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Mathilde Almlund

Mette Ejrnæs

Thomas H. Jørgensen

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CEBI
Department of Economics
University of Copenhagen
www.cebi.ku.dk

Financial Incentives, Contraceptive Use and Abortion Behavior*

Mathilde Almlund† Mette Ejrnæs‡ Thomas H. Jørgensen§

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Abstract

We examine whether financial incentives affect fertility and family planning. We use a reform reducing child benefits paid to larger families together with Danish longitudinal register data on the universe of legal abortions and birth control pill purchases to address this question. We find that partnered women in low-income households reduced their fertility in response to the reform, partly by increasing the use of abortions. Younger women also increased the use of oral contraceptives. Responses are largest for younger and cohabiting women compared to their married counterparts. Our results show that family policies can affect family planning through financial incentives.

Keywords: Childbirth, Abortion, Birth control, The Pill, Child Benefits.
JEL codes: J13, I38, J16.

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†VIVE - The Danish Center for Social Science Research. E-mail: maal@vive.dk.

‡Center for Economic Behavior and Inequality (CEBI), Department of Economics, University of Copenhagen. E-mail: mette.ejrnes@econ.ku.dk.

§Center for Economic Behavior and Inequality (CEBI), Department of Economics, University of Copenhagen. E-mail: tjo@econ.ku.dk, web: tjeconomics.com.

1 Introduction

Fertility and family planning are major political concerns globally. Fertility rates are plummeting in many countries and, at the same time, reproductive rights through legal access to abortion has recently been challenged, with the overturning of Roe v. Wade by the US Supreme Court in 2022 as a prominent example. Abortion bans and restrictions have, however, been shown to have adverse consequences for the affected women (Miller, Wherry and Foster, 2023). A pressing question for policy makers, which we investigate, is thus whether financial incentives affect fertility and family planning.

We combine high quality Danish administrative data on the universe of births, legal abortions and contraceptive pill purchases with a sudden and unexpected child benefit reform in 2010. The reform reduced child benefits for larger families by up to approximately USD 1,500 while leaving benefits for families with two or fewer children unchanged. We use this exogenous variation in a Differences-in–Differences (DiD) setup to estimate the effect of unanticipated (perceived) permanent income shocks on contraceptive use, abortions and child births of low income partnered mothers.

We find meaningful responses on all margins. We find that the reform-induced income shock leads to a significant reduction in child births through an increase in abortions. In our main sample, we estimate a fertility elasticity of 0.94 and find that a $1,000 reduction in annual child benefits would lead to a 6.4 percentage points immediate increase in abortions. For younger mothers, we also see a significant increase in contraceptive use. The effects are generally stronger for younger mothers as well as for cohabiting relative to married mothers.

We provide several robustness and placebo checks. Importantly, as economic theory would suggest, we find that income effects are larger for low income households. Further, placebo reform results also suggest that the income effects we estimate are likely driven by the reform-induced income shock. The results are robust to changing key elements of our identification strategy.

Our results contribute to several growing strands of literature documenting how financial incentives affect fertility behavior. Fertility has been shown to respond to wealth increases (Lovenheim and Mumford, 2013; Dettling and Kearney, 2014; Atalay, Li and Whelan, 2017; Daysal, Lovenheim, Siersbæk and Wasser, 2021), child subsidies and tax reliefs (see e.g. Milligan, 2005 and Cohen, Dehejia and Romanov, 2013), and child care costs (Blau and Robins, 1989; Del Boca, 2002; Mörk, Sjögren and Svaleryd, 2013).

We also contribute to a much more sparse literature on the effect of income shocks on abortions and contraceptive use. González (2013) and González and Trommlerová

(2024) leverage a reform in Spain that temporarily increased universal child benefits (baby bonuses) to estimate the effect of unconditional cash transfers to parents on abortion behavior and fertility. Using province- and time variation they found that this reform led to a decline in the number of abortions. To our knowledge, Abiona (2017) and Alam and Pörtner (2018) represent the only existing research studying the effect of (agricultural) income shocks on contraceptive use. While both studies are based on self-reported measures in developing countries, we estimate contraceptive use responses that are in line with these studies.

We contribute to the existing literature in several important ways.[1] We use rich longitudinal administrative data on the universe of women in a developed country. This enables us to uncover interesting individual-level heterogeneity and show that age and marital status matter for the sensitivity of family planning to financial incentives. The data also enable us to study abortion behavior and contraceptive use within the same population and identification framework. Finally, we study contraceptive use, abortion behavior and fertility of a particularly relevant group: Working-age partnered women who already have children. As we document, this group accounts for a significant share of abortions, and for women with two or more children, the probability of terminating a pregnancy is above 30%. It is also a group of particular policy interest, as paternalistic policies aimed at increasing fertility would typically also target this demographic group.

The remainder of the paper proceeds as follows. In the next section, we describe the Danish data and child benefit reform that we leverage to identify the effect of income shocks on family planning. In Section 3, we discuss the identification strategy and report empirical results. In Section 4, we investigate the sensitivity and robustness of our results before concluding in Section 5.

