and preferences in labour market discrimination, but they do not explain the origins of specific stereotypes and preferences, especially in the context of parenthood (Neumark, 2018). These antecedents are typically elaborated better

in complementary, non-economic theories (Arena et al., 2023). Therefore, the following subsections detail the two seminal theories alongside their relevant complementary theories often used as mechanisms to explain the position of (prospective) parents in the labour market.

2.1. Statistical discrimination

Statistical discrimination theory asserts that decisions are shaped by information ambiguity (Aigner & Cain 1977; Arrow 1973; Phelps 1972). In essence, employers may rely on group-level information to assess an employee's productivity when information about that specific employee's productivity is limited or imprecise (Borjas, 2020). This reliance is rooted in the idea that obtaining detailed information about individuals is costly; thus, using group-level information serves as a more cost-effective decision-making strategy. In the context of parenthood, this implies that an employer may assign (un)favourable group-level information to individuals with a certain parental status, resulting in labour market outcome (dis)advantages (Budig & England, 2001).

The original theory formulation of statistical discrimination does not specify why employers choose to rely on specific group-level characteristics over others beyond mere (perceived) productivity differences. However, a range of complementary theories from various disciplines can offer potential explanations for the emergence of concrete group-level statistical beliefs, particularly regarding women. These complementary theories can be broadly divided into two categories: those related to norms and those pertaining to stereotypes (Arena et al., 2023). In what follows, we discuss each category and its associated theories in turn.

2.1.1. Statistical discrimination related to norms

Some theories centre on how societal and cultural norms shape discrimination (Arena et al., 2023). In this case, individuals with a particular parental status are expected to conform to certain societal and/or cultural norms. Relevant theories in this respect are status characteristics theory (Berger et al., 1972), ideal worker theory (Acker, 1990), and normative discrimination theory (Benard & Correll, 2010).

First, status characteristics theory posits that individuals are categorised based on personal attributes or roles (Berger et al., 1972). One social category is valued more than another, with the socially valued category being perceived as the group with higher status. The higher-status group is often considered more competent or productive, leading to preferential treatment. Those belonging to the lower-status group are usually disadvantaged as a result. Complementary theories indicate why parenthood may yield a certain status label. For instance, social role theory expands on the idea that status is closely tied to specific social roles (Eagly, 1987). This theory posits that society expects different roles from men and women: men are typically linked to breadwinning or providing roles, while women are associated with caregiving or homemaking roles. These gendered roles shape how individuals are viewed in the workplace, with caregiving roles frequently regarded as less compatible with workplace demands (Arena et al., 2023). When combined with status characteristics theory, motherhood may be perceived as a socially devalued status in the workplace due to its association with caregiving roles (Arena et al., 2023; Ridgeway & Correll, 2004).

Second, the aforementioned caregiving roles also conflict with the expectations outlined in ideal worker theory (Acker, 1990). This theory defines the ideal worker as someone who joins the workforce in young adulthood, works 40 hours or more per week, is always available to the employer, does not take time off for children, and continues working until retirement (Williams, 2001). However, women are simultaneously expected to be good mothers, which culturally conflicts with the expectations of the ideal worker (Hays, 1996). This incongruence between these two roles may create a perceived incompatibility, leading to workplace penalties for mothers (Eagly & Karau, 2002).

Third, normative discrimination theory suggests that prevalent cultural norms regarding success in the labour market systematically disadvantage specific groups (Benard & Correll, 2010). In particular, employers may believe that success in the labour market signals stereotypically male qualities (i.e. assertiveness and dominance), contrasting with mothers' culturally expected qualities (i.e. warmth and nurturance) (Benard & Correll, 2010). According to this theory, even when mothers demonstrate high performance and succeed in their jobs—displaying qualities typically associated with male success—they may still face penalties. This disadvantage arises not because they are perceived as underperforming but

because they are seen as violating the culturally prescribed expectations of motherhood.

2.1.2. Statistical discrimination related to stereotypes

Research has also shown that parenthood is related to group-level stereotypes (Arena et al., 2023), which may, again, cause statistical discrimination. Relevant theories include the stereotype content model (Fiske et al., 2002) and the shifting standards model (Biernat et al., 1991).

First, the stereotype content model holds that stereotypes about social groups are structured along two dimensions, warmth and competence, resulting in four combinations of high/low warmth and high/low competence (Fiske et al., 2002). These stereotypes can predict discriminatory behaviour, where groups scoring high on both dimensions tend to receive positive treatment and those scoring low on both tend to receive negative treatment (Cuddy et al., 2004, 2007). However, most female subtypes fall into mixed warmth–competence categories, making them either liked or respected, but rarely both (Cuddy et al., 2004; Eckes, 2002). Since competence is more highly valued than warmth in workplace settings, female subgroups such as mothers may face disadvantages due to a perceived competency gap (Cuddy et al., 2004; Operario & Fiske, 2001).

Second, the shifting standards model suggests that stereotypes set different standards for different social groups, causing individuals to be judged relative to their within-category standards (Biernat et al., 1991; Biernat & Manis, 1994). This means that stereotypes not only shape the expectations of individuals based on group attributes but also influence the standards used to evaluate them. Parental status can contribute to these different standards; for example, while both mothers and fathers are seen as equally capable parents, mothers must demonstrate more effort than fathers to be considered good parents (Bridges et al., 2002; Kobrynowicz & Biernat, 1997). A similar dynamic can occur in the workplace, where mothers may be held to higher standards to be seen as competent employees, while fathers may be held to more lenient standards (Cuddy et al., 2004). As a result, mothers can be at a disadvantage, whereas fathers may benefit from these standards (Cuddy et al., 2004).

2.2. Taste-based discrimination

Taste-based discrimination theory asserts that individual prejudices stem from contact preferences (Becker, 1957). In essence, individuals have a ‘taste’ rather than any economic rationale to avoid contact with members of certain (demographic) groups over other groups. In the workplace, employers may discriminate against certain groups to avoid personal contact or because they believe that colleagues or customers may derive less utility from interactions with these groups (Becker, 1971; Borjas, 2020). This taste is costly as employers may forego profits by hiring too few productive workers from groups they wish to avoid and by paying too much to hire from other groups they prefer (Becker, 1971; Hedegaard & Tyrann, 2018). In the context of parenthood, taste-based discrimination implies that an employer may avoid contact with individuals with a certain parental status (Budig & England, 2001).

The original theory formulation of taste-based discrimination does not specify the origins of preferences for or against certain groups other than being rooted in contact avoidance. While various theories can explain statistical discrimination, preferences that drive taste-based discrimination are often understood through Tajfel et al.’s (1971) in-group favouritism theory. This theory posits that individuals tend to prefer associating with members of their own group (‘in-group’) rather than with those outside this group (‘out-group’). For example, a prejudiced employer without children may find it unpleasant to employ an applicant with children for reasons of in-group favouritism (Budig & England, 2001). Clearly, the dividing line between this form of favouritism and stereotype-driven preferences is thin: belonging to a particular group can go hand in hand with stereotypes about the other group and, in turn, reinforce in-group favouritism.

3. Methods

We employed a structured approach to address our research questions, following the guidelines outlined by Xiao and Watson (2017). The subsequent subsections explain the processes of study identification, study selection, and data extraction.

3.1. Study identification

An overview of the eligibility criteria used for identifying and selecting studies can be found in Table 1. This table is based on the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, Research type) by Cooke et al. (2012). The 'Sample' criterion was threefold and based on different manifestations of parenthood. First, we included the comparison of men and women at risk of having children in the near future (i.e. fertile) against less at-risk counterparts. Second, we included the comparison of pregnant women against non-pregnant counterparts. Third, we included the comparison of parents (i.e. mothers or fathers) against childless counterparts (i.e. zero children or no mention of children). The 'Phenomenon of Interest' criterion included employer discrimination against different manifestations of parenthood in labour market outcomes. The 'Design' criterion encompassed experimental research to enable causal conclusions about discrimination (Neumark, 2018). The 'Evaluation' criterion covered hiring, remuneration, promotion, and dismissal. The 'Research type' criterion was limited to primary, quantitative, empirical research. Furthermore, we focused on articles published between 2000 and 2023, as the 2000s marked a significant increase in research on labour market discrimination, and 2023 was the most recent complete calendar year at the time of data collection (Gaddis, 2018).¹

<Table 1 about here>

Our formal search strategy consisted of two manual searches to identify relevant studies. First, we conducted a systematic search in the Web of Science Core Collection using four groups of keywords: (i) discrimination, (ii) workplace, (iii) parenthood, and (iv) labour market outcomes.^{2,3} Although Cooke et al.'s (2012) SPIDER framework recommends

¹ This is also apparent from the two most cited studies on the motherhood penalty conducted in the 2000s (Budig & England, 2001; Correll et al., 2007).

