Maternity Benefits for Female Entrepreneurs: Effects on Business Outcomes and Family Health

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Abstract

We study the effects of motherhood and maternity benefits on small-scale female entrepreneurs. Using administrative microdata from the Netherlands, we document that childbirth reduces revenues by 26% in the quarter of birth and 12% in the long run. We then study the introduction of an unconditional maternity cash benefit. Exploiting eligibility by birth month, we find that eligible mothers reduce their business revenues further, but only in the first two years after childbirth, with no long-run effects. Reliance on formal daycare decreases, suggesting that eligible mothers spend more time with their child, leading to improvements in children's health.

JEL Classifications: L26, D14, I38, J13, J18, I18

Keywords: entrepreneurship, motherhood, maternity benefits, household finance, child health

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1 Introduction

Business dynamism, defined as the entry into the market of new small businesses, is one of the key drivers of job creation, innovation, and economic growth (Decker et al., 2014). Despite their importance, small business ownership and self-employment are characterized by wide gender gaps that generate capital misallocation and hurt economic growth (Morazzoni and Sy, 2022; Mertz et al., 2025). Motherhood and maternity risks are key determinants of these gaps in selection (Zandberg, 2021; Core, 2024) and performance (Bonney et al., 2025; Rutigliano, 2024) in entrepreneurship.

Historically, female entrepreneurs have received less government support during pregnancy and motherhood than employees. Recently more countries have begun extending maternity benefits to entrepreneurs, though coverage remains far from complete.[1] These benefits are intended to support recovery from childbirth, promote bonding, and protect maternal and child health. Yet they may also unintentionally contribute to long-term earnings losses among female entrepreneurs. While evidence suggests maternity leave does not reduce employees' long-term earnings (Olivetti and Petrongolo, 2017), entrepreneurs face different risks because they lack job protection. Even brief absences can jeopardize business viability through lost clients, reduced visibility, or missed growth opportunities. Anticipating these risks, entrepreneurs may choose not to reduce their labor supply in response to maternity cash benefits, which most often do not require scaling back work. This raises three central questions: (1) Do entrepreneurs adjust their labor supply in response to maternity cash benefits? (2) Do they experience long-term income losses as a consequence of these benefits? and (3) Do such benefits affect maternal and child well-being?

This paper makes two main contributions. First, we provide new evidence on how motherhood affects the business performance of female entrepreneurs, including self-employed

[1] In 2021, 81 of the 185 countries analyzed by the International Labour Organization (ILO) provided mandatory maternity leave cash benefits for female entrepreneurs (Addati and Cattaneo, 2022).

women and micro-to-small entrepreneurs.[2] To do so, we exploit high-quality administrative data from the Netherlands and study how the quarterly revenue of female (and male) entrepreneurs changes following childbirth. Second, we provide the first causal evidence on the effects of a maternity cash benefit for female entrepreneurs, directly addressing the three questions above. To do so, we exploit a 2008 policy reform in the Netherlands that introduced a flat-rate maternity cash benefit for this group. We merge multiple administrative datasets and examine the benefit's effects on business revenue and income, daycare use, household composition, and maternal and child health.

We start our analysis by showing that a child penalty (Anderson et al., 2002) is also present among small business owners and self-employed female entrepreneurs. Since the maternity cash benefit we subsequently study is fixed in amount ($\sim$ EUR 5,000), our analysis naturally centers on smaller businesses. We therefore restrict the sample to businesses with annual revenue below EUR 150,000. We document that female entrepreneurs who give birth are 12% less likely to generate any revenue in the quarter of childbirth, compared to female entrepreneurs who do not give birth. Among those who do remain active, revenue falls sharply by 39%. Total business revenue drops by 26% in euros, a smaller percentage decline than suggested by the combined extensive and intensive margin estimates, which reflects that larger businesses are less affected than smaller ones. The child penalty persists in the longer run, with entrepreneur mothers remaining 7% less likely to generate any revenue, or reporting 15% lower revenue, even three years after birth (with a combined relative effect based on euros of 11%). On the contrary, we do not find evidence of a child penalty among male entrepreneurs.

[2]Since the maternity cash benefit we study is fixed in amount (EUR 5,000), our focus naturally falls on smaller businesses. Our sample consists of 90% unincorporated (sole proprietorships / self-employed people) and 10% incorporated female entrepreneurs. Self-employment is an often-used proxy for entrepreneurship (e.g., Zandberg, 2021; Gottlieb et al., 2022; Denes et al., 2025). Self-employment contributes significantly to economic growth (Goetz et al., 2012), and it also plays a crucial role in the formation of firms: self-employed individuals are six times more likely than employees to incorporate a business within three years, controlling for age and income (own calculation based on Dutch microdata). Throughout the paper, we use the terms entrepreneurship and self-employment interchangeably. However, we also show that the effects of maternity benefits are strongest within our sample among women who not only sell their own labor, but also sell products, are incorporated, or employ others.

We then study the June 2008 introduction of the 'Self-employed and Pregnant' ('Zelfstandig en Zwanger', ZEZ) maternity cash benefit in the Netherlands. Conditional on having worked at least 1,225 hours as an incorporated or unincorporated female entrepreneur in the previous year, the benefit amounts to 100% of the gross minimum wage for 16 weeks (from 6-4 weeks before the due date to 10-12 weeks after childbirth). In 2008, the benefit amount was approximately EUR 5,000. The cash benefit does not require the cessation of work; entrepreneurs are free to choose their labor supply. To identify the causal effects of the benefit, we exploit the fact that mothers were only eligible if they gave birth after the benefit's introduction on June 4, 2008. Therefore, we compare outcomes for mothers who gave birth just before (February–May 2008) and just after (June–September 2008) the policy introduction, supplementing the analysis with additional control groups where applicable (e.g., births in other years or births among non-entrepreneurs). In line with the fact that the benefit could not have been anticipated at the time of conception, we find that these two groups of mothers are very similar in number and characteristics. We also estimate alternative specifications that restrict or expand the birth window around the policy introduction.

We first study the maternity cash benefit's effects on eligible women's business revenue. Because childbirth has a much stronger effect on business activity in the quarter of birth than in later quarters, we use quarterly data to study outcomes in *relative quarters* since childbirth. Besides female entrepreneurs who gave birth in February to September 2008, we also include female entrepreneurs in our sample who did not give birth in the 2008-2011 period. This allows us to precisely account for quarter-by-quarter variation in revenue that is unrelated to birth (industry-quarter fixed effects). We find that eligible female entrepreneurs decrease their business revenue by EUR 970 (or 8.6% compared to the mean of the control group) on average in the first two years after childbirth. These effects arise as a combination of extensive and (mostly) intensive margin effects. The negative effects on revenue are stronger in the first than in the second year after childbirth, and diminish and become statistically insignificant in the third year.

We then study how benefit eligibility affects the (household) income and household composition of female entrepreneurs. Giving birth earlier or later in the year is likely correlated with annual income and other annual outcomes, either due to seasonality in birth patterns (Lam and Miron, 1991) and parents' characteristics (Bobak and Gjonca, 2001), or simply due to the effects of having a child for a shorter or longer period. Therefore, when we study annual outcomes, we use as a control group female entrepreneurs who gave birth in 2009, either in the February-May or in the June-September period. The identifying assumption is that differences between the outcomes of women giving birth earlier or later in 2009 (when everyone is eligible for the benefit) constitute a valid counterfactual for similar differences in 2008 (when only those giving birth after June are eligible).[3] We find that eligible women reduce their taxable business income (business revenue minus expenses) by EUR 2,060 in the year of childbirth, and by about EUR 2,100 in total in the first three years. This amounts to about 60% of the expected benefit amount (assuming a 70% take-up rate). As a result, the personal income of eligible women increases. We do not find evidence that the benefit affects household composition (having a partner, or the number of children) in the first three years following childbirth. The income of the partner (if any) is also unaffected, therefore household income increases in the year of birth due to the higher personal income of the mother, and we find evidence that the households of eligible women save at least part of this increased household income. Lastly, we find that eligible self-employed women become more likely to transition into business ownership, defined as owning an incorporated business, having employees, or having tangible capital on the business' balance sheet. Nonetheless, we do not find that the businesses of female entrepreneurs grow significantly in employment in response to the benefit.

Having documented the effects of the cash benefit on business activity and income, we next study whether the benefit affects childcare choices. Using the same discontinuity

[3]This identification strategy is similar to the one applied among others by Schönberg and Ludsteck (2014), who study the effects of expansions in maternity leave coverage on mothers' labor market outcomes. In these analyses we do not include female entrepreneurs who did not give birth.

in benefit eligibility by birth month and incorporating additional control groups of non-entrepreneurial mothers giving birth in 2008 or 2009 (i.e., a triple difference-in-differences analysis using entrepreneur vs. non-entrepreneur mothers, 2008 vs. 2009, and pre- vs. post-June births), we find that children of eligible mothers are significantly less likely (10%, or 6 percentage points) to attend formal daycare. We interpret this result as eligible mothers preferring to use the benefit to reduce their labor supply rather than purchase additional formal childcare. We find that the lower labor supply has no clear positive effects on the mental health of eligible mothers, although our measure (binary antidepressant use) is rather coarse. However, benefit eligibility has important effects on the newborn child's health.

In fact, we find that newborns' health outcomes improve in the first calendar year after birth as a result of the cash benefit. We document a significant reduction of 15% in the child's total health costs, driven partially by lower costs of general practitioner consultations and medical specialist care. We also find evidence of a reduced use of medications that could be associated with spending time in daycare (e.g., medicines against skin infections). While we find no clear evidence of worsening health at older ages (2-6), as might be predicted by the hygiene hypothesis - where lack of early daycare exposure reduces immune system stimulation, leading to better short-term but worse long-term health (Strachan, 1989) - we also do not detect statistically significant health improvements over the overall early childhood period (0-6 years).

Overall, our results suggest that childbirth substantially affects female entrepreneurs' business performance. In the presence of a maternity cash benefit, women appear willing to forgo additional business income in order to spend more time with their child. This yields, possibly due to decreased daycare use, short-term health improvements for the child, but no substantial long-term health benefits. Maternal health and family composition are unaffected by the cash benefit, while it also does not lead to a lower business activity beyond two years. These findings carry important implications for the design of policies intended to support entrepreneurs following childbirth.

Our paper contributes to multiple strands of the literature in entrepreneurship, finance, and economics. First and foremost, we contribute to a novel literature on entrepreneurship and childbirth. While Zandberg (2021) and Core (2024) study how access to reproductive rights (e.g., abortion and contraception) fosters selection of women in entrepreneurship, we study how female-owned businesses react to motherhood. Related to our work, Gottlieb et al. (2022) and Fontenay (2024) study how selection into entrepreneurship is affected by maternity leave policies, while we study how an easy to implement maternity cash benefit policy affects the business performance and well-being of entrepreneurial mothers and their children. Our paper is also close to Bonney et al. (2025) and Rutigliano (2024), who study the effects of childbirth on women's founding rates and firm performance, and to Ferrando et al. (2025), who also use data from the Netherlands to document how childbirth affects the revenue of female entrepreneurs. Our focus on the other hand is not exclusively on the effects of childbirth, but rather on understanding how maternity benefits affect the allocation of time of small-scale female entrepreneurs and the self-employed, with important repercussions on mothers' income and children's well-being. Therefore, our paper also complements results in Simintzi et al. (2025), who study the expansion of free childcare access on women's employment outcomes and firm performance. By studying the introduction of a cash-based maternity benefit in the context of flexible work arrangements (i.e., entrepreneurship), our results on daycare use can be interpreted as income effects (i.e., income and time use), rather than price effects (i.e., free access).

Second, our results contribute to a broad literature on the effects of maternity benefits on maternal labor market outcomes. In general, it is difficult to separate how cash benefits and job protection measures incorporated into parental leave policies affect maternal labor supply (Lalive et al., 2014) because most parental leave expansions increase both the length of benefit payment and the length of job protection (e.g., Lalive and Zweimüller, 2009; Schönberg and Ludsteck, 2014). We study a pure cash transfer policy that does not have any job protection element, and find that an increase in unearned income reduces maternal labor

supply among female entrepreneurs. Our results are in contrast with the findings of Borra et al. (2021), who document that a comparable maternity cash benefit offered to the general Spanish population has no effects on maternal labor supply. A key difference is that Spanish mothers receive 16 weeks of paid maternity leave regardless of the cash benefit, whereas for the entrepreneurs in our sample the cash benefit constitutes their only support, and, unlike salaried workers on leave, they are not required to stop working following childbirth. In addition, self-employed women and small-scale entrepreneurs may be better able to adjust their working hours than employees (Pugsley and Hurst, 2011; Goldin, 2014).