2 Data and Child Benefits Reform

We use high quality longitudinal register data on the universe of Danish women, their contraceptive pill prescriptions and purchases, legal abortions, and births. We link women to childbirths through the medical birth register (MFR), contraceptive pill prescriptions and purchases through the Danish drug database (LMDB), and legal abortions through the abortion register (ABR). We also include information on household income, partner status and educational attainment.

[1] Our work builds on and subsumes an earlier pre-print (Almlund, 2018), using the reform to study fertility and abortion effects. Jensen and Blundell (2024) utilize the same reform as us to investigate the labor market effects of the income effect generated from the reform.

Since 1973, abortions have been legal and free in Denmark until (and including) 12 weeks of gestation. After 12 weeks of gestation, women are required to obtain permission for an abortion based on medical or social grounds. The cost of abortions are covered by the public health care system, and the abortions are carried out at hospitals or clinics. At approximately 12 weeks of gestation, most Danish pregnant women undergo their first ultrasound scan, which screens for potential medical issues or abnormalities. We focus on abortions that are not performed due to medical issues or abnormalities. Hence, we define an abortion as a legal abortion registered at the latest in week 12 of gestation. Generally, the abortion prevalence in Denmark is quite similar to e.g. the US, since both countries have an abortion rate (percent of women having an abortion a given year) of around 2% (See Figure A.1 in the Supplemental Material and Finer and Henshaw, 2006).

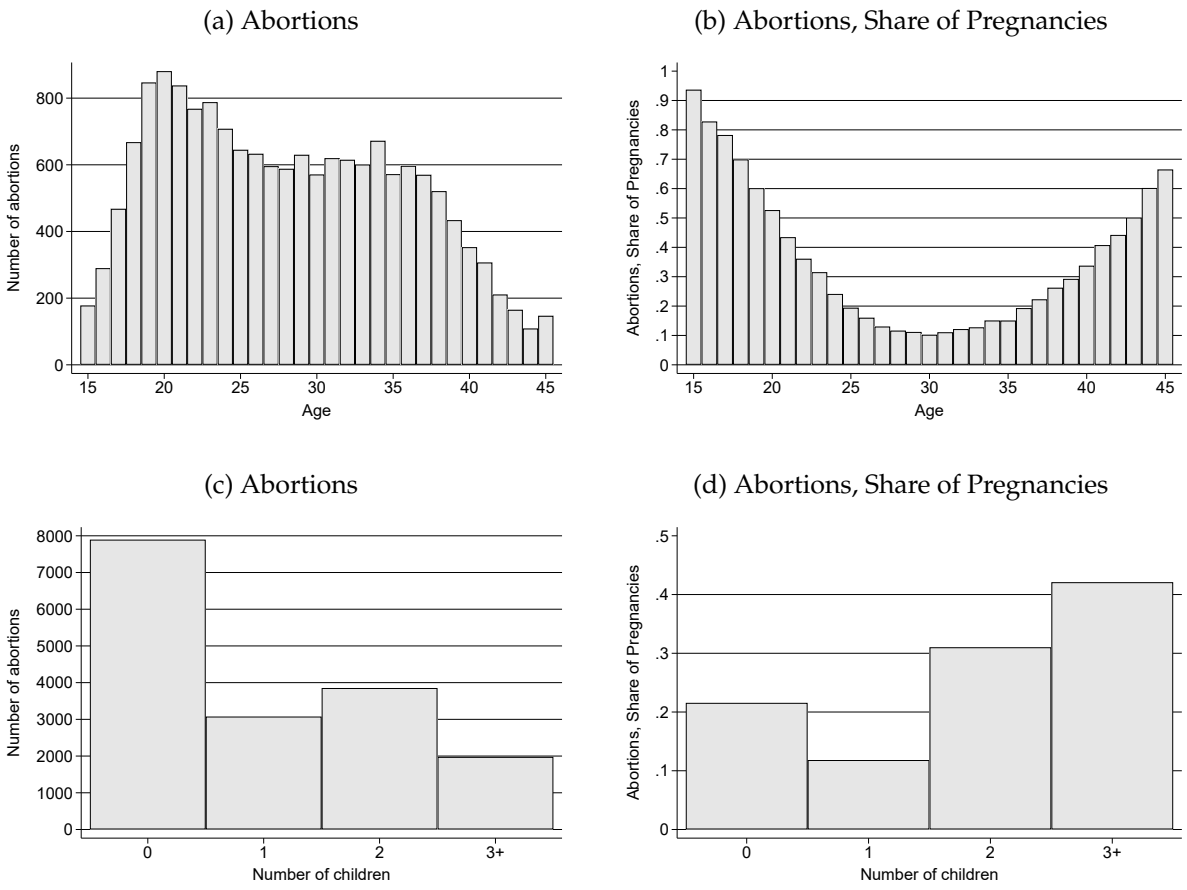
Figure 1 shows the population distribution of abortions in 2009 split by age and by how many children the woman has already. While the young account for the largest proportion of total abortions, the number of abortions are still high among the 25-37-year-olds and then taper off after age 37. When looking at the abortion share, defined as the share of pregnancies that are terminated with an abortion, there is a very clear u-shaped pattern in age, with most teenage pregnancies being terminated with an abortion, decreasing to 10% of pregnancies among 30-year-olds, and then increasing again to more than 60% of pregnancies among women in the mid-forties.[2] When considering the distribution of abortions according to how many children the woman has already, women without children clearly account for the largest proportion. However, women who already had at least one child account for more than half of the abortions. When considering the share of abortions among the women with children, the share increases dramatically with the number of children. While 12% of pregnancies among women with one child are terminated, 31% of women with two children, and 42% of women with three or more children who become pregnant decide to terminate the pregnancy. This is consistent with the high prevalence of two-children-families in Denmark. These numbers demonstrate that while the public debate about abortions is often focused on teenage pregnancies, abortion prevalence is also high among women over 30 and among those who already have children, both in absolute terms and as a share of pregnancies.