² We searched for commonly used keywords in existing studies and reviews for each category. The exact search strategy consists of the following keywords: (i) 'discrimina*' or 'unequal treatment' or 'penalty' or 'bonus' or 'premium', (ii) 'workplace' or 'workspace' or 'work' or 'job*' or 'labo*r market' or 'employee*' or 'employment' or 'employing', (iii) 'mother*' or 'mommy track' or 'mommy effect' or 'maybe baby' or 'maternity' or 'father*' or 'breadwinner*' or 'parent*' or 'pregnan*' or 'fertility' or 'child*' or 'kids', and (iv) 'hiring' or 'recruitment' or 'recruiting' or 'job applica*' or 'promotion*' or 'advancement' or 'job mobility' or 'career' or 'glass ceiling' or 'sticky floor' or 'earnings' or 'income' or 'remuneration' or 'pay' or 'salary' or 'salaries' or 'wage*' or 'job loss*' or 'layoff*' or 'lay-off*' or 'discharge' or 'firing' or 'displacement' or 'dismissal'.

³ To ensure the quality of the review, we compiled a list of five key studies, selected based on their high number of citations, prior to the screening process (Benard & Correll, 2010; Correll et al., 2007; Fuegen et al., 2004; Hebl et al., 2007; Heilman & Okimoto; 2008). We then conducted a trial search using our keywords to

including a group of keywords related to the method, we opted not to do this. This decision was based on the observation that some studies do not mention their methods in the title, abstract, or keywords (e.g. Bear & Glick, 2017; Benard & Correll, 2010; Fuegen et al., 2004; Henle et al., 2019). Additionally, we filtered out certain research areas from our search because they were not expected to yield relevant results.⁴ Second, we conducted forward and backward citation searches to minimise the risk of missing relevant studies.

A limitation of this search strategy, which focuses solely on published studies in the Web of Science Core Collection, is the risk of sample skewness towards studies reporting significant findings due to publication bias. Nevertheless, the review focuses on identifying broader patterns across the literature rather than drawing conclusions from individual studies, which helps to mitigate the impact of any publication's bias. Additionally, the reliance on peer-reviewed and high-quality studies ensures the validity of the findings (Weichselbaumer & Winter-Ebmer, 2005). This approach also enhances the replicability of the review by employing a transparent and consistent search strategy, which is not feasible in some databases that include material that is not peer-reviewed, such as Google Scholar.

3.2. Study selection

The first step of the search strategy in the Web of Science Core Collection yielded 1,283 studies, including one duplicate that was removed. The titles and abstracts of these studies were screened based on our eligibility criteria, except for the criterion regarding the research design. This approach allowed us to map all empirical evidence on employer discrimination related to different manifestations of parenthood across different labour market outcomes. In other words, this served as a scoping review to obtain an initial

verify their effectiveness by checking whether these key studies appeared in the search results (Xiao & Watson, 2017). Our trial confirmed that the keywords performed adequately.

⁴ The filtering procedure in our search results was based on the following research areas from the review by Arena et al. (2023): accounting, communications, economics, family studies, gender studies, health (general), industrial relations and labor, law, librarianship, management, nursing, population studies, psychology, sociology, and women's health. Translated to the research areas available in the Web of Science Core Collection, the disciplines corresponded to the following research areas: communication, business economics, family studies, social sciences other topics, biomedical social sciences, mathematical methods in social sciences, social issues, social work, development studies, behavioral sciences, health care sciences services, public environmental occupational health, international relations, government law, literature, nursing, demography, geography, psychology, sociology, and women's studies.

overview of the available relevant literature. This process was performed independently by both the first and second screeners (the first and last author of the present study), resulting in an inter-rater reliability score (IRR) of 90.3% and a Cohen's kappa of 66.5%, indicating substantial agreement according to Landis and Koch's (1977) classification. Disagreements between the two screeners were discussed to reach consensus, resulting in 219 retained studies.

After the scoping review, we observed that the numerous non-experimental studies on parenthood and labour market outcomes were too broad for a structural review and hardly ever allowed for causal interpretation (under reasonable assumptions). Therefore, we refined our focus, and both screeners conducted a second screening of the remaining 219 studies by evaluating the titles and abstracts for experimental research designs. This process resulted in an IRR of 98.6% and a Cohen's kappa of 94.7%, indicating almost perfect agreement (Landis & Koch, 1977). After discussing disagreements, the screeners ultimately selected 34 studies that passed title and abstract screening.

The first screener then conducted a full-text screening of the remaining 34 studies based on the eligibility criteria. During this step, four studies were excluded: two for not including a non-parent control group, one for lacking a genuine experimental research design, and one for not addressing employer discrimination. This first systematic search resulted in 30 included studies.

The second step of the search strategy involved citation searching by the first screener on these 30 studies to identify any additional relevant work. This search identified 3,590 studies, of which 1,431 were duplicates. The titles and abstracts of the remaining studies were screened, this time concentrating immediately on experimental research designs, resulting in 21 identified studies. These 21 studies were then subjected to a full-text screening, of which 14 were excluded: eight for lacking a genuine experimental research design, four for not including a non-parent control group, one for not addressing one of the four labour market outcomes, and one for not using new data or analyses.⁵ This additional search strategy resulted in seven included studies. The entire procedure, as summarised in

⁵ Both Kricheli-Katz (2012) and Kricheli-Katz (2013) met our inclusion criteria. However, since the two studies used the same sample without providing supplementary analyses relevant to this review, we included only one of them. Specifically, we chose to report on Kricheli-Katz (2012), as it focuses exclusively on motherhood, whereas the 2013 study also addresses obesity and homosexuality.

a PRISMA flow diagram in Figure 1 (Page et al., 2021), culminated in 37 studies.

<Figure 1 about here>

3.3. Data extraction

We extracted the following data from each of these 37 selected studies: bibliographic details (i.e. authors and year of publication), region and country, research design (i.e. field or lab experiment), experimental group (i.e. how fertility, pregnancy, or parenthood is manipulated), and main results (i.e. classification of the empirical evidence on the effects of fertility, pregnancy, or parenthood based on the studies' findings). Missing information was indicated by 'N/A', as missing data should not be a reason to exclude a study (Deeks et al., 2022). If authors conducted multiple experiments or experiments with multiple labour market outcomes, we treated these as separate treatment effects in our analysis and extracted data accordingly. This process resulted in the review of 56 different treatment effects.

4. Results

Here, we first present an overview of the empirical evidence on the effect of different manifestations of parenthood (i.e. female fertility, male fertility, pregnancy, motherhood, and fatherhood) on employer discrimination in various labour market outcomes (i.e. hiring, remuneration, promotion, and dismissal) (RQ1). Second, we discuss the empirical evidence for the mechanisms driving this labour market discrimination (RQ2). Third, we identify gaps in the literature and provide suggestions for future research (RQ3).

4.1. Evidence for labour market discrimination by different manifestations of parenthood

In this subsection, we address RQ1 by evaluating the effects of different stages of parenthood on labour market outcomes for both women and men. First, we present general descriptive statistics outlining the types of research that have been conducted. Second, we

summarise the empirical evidence on labour market discrimination for women and men without distinguishing among parental stages. In the third stage, we disaggregate the preceding findings by fertility, pregnancy, and parenthood, followed by an analysis of outcome heterogeneity by region, research design, and labour market outcome, focusing specifically on mothers and fathers due to the larger number of treatment effects for these groups. Last, we highlight an important point regarding the manipulation of parenthood in experiments, particularly concerning the number of children revealed. Due to substantial differences in underlying treatment groups, research designs, and analysis methods, we rely solely on a qualitative synthesis of the included studies supplemented with study-level descriptive statistics. Our approach does not allow us to make conclusive statements about the overall direction or magnitude of (average) treatment effects (McKenzie & Brennan, 2011).

