FINANCIAL INCENTIVES AND FERTILITY*

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This paper investigates how fertility responds to changes in the price of a marginal child. We construct a large, individual-level panel data set of over 300,000 Israeli women during the period 1999–2005 with comprehensive information about their fertility histories, education, religious affiliation, ethnicity, and income. We exploit variation in Israel's child subsidy program to identify changes in the price of a marginal child. We find a statistically significant and positive price effect on fertility: the marginal child subsidy increases the probability of pregnancy by 0.99 percentage points in our preferred specification. This positive effect is present in all religious and ethnic subgroups, including those whose social and religious norms discourage family planning. There is also a significant price effect on fertility among women who are close to the end of their lifetime fertility, suggesting that at least part of the effect that we estimate is due to a reduction in total fertility. As expected, the child subsidy effect is strongest for households in the lower range of the income distribution, and weakens with income. Finally, we investigate how changes in household income affect fertility choices. Consistent with Becker (1960) and Becker and Tomes (1976), we find that the income effect is small in magnitude and is negative at low income levels and positive at high income levels. Our results are robust to including mother fixed effects and instrumenting for household income with the lag of the husband's income.

Key words: fertility, child subsidies, child allowances.
JEL Classification: D1, H31, I38, J13, K36.
This version: April 30, 2009

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* An earlier version of this paper was circulated as "Do Financial Incentives Affect Fertility?" We thank Joshua Angrist, Lucian Bebchuk, Gary Becker, Avraham Ebenstein, Zvika Eckstein, Yona Rubenstein, Analia Schlosser, Manuel Trajtenberg, Yoram Weiss, anonymous referees, and seminar and conference participants at the Bank of Israel, Bar-Ilan, Ben-Gurion, the University of Chicago, the Chicago Fed, Columbia, Cyprus, Haifa, Maryland, Miami, St. Gallan, Sussex, Tel-Aviv, Yale SOM, IIES Stockholm, the Van Leer Institute in Jerusalem, UPF Barcelona, the annual meetings of European Association for Labor Economics, and the Israeli Economic Association for their many valuable comments and suggestions. We thank Michal Goltzman for excellent research assistance, Yuri Homenko of the Central Bureau of Statistics for assistance in preparing the data, and Anat Katz and David Gordon of the Central Bureau of Statistics for facilitating our work on the project at the Central Bureau of Statistics. Alma Cohen gratefully acknowledges the financial support of the Foerder Institute for Economic Research and the Pinhas Sapir Center for Development at Tel Aviv University.

1. Introduction

This paper investigates empirically the effect of financial incentives on individuals' fertility decisions. We construct a large, individual-level panel data set using non-public data from Israel's Central Bureau of Statistics (ICBS) that matches fertility histories to detailed controls including education, income, and religious affiliation for the seven-year period 1999 to 2005. We exploit the substantial changes in child subsidies that occurred during this period to study how financial incentives affect fertility both in the population as a whole and within demographic subgroups.

The literature on fertility goes back at least to Thomas Malthus and the nineteenth century debate on the Poor Law (see Boyer 1989). Malthus argued that the Poor Law subsidized marriage and fertility by removing natural checks on population growth, namely delayed marriage and abstention from sexual activity. The key modern reference on fertility as an economic decision is Becker (1960), who argues that children should be analyzed as durable consumption and production goods.[1] Within the Becker framework, demand for children responds to changes in the price of a marginal child. We test this key hypothesis, as well as Becker's conjecture about the limited effect of income changes on fertility.

Whether and to what extent fertility responds to financial incentives is not only of theoretical interest but also has significant policy implications. According to the United Nations' latest population estimates, fertility is now below replacement level in 76 countries, accounting for nearly half the world's population.[2] Facing sharp declines in birthrates in recent decades, many developed economies have adopted either explicitly pro-natalist policies (France, Germany, Sweden, and the Canadian province of Quebec) or implicit subsidies to children through childcare (most Western European countries, the United States, and Canada). At the same time, some developing countries (most notably China) have used financial incentives to discourage fertility.[3]

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[1] This canonical model has been extended in various directions by, for example, introducing family transfers (Cigno 1986) and social dynamics (see Manski and Mayshar 2003, who discuss how fertility rates in Israel could decline in the overall population while at the same time increase in the Ultra-Orthodox Jewish population).

[2] See United Nation Press Release (March 2009) "World Population to Exceed 9 Billion by 2050".

[3] Recent studies of China's policy to discourage fertility include Oster (2005), Ebenstein (2008), and Qian (2008).

By merging several non-public data sets maintained by the ICBS, we create an individual-level panel data set with 1.2 million person-year observations on fertility for married women. Our data set contains comprehensive information on fertility histories, education, religion, immigrant status, and income for the woman and her husband. During the period we study, there were a number of significant and unanticipated changes in the level of the child subsidy, both increases and decreases, but no changes in eligibility.

We estimate the effect of the child subsidy a mother would receive for her next child ("the marginal child subsidy") on the probability of becoming pregnant. Our identification strategy is based on the fact that the generosity of the marginal child subsidy varies differentially over time based on the previous number of children and that these changes were unanticipated (we discuss the policy in greater detail in Section 2). This implies that, controlling for fertility histories, we can identify the effect of the marginal child subsidy just off unanticipated changes in the program. We control for a woman's fertility history using a fully interacted set of dummies for the number and age structure of existing children. We use two approaches to deal with time effects: age-ethnic-group-and-education-specific reference fertility and year fixed effects.

We find that a 150 NIS (about US$34)[4] reduction in the monthly subsidy for a marginal child – which was roughly equal to 2 percent of average income and 3.3 percent of median income during the period we study – reduces the probability of an incremental child in a given year by 0.99 percentage points in our preferred specification. Our results are robust to controlling for mother fixed effects or instrumenting for household income. We estimate a price elasticity of 0.496 and a benefit elasticity of 0.176 for the population as a whole, and provide estimates for these elasticities for different income and religious subgroups.

The effect of the marginal child subsidy on fertility is weakest among households at the upper end of the income distribution. The effect is present across all religious groups, and is strongest among Arab Muslims. We also find an effect among women who are nearing the end of their lifetime fertility and are unlikely to postpone fertility (those in the 35-to-40 and 40-to-45 age cohorts), suggesting that the effect we identify is not only from changes in the timing of births but at least partly from changes in total fertility. Consistent

[4] During the period of our study, the average exchange rate was 4.4 NIS to US dollars.

with the conjecture in Becker (1960) and the prediction in Becker and Tomes (1976), we find that the effect of income on fertility is small and that this effect is negative at low levels of income and positive at higher income levels; we continue to find a similar pattern when we control for a mother fixed effect or when we instrument for household income.

While cross-country studies have found mixed, weak, or insignificant effects of child subsidies on fertility,[5] two recent studies using individual data have also identified positive and significant effects. Milligan (2005), using Canadian data, finds that the introduction of a child tax subsidy in the 1990s had a significant and positive effect on fertility. Laroque and Salanié (2008), using French data and variation in the French tax code, conclude that tax incentives affect fertility decisions in France.[6] There is also a literature that examines the effect on fertility of U.S. tax provisions and social policies benefiting families with children (Blau and Robbins 1989, Whittington 1992, Acs 1996, Fairlee and London 1997, Moffitt 1998, Moffitt 2000, Groger, Karoly, and Klerman 2002, Dyer and Fairlee 2003, Rosenzweig 1999, Joyce, Kaestner, and Korenman 2003, and Kearny 2004). Overall, this literature finds no effects or modest effects.[7]

Our study differs from previous work, and contributes to the empirical literature on financial incentives and fertility, in three ways. First, we have access both to a rich micro-level panel data set on fertility histories and to significant variation in the financial incentives for fertility. In particular, our data enables us to back-time births to their date of conception, and thus to use controls timed to when fertility decisions are made rather than the date of birth. In addition, as discussed in Section 2.2, we use detailed information on the ages of a woman's existing children to calculate the effect of policy changes on the present value of the stream of subsidy payments that she can expect for a marginal child. In addition to detailed controls for education, income, and ethnicity, we can also allow for a mother fixed effect since our data set is longitudinal.

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[5] See, e.g., Demeny (1986), who reviews the mixed evidence on pro-fertility policies in France, Romania, Germany, and Hungary; Gauthier and Hatzius (1997), who provide cross-country evidence from 22 OECD countries; and Dunn (2003).

[6] In addition, Schellekens (2006) examines data from the period 1983-1995 in Israel and seeks to estimate the effect of the child subsidy on the hazard rate of childbirth. The length of the period examined makes it difficult for this study to disentangle the effect of child subsidies from that of long-run fertility trends.

[7] More recently Lalive and Zweimuller (2008) find significant effects of parental leave policies in Austria.

Second, we are able to investigate how the effect of incentives on fertility varies across ethnic, religious, and income subgroups. It has been suggested that the effect of financial incentives on fertility is likely to vary both with economic development (see Schultz 1973 and Jones and Tertilt 2008 for useful surveys) and with cultural norms (Fernandez 2009). Israel provides a good setting for studying such variation, as it has population groups that vary considerably in income, level of religiosity, religion, and social and cultural norms.

Third, although the primary focus of this paper is the price effect of the child subsidy on fertility, we also identify the effect of changes in household income on fertility.[8] Although the negative association between income and fertility has been widely documented (see Becker 1960, Borg 1989, Docquier 2004, and Jones, Schoonbroodt, and Tertilt 2008), it has been recognized (since Becker 1960) that these results are plagued by omitted variable bias. One approach adopted in the literature is to use the husband's income (e.g., Hotz and Miller 1988, Milligan 2005, and Jones and Tertilt 2008), but this could also be jointly determined with a woman's fertility. Black, Kolesnikova, Sanders, and Taylor (2008) use shocks to coal prices to instrument for county-level income in coal-producing regions, but do not identify the price effect. In a well-known early paper, Schultz (1985) uses agricultural commodity prices to instrument both for women's and men's wages. Our approach is to control for a mother fixed effect (hence identify the effect of transitory income shocks controlling for time-invariant permanent income) or to instrument for net household income using the husband's income two years before the incremental childbirth.