In our empirical analysis, we use data for the years 2007–2011 and focus on women who are aged 20–39 within that period. In all of our analyses, we focus on women with a partner (cohabiting or married) and with an annual household income which is below DKK 200,000.[3] The exchange rate was around 5.2DKK/USD beginning of 2010. We also

[2]We identify pregnancies based on the gestational age at time of birth or abortion.

[3]The income threshold is around the 5 percentile and is based on the 2024 income threshold for being

Figure 1: Abortion Patterns by Age and Parity.



Notes: This figure shows abortion patterns in 2009 in the Danish data, consisting of the universe of all live births and legal abortions. Each birth cohort comprises of around 30,000 women. The top two panels show abortion behavior across the age distribution and the bottom two panels show abortion behavior across parity i.e. the number of children a woman is already a mother to. The left panels shows the raw number of abortions for all women aged 15-49 in 2009. Due to a small number of conceptions among women aged 45-49, the number and share of abortions are calculated for the age group 45-49. The right panels show the share of registered pregnancies terminated by an abortion. Registered pregnancies are identified based on either a life birth or an abortion, where gestational age is recorded.

restrict the sample to women who have at least one child. We use monthly observations.

Our outcome variable for oral contraception (the pill) measures the monthly number of oral contraception purchases, which we can link to individuals because they can only be purchased with a prescription.[4] When analyzing the use of contraceptives, we condition on the women not being pregnant. The abortion variable is a dummy variable taking the value one if the woman has an abortion in the given month. We only classify a termination of pregnancy as an abortion if it is induced, and miscarriages are thus not included in our abortion measure. Analyses of abortions are only carried out using women who are pregnant and have a gestational age between 0 and 12 weeks. The gestational age is measured for (almost) all births and abortions and is used for calculating the date of conception. Our final outcome is fertility, which we construct as an indicator variable which takes the value one if a child is born nine months ahead.

Table 1 shows summary statistics at the monthly level for the estimation sample, as well as split by whether they were affected by the reform (untreated and treated) as described in section 2.1. The treated women tend to be older, less skilled, more often married rather than cohabiting, have more and younger children, and have lower fertility and higher abortion rates.[5]

2.1 Child Benefit Reform

Before 2011 (and today), every family with children under 18 in Denmark was entitled to universal child benefits. The child benefit consisted of a payment per child in the household every year until the child were 18. The payment varied with the age of the child, starting at DKK 16,988 (2010) for a newborn and decreasing to DKK 13,448 at 3 years of age and DKK 10,580 at 7 years of age. The Danish government announced on May 25, 2010 that a parliamentary majority was in favor of introducing a ceiling on the total amount of child benefits a household could receive per year.[6] The first mention in the media of the ceiling was also on May 25, with the clear expectation that such a law would be passed, although with some room for the negotiation of details. The law was passed on June 26, 2010, taking effect from January 1, 2011. The reform was repealed in the end of 2011 with effect from 2012 and thus only affected child benefit payments in 2011.[7]

granted free child care. We check that our results are robust to the income threshold and in the Supplemental Material we also present results for a sample of women with household income above DKK 200,000.

[4]Oral contraception is defined by the ACT codes: G03AA, G03AB and G03AC.

[5]The abortion incidence during the first 12 weeks (three months) is $1-(1-0.038)^3 = 0.11$ for untreated and $1-(1-0.071)^3 = 0.20$ for treated.

[6]The government coalition consisted of Venstre and Konservative, politically both right-of-centre parties in a Danish context.

[7]The reform was repealed after an election and a change of government.

Table 1: Summary Statistics.

	All		Untreated		Treated	
	mean	std	mean	std	mean	std
Pill prescriptions	0.060	0.24	0.060	0.24	0.057	0.23
Abortion cond. on pregnancy	0.043	0.20	0.038	0.19	0.071	0.26
Births	0.010	0.10	0.011	0.11	0.0061	0.078
Age	33.0	4.35	32.5	4.50	34.5	3.39
High skilled	0.40	0.49	0.41	0.49	0.36	0.48
Married	0.82	0.39	0.79	0.41	0.91	0.28
Number of children	2.21	1.03	1.81	0.68	3.60	0.81
Age of youngest child	47.6	40.5	50.1	43.7	39.0	25.5
Observations	495,376		384,978		110,398	

Notes: This table displays summary statistics at the monthly level for the estimation sample as well as divided into untreated and treated groups. Pill prescriptions, abortion shares, and births are reported per month. Household income is annual.