Our discussion is based on Table 2. The first column lists the included studies alphabetically by labour market outcome. The second and third column present each treatment effect's region and research design. The fourth column details the experimental group, where the control groups consist of childless individuals (i.e. zero children or no mention of children) in the case of parenthood, non-pregnant individuals in the case of pregnancy, and individuals less at risk of parenthood in the case of fertility. The fifth column categorises the main empirical evidence related to RQ1. In bold, we indicated whether there is (i) a penalty, (ii) no effect, or (iii) a premium. No effect denotes the absence of significant evidence, not evidence for the lack of an effect per se.

<Table 2 about here>

4.1.1. Descriptive overview of research characteristics

Table 2 summarises 56 treatment effects. Among these, most researchers examine hiring (37 out of 56 treatment effects; 66.1%) as a labour market outcome, while smaller shares examine remuneration (10 out of 56 treatment effects; 17.9%) and promotion (9 out of 56 treatment effects; 16.1%) as labour market outcomes. Notably, there is no literature on dismissal meeting our eligibility criteria. In terms of geographical distribution, most research has been conducted in North America (26 out of 56 treatment effects; 46.4%) and Europe (18 out of 56 treatment effects; 32.1%), with European studies spread across various

regions. A smaller number of studies are conducted in Asia and Oceania. Regarding research design, lab experiments are predominant (41 out of 56 treatment effects; 73.2%), followed by field experiments (15 out of 56 treatment effects; 26.8%).

4.1.2. General evidence for labour market discrimination by gender

The 56 treatment effects encompass labour market outcomes for women and men. For all these treatment effects, researchers concentrate on the outcomes for women. Concretely, women experience a penalty in labour market outcomes in 39 out of 56 treatment effects (69.6%) due to parenthood (i.e. fertility, pregnancy, and motherhood). In some cases, they experience no effect (15 out of 56 treatment effects; 26.8%) or even a premium (2 out of 56 treatment effects; 3.6%). In contrast, men's labour market outcomes are considered in only 38 out of 56 treatment effects (67.9%). These studies show that men predominantly experience no effect (22 out of 38 treatment effects; 57.9%) or even a premium (11 out of 38 treatment effects; 28.9%) due to parenthood (i.e. fertility and fatherhood). A minority indicates a penalty (5 out of 38 treatment effects; 13.2%). In brief, labour market outcomes for women and men appear to differ significantly.

4.1.3. Disaggregation by parental stages for women

The labour market penalty for women is due to various manifestations of parenthood: fertility, pregnancy, or motherhood. The first stage is fertility. A small portion of the literature (5 out of 56 treatment effects; 8.9%) concentrates on this, all finding a female fertility penalty in labour market outcomes. The underlying notion is that discrimination against women is not limited to their actual parental status but extends to all women who have the potential to become pregnant and, consequently, mothers (Gloor et al., 2022). This phenomenon has been investigated by manipulating variables that signal women's perceived risk of future childbearing. The first predictor is a woman's age. For instance, Wang and Chen (2023) examine the hiring chances of childless versus non-childless women at age 28, a figure based on the average age of first childbirth in China. They find that childless 28-year-old women receive fewer callbacks than their counterparts with children, providing clear evidence of a fertility penalty. Another significant predictor is the age of children. Becker et al. (2019) evaluate whether women with older children are more likely

to have completed their childbearing cycle, thus reducing the perceived risk of future childbearing. Their experiment shows that women who are likely to have finished childbearing receive more callbacks for part-time jobs than single, childless women, further supporting the existence of a female fertility penalty. Finally, some studies examine this issue more directly, for example, by explicitly assessing someone's interest in having children. Gloor et al. (2022) subtly manipulate applicants' Facebook posts to signal either an interest or no interest in having children. The results indicate that women interested in having children are more likely to receive job offers with precarious employment conditions than those without interest in having children.

The consequences of pregnancy among women in the labour market have also been relatively understudied, with only 7 out of 56 treatment effects (12.5%) in our review study considering such consequences. Among these, a penalty is identified in 5 treatment effects (71.4%), while no effect is found in 2 treatment effects (28.6%). These studies typically compare applicants in a hiring setting with and without a visibly noticeable pregnancy prosthesis (e.g. Bragger et al., 2002; Cunningham & Macan, 2007; Masser et al., 2007). The findings consistently show that pregnant applicants are more likely to be denied the opportunity to complete their applications (Morgan et al., 2013) and receive lower hiring ratings (Bragger et al., 2002; Cunningham & Macan, 2007; Masser et al., 2007) than their non-pregnant counterparts.

Motherhood has garnered the most attention from researchers (44 out of 56 treatment effects; 78.6%). Generally, studies find that women experience penalties in labour market outcomes due to having children (29 out of 44 treatment effects; 65.9%), although a substantial portion of the literature also finds no effect (13 out of 44 treatment effects; 29.5%). This motherhood penalty appears in various settings. For instance, in Europe and North America, mothers experience penalties in 9 out of 16 (56.3%) and 16 out of 21 (76.2%) treatment effects, respectively. Furthermore, the penalty occurs in both field (6 out of 9 treatment effects; 66.7%) and lab experiments (23 out of 35 treatment effects; 65.7%). Finally, this penalty manifests across all three labour market outcomes: hiring (17 out of 27 treatment effects; 63.0%), remuneration (5 out of 8 treatment effects; 62.5%), and promotion (7 out of 9 treatment effects; 77.8%). For instance, Correll et al. (2007) examine all three outcomes and find that mothers are less likely to be recommended for hiring,

receive lower salary recommendations, and are less likely to be promoted than non-mothers—indicating a motherhood penalty. Other recent studies corroborate these findings and even suggest that the penalties extend further. For example, mothers not only face a lower likelihood of being hired but also receive a more negative tone and word choice in callbacks and are rejected more swiftly than non-mothers (Cheung et al., 2022). Additionally, they are given less priority in the sequence of interview callbacks (González et al., 2019). Regarding promotion chances, mothers face not only a lower likelihood of promotion but are also less likely to be recommended for management training (Correll et al., 2007) and are more frequently denied promotions than non-mothers (Heilman & Okimoto, 2008).

4.1.4. Disaggregation by parental stages for men

In contrast, men generally experience no effect or even a premium in the labour market due to various manifestations of parenthood, with these findings being evident across both fertility and fatherhood. Male fertility is examined in only 2 out of 38 treatment effects (5.3%), with neither showing an effect. To illustrate, Becker et al. (2019) report no difference in callback rates between men who are and are not at risk of having children. Similarly, Wang and Chen (2023) find no differences in callback rates between childless men in their fertile ages and their counterparts with children. However, these findings should be interpreted with caution due to the limited number of studies.

The remaining research on men relates to fatherhood (36 out of 38 treatment effects; 94.7%). Among these, there is empirical evidence of a premium in 11 treatment effects (30.6%), while no effect is found in 20 (55.6%). However, it is essential to note that this fatherhood premium does not occur uniformly across all settings. For instance, regarding study region, the fatherhood premium is predominantly found in North America (8 out of 20 treatment effects; 40.0%). In contrast, a premium for fathers is reported in only 1 out of 12 treatment effects (8.3%) in Europe, with most studies in this region finding no effect (9 out of 12 treatment effects; 75.0%).

Interestingly, the fatherhood premium is primarily identified in lab experiments (10 out of 30 treatment effects; 33.3%) and rarely in field experiments (1 out of 6 treatment effects; 16.7%). Moreover, the sole field experiment that identifies a premium (i.e. Cheung et al., 2022) finds only a subtle effect: fathers are rejected less quickly than non-fathers, indicating

a slight difference in how seriously applicants are considered, rather than an increased chance of being hired. This observation raises the question of whether the controlled environment of lab experiments may artificially induce the fatherhood premium, as it is rarely found in the field. Concretely, lab experiments often lack realism and generalisability, as they fail to capture the complexity of real-world situations (Berkowitz & Donnerstein, 1982; Falk & Heckman, 2009; Forster & Neugebauer, 2024). Additionally, participants in lab studies may alter their behaviour simply due to the awareness of being observed (the Hawthorne effect; Falk & Heckman, 2009). Moreover, laboratory experiment decisions often have no real consequences for the participants or others, unlike field experiments, where decisions can have tangible implications (Neumark, 2018; Winkler & Murphy, 1973).