Finally, our results also contribute to a growing literature on the effects of maternity policies and cash transfers on children's health and development. A large literature documents positive effects of extension of maternity leave policies (paid or unpaid) on child health (Ruhm, 2000; Rossin, 2011; Bullinger, 2019; Fabel, 2021), although other studies find limited or no effects (Dustmann and Schönberg, 2012; Beuchert et al., 2016). The evidence is more mixed on the impact of pure cash transfers. While a few studies report improved child health in the short and long run (Hoynes et al., 2015; Aizer et al., 2016), other papers document no or mixed effects (Milligan and Stabile, 2011; Cesarini et al., 2016).[4] Closest to our paper in this field is the above-cited work of Borra et al. (2021), who find that the maternity cash benefit they study has no effect on maternal labor supply and consequently on child health either. Our work shows that maternity cash transfers can improve child health if they lead to a reduction in maternal labor supply. Particularly, our results suggest that lower daycare attendance is a key mechanism for short-term improvements in child health. On the contrary, we do not find any effects on long-term child health in our setting either, despite better short-term health.

The remainder of the paper is organized as follows. Section 2 presents the data and institutional details, including variable definitions and summary statistics, and it also presents our methodology. Section 3 contains our results, including results on business activity, in-

[4]For a systematic review of this literature see Cooper and Stewart (2021).

come, daycare use, and child health. Section 4 concludes.

2 Data and Methodology

2.1 Institutional Setting

We study the effects of motherhood and maternity cash benefits on the outcomes of female entrepreneurs and their children. Female entrepreneurs in our sample include both women operating an unincorporated business whose main business asset is their own human capital ('solo self-employed'), and those who either have an incorporated business, employ other people, or have property, plants, or equipment ('business owners').[5] About 55% of women in our sample are considered business owners following this definition. Section 2.3 provides examples of the types of businesses operated by women in our sample.

In the Netherlands, female entrepreneurs are eligible for a cash maternity benefit since June 4, 2008 ('Zelfstandig en Zwanger' or ZEZ benefit). The bill introducing the benefit was submitted on February 27, 2008, and was adopted by the Lower House on April 22. Therefore, the benefit could not have been anticipated at the time of conception for the births in our sample.[6] Women qualify for the benefit if they give birth on or after this date, and if on the day before the start of the benefit they are self-employed or business owners. This includes self-employed individuals and entrepreneurs both with unincorporated (e.g., sole proprietorship, partnership) and incorporated (e.g. private limited company) legal forms.[7]

[5]Statistics Netherlands categorizes unincorporated firms with property, plant, or equipment on their balance sheet as selling products rather than the entrepreneur's labor.

[6]Self-employed mothers might also privately insure themselves for income loss due to pregnancy and childbirth as part of their disability insurance. However, most Dutch self-employed do not have any form of disability insurance, and even fewer have additional maternity-related coverage. According to Statistics Netherlands, in 2015 only about 15% of the self-employed people with similar income to those in our sample had any private disability insurance. Moreover, many insurers have a two-year waiting period for maternity-related payments, which makes strategic contracting more difficult. As the Dutch minister of social affairs and employment noted, in practice private maternity insurance was not within the reach of all female entrepreneurs (Asscher, 2013).

[7]Women working for their self-employed spouse or partner are also eligible for the ZEZ benefit; however, these individuals are not part of our sample.

The benefit generally lasts 16 weeks; it starts 6 to 4 weeks before the pregnancy due date and lasts 10 to 12 weeks after childbirth.[8] The benefit amount is calculated based on income from the previous calendar year, but if the applicant worked at least 1,225 hours as self-employed in the previous year they receive the maximum amount of the 100% of the statutory gross minimum wage. The weekly minimum wage reached EUR 308 in 2008, resulting in a total benefit amount of about EUR 5,000.[9] The benefit is taxed as regular income. Crucially, female entrepreneurs are not required to stop working while they receive the ZEZ benefit; they are free to choose their labor supply in their business. Given the mild conditions, the take-up rate of the benefit is relatively high. An evaluation presented by the Dutch Minister of Social Affairs and Employment concluded that among female entrepreneurs who gave birth between 2008 and 2011, at least 65% requested the benefit, with female entrepreneurs with lower incomes more likely to request the benefit.[10] Although data on benefit recipients in 2008 are not available anymore, for the earliest available year, 2011, we estimate a 70% take-up rate in our target population using income microdata from Statistics Netherlands. Our estimates are intention-to-treat estimates.

In the Netherlands, childcare is mostly provided at home by the parents, or by formal childcare providers (daycare centers or childminders).[11] Childminders provide small-scale care at the carer's home (or the parent's home), usually up to 6 children. Childminders are commonly chosen for their flexibility, as they often accommodate early/late pickups, irregular shifts, and sometimes evenings or weekends, whereas daycare centers typically run on fixed weekday schedules. While formal childcare is not free, a childcare allowance is provided by the state. To receive the allowance, the applicant and their tax partner (if any)

[8] In some cases the benefit can last longer than 16 weeks if the actual date of delivery is after the due date of delivery. This is because minimum 10 weeks of benefit payment after childbirth is guaranteed.

[9] The relative size of the benefit (4 months of minimum wage) is very similar to the relative size of the EUR 2,500 cash benefit (4.5 months of minimum wage) studied by González (2013) in Spain.

[10] Source: https://zoek.officielebekendmakingen.nl/dossier/kst-31311-101.html.

[11] In 2009, 38% of the families in which the youngest child was one year old used a formal provider as their primary form of childcare. In 36% of the families parents were the primary care providers, while in 21% unpaid babysitters (family members) had this role. Finally, in 5% of the families paid babysitters provided the majority of care (Statistics Netherlands). Families most often use a combination of these childcare modes, for example users of formal daycare use these services on average for about 20 hours per week.

have to be in paid employment (or receive income from self-employment/entrepreneurship). The allowance covers a percentage of the costs up to a threshold on the maximum hourly rate. Childcare providers normally set their rates close to this upper threshold (EUR 6.10 per hour in 2009). The coverage percentage depends on the level of income and the number of children. In 2009, for a family with a gross household income of EUR 68,000 (the median in our sample) the subsidy rate was 31.5% for the child using the most care and 59.9% for any additional children. While the subsidy rate decreases with income, an additional EUR 5,000 of gross income (the amount of the maternity cash benefit) would only lower the coverage rate by 3.8 percentage points (pp.) for the child using the most care and by 0.3 pp. for any additional children.[12] Overall, no significant changes were introduced in the childcare allowance between 2009 and 2010, the two years that we study in our baseline specification on childcare use. The number of children in formal childcare and the average hours of use were stable in these years (2009: 441 thousand children and 930 hours per year per child; 2010: 450 thousand children and 930 hours per year per child).

2.2 Data

We use administrative data from the Netherlands to estimate the effects of childbirth on the earnings of female entrepreneurs and the effects of the maternity cash benefit introduced in 2008. Statistics Netherlands (SN) offers a broad set of microdata files that can be matched at the individual level using pseudo-anonymized identifiers. We express all nominal values in 2008 EURs using the Dutch CPI index. We use the following data files from Statistics Netherlands:

Business revenue (from 2007) - Linkage between self-employed individuals / entrepreneurs and their businesses (incorporated or unincorporated), and quarterly revenue figures of the businesses. In a large part of our analysis we focus on revenue instead of profits because (a) revenue is more comparable across unincorporated and incorporated businesses (no differ-

[12] Besides the income-dependent childcare allowance, employees also received a fixed allowance of $1/6^{th}$ of their childcare costs ($1/3^{rd}$ if both parents worked).

ences in taxation), (b) does not depend on profit extraction decisions (paying dividends or salary, or consuming via the firm), and (c) data on revenue are available at the quarterly frequency.

Revenue figures are sourced from value-added tax (VAT) declarations. Some services are exempted from the VAT such as health services (e.g., general practitioners, dentists, and midwives) or educational services. This concerns about 22% of our sample, mostly health service providers. These businesses are not part of our sample when we study business revenue as an outcome, but they are included for other outcomes such as income or child health. Among businesses that are not exempted from paying the VAT, most file VAT declarations every quarter or larger businesses every month. However, in some cases unincorporated businesses with annual VAT payments below EUR 1,883 can opt to declare their VAT annually. About 10% of VAT payers fall into this category, or 20% in our sample which is focused on smaller businesses. When we study quarterly business revenue as an outcome, businesses that did not file quarterly revenue in at least one quarter of 2007 are not part of our sample. Some of the businesses that enter our sample may switch to annual filing after 2007, if their revenue falls. These observations will then have zero quarterly revenue recorded. This might somewhat affect the separation of treatment effects into extensive and intensive margins, as the extensive margin might also include some cases where the business does produce revenue but the revenue is that low that the business can file VAT annually. When we use business revenue in levels (EURs), we trim it at the 1st and 99th percentiles in the sample.

Demographics - Age, gender, household composition, partners (married and non-married), and children, including the birth month of children.

Income and bank account balances (from 2005) - (Gross) personal income includes business income, employment income (including employer contributions), and subsidies and benefits. Personal income is subject to personal income tax. Business income, defined for unincorporated businesses, equals total business revenues minus all deductible business expenses, and is subject to personal income tax. We do not observe business expenses separately. Gross

household income is the sum of the personal income of household members plus income and subsidies/benefits received jointly (e.g, income from wealth, housing benefit). Disposable household income equals gross household income minus social insurance premiums (including employer contributions) and taxes. Income variables for our sample period are top-coded (censored) at EUR 1 million by Statistics Netherlands, and we apply no further trimming or winsorization. Data on bank account balances are sourced from household wealth files, which are created by Statistics Netherlands using data from the Tax Authorities (who collect account balances directly from financial institutions). Bank accounts include checking accounts, savings accounts, and deposits.

Daycare use (from 2007) - Annual daycare use hours subsidized by the childcare allowance, separately reported for daycare provided by daycare centers and childminders (see section 2.1).

Health costs (from 2009) - Annual health costs covered under the mandatory Dutch basic health insurance. The basic health insurance package covers all necessary medical care, including general practitioner care, maternity care, hospital care, home nursing care, pharmaceutical care, and mental healthcare. We use data on total health costs, and data on costs of general practitioner care, medicines, and specialist care, separately. In the Netherlands, general practitioners are typically the first point of contact for all patients, including children. Specialist care, including care provided by pediatricians, requires a referral from a general practitioner and covers both inpatient and outpatient services. Children may be referred to a pediatrician in cases of chronic, complex, or unclear medical conditions.

Medicine use (from 2006) - Annual binary indicators for the use of medicines grouped by two-digit ATC (Anatomical Therapeutic Chemical) classification codes (ATC2). For example, 'J01' refers to antibacterials for systematic use including penicillin antibiotics.[13] We study the eight ATC2 codes with the highest incidence among our control group (children

[13]The medicine use data are available at the three-digit level. However, most two-digit codes in our sample only contains a single three-digit code, and when multiple codes are present their therapeutic use is similar (e.g., topical steroids with or without anti-infectives, or different types of antibiotics for systemic use).

born between February and May 2008), or equivalently codes with at least 3% incidence in the first year after birth. Table IA.3 of the Internet Appendix provides a description of the eight ATC2 codes we study. Data on dosage (DDDs) are not available. Data on over-the-counter medications (e.g., paracetamol, ibuprofen) are not available. Finally, we also study the number of different medicines (ATC2 codes) used as a dependent variable. When we calculate this measure, we consider all (72) possible ATC2 codes.

2.3 Sample Selection and Descriptive Statistics

Because the maternity cash benefit is fixed at about EUR 5,000, we focus our analysis on smaller businesses. We select businesses, both incorporated and unincorporated, with no more than EUR 150,000 in revenue (excluding value-added tax) in the year before birth.[14] For female entrepreneurs with unincorporated businesses, we additionally require positive business income in the year before birth to ensure inclusion of only viable businesses.