†: Abortion is the share of pregnancies ending in abortion.

‡: Age of youngest child is in months.

Child benefits differ in several dimensions in 2011. A major part of the reform was to introduce an annual cap of DKK 35,000 on the total amount of child benefits a household could receive. Since the cap was independent of household size, it would affect larger families (families with two or fewer children would be unaffected), and more so the families with younger children. To reduce the severity of the income effect for heavily affected families, a gradual phase-in was implemented. This included a maximum reduction in child benefits of around DKK 12,000 in 2011 through 2013, after which the maximum deduction was intended to gradually increase and be phased out by 2020.

We calculate pre- and post-reform benefits for every woman in the sample based on her number of children and their ages. We define the income shock from the child benefit reform as

$$IS_i = \mathcal{B}_{2010}(z_{i,2010m1}) - \mathcal{B}_{2011}(z_{i,2010m1}) \tag{1}$$

where $\mathcal{B}_j(z_{i,k})$ denotes the child benefits of woman i with family composition $z_{i,k}$ in year-month k when applying the child benefit rules of year j. $\mathcal{B}_{2011}(z_{i,2010m1})$ thus denotes the mechanical benefit level using 2011 reform rules with 2010 information. Figure A.3 in the Supplemental Material shows the distribution of mechanical income shocks, IS_i, for treated women with a reform-induced income reduction, $IS_i < 0.0$.

3 Empirical Strategy and Results

Letting $y_{i,t}$ denote our outcomes of interest, we estimate Differences-in-Differences (DiD) specifications of the form

$$y_{i,t} = \theta T_i \times Post_t + \gamma T_i + \alpha_t + \beta \mathbf{x}_{i,t} + \varepsilon_{i,t} \tag{2}$$

where $T_i = \mathbf{1}(IS_i < 0)$ is a treatment indicator, equal to one if woman i would experience a reduction in her child benefits if the 2011 rules applied to her 2010 family composition and $Post_t = \mathbf{1}(t \geq 2010m5)$ indicates the period after the announcement of the child benefit reform. We include year-month effects through α_t, and $\mathbf{x}_{i,t}$ includes age-dummies, number of children dummies, dummy variables for the age of the youngest child, ethnicity, and marital status.

In Table 2, we report estimated income effects from the child benefit reform for low income women on the number of birth control pill purchases for non-pregnant women in column (1), the likelihood of having an abortion for women who were pregnant and of at most 12 weeks of gestation in column (2), and the likelihood of a birth within the next nine months for all low income women in our sample in column (3).[8]

We estimate an insignificant effect on birth control pill purchases (p-value of 0.728), a significant increase in the likelihood of having an abortion (p-value of 0.013) and a decrease in the likelihood of giving birth in nine months (p-value of 0.099). The estimates can be converted into elasticities with respect to the child benefit by $\hat{\theta}/\overline{IS} \cdot (\overline{\mathcal{B}}/\overline{y})$ where $\overline{IS}$ is the average income change from the reform (for those with an income effect), $\overline{\mathcal{B}}$ is the average child benefit level, and $\overline{y}$ is the average outcome. We estimate sizable elasticities of around -4.04 for abortions and 0.94 for fertility.

Our results are in line with existing literature. The fertility effect in column (3) confirms findings in a large literature showing that increased wages of women decrease fertility (see e.g. Haan and Wrohlich, 2011 and Jakobsen, Jørgensen and Low, 2024), child benefits and tax reliefs (see e.g. Rosenzweig, 1999; Milligan, 2005; Brewer, Ratcliffe and Smith, 2012; Cohen, Dehejia and Romanov, 2013; Laroque and Salanié, 2014), and reduced child care costs (Blau and Robins, 1989; Del Boca, 2002; Mörk, Sjögren and Svaleryd, 2013; Wang, 2022) and wealth increases (Lovenheim and Mumford, 2013; Dettling and Kearney, 2014; Atalay, Li and Whelan, 2017; Daysal, Lovenheim, Siersbæk and Wasser, 2021). To put the magnitude of our estimates into perspective, Daysal, Lovenheim, Siersbæk and

[8]The number of observations is lower in column (3) than (1) although we do not condition on not being pregnant at year-month t in the last column. The reason is that we require information about realized childbirths nine months in the future in column (3).

Table 2: Income Effects on Family Planning.