The paper is organized as follows. Section 2 describes our data set and the child subsidy program in Israel. Section 3 discusses our identification strategy and specifications. Section 4 presents our results. Section 5 discusses the magnitude of the effect, and Section 6 concludes.

[8] An extensive literature examines the causal relationship in the other direction, i.e. from fertility to mother's labor supply; see, for example, Angrist and Evans (1998).

2. The Data and Institutional Background

2.1 The Israeli Setting

Total fertility in Israel, which averages 2.9 births per woman, is substantially higher than the average for OECD countries, which is 1.6. Among married women between age 45 and 50 (the youngest group for whom total fertility rates can be approximated), more than 87 percent have two or more children, with more than 60 percent having three or more children. Because in Israel the majority of women have at least two children, the choice that households commonly make is whether to have more than two children and, if so, how many more. For this reason, the Israeli government's system of child subsidies, which will be discussed in detail in Section 2.3, has focused on providing substantial benefits for children who are third or higher parity, and it is these subsidies, rather than the smaller subsidies given for the first two children, that have fluctuated substantially over time, usually due to exogenous political shocks. Another feature of Israeli society is that births are largely concentrated among married women.[9] Among 45 to 50 year old women in Israel, only 10 percent were never married, and among these unmarried women more than four fifths have no children.

Because (i) children are largely born to married women, (ii) most married women have at least two children, and (iii) only child subsidies for third and higher parity births are significant and have varied over time, we focus on the fertility decision among married women with at least two children. This is the group whose fertility decisions shape total fertility figures in Israel and whose decisions could be influenced by the government's program of child subsidies. This raises the question: do our results generalize to countries with lower fertility? We would argue that the ability of financial incentives to induce Israeli women to move beyond the minimum typical family size of two children can be informative about a woman's decision in a lower-fertility country to move beyond the norm she faces, which, for example, is one child in many European countries.

An advantage of using Israeli data is that social norms regarding fertility vary greatly by religious group. About 80 percent of the population is Jewish and 20 percent is Arab Muslim. The Jewish population can be divided into the secular, Orthodox, and Ultra-

[9] For example, in 2005 only 2.3 percent of all births were to unmarried mothers (3,349 births out of a total of 145,207).

Orthodox populations. The secular Jewish population, which has high education levels and high female labor force participation, is similar in many respects to much of the population in OECD countries. The Orthodox Jewish population also has high education levels and high female labor force participation, but it differs from the secular Jewish population in its social norms with respect to total fertility: in our sample, total fertility averages 2.9 in the secular Jewish population and 4.1 in the Orthodox Jewish population. In contrast, the Ultra-Orthodox population is characterized by a low level of education, low male labor force participation, and social norms that strongly encourage fertility (with total fertility averaging 6.4 in our sample). The Arab Muslims population has low education, female labor force participation which is lower than any of the other sub-groups we study, and a total fertility level (5.34 in our sample) which falls between that of the Orthodox and Ultra-Orthodox Jewish populations. As we explain below, our data enable us to identify the effect by religious subgroup.

2.2 The Data

We use non-public individual-level panel data sets maintained by Israel's Central Bureau of Statistics (ICBS), to which the ICBS allows restricted access. For the reasons outlined in the preceding section, we focus on married women with at least two children. Our data contain information on a 40 percent random sample of all women in Israel who were married, under 45, and had at least 2 children during the period 1999-2005. (Since women enter the sample when they have two or more children and exit when they turn 45, it is not a balanced panel).[10] Altogether, we have data on about 1.2 million woman-year observations that account for about 300,000 women.

We merge several data sets, each separately maintained by the ICBS, to create a comprehensive data set that includes fertility histories, education, religious affiliation, ethnicity, and income. Below we describe briefly the process we follow and the information available for individuals in our data set. A detailed list of variables appears in Appendix A.

[10] The sample excludes Arab Christians and others small minorities which account for less than five percent of the sample.

Fertility history and basic demographic characteristics: From the Population Register's data set maintained by the ICBS, we obtain information on the following: the woman's date of birth, country of origin and year of immigration for individuals not born in Israel, the country of origin and year of immigration for parents of Israeli-born women, the number of children and their dates of birth, and information about the husband – date of birth, country of origin and year of immigration for men not born in Israel, and the country of origin and year of immigration for parents of Israeli-born men. We back-time from the date of birth to estimate the date of conception, which we use as the relevant date in our data set.[11]

Education: We compile data on education of mothers and their husbands from various data sets maintained by the ICBS. The administrative records of Israel's higher-education institutions provide information on the mother's and husband's most recent academic degrees. For individuals who do not appear in the higher education records, we obtain information on education from the school registry (created when parents register their children in public schools and public kindergartens).[12] For immigrants who do not appear in one of the aforementioned sources, we obtain data on years of schooling from the immigration registry (data that they are required to provide when they immigrate to Israel).

In order to render the data on higher education degrees and years of schooling comparable across different countries and databases, we code the mother's and husband's education as a categorical variable on a 1 to 4 scale (for primary school, high school graduate, college, and post-graduate education). Because education data are missing for some women but available for their husbands and vice versa, we code education as the maximum of a woman's and her husband's education. For observations where the data on education are available for both the mother and the husband, about 85 percent of the sample, the correlation is above 0.86. By using the maximum level of education we reduce the number of missing observations considerably. Our results are similar when we use the

[11] An issue with using live births to determine the date of conception is that we miss aborted or miscarried births. Abortions, although legal, are less important in Israel than, for example, the United States with one abortion to every 7 live births in Israel compared to a 1:4 ratio in the United States.

[12] In Israel, virtually all primary schools and pre-school kindergartens are supported with public funds. Information on parents' school years was obtained for parents who had children already enrolled in primary school or public kindergartens and recorded information regarding their own years of schooling when registering their children.

mother's and husband's level of education separately and control for missing observations.[13]

Religion: Identifying the degree of religiosity for the Jewish population is challenging, but essential for understanding their fertility decisions. In Israel, there are three main degrees of religiosity for the Jewish population: secular, Orthodox and Ultra-Orthodox. The boundaries among these three groups are somewhat porous. We infer the degree of religiosity for Jewish women by using information on the kind of kindergarten and school that their children attend. Portnoi (2007) has shown that this method is more reliable than alternatives.[14]

Income: Finally, income data are obtained from a matched employer-employee database of income tax files. We have the following information for both mothers and their husbands: employment status (self-employed or wage earner), the number of jobs held, the number of months worked, gross income, industry of employment, income tax, mandatory health insurance contributions, and social security contributions. We use these data to create net household income, which is equal to the sum of mother's and husband's after-tax income, health insurance and social security contributions, and the subsidy that the mother is paid for her existing children.[15]

2.3 Institutional Background: Child Subsidies in Israel

The child subsidy is a non-taxable payment to all mothers of children under the age of 18, with the amount of the payment a function of the number of children (see Tables 1a and 1b and Figure 1). The child subsidy is one of Israel's most important welfare expenditures. In 2004, 947,000 mothers received child subsidies, paid to support approximately 2.2 million

[13] Ultra-Orthodox Jewish men missing administrative records on education and reporting more than 12 years of education in the school or immigration registry are coded as having only 12 years of schooling; since most Ultra-Orthodox men spend many years engaged in religious study, any additional years of schooling that are not recorded are unlikely to reflect in their earnings potential.

[14] For example, Dahan (1998) suggests using husbands attending *yeshiva* as their last school to identify the Ultra-Orthodox. But this method of identifying religiosity has been criticized for its inability to distinguish between the secular and the Orthodox, and has been shown to bias downward estimates of the Ultra-Orthodox population.

[15] It is widely believed that income is systematically underreported for Ultra-Orthodox men and Arab Muslims, since they are less likely to participate in the formal labor market. This implies that for these populations we are more likely to mis-categorize when we split the sample by household income.

children. Child subsidy outlays in 2004 were 4.6 billion NIS. During the period we study, total child-subsidy expenditure ranged from 0.8 percent to 1.5 percent of Israel's GDP, peaking in 2000 and declining significantly after the 2003 reform that we describe below.[16]

Israel first introduced the child subsidy in 1959, and has revised its coverage (age, family size, veteran status) and generosity many times since then. The program originally covered children under age 14, which was extended to age 18 in 1965. Coverage was initially limited to families with four or more children, but was extended in 1972 to families with three or more children and in 1975 (in the so-called Ben-Shahar Reform) to all children under age 18. In the 1990s, child subsidies for the first (and eventually second) child of families with three or fewer children were revoked, but eventually reinstated. Another feature of the program that has varied is eligibility based on military veteran status, which was required until the mid-1990s but not afterwards.

The period we study (1999-2005) includes significant variation in the level of child subsidies but not in eligibility and coverage. In general, the child subsidy has tended to increase over time, although in the period we study there were a number of unanticipated policy changes – induced by shifts in Israel's complex coalition politics – that magnified or negated this trend. The Halpert Law, which was implemented from January 2001 onward, increased the benefit for fifth and higher-parity births by 33 to 47 percent. The so-called Netanyahu reform in June 2003 significantly reduced benefits so that children born after June 2003 receive a subsidy equivalent to that of the first two children in the family regardless of their birth parity. For example, in 2002 a family with six children would receive 790 NIS per month for their next child, whereas after June 2003 such a family would receive only 150 NIS per month for an extra child. Children born before 2003 continue to receive higher benefits after 2003 during a transition period. Although child subsidies were reduced across the board, given the pre-2003 non-linearity in the subsidy, the biggest reduction in benefits post-2003 was for large families.

Table 1a summarizes the child subsidy for a marginal child. Table 1b summarizes the total child subsidy for existing children, and Figure 1 plots the total child subsidy to families based on the current number of children. The schedule of subsidies has several

[16] For a review of the child subsidy system and a wealth of descriptive statistics about it, see Frish (2004).

notable features. Before 2003, the marginal benefit increased non-linearly: a third child received approximately double the subsidy of each of the first two children and a fifth or higher marginal child received between 3.75 and 5 times as much. The benefits also varied from year to year. Before 2003 changes tended to accentuate the non-linear increase in marginal child benefit with parity, whereas after 2003 the benefit schedule has become linear for the marginal child. Furthermore, comparing Tables 1a and 1b, we can see that the child subsidy has changed more dramatically for the marginal child than for infra-marginal children.