These criteria affect our sample sizes as follows. In total, 6,561 female entrepreneurs gave birth in 2008. Of these, 4,497 gave birth within our primary ±4-month window around June 2008 (February–September 2008), including both first births (37%) and non-first births (63%). The businesses of 2,750 women (61%) meet the revenue size and profitability criteria, of which 2,479 (90%) are unincorporated and 271 (10%) are incorporated. As discussed above, our sample includes both female entrepreneurs who can be classified as 'business owners' (58% of the sample) and those who can be regarded as 'solo self-employed' (42%). Typical industries for business owners are 'other services' (e.g., hair and beauty salons), 'healthcare and well-being' (e.g., midwife practices, practices of physiotherapists, general practitioners, dental practices), 'other business services' (e.g., advertising and management consulting services), and 'retail' (various stores). Solo self-employed women in our sample also operate in 'other business services' and 'other services', but compared to entrepreneurs they are less frequently found in the 'healthcare and well-being' sector while they are also

[14] In Section 3.4, we discuss the sensitivity of our results to alternative cutoff values.

active in 'culture' (e.g., creative arts and documentary writers, performance art), and 'education' (e.g., business education and training, driving instructors). Table IA.1 in the Internet Appendix presents the seven most frequent 2-digit industry codes for both groups.

Besides our baseline sample selection criteria discussed above, we apply some additional restrictions due to data availability. First, when studying effects on business revenue, in Table 2, we restrict our sample to businesses that reported a non-zero quarterly revenue in any of the quarters of 2007. This is to exclude businesses that lack quarterly data on revenue, i.e., VAT-exempt businesses (e.g., healthcare) and businesses whose revenue is generally too low to report quarterly. Second, when studying business income, in Table 3, we restrict our sample to owners of unincorporated businesses. This is because the variable business income is zero for owners of incorporated businesses, which are taxed differently and can extract income in multiple ways (salary or dividends), or decide not to extract any income. Finally, when studying children's health outcomes in Table 6, we exclude children in the top one percent of the annual health cost distribution to prevent extreme cases from disproportionately influencing the results. This exclusion is mainly relevant for outcomes measured in euros.

Table 1 presents summary statistics for the female entrepreneurs in our sample. The table differentiates between women who gave birth between June and September 2008 (eligible for the benefit) and those who gave birth between February and May 2008 (not eligible). The two groups are close to identical in a broad range of characteristics. The average age at birth is 33.7 years, and over 90% of those who gave birth in 2008 had a partner (married or not) on 1 January 2008. Mothers have on average 0.9 children born before 2008. Due to our sample selection criteria, most businesses in our sample are relatively small. The mean business revenue in 2007 is about EUR 37,000 excluding businesses that are VAT-exempt (or EUR 51,000 in the sub-sample that reported revenue quarterly in 2007). The owners of unincorporated businesses earned about EUR 26,000 income (before-tax) from their businesses in 2007, approximately 82% of their total personal income or about 165% of the gross minimum wage in 2007.

[Insert Table 1 here]

2.4 Empirical Strategy

We start our analysis by estimating the effects of childbirth on the business revenue of female entrepreneurs. Our sample includes women who were owners or owner-managers of unincorporated or incorporated businesses on 1 January 2008. Among these women, we compare the evolution of business revenue between those who gave birth between January and May 2008 and those who did not give birth during the 2008–2011 period.[15] We estimate the following model:

$$y_{i,q} = \alpha_i + \sum_{k=-5, k\neq -2}^{12} (K_{i,q} = k) \times \beta_{0,k} + \gamma_{q\times ind} + \delta_{age} + \epsilon_{i,q} \tag{1}$$

$y_{i,q}$ stands for the business revenue of individual i in quarter q in euros, or a binary indicator for having any revenue, or the natural logarithm of business revenue in euros. α_i are individual fixed effects. $\gamma_{q\times ind}$ are quarter times 4-digit industry code fixed effects, while δ_{age} are age fixed effects (indicators). These fixed effects ensure that we compare similar individuals over time. $K_{i,q} = (q - \text{quarter of birth})$ measures the quarters passed since individual i gave birth. $K_{i,q}$ is set to -2 for those not giving birth, i.e., these individuals only help to identify the quarter-industry fixed effects and the age fixed effects. In this model, our main coefficients of interest are $\beta_{0,k}$, which identify the difference in business revenue in quarter q between women who gave birth in 2008 and those who did not give birth in the 2008 to 2011 period. We plot these coefficients to present the dynamic effects of childbirth. We cluster standard errors at the individual level.

Next, we study how being eligible for the EUR 5,000 maternity cash benefit affected the business revenue of female entrepreneurs. We augment Model 1 with an interaction term that separately identifies the effects of childbirth for those women who gave birth between June

[15] From this baseline child penalty analysis, we exclude women who gave birth after May 2008 to establish a clean benchmark for the period before the introduction of the ZEZ maternity cash benefit.

and September 2008 (eligible for the benefit) and those who gave birth between February and May 2008 (not eligible for the benefit). Compared to Model 1, we exclude January 2008 births but include June to September 2008 births. We estimate the following model:

$$y_{i,q} = \alpha_i + \sum_{k=-5,k\neq-2}^{12} (K_{i,q} = k) \times \{\beta_{0,k} + \beta_{1,k} E_i\} + \gamma_{q\times ind} + \delta_{age} + \eta_{Z_i,K_{i,q}} + \epsilon_{i,q} \qquad (2)$$

This specification is the same as Model 1, except for two modifications. First, we allow the dynamic effects of childbirth to differ between those eligible and ineligible for the cash benefit ($\beta_{1,k}E_i$). Second, we add controls for indicators of relative quarters since birth, interacted with both the mother's age at birth and the number of children before 2008 (categorized as 0, 1, or more than 1) ($\eta_{Z_i,K_{i,q}}$). We add these controls to further increase the comparability of eligible and non-eligible mothers (although in practice these controls matter little as the two groups are very similar, see Table 1). E_i is an indicator that takes a value 1 for individuals who were eligible for the benefit, i.e., those who gave birth between June and September 2008 (and 0 for those giving birth between February and May 2008). Therefore, our key coefficients of interest are $\beta_{1,k}$, which identify the differences in relative time trends between eligible and ineligible mothers. We restrict the sample to cover the period from five quarters before birth (given that data on revenue starts in 2007) to twelve quarters after birth. We cluster standard errors at the individual level.

We also use a version of Model 2 where we replace the full set of relative year indicators and their interactions with the eligibility indicator with a single 'Post' indicator and its interaction with eligibility ($\beta_0 Post_{i,q} + \beta_1(E_i \times Post_{i,q})$). The post period also includes the quarter before birth allowing for anticipation and the fact that the benefit is available from 6 to 4 weeks before birth. Given the evidence from the full dynamic specification that treatment effects diminish after the 8th quarter following birth, we restrict the sample to cover the period from five quarters before birth to eights quarters after birth. β_1 shows the average effect of being eligible for the maternity cash benefit in the first eight quarters

following birth.

When analyzing outcomes observed only at the annual frequency, such as income or child health, we adopt a different identification strategy. Annual data do not allow us to compare outcomes of eligible and ineligible women and their children at the same child age, because children of eligible women are born later in the year and are therefore, on average, younger during that year. Conditioning on child age is crucial, since age is a key determinant of both childcare needs and child health. To address this issue, we employ a difference-in-differences design, comparing outcomes for women who gave birth between February and May or between June and September, in either 2008 or 2009. In 2008, when the benefit was introduced, eligibility differed for women giving birth before versus after June. In 2009, no such eligibility difference existed. This allows us to use the 2009 differences to isolate the effects of benefit eligibility from those of child age. We estimate the following model:

$$y_{i,t} = \alpha_i + \sum_{s=-2, s\neq -1}^{2} (S_{i,t} = s) \times \{\beta_{0,s} E_i + \beta_{1,s} B2008_i + \beta_{2,s}(E_i \times B2008_i)\} + \gamma_{t\times ind} + \delta_{age} + \eta_{Z_i,S_{i,t}} + \epsilon_{i,t} \quad (3)$$

The sample includes women who were owners or owner-managers of unincorporated or incorporated businesses on 1 January 2008 or 1 January 2009, and who gave birth the same year between February and September. $y_{i,q}$ stands for the outcome of individual i in calendar year t. α_i are individual fixed effects, $\gamma_{t\times ind}$ are calendar year times 4-digit industry code fixed effects, while δ_{age} are age fixed effects (indicators). $S_{i,t} = (t - \text{year of birth})$ measures the years passed since individual i gave birth. We restrict the sample to the period from two years before birth till two years after birth for each individual. E_i is an indicator that takes a value 1 for individuals giving birth between June and September (and 0 for those giving birth between February and May). $B2008_i$ is an indicator that takes the value 1 for individuals giving birth in 2008 (and 0 for those giving birth in 2009). $\eta_{Z_i,S_{i,t}}$ are indicators of relative years since birth, interacted with both the mother's age at birth and the number

of children before 2008 (categorized as 0, 1, or more than 1). $\beta_{2,s}$ are our main coefficients of interests, which identify the difference in outcomes between mothers who gave birth in February to May 2008 (ineligible for the cash benefit) and those who gave birth in June to September 2008 (eligible for the benefit). We cluster standard errors at level of the individual entrepreneur.

When analyzing the health outcomes of children, we use a modified version of Model 3, based on cross-sectional rather than panel comparisons, since outcomes for newborns are undefined before birth. We examine (calendar) years after birth separately. In our main analysis we focus on the *first calendar year after birth*, when health effects are most pronounced. In these analyses, we include control groups of non-entrepreneur women who gave birth between February and September in 2008 or 2009 as well. These controls help account for differences between earlier and later births within each year, which could otherwise reflect cohort-level factors such as daycare regulations or seasonal diseases. This design yields a triple-differences analysis, comparing outcomes for children of entrepreneurs and non-entrepreneurs who gave birth in 2008 or 2009, and before or after June. We then estimate the following model, where y_i denotes the outcome for infant i, such as annual health costs or annual medicine usage, in a given year after birth:

$$y_i = \alpha + \beta_0 E_i + \beta_1 B2008_i + \beta_3 ENT_i + \beta_4 (E_i \times B2008_i) + \beta_5 (ENT_i \times B2008_i) + \beta_6 (E_i \times ENT_i) + \beta_7 (E_i \times B2008_i \times ENT_i) + \delta_{Z(i)} + \gamma_{B2008_i \times ind} + \delta_{age} + \eta Z_i + \epsilon_i \quad (4)$$

As in Model 3, E_i is an indicator equal to 1 for individuals who gave birth between June and September, and 0 for those who gave birth between February and May. $B2008_i$ is an indicator equal to 1 for individuals who gave birth in 2008, and 0 for those who gave birth in 2009. ENT_i is an indicator equal to 1 if the mother is an entrepreneur (i.e., included in the estimation of Model 3) and 0 if she is not (in most cases, an employee). Our main parameter of interest is the triple interaction term, β_7. This coefficient captures the difference

in outcomes between entrepreneur mothers who gave birth in February–May 2008 (ineligible for the cash benefit) and those who gave birth in June–September 2008 (eligible for the benefit). As in the other models, we also include several sets of fixed effects and controls. $\gamma_{B2008_i \times ind}$ are 4-digit industry code fixed effects, specific to the birth year (2008 or 2009). Since industry codes are not defined for non-entrepreneurs, we classify these individuals under a separate category. δ_{age} are age fixed effects (indicators), and η_{Z_i} are indicators for the number of children the mother had prior to 2008 (categorized as 0, 1, or more than 1). Since the data are cross-sectional and treatment occurs at the individual level (mother or equivalently newly born child), we compute heteroskedasticity-robust standard errors.

3 Results

3.1 Childbirth and Revenue of Female Entrepreneurs

We begin by documenting the effect of childbirth on business revenue using Model 1, estimated separately for female and male entrepreneurs. Because the maternity cash benefit we subsequently study applies to both first and higher-order births, and since we study the child penalty primarily as a benchmark for estimating the benefit's effects, we do not restrict the analysis to first births only. Panel A of Figure 1 plots revenue from five quarters before to twelve quarters after birth for female entrepreneurs (blue line) and male entrepreneurs (red line) who had a child between January and May 2008 (before the introduction of the ZEZ maternity cash benefit) compared to those of female and male entrepreneurs who did not have a child during the 2008–2011 period. The sample consists of entrepreneurs who were owners or owner-managers of unincorporated or incorporated businesses as of 1 January 2008.