	Contraception (pill purchases) (1)	Abortion (indicator) (2)	Birth (indicator) (3)
Treatment effect	-0.0006	0.0340	-0.0010
	(0.0019)	(0.0136)	(0.0006)
	[0.728]	[0.013]	[0.099]
No. of children dummies	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes
Mean dep. var.	.066	.056	.009
Mean benefits	29,080	25,743	29,005
Mean benefit change	-3,442	-3,873	-3,463
Elasticity	0.083	-4.039	0.942
Obs.	442,305	16,372	456,183
Women	24,615	5,327	24,622

Notes: This table reports income effects for partnered women in the age range of 20 to 39 with a household income of less than DKK200,000. Column (1) shows the income effect on the monthly number of contraceptive pill purchases for non-pregnant women. Column (2) shows the income effect on the monthly likelihood of having an abortion for pregnant women. Column (3) shows the income effect on the likelihood of giving birth 9 months ahead for all women in the sample. "Add. controls" include a dummies for marital status, married, education, ethnicity. Robust standard errors are reported in brackets and *p*-values in square brackets.

Wasser (2021) estimate, also using Danish data, that a DKK100,000 increase in home prices increases fertility by 2.35%. In comparison, we find that a DKK100,000 increase in child benefits would lead to around a 3.2% ($0.001/0.009/3,463 \cdot 100,000$) increase in fertility.

Our results also align with the much smaller, yet growing, literature investigating family planning. Abiona (2017) estimates an agricultural income elasticity for contraceptive use in Uganda of approximately 0.2, using rainfall as an instrument.[9] Alam and Pörtner (2018) find that crop loss in Tanzania tends to lead to increased use of contraceptive methods, primarily through "traditional" methods. They find no significant effect on modern approaches, such as the birth control pill, similarly to our results in Table 2. As we will show below, however, younger women in our sample do seem to increase the use of birth control pills.

Using aggregate data for Spain, González (2013) estimates around a 6-7% reduction in abortions from the introduction of a one-time child subsidy of €2,500. Using an ex-

[9]Contraceptive use includes both "traditional" and "modern" approaches.

change rate of 7.45DKK/EUR, we can relate this to our estimated abortion effect of 2.9% ($0.0340/0.056/3,873 \cdot 2,500 \cdot 7.45$).[10] Broadly similar results as in González (2013) are found in González and Trommlerová (2024), using also the cancellation of the subsidy.

3.1 Heterogeneity Analysis

To test for heterogeneous effects, we split the sample according to age and marital status and estimate separate equations for each sample. When focusing on young women aged 20–29 in the left panel of Table 3, we find a positive income effect on contraceptive pill purchases, and the effect is significant (p-value of 0.012). The estimated elasticity is large, around 1.47, compared to the elasticity of 0.2 in Alam and Pörtner (2018). It is worth noting, however, that there might be different preferences and norms in developed versus developing countries in relation to modern contraceptive use. Further, the sample in Alam and Pörtner (2018) consists of women up to the age of 50, where the left panel of Table 3 includes only much younger women, who are found to respond much more than older women in our sample (see the right panel of Table 3). Also, the effect of abortion and births are stronger for the young women, although none of the effects are significant at the five percent level. A possible explanation for why young women respond more strongly to income shocks, both in terms of their abortion and contraception behavior, is that young women to a larger extent can postpone childbearing, whereas for older women, this might not be a possibility due to declining fecundity (see Ejrnæs and Jørgensen, 2020).

In Table 4, we estimate separate effects for cohabiting and married women, since marriage may signify a more stable and committed relationship (Manning, Smock and Majumdar, 2004). The estimation results indicate that the effects on abortions and births are driven by cohabiting women. For cohabiting women, the effect on abortions is positive (with a p-value of 0.004) and the effect on births is negative (with a p-value of 0.001), suggesting that the income effects on abortions and births are stronger for women in less stable relationships.

[10] Our estimates likely include anticipated future child benefits, which should be kept in mind when interpreting and comparing the results.

Table 3: Heterogeneous Income Effects on Family Planning: Age

	20–29			30–39		
	Contraception (pill purchases) (1)	Abortion (indicator) (2)	Birth (indicator) (3)	Contraception (pill purchases) (4)	Abortion (indicator) (5)	Birth (indicator) (6)
Treatment effect	0.0151	0.0566	-0.0029	-0.0024	0.0271	-0.0009
	(0.0060)	(0.0308)	(0.0022)	(0.0020)	(0.0155)	(0.0006)
	[0.012]	[0.066]	[0.196]	[0.231]	[0.080]	[0.144]
No. of children dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	0.078	0.051	0.015	0.063	0.059	0.007
Mean benefits	25,412	22,6458	25,260	30,051	27,630	30,045
Mean benefit change	-3,331	-3,439	-3,332	-3,456	-3,982	-3,480
Elasticity	-1.474	-7.383	1.441	0.326	-3.178	1.116
Obs.	92,577	6,198	99,196	349,728	10,174	356,987
Women	6,784	2,050	6,802	19,049	3,398	19,050

Notes: This table reports results split by the age of the woman. See notes to Table 2.

Table 4: Heterogeneous Income Effects on Family Planning: Marital Status.