Finally, this fatherhood premium is also observed across different labour market outcomes. Specifically, a premium for fathers in hiring is reported in 4 out of 21 treatment effects (19.0%), while no effect is found in 13 (61.9%). Regarding wages, a premium is observed in 3 out of 6 treatment effects (50.0%), while no effect is shown in 2 treatment effects (33.3%). For promotion, a premium is reported in 4 out of 9 treatment effects (44.4%), with no effect being found in 5 treatment effects (55.6%). For example, Correll et al. (2007) identify this premium across all three outcomes, finding that fathers are marginally more likely to be recommended for hiring, offered higher salaries, and marginally more likely to be recommended for management training than non-fathers—evidence of a fatherhood premium. Other recent studies have reached similar conclusions. Cheung et al. (2022) show that fathers are rejected less quickly than non-fathers, and Fernández-Lozano et al. (2020) prove that fathers receive higher promotion scores than non-fathers.

4.1.5. Considerations on the manipulation of parenthood in experiments

The preceding discussion primarily emphasised motherhood and fatherhood without specifying the experimental groups, as these are not always clearly defined. There are two main explanations for this. On the one hand, some studies manipulate the parenthood variable in terms of the number of children, as this could produce varying effects. However, only a few studies have done this (i.e. Albert et al., 2011; Eriksson et al., 2017; Oesch et al., 2017). Specifically, Eriksson et al. (2017) report that both mothers and fathers experience a penalty in job offer rates, but only when they have two or more children. If they have only

one child, there is no significant difference from their childless counterparts. Similarly, Oesch et al. (2017) find that mothers are less likely to be invited to a job interview only when they have three children. They also find that mothers receive lower salary recommendations than non-mothers, with the penalty increasing when they have two or three children. Note that the age of the children is never manipulated in these studies.

On the other hand, many studies select a specific group as the experimental group. For example, some studies refer to children without further specification (e.g. Henle et al., 2020), while others refer to one child (e.g. Mari & Luijkx, 2020), one child aged three (e.g. Hipp, 2020), one young child (e.g. Bedi et al., 2022), two children (e.g. González et al., 2019), two young children (e.g. Fuegen et al., 2004), or even parent–teacher association membership (e.g. Ishizuka, 2021). The wide variety of experimental groups makes comparing the results across studies difficult.

4.2. Evidence for the underlying mechanisms

This subsection discusses how the studies included in this review provide empirical evidence for the mechanisms explaining labour market discrimination based on fertility, pregnancy, and parenthood, as outlined by the theories in Section 2 (RQ2). While ample evidence addresses mechanisms of discrimination related to parenthood, empirical support for similar mechanisms regarding fertility and pregnancy is comparatively scarce. We also find that empirical research has focused on theories rooted in statistical discrimination, rather than taste-based discrimination, through both norm-based and stereotype-based theories. In what follows, we discuss the empirical evidence supporting mechanisms regarding statistical discrimination.

4.2.1. Evidence for fertility

Evidence for mechanisms underlying fertility discrimination is limited. The reviewed studies primarily focus on whether discrimination exists—that is, whether individuals at risk of having children in the near future are treated differently from those who are less at risk. While these studies operate under the assumption that statistical discrimination may play a role (e.g. Baert, 2014; Becker et al., 2019), they do not delve into the specific mechanisms

or causes of this bias.

4.2.2. Evidence for pregnancy

Evidence for statistical discrimination against pregnant women aligns with the stereotype content model and shifting standards model. Masser et al. (2007) apply the stereotype content model's premise that pregnant employees should be perceived as warmer but less competent. Contrary to expectations, while pregnant applicants are indeed seen as warmer, they are also perceived as more competent. Despite this gain in perceived competence, they still face discrimination compared to non-pregnant applicants. These findings offer mixed support for the stereotype content model. Instead, the authors suggest that evaluators might employ a shifting standards model, as they seem to make within-group rather than between-group comparisons. Specifically, pregnant applicants may be evaluated in comparison to other pregnant women rather than to female employees in general. As a result, evaluators may view pregnant applicants as more competent than typical pregnant women because they are willing to take on the demands of a new role.

4.2.3. Evidence for parenthood

For parenthood, evidence supports various mechanisms of statistical discrimination. First, empirical evidence exists for the devaluation of motherhood in workplace settings related to status characteristics theory. Correll et al. (2007) propose that status characteristics trigger beliefs about performance capacity—meaning that if motherhood is a devalued status, it should result in lower competence and commitment ratings for mothers. Their findings support this, as mothers receive worse labour market outcomes than non-mothers because they are perceived as less competent and less committed to paid work.

Second, researchers acknowledge the existence of the ideal worker to understand how this norm drives labour market discrimination against parents. For instance, Fernández-Lozano et al. (2020) explore the expectation of working 40 hours or more per week and find that a motherhood premium is only granted to mothers who meet this ideal by working 40 or 45 hours, while mothers working 35 hours no longer receive this premium compared to their childless counterparts. Additional evidence for the existence of this ideal can be found

in Henle et al.'s (2020) work, which examines the ideal worker's constant availability to the employer without taking time off for caregiving responsibilities. They discover that non-primary caregiving mothers, who align more closely with this norm, are more likely to be hired and recommended for higher salaries than non-mothers. The same is true for non-primary caregiving fathers compared to non-fathers. These premiums disappear for both mothers and fathers when they assume primary caregiving roles. In a similar vein, Bear and Glick (2017) explore parents presenting themselves as caregivers versus breadwinners. Their findings show that mothers face a penalty in leadership training opportunities compared to non-mothers when presenting as caregivers. However, this penalty disappears when presenting as breadwinners, which conforms more closely to the ideal worker norm. In fact, in terms of remuneration, they receive a premium when presenting as breadwinners. For male employees, no difference in labour market outcomes is observed, regardless of whether they present themselves as caregivers or breadwinners, or whether they have children.

Third, there is empirical evidence that normative discrimination contributes to the motherhood penalty. Benard and Correll (2010) examine this mechanism and initially find a motherhood penalty across various labour market outcomes. However, even when mothers demonstrate exceptional competence and commitment—challenging culturally prescribed expectations of motherhood—they still face penalties compared to their childless counterparts. These penalties stem from perceptions that highly successful mothers lack interpersonal qualities, specifically in terms of likability and warmth.

Fourth, Cuddy et al. (2004) provide evidence for the stereotype content model by examining how employees score on the warmth and competence dimensions based on their parental status and how this impacts their labour market outcomes. They find that becoming a parent alters perceptions along these dimensions in gender-specific ways: mothers gain in perceived warmth but lose in perceived competence, while fathers gain in perceived warmth and maintain their position in perceived competence. Notably, mothers' gain in perceived warmth does not benefit them; instead, their loss in perceived competence negatively affects their hiring and promotion chances. Fathers, on the other hand, experience no such differences. These findings suggest that competence, rather than warmth, drives labour market outcomes for parents.

Fifth and last, Fuegen et al. (2004) obtain empirical evidence supporting the shifting standards model. Concretely, the authors focus on performance and time commitment standards as measures of competence judgements in hiring settings. They find that these standards are polarised by parenthood: women are subjected to harsher standards when they are parents compared to when they are not, while men are held to more lenient standards when they are parents compared to when they are not. Benard and Correll (2010) similarly observe this pattern of stricter and more lenient judgments, even for highly successful parents. However, it is essential to note that these standards do not necessarily result in different labour market outcomes for parents, as both performance and time commitment standards are largely uncorrelated with hiring decisions (Fuegen et al., 2004).

4.3. Future research recommendations

This subsection provides several recommendations for future research, addressing RQ3. First, there is a need for a more extensive investigation into fertility as a discrimination ground. Notably, researchers have only recently shifted towards studies with fertility as a primary subject (e.g. Becker et al., 2019; Gloor et al., 2022; Wang & Chen, 2023). As a result, the existing body of knowledge in this research area remains relatively limited, as evidenced by the low number of published papers (see Subsection 4.1). In addition, fertility should be examined with careful consideration of men's age. For instance, Becker et al. (2019) and Wang and Chen (2023) investigate discrimination based on both female and male fertility, but their studies are limited to a single age group of applicants based on the average age at which women typically have their first child. However, in practice, men in couples are often older than their female partners, prompting the question of whether it is appropriate to use the same average age for men and women in fertility research (CBS, 2019).