[Insert Figure 1 here]

While both mothers and fathers display a slightly positive revenue trend before birth,

only mothers experience a sharp decline in revenue following birth. Mothers' revenue falls on average by EUR 3,300 in the quarter of childbirth, corresponding to a 26% reduction relative to the unconditional mean revenue of female entrepreneurs not giving birth. This large negative effect persists into the following quarter, although it begins to diminish from the second quarter after birth onward. The negative impact, however, remains visible for at least three years (twelve quarters) after childbirth, with long-term effects of about EUR –1,600, or approximately 12.5% in relative terms. Fathers, by contrast, experience no revenue decline.[16]

The evidence we present here, albeit purely correlational, does suggest that female entrepreneurs experience a sharp child penalty after giving birth, in line with the evidence on women working as employees (Kleven et al., 2019). As it is the case for employees, this child penalty is detectable in the longer run. Our results show that women who give birth may be disadvantaged in the labor market even in the case of professions that can be flexible in terms of working hours, such as small-scale entrepreneurship and self-employment (Goldin, 2014).

3.2 Maternity Cash Benefits, Business Activity, and Income

Having documented a child penalty among female entrepreneurs, we turn to estimating the effects of the maternity cash benefit on business activity. The effects of receiving the benefit are ex-ante ambiguous. On the one hand, the benefit may enable mothers to work less and increase their time dedicated to leisure or childcare (*income effect*). However, because the benefit amounts to only about 6% of eligible women's gross household income (Table 1), income effects might be limited. On the other hand, eligible mothers may also use the

[16]Figure IA.1 in the Internet Appendix shows that the overall decline in mothers' revenue reflects a combination of extensive-margin and intensive-margin effects. In the long run, the extensive margin decreases by 7.5 percentage points, while the intensive margin falls by 15%. The fact that these combined margin effects translate into a larger relative revenue decline than the 12.5% average effect based on revenue measured in euros suggests that smaller businesses are disproportionately affected. As a benchmark, we conduct a similar analysis among employees, comparing the quarterly labor income trajectory of those giving birth in 2008 and those not giving birth in the 2008-2010 period. The long-term (3-year) effects on female employees' labor earnings are similar to those we estimate for female entrepreneurs, though relatively more concentrated on the intensive margin (21% lower earnings) than on the extensive margin (4 percentage points less likely to earn any labor income).

benefit to purchase childcare while keeping their labor supply unchanged. Borra et al. (2021) find no effects on Spanish mothers' labor supply in paid employment who were provided a cash benefit of comparable size. We might expect a stronger labor supply reaction among self-employed mothers, as they could find it easier to adjust their working hours (Goldin, 2014). Conversely, job protection provided for employees is an important factor for reducing labor supply after birth (Lalive et al., 2014), but female entrepreneurs lack such protection and may risk losing customers or clients during periods away from work.

Following Model 2, Panel B of Figure 1 shows the estimated differences in quarterly revenue (in euros) between mothers who gave birth between June and September 2008 (eligible for the benefit) and those who gave birth between February and May 2008 (ineligible). Prior to the quarter before birth, we find no statistically significant differences in revenue trends between eligible and ineligible mothers. Beginning in the quarter before birth, the two groups start to diverge, although most quarter-by-quarter coefficient estimates are imprecise. The negative effects are larger in the first year after birth than in the second year. From around the ninth quarter after birth onward, the difference disappears. Because these effects diminish after year two, our difference-in-differences specification focuses on the first two years following birth.

Table 2 reports the difference-in-differences estimates for the first two years after birth. These estimates are based on Model 2, where the relative quarter-by-quarter indicators and their interactions with eligibility are replaced by a single Post indicator and its interaction with eligibility. The sample is restricted to the first eight quarters after birth. The quarter before birth is included in the Post period, since the benefit is paid from four to six weeks before birth and anticipation effects are possible.[17] Column 1 shows that eligible mothers earned, on average, EUR 970 less revenue in the first eight quarters (two years) after birth, an 8.6% decrease relative to ineligible mothers. Compared to the average child penalty documented in Panel A of Figure 1 - about EUR 1,700 per quarter during the same period

[17]Excluding the quarter before birth changes the point estimate in Column 1 of Table 2 only slightly, to EUR –941 (95% CI: –1,725 to –157).

- these represent substantial treatment effects. Columns 2 and 3 decompose this effect into extensive and intensive margins. Column 2 indicates no economically or statistically significant effect on the extensive margin: eligible mothers are not less likely to have any revenue following birth. By contrast, column 3 shows a stronger effect on the intensive margin, albeit only statistically significant at the 10% level. Eligible mothers earn 5.2% ($\exp(-0.053) - 1$) less revenue than ineligible mothers.

[Insert Table 2 here]

Our results on business revenue indicate that eligible mothers use the maternity cash benefit to partially reduce their labor supply during the first two years after birth. Importantly, if the resulting revenue loss is substantial, the benefit may leave mothers—and potentially their households—poorer. To test this, we shift our focus from revenue to income. Since income is measured annually rather than quarterly, we adjust our estimation model as described in Section 2.4. Specifically, we employ a difference-in-differences design where the first difference compares mothers giving birth between June and September with those giving birth between February and May, and the second difference compares births in 2008 with births in 2009. This approach allows us to use the difference between June–September and February–May births in 2009 (when all mothers were eligible) as a counterfactual for the difference in 2008 (when only the June–September group was eligible).

Table 3 reports estimates from Model 3 of the effects of benefit eligibility on income components, bank savings growth of female entrepreneurs and their partners (if any), and selected business characteristics. The sample is restricted to the period from two years before to two years after birth, with coefficients from the year before birth normalized to zero. Eligible and ineligible women (and their partners or households) display no statistically significant differences in the evolution of outcomes prior to birth.

In column 1, we find that eligible mothers earn EUR 2,060 less business income in the year of birth. A negative effect is also observed in the year after birth, and a positive effect

two years after birth, though neither is statistically significant. A difference-in-differences estimate suggests an overall income loss of EUR 2,090 in the first three years after birth. These findings are consistent with the negative revenue effects documented in Table 2. The reduction in business income corresponds to about 60% of the expected benefit amount of EUR 3,500 (calculated as EUR 5,000 multiplied by the estimated 70% take-up rate).

[Insert Table 3 here]

Although eligible women reduce their business revenue and business income, the benefit more than compensates for this earnings loss and leads to higher personal income (columns 2 and 3). The somewhat less precise estimates in column 2 suggest an increase of EUR 1,720 in personal income in the year of birth, corresponding to 6.4% relative to the income of ineligible mothers. The more precise estimates based on the logarithm of personal income indicate a 17.8% ($\exp(0.164) - 1$) relative increase. In an untabulated regression, we find that the partner's income (if the female entrepreneur has a partner) is not statistically significantly affected. Consequently, column 4 shows that disposable household income rises by about 6.2% ($\exp(0.06) - 1$) in the year of birth for women eligible for the maternity cash benefit. Column 5 provides suggestive evidence that at least part of the additional income provided by the benefit, net of the decline in business income, is saved by the household. Specifically, column 5 shows that the end-of-year bank account balances of households with eligible mothers grow faster in the year of birth than those of ineligible households.[18]

Finally, columns 6 and 7 examine two business outcomes: the entrepreneur being a business owner (column 6) and the number of employees other than the entrepreneur employed in the business (column 7). As mentioned in the previous section, we define a business owner as an individual owning an incorporated business or a self-employed individual with employees other than herself or having tangible capital on her business' balance sheet. In column 6, we find that eligible women become more likely to be business owners rather than

[18]It is difficult to determine the exact amount saved from the benefit because the distribution of bank account balances is highly skewed, and the level estimates (in euros) are sensitive to the winsorization applied.

solo self-employed, suggesting that the benefit helps women to better structure their businesses, potentially investing more into it. Yet, the cash benefit has no statistically significant effect on the number of employees (other than the entrepreneur) in the business (column 7), signaling the extra resources available are not used for hiring decisions.[19]

Overall, our results suggest that female entrepreneur mothers who are eligible for the maternity cash benefit scale down their business activity more after childbirth than those who are ineligible for the subsidy. However, the resulting decrease in business revenue and income is more than offset by the benefit. As a result, mothers experience higher personal and household income, and might save part of this increased income. Lastly, the benefit appears to help mothers to move to a more structured form of business ownership in the years following childbirth.

Finally, we study heterogeneity in the treatment effects on business revenue and income along two characteristics that are likely correlated with the extent to which business operations and revenue depend on the female entrepreneur's own labor input. On the one hand, female entrepreneurs whose labor input is more essential to their business may reduce their labor supply less in response to the maternity cash benefit. On the other hand, an equal reduction in labor input may lead to a larger drop in revenue and profit for labor-intensive businesses.

Columns 1 and 2 of Table 4 show that entrepreneurs classified as business owners (as defined in Section 2, these are businesses that are either incorporated, employ other people, or report property, plants, or equipment on their balance sheet) experience larger absolute reductions in revenue and business income when eligible for the maternity cash benefit, compared to self-employed women who primarily sell their own labor. Columns 3 and 4 further show that businesses with more than one entrepreneur (where the second entrepreneur is often the partner) also experience larger absolute cuts in revenue and business income than businesses run by a single entrepreneur. This heterogeneity suggests that female en-

[19]This result is in line with the high level of rigidity and regulatory burden that affects the Dutch labor market, despite recent deregulation (Delsen and Poutsma, 2005).

trepreneurs' labor supply is more responsive to the maternity cash benefit when their own labor input is more easily or temporarily substitutable within the business.

3.3 Maternity Cash Benefits, Childcare, and the Well-being of Mother and Child

In the previous section we showed that, upon receiving the benefit, mothers reduce their business revenue and income. Although we do not observe hours worked, it is probable that the lower business activity is due to a cut in mothers' labor supply. This raises the question of what mothers do with the additional time they do not spend working. One possibility is that they dedicate this time to childcare, substituting for formal care or informal care provided by family members.

While we do not observe the amount of informal care provided by family members in our data, we do observe the amount of formal childcare received by the newly born child. This includes childcare by daycare centers and childminders that is subsidized by the Dutch childcare allowance. In Table 5 we study the effect of the mother being eligible for the benefit on the use of formal daycare in the year after birth.[20] The table shows estimates from Model 4, which implements a triple difference-in-differences analysis comparing comparing the outcomes of children born in the June-September or the February-May periods, in 2008 and 2009, and by mothers who are entrepreneurs or not. The triple interaction term (Eligible × 2008 birth × Entrepreneur) identifies the average treatment effect of being eligible for the maternity cash benefit. The table shows that treated children spend 59 fewer hours in daycare (column 1), which is partly explained by a 6 percentage points lower probability of attending daycare at all (column 2). The reduction in daycare use is driven by a decline in attendance at daycare centers (columns 3–4), rather than among childminders

[20] In untabulated results, we do not find a statistically significant effect on formal daycare use in the year of the birth, when eligible children are between 3 and 6 months old. This might be explained by the relatively low use of formal daycare in the first months of life: among the general population, only 31% of the children born between June and September in 2008 have used any formal daycare in the same year. In line with no effects on daycare use, we also do not find any effects on child health in the year of birth.

(columns 5–6). The estimated, though statistically insignificant, increase in childminder use may reflect the greater flexibility of this form of care. While some daycare centers offer half-day options, others only provide full-day care. In contrast, childminders are generally more flexible in scheduling, including on a week-to-week basis. Parents therefore often use childminders to "top up" around fixed daycare-center schedules: a parent wishing to reduce formal childcare might cut daycare-center days and cover half-days or irregular needs with childminder care.

Overall, these results support the hypothesis that entrepreneurs and self-employed mothers who are eligible for the maternity benefit decide to work less and spend more time with their children.