	Cohabiting			Married		
	Contraception (pill purchases) (1)	Abortion (indicator) (2)	Birth (indicator) (3)	Contraception (pill purchases) (4)	Abortion (indicator) (5)	Birth (indicator) (6)
Treatment effect	-0.0003	0.1383	-0.0057	-0.0008	0.0168	-0.0002
	(0.0059)	(0.0485)	(0.0017)	(0.0020)	(0.0139)	(0.0006)
	[0.963]	[0.004]	[0.001]	[0.676]	[0.226]	[0.715]
No. of children dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	0.076	0.07	0.011	0.064	0.052	0.008
Mean benefits	24,719	22,376	24,619	30,033	26,770	29,978
Mean benefit change	-3,361	-4,121	-3,410	-3,450	-3,840	-3,468
Elasticity	0.026	-10.768	3.883	0.112	-2.272	0.243
Obs.	79,278	3,829	82,882	363,027	12,543	373,301
Women	5,581	1,298	5,580	19,347	4,053	19,360

Notes: This table reports results split by whether the woman is cohabiting with or married to her partner. See notes to Table 2.

4 Sensitivity and Robustness

To investigate the plausibility of the identifying assumption that the change in family planning post reform is due to the reform, we report placebo results in Figure A.2 in the Supplemental Material. Specifically, we calculate hypothetical income shocks in years *prior* to the reform as

$$IS_{i,t} = \mathcal{B}_t(z_{i,tm1}) - \mathcal{B}_{2011}(z_{i,tm1})$$

for years $t \in \{2007, 2008, 2009, 2010, 2011\}$. We then construct four dummies $D^1_{i,t} = \mathbf{1}(IS_{i,t} < 0.0)\mathbf{1}(2007m1 \leq t \leq 2008m4)$, $D^2_{i,t} = \mathbf{1}(IS_{i,t} < 0.0)\mathbf{1}(2008m5 \leq t \leq 2009m4)$, $D^3_{i,t} = \mathbf{1}(IS_{i,t} < 0.0)\mathbf{1}(2009m5 \leq t \leq 20010m4)$, and $D^4_{i,t} = \mathbf{1}(IS_{i,t} < 0.0)\mathbf{1}(2010m5 \leq t \leq 2011m12)$. We then estimate the equation

$$y_{i,t} = D^1_{i,t} + D^2_{i,t} + D^4_{i,t} + \gamma T_i + \alpha_t + \beta \mathbf{x}_{i,t} + \varepsilon_{i,t} \tag{3}$$

where the first two dummies are placebo periods, $D^3_{i,t} = 0$ is a normalization, and the last dummy, $D^4_{i,t}$, is the post reform period (actual treatment). All placebo effects are close to zero and insignificant, in line with our interpretation of our main results.[11]

We have focused on low income households throughout, as these households are expected to be the ones most affected by income effects. Table A.1 in the Supplemental Material shows similar estimation results for women in higher income households as another placebo test. The effects are an order of magnitude smaller for this group, with the exception of birth control pill usage.[12]

In Table A.2 in the Supplemental Material, we investigate the sensitivity of the results to the chosen income cut-off in our main analysis. While the results are robust to moving the cut-off down/up by DKK25,000, there is a clear pattern: The point estimates and elasticities are largest (in absolute values) for lower income households. Unfortunately, our data do not allow a more full-fledged analysis of the effects across the income distribution, since we quickly run into power issues.

In Table A.3 in the Supplemental Material, we show results under the assumption that the income effect enters linearly (in DKK1,000). So far, we have included a treatment dummy $\mathbf{1}(IS_i < 0)$, not using the continuous nature of the size of the income effect. We find similar results when using the continuous treatment dosage, and the elasticities are also quite similar to the ones reported in Table 2.

[11] The post reform effects are insignificant at the 5% significance level here because we do not restrict the pre-period effects to zero, as in our main analysis.

[12] Cohen, Dehejia and Romanov (2013) also find that the income effect on births is lower for households above the poverty line.

5 Conclusion

Declining fertility rates around the globe have sparked a debate about which policy interventions can affect fertility. Our analyses show that unexpected and permanent income shocks, such as changes in child benefits, can impact the use of contraception and abortion, thereby affecting fertility. Interestingly, our results show that women with a partner in low-income households are more likely to have an abortion when experiencing a negative income shock. This highlights that even mothers with a partner in a country with a high level of social security react to income shocks by reducing fertility. The effects are largest among young women and women in less stable relationships. For young women with a partner, we also find that a negative income shock increases the use of oral contraceptives. The lack of significant responses with respect to contraceptive use among older women (30–39) may be due to substitution between different types of contraception (e.g. intrauterine device (IUD)).

Our research suggests several avenues for future research. First, we are analyzing the effect of permanent income shocks on abortions, contraceptive use, and fertility in the short run. Unfortunately, our set-up does not allow to investigate the long run impact as the reduction in child benefit was repealed after a year. Second, while we have detailed data on oral contraceptive use, we do not have a complete picture of contraceptive use, since we do not know how the women in our study substitute between "the pill" and other types of contraceptives. Third, since the monthly number of abortions is small, we do run into power issues when estimating the effect of the reform. Despite these caveats, we believe our results provide valuable insights into the effect of financial incentives on family planning.