A natural concern in exploiting changes in child subsidy levels is that other government programs may have changed concurrently. However, changes in the child subsidy were unanticipated and largely driven by changes in the power that religious parties, which strongly support child subsidies, wielded in the complex coalition politics of Israel. In 2001, the aforementioned Halpert Law focused on the child subsidy, and was not accompanied by any other changes in government programs. The 2003 revision of child subsidies was accompanied by other fiscal reforms, but these reforms did not have a significant impact on married families with children.[17]

3. Theoretical and Empirical Framework

3.1 Theoretical Framework

We examine the fertility decision within the Becker (1960) framework. Children are viewed as durable consumer goods, and there is demand for children along with other commodities. We examine three types of effects. (See Hotz, Klerman, and Willis 1997 for a more detailed discussion.)

First, reductions in the child subsidy decrease the subsidy for the marginal child and, in turn, increase the net-of-subsidy price of the marginal child. We would expect the price effect to reduce the demand for children, since any income effect from the marginal child subsidy is likely to be small. To examine the price effect our key right-hand-side variable is the child subsidy that would be paid for the next (marginal) child, which is inversely related to the price of a marginal child.

[17] The Netanyahu reforms also included cuts in unemployment benefits and income-maintenance benefits, but very few families in our research sample could have been affected by these changes.

Second, reductions in the child subsidy can lead to a temporary postponement of fertility, such as an increase in the age at first birth or an increase in the time between births (see Heckman, Hotz, and Walker 1985, Heckman and Walker 1990, and Pettersson-Lidbom and Skogman Thoursie 2009). Although it is difficult to estimate these effects given our short (six-year) data window, we split the results by mother's age and in particular present results for women aged 35 and older, a group for whom it is difficult to postpone fertility and for whom any observed reduction in fertility is very likely to correspond to a reduction in completed fertility.

Third, we also examine the effect of income on fertility. In particular, we examine Becker's (1960) hypothesis that income effects on fertility are likely to be small, in part because of his conjecture that households respond to fertility along both quantity and quality dimensions. The standard presumption in the literature is that children are normal goods, although Becker (1960) notes that this is not an implication of the model and subsequent authors have conjectured that the income elasticity of fertility may vary with the income (Becker and Tomes 1976) and the level of development (e.g., Galor and Weil 1999).[18]

3.2. Empirical Strategy

Our empirical strategy is based on examining the fertility decision for a marginal child. Thus, we time births to the month of conception (estimated as nine months prior to the birth of a child) and use an indicator for having become pregnant in that year as the outcome.

Our key right-hand-side variable is the present value of the subsidy a woman would expect to receive for her next child given the number of children under age 18 that she has at that point. This varies by the number of prior children younger than age 18 and by year (as indicated in Table 1a) and by the age distribution of previous children under age 18. The age distribution of previous children under age 18 determines how long a mother will expect to receive a given level of child subsidy. For example, a fourth child preceded by three children aged one, two, and three would receive the fourth-child subsidy (e.g., 640

[18] An issue that we do not examine, as we do not have the data necessary to do so, is the tradeoff between quality and quantity of children. Work focusing on this issue includes recent papers by Angrist, Lavy, and Schlosser (2006) and Black, Devereux and Salvanes (2007).

NIS per month in 2005) for the next 15 years, but a fourth child preceded by three children aged 16, 17, and 18 would receive the fourth-child subsidy for only one year and within three years would transition to receiving the first-child subsidy (e.g., 150 NIS) for the next 15 years.

The present-value calculation is forward looking in the sense that it correctly accounts for previous children ageing out of the subsidy (i.e., turning 18) and future changes in the child-subsidy schedule that have been announced under the current rules,[19] but assumes that individuals expect the policy to remain in place indefinitely. We believe that this leads to a conservative estimate of the effect of the child subsidy. Examining the evolution of the child subsidy (Figure 2), we see that prior to 2001 the subsidy had been gradually increasing over time; in this context, the considerable increase produced by the Halpert Law was probably greater than expected, and the subsequent drastic decrease produced by the Netanyahu reform was largely unexpected. Thus, if women factored in uncertainty regarding future changes in subsidy levels, they would shade down the extent of the increase in the child subsidy in 2001 and of the decrease in subsidy in 2003. In this case, the change in expected child subsidy is smaller than the change in actual child subsidy, and we would be underestimating the effect of child subsidies on fertility.

Our identification strategy is to control for the number and age of prior children younger than 18 – which we do using a non-parametric specification fully interacting indicators for the previous number of children and indicators for the age distribution of previous children – and to identify the child subsidy effect just from unanticipated, exogenous between-year policy variation within number × age distribution of children cells.

Our identification strategy also requires us to control for potentially confounding time effects. We therefore control for education-religion-and-age-specific reference fertility (the number of children a woman in the same education-religion-and-age cell would have

[19] The child-subsidy reform in 2003 announced a benefit schedule for current and future children until 2009, which we assume remains in place thereafter. Our calculation of the present value of the marginal child subsidy uses a discount rate of 5 percent, and assumes that all live births survive to age 18. By ignoring infant mortality, we somewhat overstate the present value of the child subsidy. However, infant mortality rates in Israel, including those for the Arab Muslim population, are fairly low, even by OECD country standards.

had five years ago), and include year fixed effects (and eventually income group × religious group × year fixed effects, when we split the sample).

Another key right-hand-side variable is log net household income. By controlling for income, we ensure that we are identifying the price effect of a change in the marginal child subsidy, and of course obtain an estimate of the effect of income on fertility. Thus our specification is a linear probability model of the form:

$$Pregnant_{it} = \alpha + Child\ subsidy_{it}\delta + \log Household\ income_{it}\gamma + \\ + \sum_j \sum_k \sum_m 1(\#\ kids_{it} = j) \cdot 1(\#\ kids\ in\ age\ range_{it}\ k = m)\beta_{jkm} + X_{it}\varphi + \rho_r + \tau_t + \varepsilon_{it},$$

where $Pregnant_{it}$ is equal to 1 if mother i was pregnant in year t, $1(\cdot)$ is the indicator function, $\#kids_{it}$ is the number of existing children mother i has at the beginning of year t, *#kids in age range k* it is the number of children a woman has in age range k at the beginning of year t (where we consider 3 ranges: between 0 and 4, between 5 and 13, and between 14 and 17), X_{it} is education, ρ_r are religious group dummies, and τ_t are year dummies.[20] We cluster standard errors by year × the age distribution of children, which is the level of variation of the child subsidy.[21]

Controlling for income raises issues of simultaneity – that household income and fertility could be jointly determined. To mitigate simultaneity, we control for household income in the year prior to the birth of the marginal child. Nonetheless, it is possible that households anticipate future births by more than nine months in making work decisions, especially for the mother.[22] Thus, we will examine two robustness checks for the main specification: mother fixed effects and instrumental variables. A mother fixed effect controls for permanent household income, along with any other time-invariant sources of heterogeneity in fertility decisions. Alternatively, we instrument for household income using the husband's lagged income. Husband's lagged income is a valid instrument under the assumption that it is not simultaneously determined with fertility. We believe that this is

[20] Using a probit provides similar results.
[21] This gives 1686 clusters. Our results are similar for other plausible clustering schemes.
[22] Since our data are annualized, for children born after September our income measure includes up to three months of post-birth income. Israeli women who worked for at least twelve months before giving birth usually receive maternity-leave payments during this three-month period, which are included in our data.

a plausible assumption because by lagging we are looking at income 1.25 to 2 years prior to the birth of the marginal child and because husbands are less likely to adjust their work in response to anticipated fertility than mothers.

We present results for the full sample and splitting the sample by religious group, by income group, by religious group × income group, and by the mother's age group. When splitting the results by religious group, we include controls for immigrant status for the Jewish population.

4. Results

4.1 Summary Statistics

Table 2 presents summary statistics for our sample. The main sample consists of approximately 1.2 million person-year observations. Of these, 54 percent are secular Jewish, 14 percent are Orthodox, another 12 percent are Ultra-Orthodox, and 20 percent are Arab Muslim. Table 2 indicates that the mean number of children per woman is 3.4.[23] The mean number of children varies by income group and by religious group: fertility declines from an average of 3.93 children among below-poverty-line mothers to 2.97 in the top decile of income and ranges from 2.68 in the secular Jewish population to 4.76 and 4.23 in the Ultra-Orthodox Jewish and Arab Muslim populations.

The mother's average age in the sample is 35. Average annual household income is approximately 113,000 NIS (2007). Notably net household income is much higher for the secular Jewish and Orthodox Jewish populations and much lower for both the Ultra-Orthodox and Arab Muslims. This is partly due to low participation rates of Ultra-Orthodox men and Arab women in the labor force (55 per cent and 21 per cent respectively). The marginal child subsidy accounts for 4.13 percent of net household income.

Figures 3 and 4 provide a snapshot of the underlying time trends in fertility. In Figures 3a and 3b, there are no dramatic fluctuations in the probability of pregnancy from 1999 to 2002. There is a small but detectable downturn among the Ultra-Orthodox and Arab Muslims (see Figure 3a), and for the below-poverty-line income group from 2003

[23] This is higher than the average level of fertility among Israeli women (2.9 children) because our sample consists of women with two or more children.

onward (see Figure 3b). Figure 4, which splits the data by income groups and by parity, shows a similar pattern in the low-income group: a small decrease in the probability of pregnancy from 2003 onward. The middle-income group shows some effect for higher parity births, and the high-income group shows no discernable pattern.

4.2 Baseline Specification

Table 3 presents several versions of our baseline specification. In column (1), we control for income using indicator variables for whether the husband is working and for middle-income and rich households. This is a reasonable starting point, because these indicators are unlikely to be simultaneously determined with fertility. In contrast, in column (2), we control for log net household income. Whereas in columns (1) and (2) we control for the mother's fertility history using parametric controls in the number of previous children, age at first birth, and months since last birth, in column (3), we use a fully interacted set of dummies for the number and age distribution of children.