Second, there are areas for improvement regarding research combining parental and marital status. Existing experimental research primarily concentrates on the manipulation of parental status. Occasionally, marital status is partially manipulated, such as in Fuegen et al. (2004), who compare married applicants with two young children to single applicants with no children. In this case, the observed effects could be attributed to marital status rather than parental status, as marriage can influence hiring chances (Jordan & Zitek, 2012). Moreover, manipulating marital status can be relevant, as one's marital status may

moderate the effects of parental status on labour market outcomes. This is particularly relevant in cases of single parenthood, where the caregiving responsibility is borne by one parent (Güngör & Biernat, 2009). Employers may view this as a risk to productivity, which could lead to more negative labour market outcomes for single parents (Güngör & Biernat, 2009). A related area worth exploring is the role of grandparents, who are often perceived as an always-available source of childcare (Marcos, 2023). Their involvement could reduce caregiving burdens and potentially improve the labour market outcomes of (single) parents.

Third, we observe shortcomings in the manipulation and expression of parenthood. As discussed in Subsection 4.1, some experiments report having children as the experimental condition without further details; for instance, Cheung et al. (2022) and Erlandsson et al. (2023) refer to ‘children’ on the resumes in their lab experiments. The issue with this is that such ambiguity can lead employers to make assumptions about the number or age of children. However, when such details are provided, researchers often choose one group, such as ‘two children’ in González et al. (2019) or ‘one child aged 3’ in Hipp (2020). The issue here is that it becomes unclear whether the observed effects stem from having children in general or from having a specific number or age of children. Moreover, the heterogeneity in the number and age of children is expected to have different effects (e.g. Oesch et al., 2017). A last issue to consider is the indirect expression of parenthood on resumes. For instance, parenthood is sometimes implied through the mention of membership in a parent–teacher association (Ishizuka, 2021). While this should suggest to employers that the applicant has children, such a membership might also indicate other attributes. There is also the possibility that employers may not infer that the applicant has children based on this information alone. Overall, future research should concentrate more on the manipulated parenthood variable, not only by varying the number and age of children but also by considering different ways in which parenthood can be better expressed.

Fourth, researchers should critically evaluate their operationalisation of the non-parent control group. In some studies, the non-parent control group is conveyed without stating anything about one’s children (e.g. Bedi et al., 2022; Brandén et al., 2017; Bygren et al., 2017), while in other studies, it is explicitly defined by stating childlessness (e.g. Eriksson et al., 2017; Henle et al., 2020; Oesch et al., 2017). These varying approaches may convey different signals to employers. For instance, when parental status is not disclosed, it may

lead to the assumption that the individual is concealing information about having children. On the contrary, explicitly stating childlessness might suggest an interest in children and a potential future desire to have them. Therefore, examining whether labour market outcomes differ between individuals who explicitly declare childlessness and those who do not mention children at all would be valuable. Such insights could be particularly beneficial for policymakers, offering guidance on whether omitting parental status might effectively mitigate discrimination based on parental status.

Fifth, more experimental research is needed on particular (understudied) labour market outcomes related to employer discrimination based on parenthood. To start, no experimental research on dismissal exists (see Table 2). Although some correlational studies have been conducted (e.g. Artz, 2023; Dias et al., 2020; Fuller & Qian, 2021), they fall short of providing the causal insights necessary to identify underlying causes and guide effective policy measures. Next, while a considerable body of research addresses hiring discrimination (see Subsection 4.1), there is still room for further exploration. On the one hand, current studies tend to concentrate on formal hiring methods (i.e. applying for a vacancy), but it is equally important to investigate informal methods (i.e. networking). On the other hand, methodologically, laboratory experiments could be enhanced with multi-phased vignettes, as hiring discrimination is not limited to the initial stage of the hiring process. Last, it is imperative to examine additional labour market outcomes that could influence the outcomes discussed in this review. For instance, one could analyse whether mothers have equal access to training opportunities as non-mothers and use these opportunities to the same extent. Lower participation in training could explain the reduced chances of promotion among mothers.

Sixth and last, understanding the specific nature of discrimination is crucial for shaping effective policy interventions (Neumark, 1999), but this nature remains unclear with respect to the different manifestations of parenthood. On the one hand, while there is substantial empirical evidence supporting the existence of statistical discrimination, it warrants further exploration. The mechanisms underlying this theory have been primarily tested in relation to motherhood and fatherhood, with less emphasis on pregnancy and almost no consideration of fertility. These theories could be tested by examining whether pregnant individuals or employees at risk of having children are evaluated in line with the norms and

stereotypes associated with working mothers, as Masser et al. (2007) did. On the other hand, while statistical discrimination seems to be better suited to explaining discrimination based on parenthood, it raises the question of whether taste-based discrimination also plays a role and could serve as an additional explanation. This association is especially relevant because taste-based discrimination has been observed in other forms of hiring discrimination, such as ethnic discrimination (e.g. Lippens et al., 2022). Thus, future research could explore this experimentally, following Sterkens et al. (2021) and Van Borm et al. (2021), using measures that capture preferences for collaboration from the perspective of employers, colleagues, and customers, through statements such as ‘I think customers would enjoy collaborating with this person’.

5. Conclusion

In this systematic review, we elucidated the impact of fertility, pregnancy, and parenthood on labour market outcomes, focusing on employer discrimination. Our review makes several significant contributions to the literature. First, we extended the scope of previous reviews by including various manifestations of parenthood—encompassing not only motherhood but also fatherhood, pregnancy, female fertility, and male fertility. Second, we examined these manifestations across four key labour market outcomes: hiring, remuneration, promotion, and dismissal. Third, we provided a basis for a causal interpretation of discriminatory practices, as the findings are derived exclusively from experimental research. Fourth, we implemented a structured approach by incorporating a formal search strategy and providing comprehensive tabular reporting. This thorough examination allowed us to synthesise the existing literature's main findings and provide empirical evidence on the mechanisms driving this labour market discrimination, laying the groundwork for future research.

Our review reveals consistent employer discrimination against mothers, who face hiring, remuneration, and promotion penalties. Pregnancy and fertility also lead to adverse labour market outcomes for women. On the other hand, fathers often experience no effects or may even receive a premium in hiring, remuneration, and promotion. However, this fatherhood

premium is primarily found in North America and lab experiments. The latter suggests that the premium may be artificially induced by the controlled settings of these experiments. Additionally, the impact on parents' labour market outcomes appears to increase or only become apparent when they have multiple children. These findings align strongly with statistical discrimination, as there is significant empirical evidence supporting the existence of certain norms, such as the ideal worker norm, and stereotypes, such as those related to competence, which employers use to make decisions. Given these insights, future research should (i) expand the limited research on fertility, (ii) manipulate parenthood in a more nuanced way in experimental designs concerning the parent experimental group and the non-parent control group, (iii) explore understudied labour market outcomes such as dismissal, and (iv) investigate the mechanisms underlying this discrimination, including taste-based discrimination.

Our findings hold several practical implications for policymakers. First, our review identifies many studies with evidence of statistical discrimination, where employers rely on norms and stereotypes when making decisions due to a lack of accurate information about individuals. This reliance and subsequent discrimination hinder equity in the workplace. To counter this, policymakers should ensure structured and standardised hiring processes that collect detailed and relevant information about applicants, reducing the reliance on group-level information (Arena et al., 2023; Bragger et al., 2002). Examples include structured interviews, standardised resume formats, and thorough reference checks (Bragger et al., 2002). Second, several enclosed studies report a link between motherhood and caregiving responsibilities, often leading to adverse labour market outcomes for mothers. Policymakers can mitigate these adverse effects by implementing supportive measures that reduce the burden of caregiving on mothers (Arena et al., 2023). This includes increasing access to affordable and flexible childcare options, such as extended hours or more subsidised places in childcare facilities (Huber & Rolvering, 2023; Wang & Ackerman, 2020). Moreover, addressing the current shortage of childcare workers, for instance, by raising workers' salaries, would help meet the growing demand and allow mothers more flexibility to remain in the workforce (Huber & Rolvering, 2023; Rendon, 2023). Third and last, policymakers should further support mothers in becoming primary breadwinners if they choose to, as this challenges the ideal worker norm that penalises them. This could be achieved by increasing hiring and promotion opportunities for mothers and eliminating wage ceilings (Wang &

Ackerman, 2020). One effective measure could be to equalise maternity and paternity leave, ensuring that periods of absence from work are more evenly distributed between men and women (Castro-García & Pazos-Moran, 2015; Wang & Ackerman, 2020). This would help prevent the uneven penalties mothers face and ensure fairer career progression opportunities for both genders.