[Insert Table 5 here]

A key policy goal of providing the maternity cash benefit was to improve the well-being of mothers and their children. While decreased maternal labor supply and increased household income (Tables 2 and 3) might contribute to better maternal health, we do not find evidence of improved mental health (lower use of antidepressants) or overall health (lower health costs) among eligible mothers. We also do not find that being eligible for the subsidy changes the probability of having a partner or having (additional) children, at least not in the three years following birth. These results are presented in Internet Appendix Table IA.2.

On the contrary, we do find evidence of improved health among the newborn children of eligible mothers, in the first (calendar) year after birth. In Panel A of Table 6 we present the effects of benefit eligibility on children's health costs, estimated using Model 4. In columns 1 and 2, we find that children of eligible mothers have significantly lower health costs by around EUR 130, or 15.6% ($= exp(-0.17) - 1$). This decrease in total health costs is partly explained by an about 12% lower general practitioner (GP) consultation costs (i.e., fewer or less complex visits), as shown by column 4, and a 14% decrease in the cost of medicines used (column 6). The remainder of the effect, as column 7 suggests, is driven by lower cost of

specialist medical care (around EUR 101 lower, column 7), including pediatric care. While conditional on having any specialist care children of eligible mothers have no lower costs (column 7), they are 6 percentage points less likely to need any specialist care (column 9). While we do not have data on the exact diagnoses by medical specialists for the sample period, Table IA.4 in the Internet Appendix presents the 10 most common diagnoses among children of the same age in 2013. These are often conditions that are either transmittable (upper respiratory tract infections, gastro-enteritis, RSV, diseases of adenoid and tonsil) or ones that can be affected by childcare and/or environment (foreign body in ear, nose, or airway, gastroesophageal reflux disease (GERD), feeding problems, food allergies).[21]

[Insert Table 6 here]

Although we do not have data on medical diagnoses, we do have data on prescribed medicines classified by the ATC (Anatomical Therapeutic Chemical) classification system. To better understand what kind of diseases treated children are less likely to be exposed to, we study treatment effects on medicine use. In Panel B of Table 6, we study the effects of being eligible for the cash benefit on the number of distinct medications used by the child and the likelihood of the child to be prescribed the eight most used medicine classes (i.e., ATC2 codes) in the first (calendar) year after birth.[22] In column 1, we find that children of eligible mothers take on average 0.18 fewer different types of medicines, or 12.5% fewer relative to the mean among ineligible children (1.44). The magnitude of this effect is in line with our estimate on lower health costs (15.6%) in Panel A of Table 6, although the two outcomes are not directly comparable. Regarding the type of medications used, we find negative effects

[21] In an untabulated analysis, we further estimate the effects of benefit eligibility on the probability of having medical specialist costs above the median (EUR 542), 75th percentile (EUR 1,700), and 95th percentile (EUR 5,096) of the medical specialist costs distribution in our sample (conditional on having any costs). The estimates are as follows: median -4 pp. (95% CI: -8 to 0 pp.), 75th percentile -3 pp. (CI: -6 to 0 pp.), 95th percentile 0 pp. (CI: -1 to +1 pp.). These results show that while benefit eligibility reduces the probability of high medical specialist costs, it does not reduce the risk of very costly health conditions (possibly requiring hospitalization).

[22] Table IA.3 in the Internet Appendix provides a description of the eight classes and examples of diseases against which these medicines are used.

on medications that fall under the codes A07/D01 in column 2 (minus 4 percentage points, pp.), D06 in column 4 (minus 3 pp.), D07 in column 5 (minus 4 pp.), and J01 in column 6 (minus 5 pp.). The group A07/D01 includes nystatin and miconazole, which are antifungal medications used to treat infections of the skin, including diaper rash and thrush, as well as ringworm.[23] D06 includes fusidic acid and mupirocin, antibiotics found in creams and ointments that are used to treat skin infections locally (e.g., impetigo, a bacterial skin infection, or infections near eczema rashes). D07 are corticosteroid preparations (e.g., hydrocortisone) that reduce inflammation and suppress the immune response. These medications are used for example in case of diaper rash. J01 are antibacterials for systemic use, including antibiotics. Antibacterials are the most frequently used (prescription) medications among one-year-old children, they are used to treat bacterial infections, e.g., ear infections, respiratory infections, and skin infections. We do not find significant effects in columns 7-9 on the use of some other frequently-used medications, including the R03 group (asthma medications) or the S01 and S02 groups (anti-infectives for use in ophthalmology and otology, respectively).

The results on healthcare costs and medicine use presented in Table 6 are consistent with the lower daycare attendance documented in Table 5. Many of the diseases that are treated with the medications for which we find a statistically lower use in Panel B of Table 6 are highly contagious (e.g., fungal and bacterial skin infections) and likely to spread in a daycare setting where multiple children are present, and where caretakers do not always wash the hands of children before eating or after a toilet visit, or do not always clean the toilet and kitchen areas on a daily basis (Enserink et al., 2013). In addition, the decreased general practitioner (GP) consultation costs documented in Panel A of Table 6 might signal a decrease in common infectious diseases such as influenza-like illnesses or ear infection, which often result in a GP visit among young children (Enserink et al., 2013) but are most often

[23]Nystatin and miconazole are most often used topically (cream) against fungal skin infections but because they can also be used (oral tablets) against fungal infections within the intestines (e.g., candida), they are recorded in the A07 group instead of the D01 group.

caused by viruses and do not require prescription medication.[24]

Besides lower daycare attendance, the maternity cash benefit's positive impact on child health might also be explained by the increased availability of parental time and money resources, or the combination of these. A large literature documents the positive effects of the extension of maternity leave policies (paid or unpaid) on child health (Ruhm, 2000; Rossin, 2011; Bullinger, 2019; Fabel, 2021), although other studies find limited or no effects (Dustmann and Schönberg, 2012; Beuchert et al., 2016). Baker and Milligan (2008) find that maternity leave mandates increase breastfeeding, although they find no strong effect on infant health. Regarding the impact of cash transfers, the evidence is more mixed with a few studies reporting improved child health in the short and long run (Hoynes et al., 2015; Aizer et al., 2016), while other studies document no or mixed effects (Milligan and Stabile, 2011; Cesarini et al., 2016).

3.3.1 Long-term Effects on Child Health

Previous work suggests that while higher daycare attendance may lead to a higher risk of transmittable diseases in early life, the disease burden might be actually lower during elementary school years (Côté et al., 2010; Barschkett, 2022; van den Berg and Siflinger, 2022). A possible explanation is the *hygiene hypothesis*: Early exposure to daycare may trigger an immunization process, resulting in poorer physical health in the short term but improved physical health later in childhood (Strachan, 1989).

In Table 7, we study whether the positive health effects of the maternity cash benefit are only transitory or persists in the long run. Our results suggest the effects are somewhat transitory, yet, while we find a statistically significant health improvement in the first calendar year after birth, we do not find evidence of worse health in the following years. If anything,

[24]Prior economics literature has also linked daycare use with worsening child health in the short run. Baker et al. (2008) find that greater child care utilization due to universal child care subsidies in Canada had a negative impact on a variety of child outcomes, including survey-based health measures (ever having had nose and throat infections or ear infections). Similarly, van den Berg and Siflinger (2022) estimate that increased daycare attendance brought about by lower fees in Sweden lead to strong and immediate increases in probabilities of diagnosis with physical health conditions (infections, ear, and respiratory diseases).

we find that these children use significantly fewer medicines at age four, which corresponds to the age at which Dutch children start primary school. As the last row of the table shows, we find negative but not statistically significant effects on the number of medicines used or total health costs aggregated over the first six/seven years of life, as a longer horizon makes our results noisier. As a result, while we do not find support for the hygiene hypothesis (i.e., worsening health outcomes in the long run), we cannot clearly conclude that children of eligible mothers become healthier in the long run.

[Insert Table 7 here]

3.4 Robustness

In the Internet Appendix, we present a series of robustness and placebo tests to assess whether our main results are sensitive to alternative sample definitions.

First, we study the sensitivity of our results to alternative 2007 revenue cutoffs used for selecting our sample of businesses. Given that the maternity cash benefit we examine is fixed in amount (approximately EUR 5,000), it is natural to focus our analysis on smaller businesses for which this amount is more meaningful. Indeed, in Internet Appendix Table IA.5 we find that including businesses with higher revenue in our sample reduces the estimated negative effects of the maternity cash benefit on business revenue. For example, doubling the revenue cutoff to EUR 300,000 in 2007 results in a sample of 2,300 female entrepreneurs who gave birth between February and September 2008 (compared to 1,800 in the baseline model). The estimated treatment effect in this sample is EUR –422, with a larger 95% confidence interval of (-1,370 to +526), which includes our baseline point estimate (EUR –970). The effect on log revenue is minus 3% (compared to minus 5% in the baseline), while the effect on having any revenue is minus 1 percentage point (compared to minus 2 pp. in the baseline). Conversely, when we further restrict the sample to small-scale entrepreneurs with business revenue smaller than EUR 100,000, our results become stronger and more precise.

There are several potential explanations for the attenuation of treatment effects when the sample includes businesses with higher revenue. First, the relative effects (in logs) naturally attenuate as the fixed cash benefit represents a smaller share of revenue for larger businesses. At the same time, effects on revenue in levels (EUR) are estimated less precisely because of the increasing variance and skewness of revenue in the sample. Second, entrepreneurs operating larger businesses might be less inclined to take up the subsidy. Indeed, an evaluation by the Dutch Minister of Social Affairs and Employment concluded that low-income women were more likely to take up the benefit (see footnote 10). Third, owners of larger businesses might be less willing or able to adjust their labor supply in response to a fixed (relatively small) benefit amount, for example if such adjustments are costly (e.g., due to a minimum feasible reduction in owner hours).[25] Finally, revenue may be a less sensitive measure of the owner's labor supply for larger businesses if these depend less directly on the owner's short-term labor input.

Second, for the outcome of business revenue, we conduct placebo tests where we consider births of female entrepreneurs before or after June in other years than 2008, either 2009 or 2010. In Internet Appendix Table IA.6, we estimate no reduction in business revenue for female entrepreneurs giving birth around June in these other years (2009: EUR –7, 95% CI: -693 to +679; 2010: EUR +269, CI: -368 to +806).[26]

Third, for all outcomes, we vary the sample window of birth months around the June 2008 introduction of the maternity benefit (besides the baseline 4-month window), considering both a longer 5-month window and shorter 3-month and 2-month windows. Varying the treatment window might present a variance-bias tradeoff: applying narrower windows potentially makes eligible and ineligible births more comparable at the cost of reducing sample

[25]Consistent with this idea, the child penalty (see Section 3.1) is also smaller for female entrepreneurs with larger businesses: under our baseline revenue cutoff (maximum EUR 150,000 revenue in 2007), female entrepreneurs' revenue drops by 26% in the quarter of childbirth, whereas this effect is only 17% when the revenue cutoff is raised to EUR 300,000. This suggests that entrepreneurs with larger businesses reduce their labor supply less upon childbirth and may also be less responsive to a flat-rate maternity cash benefit.

[26]For other outcomes, our difference-in-differences models already account for potential seasonality (that is, differences in outcomes between pre- and post-June births) by relying on births in 2009 as well.

size.

In Table IA.6 of the Internet Appendix, we estimate that when considering all births between January and October 2008 (i.e., 5-month window around June 2008), the effect on quarterly revenue slightly shrinks from the baseline EUR -970 (95% CI: –1,721 to –218) to EUR –788 (CI: –1,461 to –115). Conversely, when considering tighter three and two months windows around June 2008, the effect size increases to EUR -1,122 (CI: –1,955 to –290) and EUR -1,368 (CI: –2,366 to –370), respectively.

In Table IA.7 of the Internet Appendix, we present robustness tests for our results on the effects of the maternity cash benefit on annual business and personal income. Regarding business income, in the year of birth, the baseline (4-month window) treatment effect is EUR –2,057 (95% CI: –4,074 to –40); the 5-month window yields an effect of EUR -1,228 (CI: –3,005 to +549), while the 3- and 2-month windows show effects of EUR -1,798 (CI: –4,101 to +505) and EUR –2,439 (CI: –5,336 to +458), respectively. Regarding personal income, effect sizes in the year of birth are EUR 1,721 (CI: –221 to +3,663) in the baseline (4-month window), and EUR 2,273 (CI: +566 to +3,979), EUR 1,977 (CI: –237 to +4,191), and EUR 1,119 (CI: –1,661 to +3,900) for the 5-, 3-, and 2-month windows, respectively. Overall, while the effect sizes vary across specifications, eligibility for the maternity benefit leads to a consistent decline in business income and an increase in personal income. Table IA.7 also presents robustness on the probability of being a business owner, in other words having a business that is incorporated, has employees, or has tangible assets. The estimates based on alternative birth month windows are close to identical.