In columns (1) and (2) we find nearly identical and positive effects of the child subsidy on the probability of pregnancy, suggesting that the child subsidy coefficient is not sensitive to how we control for household income. In column (3), we continue to find a positive effect, statistically significant at the one percent level. The importance of flexibly controlling for the mother's fertility history is underlined by the fact that the magnitude of the coefficient is more than halved in column (3) compared to columns (1) and (2). We will, therefore, use this specification in subsequent tables.

Since the scaling of the child subsidy coefficient is not intuitive, in subsequent tables we consider the effect of a 150 NIS monthly increase in child subsidy (from Table 1 we can see that this is a typical level of variation in the subsidy), which we convert into a probability (multiplying by 100). For instance, a coefficient of 0.000066 is multiplied by 150 and by 100, yielding a 0.99 percentage point increase in the probability of pregnancy from a 150 NIS increase in child subsidy. This should be compared to the baseline probability of pregnancy of 10.3 percent.

In contrast to the uniformly positive effect of the child subsidy, we find that the sign of the coefficient of log net household income varies depending on the specification. In column (1), we find a positive effect of being in the top income decile and a negative effect

of the husband working. In columns (2) and (3), we find instead a negative effect of log net household income on fertility. In subsequent tables, when we split the results by income, we will see that both these effects are in fact present: a positive effect of income on fertility in the top income decile and a negative income effect at lower income levels. As noted in Section 3.2, controlling for income raises the issue of simultaneity bias, which we examine in Sections 4.6 and 4.7.

The signs and magnitudes of the other coefficients are in general robust and in the expected direction. Fertility is decreasing in education, and is significantly higher in the Orthodox Jewish, Ultra-Orthodox Jewish, and Arab Muslim populations compared to the secular Jewish population.

4.3 The Effect by Income Category and by Religious Group

In this section, we consider the effect of the child subsidy within subgroups defined by income and by religion. These results are of interest for several reasons. First, splitting the sample by income category provides a useful plausibility check of our results. Since the marginal child subsidy constitutes a smaller percentage of household income at the upper, compared to the lower, end of the income distribution, we would expect the child subsidy effect to decrease with income. Second, splitting the sample by religious and ethnic groups provides an interesting window on the effect within groups that have very different social norms, fertility patterns, and labor force participation rates.

We split the results by income category in Table 4, and find that the effect of the marginal child subsidy is positive, statistically significant, and large in magnitude for the below-poverty and middle income categories. A 150 NIS monthly increase in the present value of the marginal child subsidy leads to a 1.05 percentage point increase in the probability of pregnancy in the below-poverty income group compared to a baseline probability of 13.9 percent. As expected, the child subsidy effect decreases with income. The effect is 0.85 and 0.74 percentage points for the middle- and upper-income categories, but remains significant at the one percent level.

The income effect varies across income categories. It is negative, albeit small in magnitude, for below-poverty-line households: a 100 percent increase in net household income leads to a 1.04 percentage point decrease in the probability of pregnancy relative to

a baseline probability of 13.9 percent. In contrast, for middle- and high-income households, the income effect is positive, although still small in magnitude: a 100 percent increase in income leads to 0.15 and 0.55 percentage point increases in the probability of pregnancy (with the latter effect significant at the one percent level) relative to respective baseline fertilities of 8.66 percent and 6.41 percent. We discuss possible interpretations of these results in Section 5.2.

The child-subsidy effect is statistically significant within each religious and ethnic subgroup. For the secular and Orthodox Jewish populations, we find effects similar to the overall population (0.87 and 0.99, both significant at the one percent level). However, for the Ultra Orthodox we find a smaller effect (0.34, significant at the 10 percent level), and in the Arab Muslim population we find a much larger effect (1.73, significant at the one percent level). The fact that the effect is different for these two groups is not surprising, since they differ from the overall population in terms of fertility and also from each other in terms of income and labor force participation. The small effect for the Ultra Orthodox is congruent with their strong religious and cultural norms in favor of fertility.

Finally, Table 5 splits the sample by income category and religious and ethnic group. Among both the secular and Orthodox, we find a decrease in responsiveness to the child subsidy as income increases. For the Ultra Orthodox, the effect is positive, but small and not significant. For Arab Muslims, the effect is uniformly large across income levels and significant at the one percent level. We find positive and statistically significant income effects in the upper-income secular population, and significantly negative effects in the below-poverty populations for all for religious groups.

Overall, our results show a robustly positive price effect of the child subsidy on fertility. The effect is present for all religious groups, but is weaker for the Ultra-Orthodox Jewish population. The effect tends to decrease with income. We find a positive and significant income effect on fertility in the upper-income category, and a negative and significant income effect among the poor, although the magnitude is consistently small.

4.4 The Effect by Age

A qualification to the results we have presented thus far is that our results identify only the immediate impact of financial incentives on fertility, rather than their impact on total

fertility. Women could postpone pregnancies if they perceive the policy as unlikely to be maintained, or the policy could also affect age at first birth or the optimal spacing and timing of children.

Unfortunately, since the change in child subsidy that we are studying is recent and the horizon of our data is only six years, we cannot identify the impact on total fertility for the overall population. However, for women nearing the end of their lifetime fertility, a temporary reduction in fertility is likely to translate into a permanent reduction in fertility.

Table 6 breaks down our results by age. We find a significant and positive effect of the child subsidy for each age category with the coefficient decreasing among older mothers. The coefficient for 20-to-25-year-olds is more than double the coefficient for 35-to-40-year-olds and more than four times the coefficient for 40-to-45-year-olds. Since the probability of pregnancy decreases significantly with age, the magnitude of the effect relative to underlying fertility is greatest among women aged 35 to 40, followed by women aged 40 to 45. Since it is difficult for older women to postpone fertility, much of the child subsidy effect for these women likely reflects a reduction in total fertility, rather than a postponement in fertility.

4.5 Mother Fixed Effects

One of the virtues of the data set that we have constructed is that it is longitudinal – it contains mother identifiers, which allow us to estimate a mother fixed effects model. Mother fixed effects provide a useful robustness check, since they control for a wide range of unobserved heterogeneity, including attitudes toward fertility and permanent household income. Table 7 presents the results. We find a positive and statistically significant child subsidy effect in the overall population, as well as within each religious and income group. For the overall population, the magnitude is similar to Table 4. We continue to find positive and statistically significant price effects when we split the sample by income and by religious groups, although the magnitudes are larger.

The inclusion of fixed effects changes the interpretation of the income effect: we are now considering the impact of changes in log net household income holding the mother fixed effect constant (which would include permanent income). Comparing Table 7, column (1) with Table 4, column (1), we find a larger negative effect, which is now

significant at the one percent level. We find a similar effect for the below-poverty-line and middle-income groups and for the Ultra Orthodox and Arab Muslims, who are at the lower end of the income distribution in Israel. This is consistent with households postponing fertility in response to temporary changes in income. For the top income decile, we continue to find a positive income effect, although the magnitude is smaller. In the secular Jewish population, the income effect switches sign, from positive to negative.

Appendix Table 1 provides the results for this specification by income category and religious group.

4.6 Instrumenting for Income

As noted in Section 4.5, mother fixed effects provide a useful robustness check for our child allowance and income effects on fertility, but control only for time-invariant mother and household characteristics. Mother fixed effects do not correct for the possible simultaneity of household income and fertility. For example, the negative income effect estimated for the below-poverty-line sample in Tables 4 and 7 could merely reflect the fact that in poor households fertility is associated with a reduction in labor supply.

We address this concern by instrumenting for net household income using the husband's lagged income. We believe that this is a plausible instrument because husbands are less likely than wives to adjust their labor supply in advance of a birth, and are even less likely to do so two years in advance of a birth. The results are presented in Table 8.

Instrumenting for income has no significant impact on the estimated child subsidy effect: it remains positive and statistically significant for all samples except the Ultra Orthodox, and the magnitudes are similar to Table 4. The estimated income effects are also similar. We continue to find a negative income effect in the overall sample, and in the below-poverty-line, Ultra-Orthodox, and Arab Muslim samples, with larger magnitudes for all but the last group. For the top income decile, the income effect remains positive and has an increased magnitude, although it is no longer statistically significant. Finally, we continue to find a positive income effect for the secular Jewish population.

Overall, this suggests that the pattern of price and income effects observed in Table 4 is robust to instrumenting for income.

Appendix Table 2 provides the results for this specification by income category and religious group.

5. The Magnitude of Price and Income Effects

5.1 Price and Benefit Elasticities

Calculating the price elasticity of fertility is complicated by the lack of detailed data on the marginal cost of children. However, a back-of-the-envelope calculation is possible using tabulations on the marginal cost of children from Israel's National Insurance Institute. The estimated marginal financial cost of a child ranges from 980 NIS per month for the first child to 770 NIS per month for fifth and subsequent children.[24] To this we add estimated foregone earnings as a result of childbearing. Since Israel provides three months of paid maternity leave, the primary foregone earnings from childbearing are for those mothers who transition out of the labor force. Thus, our back-of-the-envelope estimate of foregone earnings due to childbearing is the product of average annual earnings among working mothers and the proportion of mothers who leave work as a result of having an additional child.[25]

From the range of coefficient estimates we have presented, we compute the elasticities based on our results in Table 4 in which we control for the mother's fertility history non-parametrically, but do not use mother fixed effects or instrument for income. Although mother fixed effects and instrumenting for income are useful robustness checks, we believe that the results in Table 4 most cleanly and parsimoniously exploit our identification strategy.

In keeping with our previous calculations, we examine the impact of a 150 NIS change in the child subsidy, which approximately corresponds to the reduction in the marginal child subsidy for a third child between 2002 and 2003. For a third child, a 150

[24] The National Insurance Institute estimates for 2003, in NIS per month, are as follows: first child 980; second child 900; third child 850; fourth child 800; and fifth and further children 770. See Sabag-Andelblad (2005).

[25] There are many reasons to be cautious about this imputation. Working and non-working mothers differ along an array of observable (and most likely unobservable) dimensions. This calculation does not account for either of these.