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Declarations

Consent to participate

Consent to participate does not apply to this review.

Data and code availability

No dataset or code was used for this manuscript. Metadata on the search process is available upon request.

Declaration of competing interest

The authors have no relevant financial or non-financial competing interests.

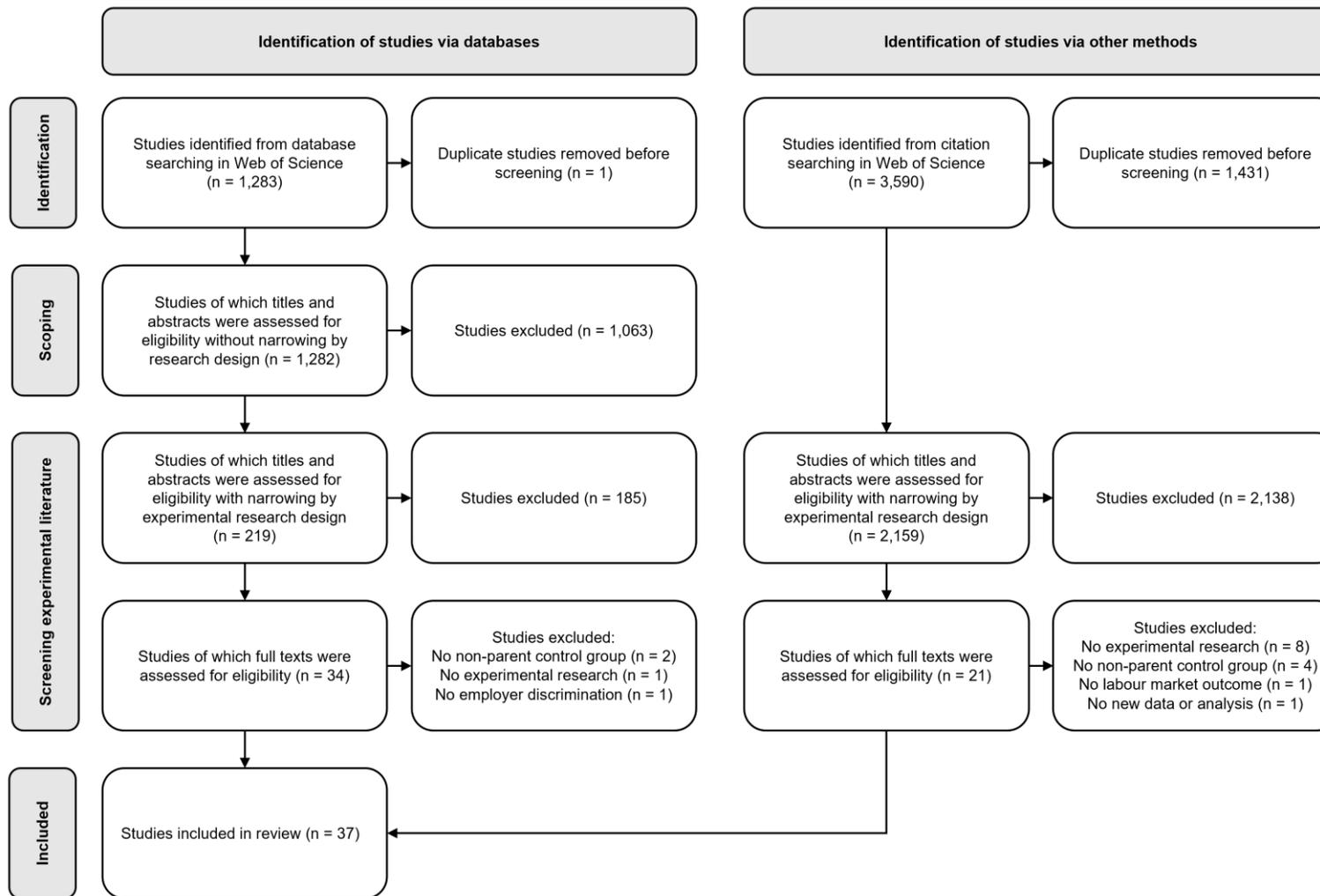
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Figures



Notes. This figure is adapted from Page et al. (2021, p. 5).

Figure 1. Study selection flowchart

Tables

Table 1. Inclusion criteria in the SPIDER framework

Criterion	Details
S Sample	Fertility: women or men at risk of having children in the near future (i.e. fertile) against less at-risk counterparts Pregnancy: pregnant women against non-pregnant counterparts Parenthood: mothers or fathers against childless counterparts (i.e. zero children or no mention of children)
PI Phenomenon of interest	Employer discrimination against different manifestations of parenthood in labour market outcomes
D Design	Experimental research (e.g. field and lab experiments)
E Evaluation	Labour market outcomes concerning hiring, remuneration, promotion, and dismissal
R Research type	Primary, quantitative, empirical research

Notes. Criteria are based on the SPIDER framework by Cooke et al. (2012).

Table 2. Overview of the literature evaluating the empirical evidence of the effect of fertility, pregnancy, or parenthood on labour market outcomes (k = 56)

(1) Author(s) (year)	(2) Region (country)	(3) Research design	(4) Experimental group	(5) Main result(s) concerning the effect of fertility, pregnancy, or parenthood on labour market outcomes
A. Hiring				
Albert et al. (2011)	Southern Europe (Spain)	Field	One child; two children	Mothers experience no difference in callback rates compared to non-mothers, indicating no motherhood effect . Fathers experience no difference callback rates compared to non-fathers, indicating no fatherhood effect . However, analyses at the occupation level show that male receptionists with children receive fewer callbacks than their childless counterparts. No differences for the other five occupations are found.
Baert (2014)	Western Europe (Belgium)	Field	One child	Heterosexual women aged 25 receive fewer positive callbacks than their lesbian counterparts, a differential treatment that is not found at the age of 37. This discrepancy applies to mothers and non-mothers. This pattern is evidence in favour of a female fertility penalty .
Becker et al. (2019)	Central Europe (Austria, Germany, Switzerland)	Field	Two children aged 7 and 9; two children aged 3 and 5	Women who are likely to have finished their childbearing cycle (i.e. married 30-year-olds with old children) receive more callbacks for part-time jobs than their single, childless counterparts. No differences are found between married 30-year-old women with young children and single, childless counterparts. Conversely, women who are likely to become pregnant (i.e. married, childless 30-year-olds) are marginally significantly disfavoured over their single counterparts. This evidence aligns with a female fertility penalty . Men experience no such difference in callback rates, indicating no male fertility effect .
Bedi et al. (2022)	Southern Asia (India)	Field	One young child	Mothers receive fewer callbacks than non-mothers, providing evidence for a motherhood penalty . However, the penalty becomes smaller when a mother signals having childcare support.
Benard & Correll (2010)	North America (USA)	Lab	PTA membership and children	Highly successful mothers are less likely to be recommended for hiring by women than their childless counterparts, which is evidence in favour of a motherhood penalty . Highly successful fathers are marginally significantly less likely to be recommended for hiring by men than their childless counterparts, hinting that a fatherhood penalty might be at play.
Bragger et al. (2002)	North America (USA)	Lab	Pregnancy prosthesis	Pregnant job applicants receive lower hiring ratings than their non-pregnant counterparts, which is evidence in favour of a pregnancy penalty . However, this penalty is only present when pregnant applicants are evaluated based on video footage of unstructured interviews, not when evaluated based on footage of structured interviews.
Brandén et al. (2017)	Northern Europe (Sweden)	Field	Two children	Mothers experience no difference in callback rates compared to non-mothers, indicating no motherhood effect .
Bygren et al. (2017)	Northern Europe (Sweden)	Field	Two children	Mothers experience no difference in callback rates compared to non-mothers, indicating no motherhood effect . However, analyses at the occupation level show that female assistant nurses with children receive fewer callbacks than their childless counterparts. Fathers experience no difference in callback rates compared to non-fathers, indicating no fatherhood effect . However, analyses at the occupation level show that male financial assistants with children receive fewer callbacks than their childless counterparts. No differences for the other twelve occupations are found.