In Table IA.8 of the Internet Appendix, we present robustness tests on the effects of the maternity cash benefit on daycare use. The estimated effect on the probability of using daycare is minus 6 percentage points (pp.) under the baseline 4-month window (95% CI: –11 to –1), and minus 6 pp. (CI: –10 to –2), minus 5 pp. (CI: –11 to +1), and minus 9 pp. (CI: –17 to –1) for the 5-, 3-, and 2-month windows, respectively.

Finally, in Internet Appendix Table IA.9 we perform robustness tests on the treatment

effect estimates on children's health costs and medicine use. The effect on (log) total health costs ranges between minus 8.6% and minus 16.5% for the different sample windows (5 to 2 months around June 2008), while the estimates on the reduction in the costs of general practitioner consultations fall between minus 4.9% and minus 14%. Children of eligible mothers are between 3 and 6 percentage points less likely to have any medical specialist costs, under the different specifications. The treatment effects on medicine use are also consistent with those of the main analysis, in both magnitude and significance, across the difference specifications. For example, the effect on the number of distinct medicines (ATC-2 codes) used ranges between –0.15 and –0.28, with –0.18 in the baseline sample.

Overall, these robustness tests show that our main results are qualitatively and quantitatively similar across alternative sample specifications, while the placebo tests in case of business revenue help rule out confounding factors related to seasonality.

4 Conclusions

We start our analysis by estimating the impact of childbirth on the business performance of female entrepreneurs in the Netherlands. We find a marked decrease in business revenue and the likelihood of generating any revenue extending at least up to three years post-childbirth. On the contrary, we find no negative effects of having a child on the business activity of comparable men. Our results mirror the previously documented 'child penalty' among female employees (e.g., Kleven et al., 2019).

We then provide causal evidence that an unconditional maternity cash benefit for female entrepreneurs (equivalent to four months of minimum wage) leads to a further reduction in business revenue during the first two years following childbirth. This result is in contrast with the previously documented insignificant effects of unconditional cash transfers (e.g., Borra et al., 2021) on maternal labor supply among the general population. We find that eligible mothers are significantly less likely to use formal daycare, which suggests that they

spend the time off their business at least partially with their child instead of using it purely for leisure. Crucially, the benefit does not lead to reduced business activity beyond the first two years following childbirth, and therefore it does not exacerbate the child penalty.

While the cash benefit leads to a reduction in business income, this reduction amounts to only about 60% of the benefit amount. Therefore, the benefit leads to both lower maternal labor supply and an overall increase in household income. As a possible results of these changes, we document that benefit eligibility leads to improved child health in the first year after birth, reflected by decreased healthcare costs and lower medication use. Especially, the use of medications associated with the treatment of illnesses linked to daycare attendance is reduced. However, we do not find systematic differences in health outcomes of children in subsequent years, when children start attending play groups or preschool and later on primary school. Overall, we find that benefit eligibility has small positive effects on health over the first six years of life, but these differences are not statistically significant.

Our study contributes to the literature on the economics of entrepreneurship, the causal effects of maternity benefits, and the interplay between family planning and economic outcomes. Our findings highlight the importance of providing maternity benefits for female entrepreneurs. By offering financial support during critical periods, these benefits not only bolster the economic stability of female entrepreneurs but also promote healthier early-life conditions for their children.

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Tables and Figures

Table 1: Summary statistics of female entrepreneurs giving birth before and after the introduction of the maternity cash benefit

The table reports summary statistics for the baseline sample of female entrepreneurs who gave birth in either June–September or February–May, shown separately. The last two columns display the difference in means between these groups and the corresponding t-statistic. Business revenue refers to proceeds (excluding VAT) from the sale of goods and services to third parties. Business income equals total business revenues minus all deductible business expenses, and is subject to personal income tax. Gross personal income includes business income, employment income (including employer contributions), and subsidies or benefits. Gross household income is the sum of household members' gross personal incomes plus jointly received income and benefits (e.g., wealth income, housing benefit). Disposable household income equals gross household income minus social insurance premiums (including employer contributions) and taxes. †: these variables are reported only for unincorporated self-employed women, about 90% of our sample. Business revenue is trimmed at the 1st and 99th percentiles. * p < 0.1, ** p < 0.05, *** p < 0.01

	June - September 2008 birth						**February - May 2008 birth**						Δ	t-stat
	N	Mean	S.d.	P25	Median	P75	N	Mean	S.d.	P25	Median	P75	mean	
Age, 2008	1,393	33.68	4.52	31	34	37	1,357	33.64	4.41	30	34	37	0.05	0.27
Has partner, 2008 jan 1	1,393	0.91	0.29	1	1	1	1,357	0.93	0.26	1	1	1	-0.02*	-1.87
Number of prior children	1,393	0.88	1.03	0	1	1	1,357	0.90	0.95	0	1	1	-0.02	-0.67
Business revenue, 2007	1,393	37,025	40,034	3,677	22,116	60,137	1,357	37,086	39,993	4,174	21,418	60,716	-61	-0.04
Business revenue, 2007 (non-zero quarterly revenue in 2007)	925	50,821	40,342	17,169	39,051	79,003	876	51,583	40,217	17,597	40,240	79,131	-762	-0.4
Business income†, 2007	1,266	26,320	28,604	6,953	16,329	34,595	1,213	25,068	28,646	7,237	15,563	32,502	1,251	1.09
Gross personal income†, 2007	1,266	32,270	29,556	12,193	23,178	43,526	1,213	30,433	29,629	11,854	21,704	39,189	1,837	1.55
Gross hh. income, 2007	1,393	85,743	71,951	46,956	69,215	103,485	1,357	82,438	63,682	46,510	67,511	100,391	3,305	1.28
Disposable hh. income, 2007	1,393	53,495	40,845	32,971	44,377	63,116	1,357	51,473	39,072	32,889	44,173	61,043	2,021	1.33

Table 2: Effects of maternity cash benefits on the quarterly business revenue of female entrepreneurs

The table reports intention-to-treat effects of eligibility for the maternity cash benefit on quarterly business revenue of female entrepreneurs. The sample includes women who gave birth between February–September 2008 and, as a baseline group, women with no births during 2008–2011. The sample period includes from five quarters before until eight quarters after birth. Coefficients from a static version of Model 2 are shown, interacting a post-period indicator (including the quarter before birth) and an indicator for giving birth in June–September 2008 (eligibility). The outcome is business revenue (excl. VAT), measured in euros (including zeros), as a binary indicator of positive revenue, or in logs. Revenue in euros (col. 1) is trimmed at the 1st and 99th percentiles. The row "Mean for ineligible" reports the mean outcome for ineligible births (February–May 2008) in the post period. Standard errors clustered at the individual level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

	(1) (EUR)	(2) (0/1)	(3) (logs)
Eligible × Post	-970**	-0.02	-0.05*
	(383)	(0.02)	(0.03)
Mean for ineligible	11,259	0.63	10.04
Observations	1,047,911	1,047,911	840,892

Table 3: Effects of maternity cash benefits on the income and business characteristics of female entrepreneurs

The table reports intention-to-treat effects of eligibility for the maternity cash benefit on annual income and business characteristics of female entrepreneurs. The sample includes women who gave birth between February–September 2008 or 2009. Columns 1–6 restrict to unincorporated entrepreneurs (∼90% of the sample). Coefficients from Model 3 are shown, interacting indicators for giving birth in 2008 and for giving birth in June–September (eligibility) with indicators for years relative to birth. The interaction coefficients (reported) identify eligibility effects in the years before and after birth; the year before birth is normalized to zero. Business income equals total business revenues minus all deductible business expenses; (gross) personal income includes business income, employment income, and subsidies/benefits; (disposable) household income equals the sum of household members' gross personal incomes plus jointly received income and subsidies/benefits (e.g., wealth income, housing benefit) minus social insurance premia (incl. employer contributions) and taxes; account growth is the change in the household's bank balance from year t to $t+1$ (log difference). Business owner is a binary indicator of having a business that is incorporated, has employees, and/or holds tangible capital. This indicator is only available from 2007 on, therefore BY-2 estimates are not available. Columns 7 also includes (initially) incorporated entrepreneurs. Number of employees excludes owners. "Mean for ineligible" reports the birth-year mean for ineligible births (February–May 2008). Standard errors clustered at the individual level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

	Business income	Personal income		Household income	Account growth	Business-owner	Number of employees
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Eligible × 2008 birth ×	(EUR)	(EUR)	(logs)	(logs)	(Δ)	(0/1)	(units)
BY - 2	-190	-348	0.01	-0.02	0.13	.	-0.20
	(1,037)	(978)	(0.04)	(0.03)	(0.11)	.	(0.22)
Birth year	-2,057**	1,721*	0.16***	0.06**	0.36***	0.02	-0.18
	(1,029)	(991)	(0.05)	(0.03)	(0.11)	(0.02)	(0.13)
BY + 1	-1,270	-1,380	-0.08	-0.03	0.11	0.04*	0.11
	(1,231)	(1,188)	(0.06)	(0.03)	(0.10)	(0.02)	(0.19)
BY + 2	1,052	246	-0.02	-0.01	0.16*	0.04*	0.06
	(1,241)	(1,192)	(0.06)	(0.03)	(0.10)	(0.02)	(0.21)
Mean for ineligible	17,946	26,742	9.75	10.61	0.03	0.53	1.09
Observations	25,948	25,948	25,074	25,593	24,213	25,864	28,740

Table 4: Heterogeneity in the effects of maternity cash benefits on business revenue and income

The table reports heterogeneity in the intention-to-treat effects of eligibility for the maternity cash benefit on business revenue and income across business subsamples. Panel A follows the sample and methods of Table 2. Panel B implements a static version of Table 3, collapsing the relative-year indicators into a single post-birth indicator that covers the birth year and the subsequent two years. Panel B includes only unincorporated businesses. Subsamples split along two dimensions: (1) business owners (incorporated, employing others, and/or holding tangible capital) vs. solo self-employed, and (2) firms with ≥2 entrepreneurs (owners) vs. single-owner firms. "Mean for ineligible" reports the mean for ineligible births (February–May 2008), as in Tables 2 and 3. Standard errors clustered at the level of the individual are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Panel A: Business revenue				
	Business owners		2+ entrepreneurs	
	Yes	No	Yes	No
Eligible × Post	-1,407**	-531	-2,163*	-536
	(592)	(479)	(1,148)	(384)
Mean for ineligible	14,202	7,859	18,934	9,039
Observations	603,536	444,355	303,531	744,380

Panel B: Business income				
	Business owners		2+ entrepreneurs	
	Yes	No	Yes	No
Eligible × 2008 birth × Post	-1,177	-533	-1,299	-402
	(1,401)	(1,409)	(2,601)	(1,038)
Mean for ineligible	20,116	15,889	25,646	15,407
Observations	12,564	12,744	6,200	19,108

Table 5: Effects of maternity cash benefits on the use of subsidized daycare

The table reports intention-to-treat effects of eligibility for the maternity cash benefit on children's subsidized (formal) daycare use in the calendar year after birth. The sample covers newly born children of female entrepreneurs and non-entrepreneurs whose mothers gave birth in February–September 2008 or 2009; the analysis period is the first calendar year after birth. Coefficients from Model 4 are shown, interacting indicators for birth in 2008, birth in June–September (eligibility), and being an entrepreneur. The reported triple interactions identify the effects of eligibility. Outcomes cover total subsidized daycare and its subcomponents (daycare centers, childminders), measured in hours, as a 0/1 indicator (> 0), or in logs. The row "Mean for ineligible" reports the mean outcome for ineligible births (February–May 2008) among female entrepreneurs. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	Total daycare		Daycare center		Childminder	
	(1)	(2)	(3)	(4)	(5)	(6)
	(hours)	(0/1)	(hours)	(0/1)	(hours)	(0/1)
Eligible	-59*	-.06**	-74**	-.079***	14	.013
× 2008 birth × Entrepreneur	(34)	(.025)	(32)	(.025)	(19)	(.018)
Mean for ineligible	637	.58	524	.49	113	.13
Observations	228,382	228,382	228,382	228,382	228,382	228,382