NIS reduction in the child subsidy raises the cost of a child by 18 percent.[26] Based on Table 4, this is associated with a 0.99 percentage point (or an 9.6 percent) reduction in fertility or an elasticity of 0.54 (with a standard error of 0.077).[27] Splitting the results by income group and by religious group (Table 9) we find the largest price elasticity in the top income decile (0.88) and in the secular Jewish population (0.65). Although these two groups do not have the largest absolute response to the change in child subsidy, both have low fertility and a high opportunity cost of time.

The finding that fertility is inelastic with respect to changes in the price of children accords both with the prior literature and Becker's (1960) theory of fertility, which suggests that the demand for children is akin to the demand for capital goods (whose price elasticity of demand is known to be low; see for example Chirinko 1993). Laroque and Salanié (2008) find a lower elasticity, 0.2. Their estimate, however, is derived from a structural model in which a woman assumes that each child is her last. In contrast, our estimates are for a marginal child conditional on the existing number of children.

Alternatively, we can scale our results to obtain a benefit elasticity. A 150 NIS reduction in the monthly child subsidy corresponds to a 50 percent decrease in the benefit for the marginal child, which from Table 4, column (1), leads to a 9.6 percent reduction in fertility and to a benefit elasticity of 0.19. Milligan (2005) finds a benefit elasticity of 0.107 for Quebec and notes that this falls into the range of previous estimates (a long-run cross-country elasticity of 0.16 in Gauthier and Hatzius 1997; an elasticity of 0.05 to 0.11 for Canada in Zhang, Quan, and Meerbergn 1994; and elasticities ranging from 0.127 to 0.248 in Whittington, Alm, and Peters 1990; see Milligan 2005).

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[26] We compute the price elasticity as follows. We consider an incremental child to a mother who already has two children and a change in child allowance from 300 to 150 NIS per month. The National Insurance Institute estimates the financial cost of a third child at 850 NIS per month. We estimate foregone earnings as the product of a working mother's annual earnings (approximately 60,600 NIS) and the incremental proportion of mothers who leave work because of a third child (0.058). Thus, the total cost changed from 850+(60,600x0.058/12)-300=843 NIS to 850+(60,600x0.058/12)-150=993, or an 18 percent increase in cost.

[27] For a 150 NIS change in child allowance, we calculate from Table 4, column (1), that the change in fertility is 0.000066 × 150 =0.0099. Thus, for a baseline probability of pregnancy of 0.103 (from Table 2, column (1)), we obtain a 0.096 percent change in fertility and an elasticity of 0.096/ 0.178 = 0.54. Standard errors are computed using the delta method, assuming that fertility is the only source of uncertainty and that cost data are not stochastic.

5.2 The Sign and Magnitude of the Income Effect

In contrast to the robustly positive price effect of child subsidies on fertility, we find substantial heterogeneity in the income effect. In the overall population, the effect is negative and significant but negligible in magnitude, but this is because a negative income effect in below-poverty-line households offsets a positive effect in middle- and high-income households.

These results might appear surprising at first, since the literature on growth and fertility associates a negative income effect with wealthier populations and a positive income effect with poorer and less developed populations. However, Becker and Tomes (1976) argue that precisely such a pattern can be observed in micro data. In particular, in a model where child quality is partly inherited the income elasticity of the parents' own contribution to quality will tend to be high at low income levels and decline with income. This leads to an increase in the observed income elasticity of quantity with income and in turn to the pattern that we observe. Sacerdote and Feyrer (2008) offer a complementary explanation in which initial increases in income and female labor force participation reduce fertility, but eventually fertility increases with income as women bear less responsibility for childcare. Another possible explanation is social norms: large families are still commonly associated with wealth in the Israeli context.

Notwithstanding the varying sign of the income effect, our most consistent finding is that the magnitude of the income effect – whether positive or negative – is small: doubling income leads to at most a one percentage point change in fertility (for the below-poverty-line and Ultra-Orthodox populations). This is underlined in Table 9 where the estimated income elasticity ranges from -0.07 for the below-poverty-line group to 0.086 for the top income decile. This is consistent with Becker's (1960) conjecture that the (quantity) elasticity of income is small, with the income elasticity estimated by Hotz and Miller (1988), and with Schultz's (1985) result that overall fertility is not very responsive to the male wage rate. Black et al. (2008) find a much larger income elasticity, although their estimate is an average effect from a significant structural shock to household income (coal prices in coal-producing regions).

6. Conclusion

This paper has used a large individual-level panel data set with detailed controls and variation in Israel's child subsidy to examine the effect of financial incentives on fertility. We have studied not only the effects of incentives on fertility in the population as a whole, but also how these effects vary across income, ethnic, religious, and age subgroups. We have also been able to separate price and income effects.

We find a consistently positive effect of the child subsidy for a marginal child on fertility. The effect is present within all religious, ethnic, economic, and age subgroups. The fact that we find an effect even among women in the 35-to-40 and 40-to-45 age groups suggests that the effect we identify is at least in part an effect on total fertility and not only on the timing of births.

Corroborating Becker's (1960) conjecture, we find that the magnitude of the income effect on fertility is uniformly small. Although cross-country and within-country time-series evidence suggests large income effects, our results indicate that over a short time horizon, and when identified by plausibly exogenous variation, income effects on fertility are small in magnitude compared with price effects. Our results with respect to income effects also match the pattern conjectured by Becker and Tomes (1976), namely a negative income effect in the low-income group and a positive income effect in the higher-income group.

Overall, our results suggest that policies that change the price of a marginal child can be an effective instrument for governments that seek to influence the fertility rate over a short time horizon. In contrast, government policies that affect income should not be expected to have a meaningful impact on fertility over a short time horizon. For developing countries, this implies that increases in income resulting from economic growth should not be expected to produce a substantial reduction in birthrates over a short horizon and that attaining such a reduction, if it were deemed to be desirable, would require policies that raise the price of a marginal child.

Appendix A: Description of the Variables

Variable	Description
Pregnant	Equal to 1 if the woman was pregnant in the calendar year and 0 otherwise. It is calculated by back-timing 39 weeks from the child's date of birth.
PV of marginal child subsidy	The present value in 2007 NIS of the child subsidy a mother will receive for her next child until that child turns 18, using the announced benefit schedules and a discount rate of 5 percent.
Husband's age	The age of the husband in years.
Mother working	Equal to 1 if the mother had a positive annual salary and 0 otherwise.
Husband working	Equal to 1 if the husband had a positive annual salary and 0 otherwise
Max education	Maximum of husband's and mother's level of education. Equal to 1 for primary school, 2 for high school graduate, 3 for college, and 4 for post-graduate education.
Age at first birth	Mother's age in years at first birth.
Reference fertility	The average number of children born five years ago within a reference group defined by a woman's religion, age, and education, and year.
Months from last birth	The number of months since the last birth.
Number of children	The number of children the women had.
Age distribution 0-4	The number of children age 4 or younger.
Age distribution 5-13	The number of children between age 5 and 13.
Age distribution 14-17	The number of children between age 14 and 17.
Mother/husband of Sephardic origin*	Equal to 1 if the mother or husband is Jewish and was born in: the Middle East, Asia, North Africa, Morocco, Ethiopia, or Africa. If the mother or husband is native Israeli then we look at her/his father's place of birth. Defined only for the Jewish population.
New immigrant*	Equal to 1 if either the mother or the husband is Jewish and immigrated to Israel after 1990.
Below-poverty-line income	Equal to 1 if net income in a given year is below that year's poverty line. This is computed by subgroup when presenting results by subgroup.
Above-poverty-line income and below the 90 percentile	Equal to 1 if net income is above poverty-line income and below the 90th percentile in that year. This is computed by subgroup when presenting results by subgroup.
Top 90 percent	Equal to 1 if net income is at or above the 90th percentile in that year. This is computed by subgroup when presenting results by subgroup.
Log net household income	Log of the mother's and husband's total income minus tax, plus annual child subsidy for existing children
Secular Jewish	Equal to 1 if the mother is Jewish and secular and 0 otherwise. In the regression specification, Secular is the base religion category.
Orthodox Jewish	Equal to 1 if the mother if Jewish and Orthodox and 0 otherwise.
Ultra-Orthodox Jewish	Equal to 1 if the mother is Ultra-Orthodox Jewish and 0 otherwise.
Arab Muslim	Equal to 1 if the mother is Arab Muslim and 0 otherwise.
Year dummy YYYY	Equal to 1 if the current year if equal to YYYY and 0 otherwise.

Notes: * Included as controls for specifications restricted to the Jewish population. Coefficients are suppressed.

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Figure 1: Cumulative Child Subsidy by Number of Children in 2007 NIS