Carlsson et al. (2021)	Northern Europe (Iceland, Norway, Sweden)	Lab	Two children	Mothers experience no difference in hireability compared to non-mothers, indicating no motherhood effect . Fathers experience no difference in hireability compared to non-fathers, indicating no fatherhood effect .
Cheung et al. (2022)	North America (USA)	Field	PTA membership and relocating with family	Mothers receive a higher degree of negativity in word choice and tone in callbacks than non-mothers. They are also rejected more quickly than non-mothers. These findings provide evidence for a motherhood penalty . Fathers experience no difference in negativity in callbacks than non-fathers. Nonetheless, they are rejected less quickly than non-fathers. These results are evidence in favour of a fatherhood premium .
Cheung et al. (2022)	North America (USA)	Lab	Children	Mothers experience no difference in job suitability or likelihood of hiring compared to non-mothers, indicating no motherhood effect . Fathers experience no difference in job suitability or likelihood of hiring compared to non-fathers, indicating no fatherhood effect .
Correll et al. (2007)	North America (USA)	Field	PTA membership and relocating with family	Mothers receive fewer callbacks than non-mothers, which is evidence in favour of a motherhood penalty . Fathers experience no difference in callback rates compared to non-fathers, indicating no fatherhood effect .
Correll et al. (2007)	North America (USA)	Lab	PTA membership and two children	Mothers are less likely to be recommended for hiring than non-mothers, providing evidence for a motherhood penalty . Fathers are marginally significantly more likely to be recommended for hiring than non-fathers. This finding provides evidence for a fatherhood premium .
Cuddy et al. (2004)	North America (USA)	Lab	One baby	Mothers are perceived as less hireable than non-mothers, which is evidence in favour of a motherhood penalty . Fathers experience no difference in hireability compared to non-fathers, indicating no fatherhood effect .
Cunningham & Macan (2007)	North America (USA)	Lab	7-8 months pregnancy prosthesis	Pregnant job applicants receive lower hiring recommendation ratings than their non-pregnant counterparts despite both groups being perceived as equally qualified for the job. This is evidence in favour of a pregnancy penalty .
Dai et al. (2022)	East Asia (China)	Lab	Young children	Mothers experience no difference in likelihood of hiring compared to non-mothers, indicating no motherhood effect . Fathers are more likely to be hired than non-fathers. This provides evidence in favour of a fatherhood premium .
Eriksson et al. (2017)	Northern Europe (Sweden)	Lab	One child; two or more children	Mothers with two or more children receive a lower job offer rate than non-mothers. No difference is found for mothers with one child compared to non-mothers. This is evidence in favour of a motherhood penalty . Fathers with two or more children receive a lower job offer rate than non-fathers. No difference is found for fathers with one child compared to non-fathers. This is evidence in favour of a fatherhood penalty .
Erlandsson et al. (2023)	Northern Europe (Sweden)	Lab	Children	Mothers experience no difference in applicant ranking compared to non-mothers, indicating no motherhood effect . Fathers experience no difference in applicant ranking compared to non-fathers, indicating no fatherhood effect .
Fossati et al. (2022)	Central and Northern Europe (Austria, Germany, Sweden)	Lab	One child aged 5	Refugee mothers are less likely to be invited for a job interview than their childless counterparts, providing evidence for a motherhood penalty . Refugee fathers experience no difference in invitation rate compared to their childless counterparts, indicating no fatherhood effect .
Fuegen et al. (2004)	North America (USA)	Lab	Two young children	Mothers receive marginally significantly lower hiring chances than their childless counterparts, which provides evidence for a motherhood penalty . Fathers experience no difference in hiring chances compared to non-fathers, indicating no fatherhood effect .

Gloor et al. (2022)	North America (USA)	Lab	Interest in having children	Childless female applicants expressing an interest in having children receive job offers with more precarious employment conditions than their counterparts expressing no interest in having children. This provides evidence for a female fertility penalty .
González et al. (2019)	Southern Europe (Spain)	Field	Two children	Mothers experience no difference in callback rates compared to non-mothers. Nevertheless, when considering the sequence in which applicants are called back if selected for an interview, women receive less priority when they are mothers, which hints at a motherhood penalty . Fathers experience no difference in callback rates or the sequence in which applicants are called back if selected for an interview, indicating no fatherhood effect .
Güngör & Biernat (2009)	North America (USA)	Lab	Children	Mothers experience no difference in hiring chances compared to non-mothers, indicating no motherhood effect . Fathers experience no difference in hiring chances compared to non-fathers, indicating no fatherhood effect .
Hebl et al. (2007)	North America (USA)	Field	6-7 months pregnancy prosthesis	Pregnant applicants experience no difference in job availability, likelihood of hiring response, or job callback compared to non-pregnant applicants, indicating no pregnancy effect .
Henle et al. (2020)	North America (USA)	Lab	Children	Primary caregiving mothers experience no difference in likelihood of hiring compared to non-mothers, indicating no motherhood effect since the primary caregiving task is often attributed to motherhood. However, non-primary caregiving mothers are more likely to be hired than non-mothers. Non-primary caregiving fathers are more likely to be hired than non-fathers, providing evidence for a fatherhood premium since the non-primary caregiving task is often attributed to fatherhood. However, primary caregiving fathers experience no difference in likelihood of hiring compared to non-fathers.
Henle et al. (2020)	North America (USA)	Lab	Children	Mothers are less likely to be hired than non-mothers, which is evidence in line with a motherhood penalty . Fathers are less likely to be hired than non-fathers, which is evidence in line with a fatherhood penalty .
Hipp (2020)	Central Europe (Germany)	Field	One child aged 3	Mothers are less likely to be invited to a job interview than non-mothers, providing evidence for a motherhood penalty . Fathers experience no difference in invitation rate compared to non-fathers, indicating no fatherhood effect .
Ishizuka (2021)	North America (USA)	Field	PTA membership	Mothers receive fewer callbacks than non-mothers. This is evidence in line with motherhood penalty .
Kricheli-Katz (2012)	N/A	Lab	PTA membership	Mothers score lower on hireability than non-mothers when motherhood is primed as a voluntary decision. This result is interpreted as evidence for a motherhood penalty since motherhood is increasingly perceived as a choice that women can freely make today. However, when motherhood is primed as a constraint beyond a woman's control, mothers are more likely to hire mothers than non-mothers.
Mari & Luijckx (2020)	Western Europe (the Netherlands)	Lab	One child	Mothers are marginally significantly preferred in likelihood of hiring in female-typical jobs (i.e. primary school teacher) over non-mothers, which is evidence in line with a motherhood penalty . Fathers experience no difference in likelihood of hiring compared to non-fathers, indicating no fatherhood effect .
Masser et al. (2007)	Oceania (Australia)	Lab	3-4 months pregnancy prosthesis	Pregnant job applicants are less likely to be recommended for hiring than non-pregnant job applicants, which is evidence in favour of a pregnancy penalty .