Table 6: Effects of maternity cash benefits on children's health in the calendar year after birth

The table reports intention-to-treat effects of eligibility for the maternity cash benefit on children's health in the calendar year after birth. The sample covers newly born children of female entrepreneurs and non-entrepreneurs whose mothers gave birth in February–September 2008 or 2009; the analysis period is the first calendar year after birth. Children in the top 1% of the total health costs distribution are excluded from all analyses. Coefficients from Model 4 are shown, interacting indicators for birth in 2008, birth in June–September (eligibility), and being an entrepreneur. The reported triple interactions identify the effects of eligibility. In Panel A, the outcome variables are total healthcare costs and specific categories of costs covered by mandatory Dutch health insurance. In Panel B, the outcome variables include (i) the number of distinct prescribed medications (two-digit ATC codes) in column 1, and (ii) binary indicators for the use of the eight most frequently prescribed medications (two-digit ATC codes) among children during the first calendar year after birth in the remaining columns. The row "Mean for ineligible" reports the mean outcome for ineligible births (February–May 2008) among female entrepreneurs. Robust standard errors are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Panel A: Healthcare costs

	Total health costs		GP consultations		Medicine costs		Specialist care costs		
	(1) (EUR)	(2) (logs)	(3) (EUR)	(4) (logs)	(5) (EUR)	(6) (logs)	(7) (EUR)	(8) (logs)	(9) (0/1)
Eligible × 2008 birth × Entrepreneur	-127.41*	-0.17**	-2.14	-0.12**	-28.27	-0.14*	-101.57*	-0.08	-0.06**
	(69.82)	(0.07)	(1.96)	(0.05)	(26.91)	(0.08)	(52.63)	(0.12)	(0.03)
Mean for ineligible	704.25	5.67	37.67	3.43	86.64	3.80	410.47	6.26	0.37
Observations	220,444	221,601	221,601	199,087	221,601	157,891	221,601	86,908	221,601

Panel B: Medicine use

	# of medicines used	A07/D01	D02	D06	D07	J01	R03	S01	S02
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Eligible × 2008 birth × Entrepreneur	-0.18**	-0.04***	-0.02	-0.03**	-0.04**	-0.05*	0.00	0.00	-0.01
	(0.08)	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.01)
Mean for ineligible	1.44	0.03	0.13	0.10	0.19	0.43	0.17	0.14	0.05
Observations	221,601	221,601	221,601	221,601	221,601	221,601	221,601	221,601	221,601

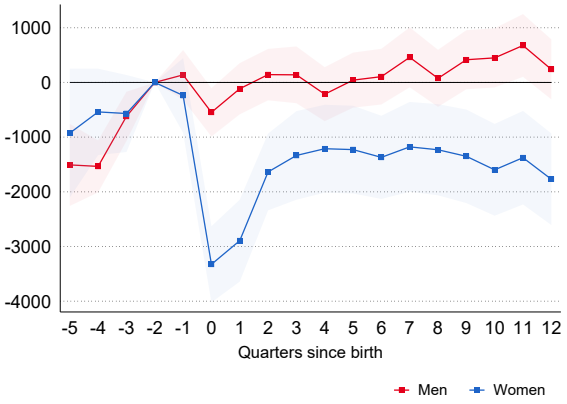
Table 7: Effects of maternity cash benefits on children's long-term health

The table reports intention-to-treat effects of eligibility for the maternity cash benefit on children's health for each of the first seven calendar years after birth. As in Table 6, the sample includes newborns of female entrepreneurs and non-entrepreneurs whose mothers gave birth in February–September 2008 or 2009. Coefficients from Model 4 are shown, interacting indicators for birth in 2008, birth in June–September (eligibility), and being an entrepreneur. The reported triple-interaction terms identify the effects of eligibility. Each row (and column) presents the coefficient on the interaction term from a separate regression, where the sample period corresponds to the given calendar year after birth. Year 0 estimates are unavailable for health costs, as the data begin in 2009. The bottom row reports the effect of benefit eligibility on the total number of medicines used (counting the same medicine in different years multiple times) and on the natural logarithm of total health costs over the first seven (calendar) years. Robust standard errors are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

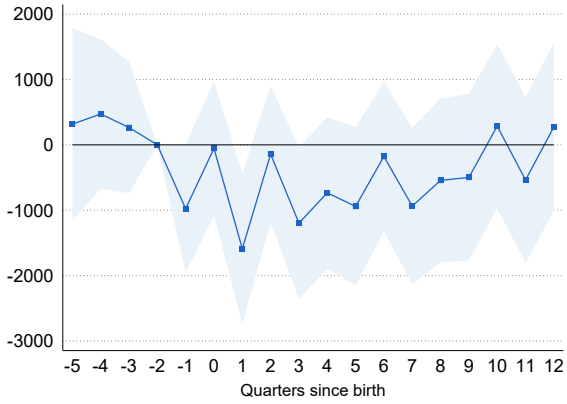
	# of medicines used	Log total health costs
Year 0	-0.04	
	(0.06)	
Year 1	-0.18**	-0.17**
	(0.08)	(0.07)
Year 2	0.05	-0.06
	(0.07)	(0.06)
Year 3	0.01	0.06
	(0.07)	(0.06)
Year 4	-0.16**	0.02
	(0.07)	(0.06)
Year 5	-0.04	0.06
	(0.07)	(0.06)
Year 6	-0.01	0.01
	(0.06)	(0.06)
All years	-0.35	-0.03
	(0.30)	(0.05)

Figure 1: Effects of child birth and maternity cash benefits on the quarterly business revenue of entrepreneurs

The figure shows the effects of childbirth (Panel A) and the intention-to-treat effects of eligibility for the maternity cash benefit (Panel B) on the quarterly business revenue of female entrepreneurs. Panel A is based on Model 1, using a sample of women who gave birth between January–May 2008 and those with no births during 2008–2011. These estimates capture the baseline "child penalty" for a cohort ineligible for the maternity cash benefit. As a comparison, Panel A also presents the effects of childbirth for male entrepreneurs. Panel B is based on Model 2, using female entrepreneurs who gave birth between February–September 2008 and those without births in 2008–2011. These estimates reflect the additional effect of benefit eligibility relative to the baseline child penalty in Panel A. Shaded areas indicate 95% confidence intervals based on standard errors clustered at the individual level.



A: Effects of birth on business revenue (EUR)



B: Effects of maternity cash benefit eligibility on business revenue (EUR)

Internet Appendix for

Maternity Benefits for Female Entrepreneurs: Effects on Business Outcomes and Family Health

– For Online Publication Only –

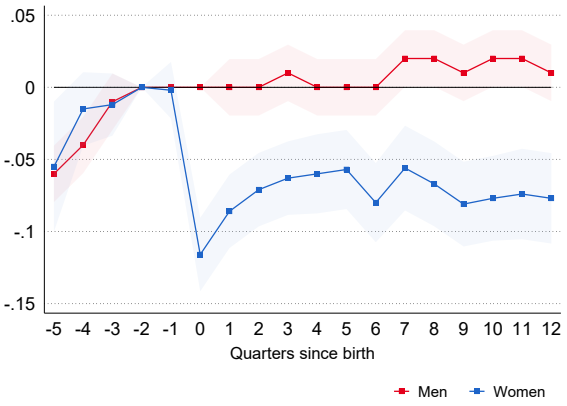
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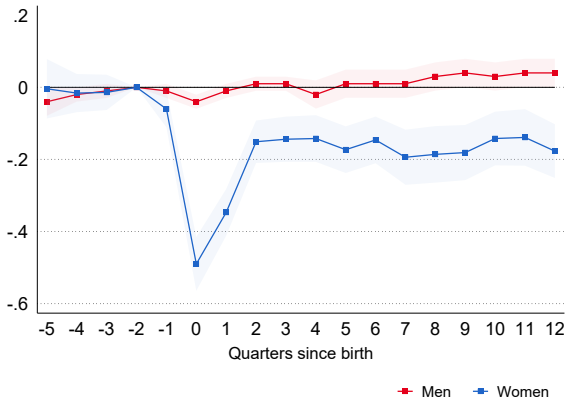
IA.1 Additional Figures and Tables

Figure IA.1: Effects of childbirth on the quarterly business revenue of entrepreneurs

The figure shows the effects of childbirth on the quarterly business revenue of female and male entrepreneurs. Estimates are based on Model 1, using samples of women (men) who gave birth (had children) between January–May 2008 and those with no births during 2008–2011. These estimates capture the baseline "child penalty" for cohorts ineligible for the maternity cash benefit. In Panel A, the outcome is a binary indicator for having any quarterly business revenue; in Panel B, it is the natural logarithm of business revenue. Shaded areas indicate 95% confidence intervals based on standard errors clustered at the individual level.



A: Having non-zero business revenue (binary)



B: Business revenue (logs)

Table IA.1: Distribution of 2-digit industry codes in the sample

The table reports the distribution of 2-digit industry codes in the baseline sample: women who were entrepreneurs/self-employed (linked to a business) on 1 January 2008, gave birth in February–September 2008, had 2007 revenues ≤EUR 150,000 (excl. VAT), and were either incorporated or had positive 2007 business profits. The sample totals 2,750 female entrepreneurs. Columns 1–3 ("Business owners") cover women who had an incorporated business, employed others, or held tangible capital (property, plant, or equipment) on the balance sheet. Columns 4–6 ("Solo self-employed") cover other self-employed women whose primary business asset was their own human capital.

Business owners		**Solo self-employed**	
Total	**1,571**	**Total**	**1,179**
93 (Other services)	421	74 (Other business services)	517
85 (Healthcare and well-being)	266	92 (Recreation and culture)	194
74 (Other business services)	209	93 (Other services)	162
52 (Retail, including reparation)	128	85 (Healthcare and well-being)	102
65 (Financial holdings)	102	80 (Education)	55
1 (Agriculture)	91	72 (Computer and related activities)	27
92 (Recreation and culture)	78	52 (Retail, including reparation)	23
Other	276	Other	99

Table IA.2: Effects of maternity cash benefits on health and demographic outcomes of female entrepreneurs

The table presents the effects of being eligible for the maternity cash benefit (intention-to-treat) on health and demographic outcomes of self-employed women. The sample includes female entrepreneurs who gave birth between February and September in 2008 or 2009. The outcome variables are a binary indicator for the use of antidepressant medication, (log) total health costs, the number of children, and a binary indicator of having a partner, respectively. Columns 1 and 4 show coefficient estimates from Model 3, where we interact indicators of giving birth in 2008 (vs. 2009) and indicators of giving birth in the June-September period (vs. February-May), in the three years before and after birth (joint sample). Effects in the year before birth are normalized to zero. Standard errors clustered at the level of the individual are reported in parentheses. Columns 2 and 3 show coefficient estimates from Model 4, where we also interact indicators of giving birth in 2008 and indicators of giving birth between June and September; however, we do this separately in each relative year after birth (cross-sectional estimation). This is because no data on pre-birth health costs are available (column 2), or because the model already controls for the number of children before birth (column 3). Unlike the baseline Model 4, these regressions do not include non-entrepreneurial women as a control group (although results are almost identical when including them). For these columns, robust standard errors are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1)	(2)	(3)	(4)
	Antidepressant use	Health costs	Number of children	Has partner
Eligible × 2008 birth ×	(0/1)	(log)	(#)	(0/1)
BY - 2	0.00	.	.	-0.01
	(0.01)	.	.	(0.01)
Birth year	0.00	.	.	0.01
	(0.01)	.	.	(0.01)
BY + 1	-0.01	32.86	0.03	0.00
	(0.01)	(77.98)	(0.02)	(0.01)
BY + 2	-0.01	-27.99	0.03	0.01
	(0.01)	(91.66)	(0.03)	(0.02)
Mean for ineligible	0.03	904.60	1.99	0.95
N	28,740	11,269	11,496	28,740

Table IA.3: ATC2 medicine groups studied in the paper

The table presents the two-digit ATC (Anatomical Therapeutic Chemical) medicine classification codes studied in the paper.