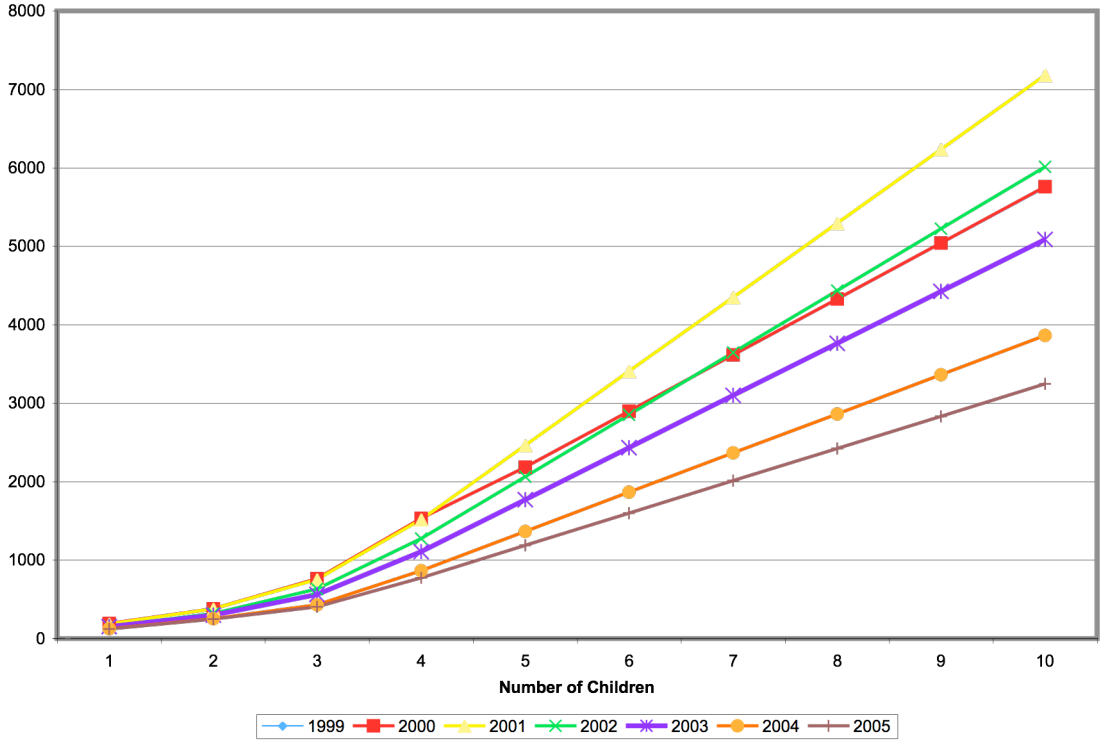

Figure 2: Cumulative Child Subsidy by Number of Children and by Year in NIS

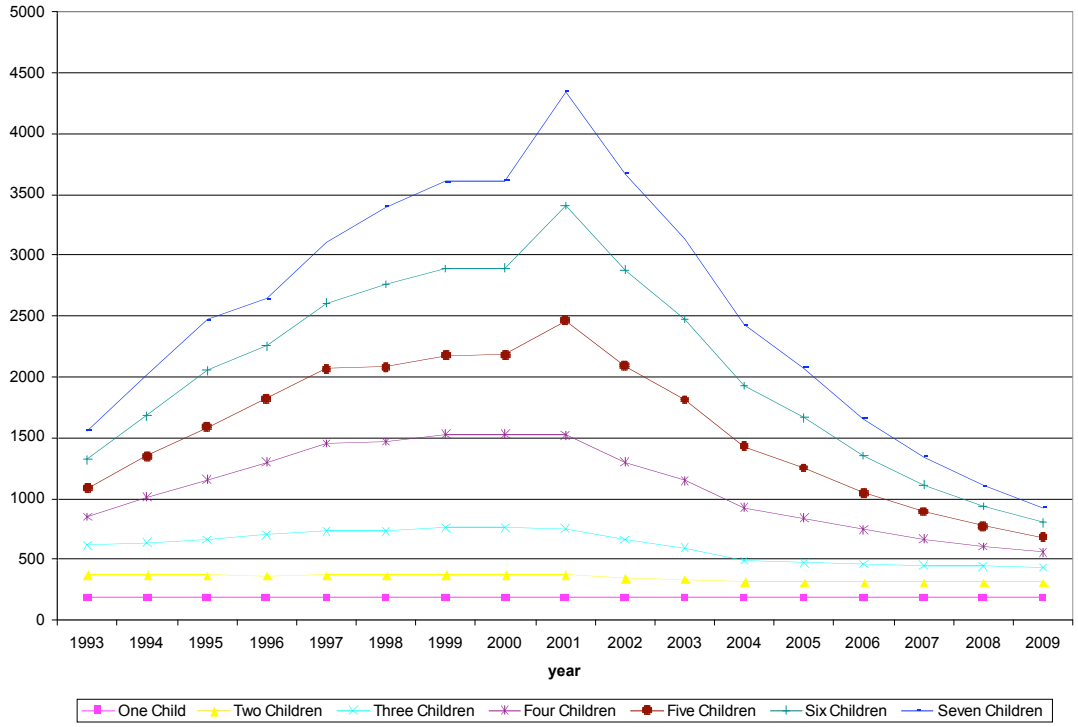

Figure 3a: Probability of Pregnancy by Ethnic Group and Religiosity of Jewish Population