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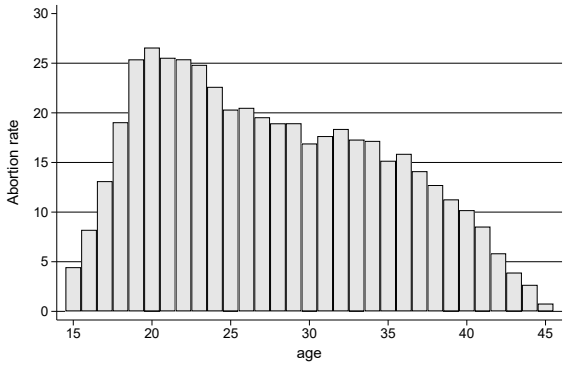
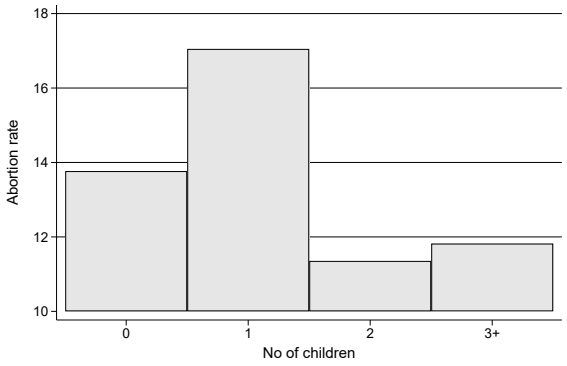
A Supplemental Material

Figure A.1: Abortion rate.

(a) By Age.



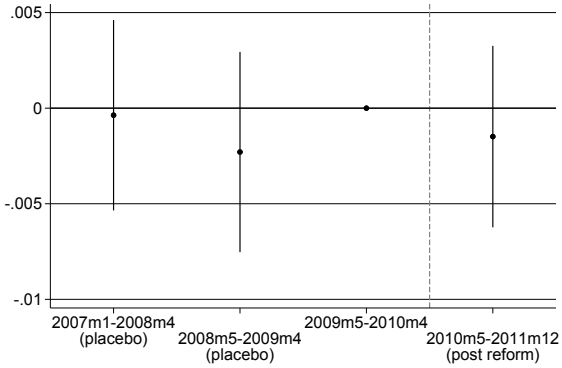
(b) By Parity.



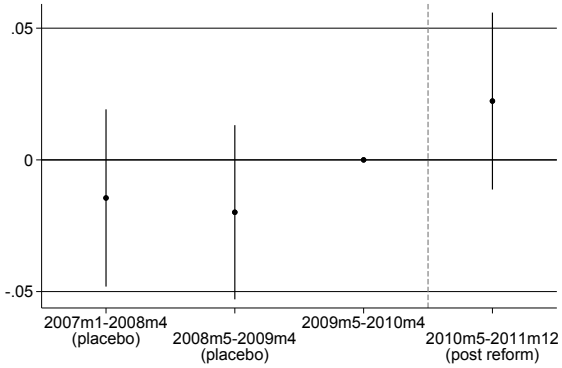
Notes: The figures shows the abortion rates (number of abortions per 1,000 women) in 2009 by age and number of children already present.

Figure A.2: Sensitivity: Placebo Effects.