ATC2	Description	Used against
A07/D01	Intestinal antiinfectives. This group contains nystatin and miconazole, which are most often used topically (cream) against fungal skin infections but because they can also be used (oral tablets) against fungal infections within the intestines (e.g., candida), they are recorded in the A07 group instead of the D01 code.	Skin infections, e.g., diaper rash, thrush, as well as ringworm
D02	Emollients and protectives, products designed to protect the skin and keep it moisturized, such as silicone products, zinc products, soft paraffin	E.g., diaper rash, eczema and dermatitis, dry skin
D06	Antibiotics and chemotherapeutics for topical use (e.g., fusidic acid and mupirocin)	Skin infections, e.g., impetigo (bacterial skin infection), infections near eczema rashes
D07	Corticosteroid preparations (e.g., hydrocortisone) that reduce inflammation and suppress the immune response	Skin conditions (e.g., diaper rash)
J01	Antibacterials for systemic use., including penicillin antibiotics (e.g. amoxicillin)	Bacterial infections, e.g., ear infection, respiratory infections, skin infections
R03	Drugs for obstructive airway diseases, including adrenergic agents administered via inhalation (e.g., salmeterol) and inhalants (e.g., fluticasone)	Asthma
S01	Antiinfectives for use in ophthalmology (e.g. tobramycin)	Infections of the eyes
S02	Corticosteroids and anti-infectives in combination for otological use (ear) (e.g., hydrocortisone with antimicrobials)	Ear infections and inflammation

Table IA.4: Most frequent medical diagnoses in children in the year following birth

The table presents the most frequent medical diagnoses (based on the Dutch Diagnosis-treatment combination classification) in the year following birth. Incidence rate refers to the probability of receiving the diagnosis. Average cost is the average cost charged by medical specialists related to the diagnosis. Hospitalization rate is the probability that the diagnosis leads to at least one night hospital stay (or only requires outpatient care).

Diagnosis	Incidence rate	Average cost 2013 (in 2008 EURs)	Hospitalization rate
Upper respiratory tract infection	3.5%	584	41%
Foreign body in ear, nose, or airway	2.9%	586	46%
Gastro-enteritis	2.4%	987	0%
RSV - Bronchiolitis	2.2%	2,208	21%
GERD	1.9%	575	36%
Asthma	1.7%	993	70%
Eczema	1.7%	184	50%
Feeding problems	1.4%	1,077	9%
Diseases of adenoid and tonsil	1.3%	560	7%
Food allergies	1.2%	671	20%

Table IA.5: Effects of maternity cash benefits on the quarterly business revenue at different revenue cut-offs

The table presents intention-to-treat effects of eligibility for the maternity cash benefit on quarterly business revenue of female entrepreneurs, for samples based on different maximum 2007 annual business revenue cut-offs. The sample includes women who gave birth between February–September 2008 and, as a baseline group, women with no births during 2008–2011. The sample period includes from five quarters before until eight quarters after birth. Coefficients from a static version of Model 2 are shown, interacting a post-period indicator (including the quarter before birth) and an indicator for giving birth in June–September 2008 (eligibility). The outcome is business revenue (excl. VAT), measured in euros (including zeros), as a binary indicator of positive revenue, or in logs. Revenue in euros is trimmed at the 1st and 99th percentiles. Column 2 presents our baseline estimate from Table 2. Standard errors clustered at the level of the individual are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

2007 revenue (EUR thousands)	<100	<150 (baseline)	<200	<250	<300	<350	<400
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Revenue (EUR)							
Eligible × Post	-1,050***	-970**	-685*	-533	-422	-273	-24
	(331)	(384)	(411)	(453)	(484)	(524)	(543)
Panel A: Revenue (logs)							
Eligible × Post	-0.06*	-0.05*	-0.04	-0.04	-0.03	-0.03	-0.03
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Panel A: Revenue (0/1)							
Eligible × Post	-0.02	-0.02	-0.02	-0.01	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
#2008 Feb-Sep births	1,509	1,793	2,021	2,160	2,274	2,381	2,459
Observations	843,040	1,047,911	1,198,925	1,309,281	1,395,845	1,465,671	1,523,038

Table IA.6: Effects of maternity cash benefits on the quarterly business revenue of female entrepreneurs - robustness

The table reports robustness checks for Table 2 in the main text. Columns 1–4 show intention-to-treat effects of eligibility for the maternity cash benefit on quarterly business revenue of female entrepreneurs, using alternative windows of birth months around the June 2008 policy introduction. Each sample includes women who gave birth within the specified 2008 birth-month window and, as a baseline group, women with no births during 2008–2011. Columns 5–6 present placebo tests replicating the baseline specification but assuming hypothetical introductions of the benefit in 2009 and 2010, respectively. In all models, the sample period spans five quarters before to eight quarters after birth. Coefficients from a static version of Model 2 are shown, interacting a post-period indicator (including the quarter before birth) with an indicator for giving birth in and after June 2008 (eligibility). The outcome is business revenue (excl. VAT), measured in euros (including zeros), as a binary indicator of positive revenue, or in logs. Revenue in euros is trimmed at the 1st and 99th percentiles. Standard errors clustered at the level of the individual are reported in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Jan-Oct births	Mar-Aug births	Apr-July births	2009 placebo	2010 placebo
	(EUR)	(EUR)	(EUR)	(EUR)	(EUR)	(EUR)
Eligible × Post	-970**	-788**	-1122***	-1368***	-7	269
	(384)	(343)	(425)	(509)	(350)	(274)
N	1,047,911	1,053,130	1,040,954	1,034,791	1,211,880	1,386,990

Table IA.7: Effects of maternity cash benefits on the income of female entrepreneurs - robustness

The table reports robustness checks for the outcomes of business income, personal income, and business ownership from Table 3 in the main text, using alternative windows of birth months around the June 2008 policy introduction. The sample includes women who gave birth in the indicated months in 2008 or 2009. Coefficients from Model 3 are shown, interacting indicators for giving birth in 2008 and for giving birth in/after June (eligibility) with indicators for years relative to birth. The interaction coefficients (reported) identify eligibility effects in the years before and after birth; the year before birth is normalized to zero. Columns 1, 5, and 9 present the baseline estimates, based on a 4-month window around benefit introduction. The other columns extend or narrow this window. Standard errors clustered at the individual level are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

	Business income				Personal income				Business owner (0/1)			
	Baseline	Jan-Oct births	Mar-Aug births	Apr-Jul births	Baseline	Jan-Oct births	Mar-Aug births	Apr-Jul births	Baseline	Jan-Oct births	Mar-Aug births	Apr-Jul births
Sample window	4 mos.	5 mos.	3 mos.	2 mos.	4 mos.	5 mos.	3 mos.	2 mos.	4 mos.	5 mos.	3 mos.	2 mos.
BY-2	-189.83	-308.04	-205.56	-615.60	-347.58	-650.20	-595.86	-1023.27	.	.	.	.
	(1036.82)	(924.66)	(1212.39)	(1527.69)	(978.21)	(858.70)	(1144.37)	(1453.18)	.	.	.	.
Birth year	-2057.01**	-1228.03	-1797.91	-2438.58*	1721.02*	2272.88***	1976.82*	1119.45	0.02	0.01	0.01	0.02
	(1028.88)	(906.55)	(1175.00)	(1478.07)	(990.97)	(870.69)	(1129.49)	(1418.56)	(0.02)	(0.02)	(0.02)	(0.02)
BY + 1	-1270.09	36.74	-810.25	-3208.09**	-1379.80	-236.04	-505.37	-2987.27*	0.04*	0.02	0.04	0.05*
	(1230.72)	(1128.02)	(1422.57)	(1626.74)	(1187.75)	(1090.35)	(1393.14)	(1567.36)	(0.02)	(0.02)	(0.02)	(0.03)
BY + 2	1051.84	1464.24	647.94	-122.07	246.11	207.76	211.34	-589.25	0.04*	0.03*	0.04*	0.06*
	(1240.54)	(1102.07)	(1444.79)	(1840.66)	(1191.82)	(1051.77)	(1391.63)	(1769.44)	(0.02)	(0.02)	(0.03)	(0.03)
Observations	25,948	32,176	19,766	13,155	25,948	32,176	19,766	13,155	25,864	32,201	19,691	13,072

Table IA.8: Effects of maternity cash benefits on the use of subsidized daycare - robustness

The table presents robustness tests on Table 5 in the main text, using alternative windows of birth months around the June 2008 policy introduction. The table reports intention-to-treat effects of eligibility for the maternity cash benefit on children's subsidized (formal) daycare use in the first calendar year after birth. The sample covers newly born children of female entrepreneurs and non-entrepreneurs whose mothers gave birth in the indicated months in 2008 or 2009; the analysis period is the first calendar year after birth. Coefficients from Model 4 are shown, interacting indicators for birth in 2008, birth in/after June (eligibility), and being an entrepreneur. The reported triple interactions identify the effects of eligibility. Outcomes cover total subsidized daycare and its subcomponents (daycare centers, childminders), measured in hours, as a 0/1 indicator (> 0), or in logs. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	Total daycare		Daycare center		Childminder	
	(1)	(2)	(3)	(4)	(5)	(6)
Sample window	(hours)	(0/1)	(hours)	(0/1)	(hours)	(0/1)
February-September births	-59*	-.06**	-74**	-.08***	14	.01
(baseline)	(34)	(.025)	(32)	(.025)	(19)	(.018)
January-October births	-65**	-.06***	-72**	-.07***	7	.00
	(30)	(.02)	(28)	(.02)	(17)	(.02)
March-August births	-47	-.05*	-62*	-.07**	15	.01
	(39)	(.03)	(36)	(.03)	(22)	(.02)
April-July births	-87*	-.09**	-106**	-.12***	20	.02
	(48)	(.04)	(45)	(.04)	(27)	(.03)

Table IA.9: Effects of maternity cash benefits on children's annual healthcare costs in the year after birth - robustness

The table presents robustness tests on Table 6 in the main text, using alternative windows of birth months around the June 2008 policy introduction. The table reports intention-to-treat effects of eligibility for the maternity cash benefit on children's health in the calendar year after birth. The sample covers newly born children of female entrepreneurs and non-entrepreneurs whose mothers gave birth in the indicated months in 2008 or 2009; the analysis period is the first calendar year after birth. Children in the top 1% of the total health costs distribution are excluded from all analyses. Coefficients from Model 4 are shown, interacting indicators for birth in 2008, birth in/after June (eligibility), and being an entrepreneur. The reported triple interactions identify the effects of eligibility. In Panel A, the outcome variables are total healthcare costs and specific categories of costs covered by mandatory Dutch health insurance. In Panel B, the outcome variables include (i) the number of distinct prescribed medications (two-digit ATC codes) in column 1, and (ii) binary indicators for the use of the four frequently prescribed medications (two-digit ATC codes) among children during the first calendar year after birth in the remaining columns. Robust standard errors are in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Panel A: Healthcare costs	Total health costs (logs)	GP consultations (logs)	Specialist care (0/1)		
February-September births	-0.17**	-0.12**	-0.06**		
(baseline)	(0.07)	(0.05)	(0.03)		
January-October births	-0.13**	-0.05	-0.05**		
	(0.06)	(0.04)	(0.02)		
March-August births	-0.18**	-0.13**	-0.05		
	(0.08)	(0.06)	(0.03)		
April-July births	-0.09	-0.15**	-0.03		
	(0.10)	(0.07)	(0.04)		
Panel B: Medicine use	Medicines used (#)	A07/D01 (0/1)	D06 (0/1)	D07 (0/1)	J01 (0/1)
February-September births	-0.18**	-0.04***	-0.03**	-0.04**	-0.05*
(baseline)	(0.08)	(0.01)	(0.02)	(0.02)	(0.03)
January-October births	-0.15**	-0.02**	-0.02	-0.04**	-0.03
	(0.07)	(0.01)	(0.01)	(0.02)	(0.02)
March-August births	-0.21**	-0.04***	-0.03*	-0.04	-0.06*
	(0.09)	(0.01)	(0.02)	(0.02)	(0.03)
April-July births	-0.28***	-0.04***	-0.04*	-0.07**	-0.07*
	(0.11)	(0.02)	(0.02)	(0.03)	(0.04)