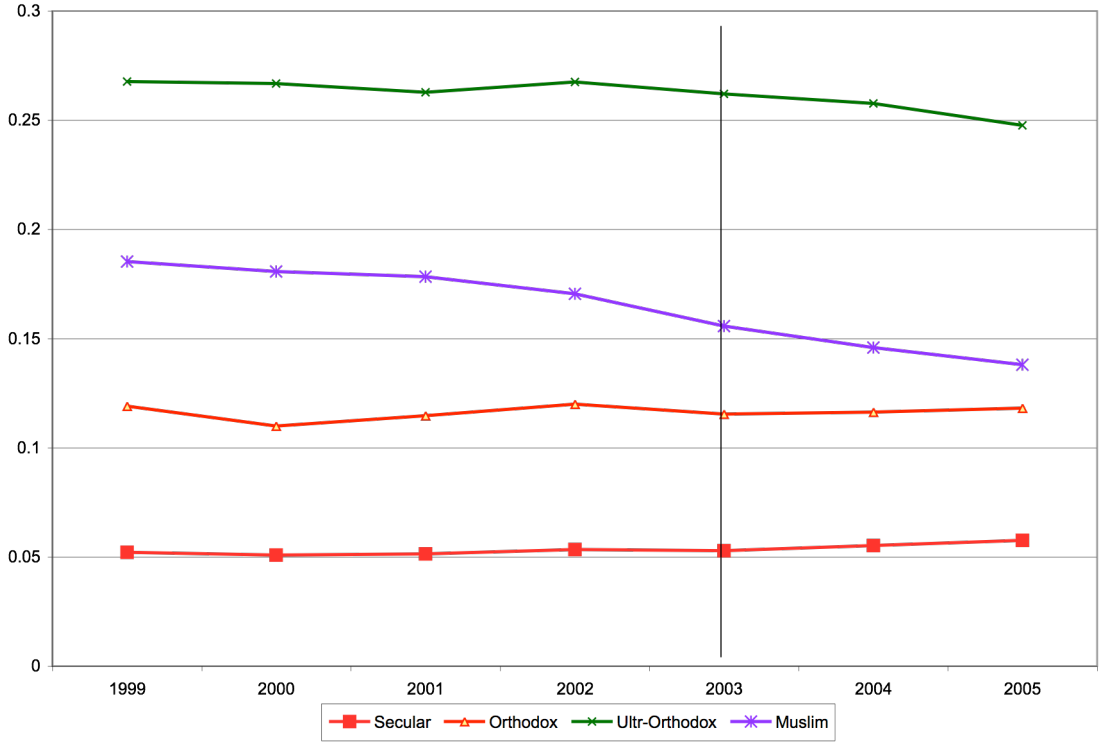

Figure 3b: Probability of Pregnancy by Socioeconomic Group

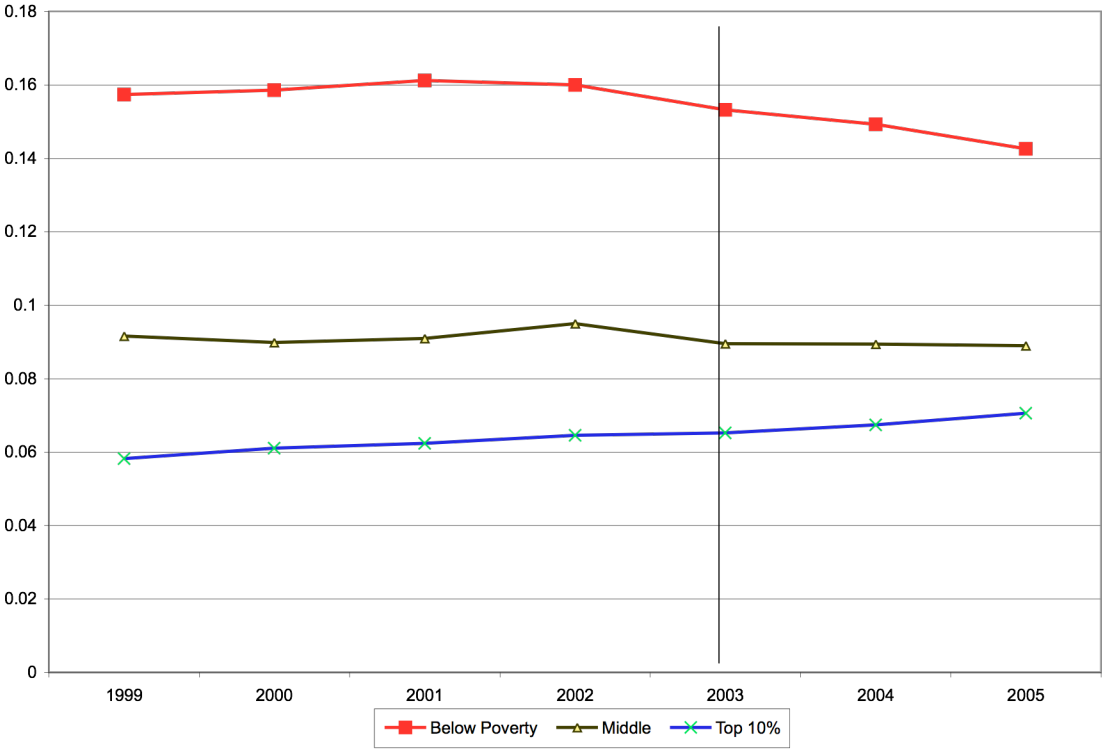

Figure 4: Probability of Pregnancy by Parity and Socioeconomic Group

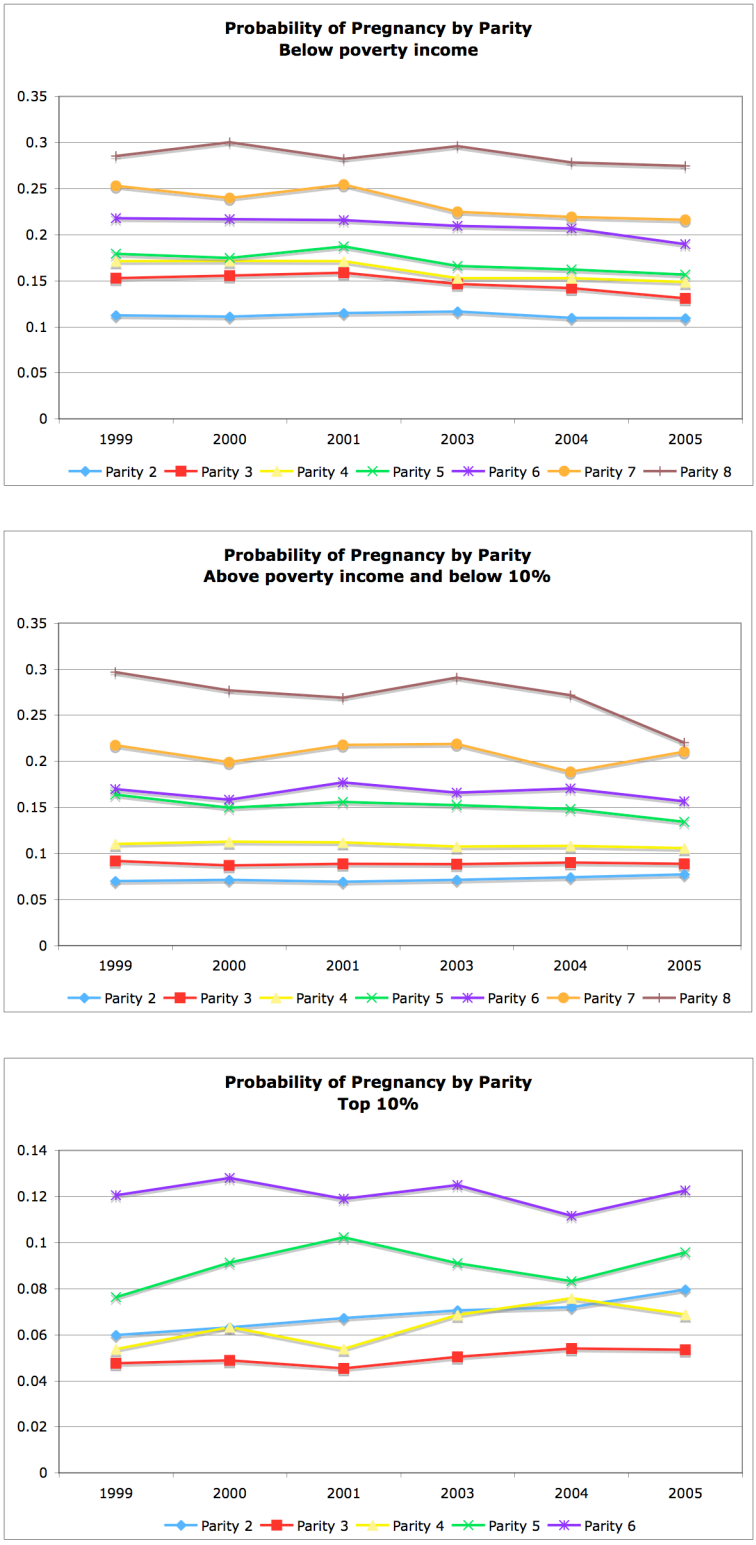

Table 1a: Monthly Marginal Child Subsidy by Parity in 2007 NIS

Number of Children	1999	2000	2001	2002	2003	2004	2005
1	190	191	188	159	150	127	123
2	190	191	188	159	150	127	123
3	381	381	378	316	259	176	160
4	770	772	765	640	550	436	369
5	647	648	943	790	663	500	412
6+	713	715	943	790	663	500	412
Newborns post 2003	---	---	---	---	150	127	123

Table 1b: Monthly Total Subsidy for Existing Children in 2007 NIS

Number of Children	1999	2000	2001	2002	2003	2004	2005
1	190	191	188	159	150	127	123
2	381	381	377	318	301	254	246
3	571	572	565	476	451	381	369
4	952	953	943	792	710	557	529
5	1722	1725	1708	1432	1260	993	898
6	2368	2373	2651	2222	1923	1493	1310
7	3081	3088	3594	3012	2586	1993	1722
…							

Table 2: Summary Statistics

	Full Sample	Below poverty income	Above poverty income and below 90%	Top 10%	Secular Jewish	Orthodox Jewish	Ultra-Orthodox Jewish	Arab Muslims
Number of children	3.40	3.93	3.07	2.97	2.68	3.49	4.76	4.23
	(1.69)	(1.99)	(1.4)	(1.16)	(0.85)	(1.4)	(2.45)	(1.91)
Propability of getting pregna	0.103	0.139	0.087	0.064	0.054	0.111	0.242	0.143
	(0.32)	(0.36)	(0.29)	(0.25)	(0.22)	(0.32)	(0.44)	(0.37)
Marginal child subsidy	389.24	396.60	385.76	378.54	357.17	409.23	428.36	430.69
	(273.56)	(290.18)	(261.84)	(264.12)	(241.38)	(286.5)	(308.62)	(304.41)
Husband's age	38.45	37.56	38.62	40.97	39.49	38.90	35.87	37.21
	(6.32)	(7.03)	(5.82)	(4.88)	(5.6)	(6.4)	(6.85)	(6.88)
Mother age at first birth	23.70	22.64	24.03	26.09	24.77	23.63	22.56	21.88
	(3.78)	(3.69)	(3.64)	(3.34)	(3.76)	(3.53)	(3.07)	(3.44)
Months from last birth	56.85	49.92	60.18	66.68	67.95	53.11	33.88	46.25
	(44.02)	(42.42)	(44.53)	(43.66)	(-45.99)	(-40.47)	(32.18)	(38.76)
Husband working	0.75	0.44	0.94	1.00	0.81	0.81	0.51	0.70
	(0.43)	(0.5)	(0.24)	(0.05)	(0.39)	(0.39)	(0.5)	(0.46)
Max education	2.60	2.20	2.70	3.44	2.89	2.76	2.08	2.03
	(0.91)	(0.81)	(0.87)	(0.73)	(0.87)	(0.93)	(0.35)	(0.84)
Reference fertility	3.17	3.51	2.99	2.81	2.49	3.25	4.34	4.08
	(1.31)	(1.51)	(1.16)	(0.79)	(0.55)	(0.93)	(1.71)	(1.45)
Number of children age 0-4	0.99	1.22	0.87	0.69	0.68	1.00	1.71	1.28
	(0.96)	(1.06)	(0.87)	(0.76)	(0.76)	(0.9)	(1.07)	(1.02)
Number of children age 5-13	1.56	1.76	1.42	1.46	1.28	1.60	2.07	1.88
	(1.15)	(1.33)	(1.02)	(0.91)	(0.83)	(1.07)	(1.58)	(1.34)
Number of children age 14-17	0.61	0.66	0.57	0.64	0.56	0.63	0.69	0.70
	(0.88)	(0.97)	(0.82)	(0.81)	(0.75)	(0.86)	(1.08)	(1.04)
Number of children above 18	0.24	0.29	0.21	0.18	0.17	0.26	0.29	0.37
	(0.69)	(0.81)	(0.61)	(0.5)	(0.48)	(0.65)	(0.8)	(0.97)
Household income	113,211	32,482	129,558	336,642	143,313	122,002	74,492	58,426
	(307528)	(23604)	(43345)	(905608)	(402953)	(224449)	(105782)	(49210)
Husband's income	64,161	12,292	74,235	209,798	83,354	68,723	31,498	34,724
	(269806)	(17732)	(38632)	(811118)	(357358)	(181570)	(90528)	(38036)
Sample size	1,240,824	454,463	646,665	139,696	670,582	171,115	148,252	244,829
As % of full population	100%	37%	52%	11%	54%	14%	12%	20%

Note: Summary statistics are for a 40 percent random sample of women less than age 45 who were married and had at least two children they entered the panel.

Table 3: Average Effect of Child Allowance on the Probability of Pregnancy

	Parametric fertility controls	Parametric fertility controls	Non-parametric fertility controls
Child subsidy	0.00016***	0.00016***	0.00007***
	(0.00002)	(0.00002)	(0.00001)
Husband working	-0.01291***		
	(0.00115)		
Max education	-0.02285***	-0.02173***	-0.01286***
	(0.00084)	(0.00085)	(0.00077)
Income dummy (>poverty,<90th%ile)	0.003102**		
	(0.00147)		
Income dummy (>90th%ile)	0.01217***		
	(0.00309)		
Log (net household income)		-0.00190**	-0.00062
		(0.00102)	(0.00103)
Age at first birth	0.00809***	0.00826***	
	(0.00050)	(0.00051)	
Months from last birth	0.00179***	0.00180***	
	(0.00023)	(0.00023)	
Months from last birth^2	-0.00001***	-0.00001***	
	(0.000001)	(0.000001)	
Number of children	0.02596***	0.02647***	
	(0.00145)	(0.00145)	
Orthodox Jewish	0.10977***	0.10910***	0.08390***
	(0.00296)	(0.00291)	(0.00184)
Ultra-Orthodox Jewish	0.30452***	0.30553***	0.22452***
	(0.00611)	(0.00589)	(0.00395)
Muslim Arabs	0.19565***	0.19385***	0.14345***
	(0.00400)	(0.00386)	(0.00311)
Reference fertility	-0.08016***	-0.08036***	-0.04845***
	(0.00282)	(0.00277)	(0.00156)
Year dummies	Yes	Yes	Yes
Mean prob. of pregnancy x 100	10.3	10.3	10.3
Effect on prob of pregnancy of	2.36***	2.38***	0.99***
150 NIS increase in subsidy x 100	(0.25)	(0.25)	(0.14)
Log net household income x 100		-0.19*	-0.06*
		(0.10)	(0.10)
Observations	1,233,263	1,233,263	1,233,342
Adjusted R^2	0.099	0.099	0.102

Notes: Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Table 4: The Effect of the Present Value of Child Allowance by Income Category and by Religious Group: Non-Parametric Controls

	Full sample	Below poverty income	Above poverty income and below 90%	Top 10%	Secular Jewish	Orthodox Jewish	Ultra-Orthodox Jewish	Muslim Arabs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Effect on prob of pregnancy of	0.99***	1.05***	0.85***	0.74**	0.87***	0.99***	0.34*	1.73***
150 NIS increase in subsidy x 100	(0.14)	(0.12)	(0.18)	(0.31)	(0.25)	(0.25)	(0.22)	(0.23)
Log net household income x 100	-0.06	-1.04***	0.15	0.55***	0.11*	-0.03	-1.23***	-0.96***
	(0.10)	(0.12)	(0.33)	(0.19)	(0.06)	(0.12)	(0.16)	(0.12)
Mean prob. of pregnancy x 100	10.3	13.92	8.66	6.41	5.4	11.1	24.2	14.3
Observations	1,233,342	451,341	643,036	138,965	666,083	170,120	147,653	243,475
Adjusted R^2	0.102	0.121	0.077	0.051	0.028	0.053	0.095	0.077

Notes: Linear probability models are presented. Additional controls include reference fertility, education controls, year fixed effects, and where relevant religious and ethnic group indicators. Standard errors are clustered by year x number and age of children. Stars denote the level of statistical significance: *** for 0.01, ** for 0.05, * for 0.10.