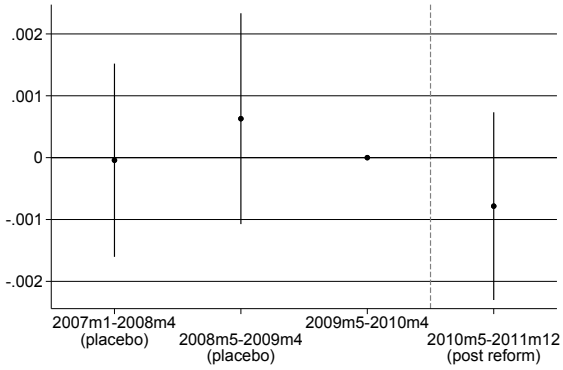
(a) The Pill



(b) Abortion

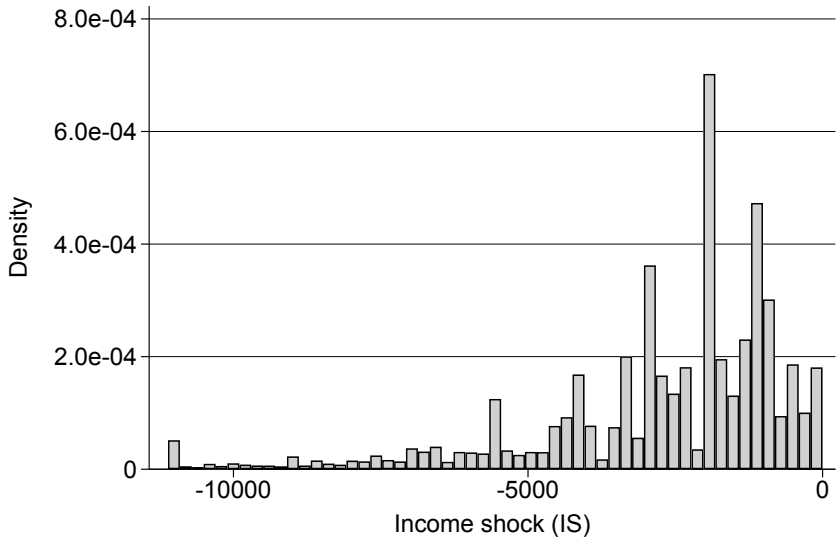


(c) Births



Notes: The figures report income effects for partnered women in the age range of 20–39 with household income less than DKK200,000. Figure (a) shows the income effect on the monthly number of contraceptive pill purchases for non-pregnant women. Figure (b) shows the income effect on the monthly likelihood of having an abortion for pregnant women. Figure (c) shows the income effect on the likelihood of giving birth 9 months ahead for all women in the sample. Robust standard errors are reported as vertical lines. All the effects are estimated in a dynamic model with the treatment dummy interacted with three dummies for the subperiods 2007m1-2008m4, 2008m5-2009m4 and 2010m5-2011m12, The period 2009m5-20019m4 is used as the baseline. The labels at the x-axis refer to the estimated coefficients of the interaction term.

Figure A.3: Income Shock Distribution (Treated).



Notes: The figure shows the distribution of simulated income shocks, IS_i, based on eq. (1) for treated women with $IS_i < 0.0$.

Table A.1: Income Effects on Family Planning. High Income.

	Contraception (pill prescriptions) (1)	Abortion (indicator) (2)	Birth (indicator) (3)
Treatment effect	0.0002	0.0004	-0.0004
	(0.0004)	(0.0043)	(0.0001)
	[0.562]	[0.917]	[0.001]
No. of children dummies	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes
Mean dep. var.	.086	.039	.008
Mean benefits	26553.192	21873.727	26346.053
Mean benefit change	-2674.643	-3175.587	-2683.842
Elasticity	-.029	-.078	.438
Obs.	12637611	420965	13265710
Women	374937	122877	375833

Notes: This table reports income effects for partnered women in the age range 20–39 with household income above DKK200,000. See table notes for Table 2.

Table A.2: Sensitivity check: income cut-off.

	Contraception (pill prescriptions)		Abortion (indicator)		Birth (indicator)	
	-25,000	+25,000	-25,000	+25,000	-25,000	+25,000
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment effect	-0.0020	-0.0010	0.0399	0.0334	-0.0011	-0.0005
	(0.0021)	(0.0017)	(0.0157)	(0.0126)	(0.0006)	(0.0005)
	[0.318]	[0.557]	[0.011]	[0.008]	[0.064]	[0.376]
No. of children dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep. var.	.066	.067	.054	.057	.008	.009
Mean benefits	29245.003	28966.586	25796.888	25582.872	29183.943	28873.924
Mean benefit change	-3427.475	-3470.047	-3890.144	-3895.578	-3449.978	-3491.107
Elasticity	.264	.125	-4.88	-3.852	1.164	.457
Obs.	365963	532240	13192	20031	376066	550885
Women	20768	29108	4332	6462	20774	29138

Notes: This table reports results for varying income cut-offs. For column (1), (3) and (5) the sample is restricted to a household income less than DKK175,000. For column (2), (4) and (6) the sample is restricted to a household income less than DKK225,000. See notes to Table 2.

Table A.3: Income Effects on Family Planning: Linear Income.

	Contraception (pill prescriptions) (1)	Abortion (indicator) (2)	Birth (indicator) (3)
Treatment effect (linear)	-0.0002	0.0088	-0.0003
	(0.0004)	(0.0030)	(0.0001)
	[0.636]	[0.004]	[0.014]
No. of children dummies	Yes	Yes	Yes
Age of youngest dummies	Yes	Yes	Yes
Year-month dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Add. controls	Yes	Yes	Yes
Mean dep. var.	0.066	0.056	0.009
Mean benefits	29,080	25,743	29,005
Mean benefit change	-3,442	-3,873	-3,463
Elasticity	-0.079	4.052	-1.077
Obs.	44,2305	16,372	456,183
Women	24,615	5,327	24,622

Notes: This table reports results when the income effect is included linearly. See notes to Table 2.

Table A.4: Summary Statistics. All Income Groups.

	All		Untreated		Treated	
	mean	std	mean	std	mean	std
Pill prescriptions	0.077	0.27	0.080	0.27	0.059	0.24
Abortion cond. on pregnancy	0.030	0.17	0.026	0.16	0.090	0.29
Births	0.0098	0.099	0.011	0.10	0.0039	0.062
Age	33.9	3.83	33.8	3.90	35.1	3.00
High skilled	0.74	0.44	0.76	0.43	0.66	0.47
Married	0.77	0.42	0.76	0.43	0.87	0.34
Number of children	1.99	0.81	1.79	0.61	3.36	0.65
Age of youngest child	50.1	41.1	51.9	43.0	38.5	22.8
Observations	14,543,169		12,644,514		1,898,655	

Notes: This table displays summary statistics at the monthly level for the full sample as well as divided into untreated and treated groups. Pill prescriptions, abortion shares, and births are reported per month. Household income is annual.

†: Abortion is the share of pregnancies ending in abortion.

‡: Age of youngest child is in months.