Morgan et al. (2013)	N/A	Field	5-6 months pregnancy prosthesis	Pregnant applicants are more likely to be denied the opportunity to complete their applications during in-person applications than non-pregnant applicants. This is evidence in favour of a pregnancy penalty . This bias diminishes when pregnant applicants provide counter-stereotypic information regarding their commitment, flexibility or accommodation.
Oesch et al. (2017)	Central Europe (Switzerland)	Lab	One school-aged child; two school-aged children; three school-aged children	Mothers with three children are less likely to be invited to a job interview than non-mothers. No difference is found for mothers with one or two children compared to non-mothers. These findings are evidence in favour of a motherhood penalty .
Petit (2007)	Western Europe (France)	Field	Three children	25-year-old single women without children receive fewer invitations to a job interview than their male counterparts; however, this is not observed among 37-year-olds. Furthermore, there is no difference between 37-year-old single women without children and 37-year-old married women with children. These findings provide evidence for a female fertility penalty .
Smith et al. (2011)	N/A	Lab	Baby	(Breastfeeding) mothers experience no difference in likelihood of hiring compared to non-mothers, indicating no motherhood effect .
Stefanova & Latu (2022)	Western Europe (Ireland and UK)	Lab	Children	Mothers are less likely to be hired than non-mothers, providing evidence for a motherhood penalty . This penalty is mitigated when mothers conform to traditional genders role by taking maternity leave. Fathers are less likely to be hired than non-fathers, providing evidence for a fatherhood penalty . This penalty is mitigated when fathers conform to traditional gender roles by not taking paternity leave.
Wang & Chen (2023)	East Asia (China)	Field	Children	Childless women at the fertile age of 28 receive fewer callbacks than their female counterparts with children, which is evidence in favour of a female fertility penalty . Childless men at the fertile age of 28 experience no difference in callback rates compared to their male counterparts with children, indicating no male fertility effect .

B. Remuneration

Bear & Glick (2017)	North America (USA)	Lab	Two children aged 2 and 5	Caregiving mothers experience no difference in salary offers compared to non-mothers, indicating no motherhood effect . However, breadwinning mothers tend to receive marginally significantly higher salaries than non-mothers. Fathers, regardless of whether they present themselves as breadwinning or caregiving, experience no difference in salary offers compared to non-fathers, indicating no fatherhood effect .
Benard & Correll (2010)	North America (USA)	Lab	PTA membership and children	Highly successful mothers are more likely to be offered lower starting salaries by women than their childless counterparts, providing evidence for a motherhood penalty . Highly successful fathers are more likely to be offered higher starting salaries by women than their childless counterparts; however, they are marginally significantly more likely to be offered lower starting salaries by men than their childless counterparts. These results hint that a fatherhood premium might be at play.
Bragger et al. (2002)	North America (USA)	Lab	Pregnancy prosthesis	Pregnant applicants experience no difference in salary recommendations compared to their non-pregnant counterparts, indicating no pregnancy effect .
Correll et al. (2007)	North America (USA)	Lab	PTA membership and two children	Mothers receive lower salary recommendations than non-mothers, which is evidence in favour of a motherhood penalty . Fathers are offered higher salaries than non-fathers, which is evidence in favour of a fatherhood premium .

Henle et al. (2020)	North America (USA)	Lab	Children	Primary caregiving mothers experience no difference in salary recommendations compared to non-mothers, indicating no motherhood effect since the primary caregiving task is often attributed to motherhood. However, non-primary caregiving mothers receive higher salary recommendations than non-mothers. Non-primary caregiving fathers receive higher salary recommendations than non-fathers, providing evidence for a fatherhood premium since the non-primary caregiving task is often attributed to fatherhood. However, primary caregiving fathers experience no difference in salary recommendations compared to non-fathers.
Henle et al. (2020)	North America (USA)	Lab	Children	Mothers receive lower salary recommendations than non-mothers, providing evidence for a motherhood penalty . Fathers receive lower salary recommendations than non-fathers, providing evidence for a fatherhood penalty .
Kricheli-Katz (2012)	N/A	Lab	PTA membership	Mothers receive lower salary recommendations than non-mothers when motherhood is primed as a voluntary decision. This result is interpreted as evidence for a motherhood penalty since motherhood is increasingly perceived as a choice that women can freely make today. However, when motherhood is primed as a constraint beyond a woman's control, mothers receive higher salary recommendations than non-mothers.
Mari & Luijkx (2020)	Western Europe (the Netherlands)	Lab	One child	Mothers experience no difference in salary offers compared to non-mothers, indicating no motherhood effect . Fathers experience no difference in salary offers compared to non-fathers, indicating no fatherhood effect .
Masser et al. (2007)	Oceania (Australia)	Lab	3-4 months pregnancy prosthesis	Pregnant job applicants receive lower salary recommendations than their non-pregnant counterparts, with pregnant applicants facing more harm when applying for a masculine-typed position than for a feminine-typed position. These findings are evidence in line with a pregnancy penalty .
Oesch et al. (2017)	Central Europe (Switzerland)	Lab	One school-aged child; two school-aged children; three school-aged children	Mothers receive lower salary recommendations than non-mothers. This disadvantage is present for mothers with one child and increases when they have two or three children. These findings are evidence in favour of a motherhood penalty . However, this trend disappears for older mothers between 45 and 55 or mothers in caretaking occupations.
C. Promotion				
Bear & Glick (2017)	North America (USA)	Lab	Two children aged 2 and 5	Caregiving mothers receive less leadership training offers – explicitly framed as a program for future leaders for the company – than non-mothers. No differences are found for mothers presenting themselves as breadwinners compared to non-mothers. These results are evidence in line with motherhood penalty . Fathers, regardless of whether they present themselves as breadwinning or caregiving, experience no difference in leadership training offers compared to non-fathers, indicating no fatherhood effect .
Benard & Correll (2010)	North America (USA)	Lab	PTA membership and children	Highly successful mothers are less likely to be rated as promotable by women than their childless counterparts, providing evidence for a motherhood penalty . Highly successful fathers are marginally significantly more likely to be rated as promotable by women than their childless counterparts, providing evidence for a fatherhood premium .
Correll et al. (2007)	North America (USA)	Lab	PTA membership and two children	Mothers are less likely to be promoted or recommended for management training than non-mothers, which is evidence in favour of a motherhood penalty . Fathers experience no difference in likelihood of promotion; however, they are marginally significantly more likely to be recommended for a management training course than non-fathers. This is evidence in favour of a fatherhood premium .

Cuddy et al. (2004)	North America (USA)	Lab	One baby	Mothers are perceived as less promotable than non-mothers, which is evidence in line with a motherhood penalty . Fathers experience no difference in promotability compared to non-fathers, indicating no fatherhood effect .
Dai et al. (2022)	East Asia (China)	Lab	Young children	Mothers receive marginally significantly higher scores on promotion potential than non-mothers, hinting at a motherhood premium . Fathers receive higher scores on promotion potential than non-fathers, providing evidence for a fatherhood premium .
Fernández-Lozano et al. (2020)	Southern Europe (Spain)	Lab	Two children	Mothers receive higher promotion scores than non-mothers, particularly those working 40 or 45 hours compared to those working 35 hours. This finding provides evidence for a motherhood premium . Fathers receive higher promotion scores than non-fathers, providing evidence for a fatherhood premium .
Fuegen et al. (2004)	North America (USA)	Lab	Two young children	Mothers receive a lower likelihood of being promoted than non-mothers, which is evidence in line with a motherhood penalty . Fathers experience no difference in promotion rates compared to non-fathers, indicating no fatherhood effect .
Heilman & Okimoto (2008)	N/A	Lab	Children	Mothers are less likely to be recommended for promotion than non-mothers. They are also more frequently denied promotion than non-mothers. These findings confirm the existence of a motherhood penalty . Fathers experience no difference in promotion recommendation or denial, indicating no fatherhood effect .
Heilman & Okimoto (2008)	N/A	Lab	Children	Mothers are less likely to be recommended for promotion than non-mothers, indicating a motherhood penalty . Fathers experience no difference in promotion recommendation, indicating no fatherhood effect .

Notes. The following abbreviations and acronyms are used: N/A (not available), PTA (parent–teacher association), UK (United Kingdom), and USA (United States of America). We divide the corresponding study into multiple rows if authors conducted multiple experiments or experiments with multiple labour market outcomes. The fourth column reflects how parenthood, pregnancy, or fertility was specified in the corresponding study. When we did not specify the number and/or age of children, it means that the authors of the corresponding study did not specify parenthood in terms of the number and/or age of children. The fifth column reflects the classification of empirical evidence on the parenthood, pregnancy, or fertility effect based on the studies’ research findings. The terms ‘no motherhood/fatherhood/pregnancy/female fertility/male fertility effect’ denote the absence of significant evidence. When results achieve statistical significance at the 10% level, we interpret these as providing confirmatory evidence, but we explicitly acknowledge their marginal significance.