Table 5: The Effect of the Present Value of Child Allowance by Income Category and Religion: Non-Parametric Controls

	Below poverty income	Above poverty income and below 90%	Top 10%
Secular Jewish			
Effect on prob of pregnancy of	0.97***	0.83***	0.75**
150 NIS increase in subsidy x 100	(0.20)	(0.28)	(0.37)
Log net household income x 100	-0.67***	0.51**	0.45**
	(0.11)	(0.23)	(0.21)
Mean prob. of pregnancy x 100	5.0	5.5	5.6
Observations	146,605	449,907	69,571
Adjusted R^2	0.036	0.027	0.035
Orthodox Jewish			
Effect on prob of pregnancy of	1.37***	0.69**	0.55
150 NIS increase in subsidy x 100	(0.29)	(0.29)	(0.57)
Log net household income x 100	-1.11***	0.20	0.14
	(0.19)	(0.43)	(0.67)
Mean prob. of pregnancy x 100	10.6	11.5	10.2
Observations	48,390	103,753	17,977
Adjusted R^2	0.057	0.052	0.074
Ultra-Orthodox Jewish			
Effect on prob of pregnancy of	0.37	0.51	0.21
150 NIS increase in subsidy x 100	(0.33)	(0.33)	(0.52)
Log net household income x 100	-1.26***	-6.06***	-0.20
	(0.24)	(0.99)	(1.22)
Mean prob. of pregnancy x 100	27.1	20.8	17.7
Observations	87,383	43,347	16,923
Adjusted R^2	0.088	0.097	0.084
Muslim			
Effect on prob of pregnancy of	1.76***	1.85***	1.47***
150 NIS increase in subsidy x 100	(0.23)	(0.38)	(0.45)
Log net household income x 100	-1.57***	-8.25***	-1.86***
	(0.19)	(1.48)	(0.72)
Mean prob. of pregnancy x 100	14.7	14.5	11.5
Observations	165,939	50,035	27,501
Adjusted R^2	0.081	0.069	0.070

Notes: Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), and year dummies. Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Table 6: The Effect of the Present Value of Child Allowance by Mother's age Category: Non-Parametric Controls

	Younger than 25	Between 25 and 30	Between 30 and 35	Between 35 and 40	Older than 40
	(1)	(2)	(3)	(4)	(5)
Effect on prob of pregnancy of	1.03**	1.18***	1.28***	0.83***	0.21**
150 NIS increase in subsidy x 100	(0.50)	(0.24)	(0.15)	(0.16)	(0.11)
Log net household income x 100	-1.84***	-0.74***	0.24	0.05	-0.08***
	(0.19)	(0.21)	(0.15)	(0.07)	(0.02)
Mean prob. of pregnancy x 100	26.3	19.0	13.1	6.8	1.8
Observations	44,616	196,776	365,299	387,308	239,343
Adjusted R^2	0.065	0.075	0.057	0.064	0.064

Notes: Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), religion, and year dummies. Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Table 7: The Effect of the Present Value of Child Allowance: Non-Parametric Controls with Mother Fixed Effects

	Full sample	Below poverty income	Above poverty income and below 90%	Top 10%	Secular Jewish	Orthodox Jewish	Ultra-Orthodox Jewish	Muslim Arabs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Effect on prob of pregnancy of	1.16***	1.47***	1.83***	2.71***	2.70***	1.67***	0.64***	1.47***
150 NIS increase in subsidy x 100	(0.33)	(0.31)	(0.48)	(0.55)	(0.71)	(0.42)	(0.28)	(0.36)
Log net household income x 100	-0.46***	-1.32***	-0.27***	0.15***	-0.23***	-0.96***	-1.31***	-2.05***
	(0.11)	(0.18)	(0.17)	(0.17)	(0.08)	(0.18)	(0.32)	(0.24)
Mean prob. of pregnancy x 100	10.3	13.92	8.66	6.41	5.4	11.1	24.2	14.3
Observations	1,233,342	451,291	643,007	138,965	671,462	170,594	147,734	243,473
Adjusted R^2	0.015	0.120	0.130	0.153	0.141	0.129	0.135	0.131

Notes: Linear probability models are presented. Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), religion and ethnic group indicators (when religion dummies are not included). Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Table 8: The Effect of the Present Value of Child Allowance by Income Category: Non-Parametric Controls with Instrumenting for Income

	Full sample	Below poverty income	Above poverty income and below 90%	Top 10%	Secular Jewish	Orthodox Jewish	Ultra-Orthodox Jewish	Muslim Arabs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Effect on prob of pregnancy of	0.86***	0.94***	0.67***	0.62*	0.67***	0.83***	0.35	1.46***
150 NIS increase in subsidy x 100	(0.14)	(0.13)	(0.18)	(0.29)	(0.23)	(0.25)	(0.25)	(0.22)
Log net household income x 100	-0.39***	-1.34***	-3.48***	1.27	0.16***	-0.05	-3.05***	-0.52***
	(0.12)	(0.19)	(0.73)	(1.11)	(0.07)	(0.18)	(0.32)	(0.15)
Mean prob. of pregnancy x 100	10.3	13.92	8.66	6.41	5.4	11.1	24.2	14.3
Observations	997,622	369,004	514,201	114,417	529,716	138,167	122,208	202,834
Adjusted R^2	0.101	0.120	0.075	0.056	0.030	0.057	0.097	0.077

Notes: Linear probability models are presented. Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), religion and ethnic group indicators (when religion dummies are not included). Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Table 9: Prices, Benefit, and Income Elasticities

Specification	Full sample	Below poverty line	Poverty line to 90th percentile	Above 90th pecentile	Secular Jewish	Orthodox Jewish	Ultra-Orthodox Jewish	Arabs
Price elasticity	0.540	0.333	0.546	0.884	0.645	0.490	0.100	0.745
	(0.077)	(0.005)	(0.010)	(0.026)	(0.014)	(0.024)	(0.031)	(0.023)
Comparisons to the literature								
Laroque and Salanié (2005)	0.2							
Benefit elasticity	0.192	0.151	0.196	0.229	0.325	0.178	0.029	0.243
	(0.028)	(0.018)	(0.043)	(0.098)	(0.092)	(0.045)	(0.018)	(0.032)
Comparisons to the literature								
Gauthier and Hatzius	0.16							
Zhang et al.	0.05-0.11							
Whittington et al.	0.127-0.248							
Milligan (2005)	0.107							
Income elasticity	-0.005973	-0.07449	0.0176	0.0862	0.0213	-0.00233	-0.0509	-0.0675
	(0.0993)	(0.00883)	(0.03843)	(0.02951)	(0.011)	(0.01)	(0.0066)	(0.00864)
Comparisons to the literature								
Hotz and Miller (1988)	0.02							
Black et al. (2008)	0.5							

Notes: Elasticities are computed for a marginal third child, with the child allowance increasing from 150 NIS per month to 300 NIS per month. Standard errors are computed using the delta method.

Appendix Table 1: The Effect of the Present Value of Child Allowance by Income Category and Religious Group with Mother Fixed Effects

	Below poverty income	Above poverty income and below 90%	Top 10%
	(1)	(2)	(3)
Secular Jewish			
Effect on prob of pregnancy of	2.63***	2.65***	2.83***
150 NIS increase in subsidy x 100	(0.55)	(0.78)	(0.80)
Log net household income x 100	-0.62***	-0.10	0.33*
	(0.11)	(0.17)	(0.19)
Mean prob. of pregnancy x 100	5.0	5.5	5.6
Observations	149,231	452,541	69,690
Adjusted R^2	0.130	0.144	0.162
Orthodox Jewish			
Effect on prob of pregnancy of	1.87***	1.48***	1.56***
150 NIS increase in subsidy x 100	(0.44)	(0.49)	(0.52)
Log net household income x 100	-1.57***	-0.68***	-0.33
	(0.28)	(0.32)	(0.61)
Mean prob. of pregnancy x 100	10.6	11.5	10.2
Observations	48,658	103,954	17,982
Adjusted R^2	0.119	0.132	0.155
Ultra-Orthodox Jewish			
Effect on prob of pregnancy of	0.63**	0.66*	0.72**
150 NIS increase in subsidy x 100	(0.32)	(0.36)	(0.37)
Log net household income x 100	-2.14***	0.01***	-1.50
	(0.43)	(0.52)	(0.94)
Mean prob. of pregnancy x 100	27.1	20.8	17.7
Observations	87,410	43,403	16,921
Adjusted R^2	0.138	0.133	0.139
Muslim			
Effect on prob of pregnancy of	1.44***	1.39***	1.59***
150 NIS increase in subsidy x 100	(0.34)	(0.55)	(0.41)
Log net household income x 100	-2.50***	-1.66***	-1.24*
	(0.27)	(0.43)	(0.71)
Mean prob. of pregnancy x 100	14.7	14.5	11.5
Observations	165,937	50,035	27,501
Adjusted R^2	0.132	0.127	0.138

Notes: Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), and year dummies. Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.

Appendix Table 2: The Effect of the Present Value of Child Allowance by Income Category and Religious Group Instrumenting for Income

	Below poverty income	Above poverty income and below 90%	Top 10%
	(1)	(2)	(3)
Secular Jewish			
Effect on prob of pregnancy of	0.86***	0.61***	0.53***
150 NIS increase in subsidy x 100	(0.24)	(0.29)	(0.39)
Log net household income x 100	-0.37***	0.25	2.52*
	(0.18)	(0.39)	(1.32)
Mean prob. of pregnancy x 100	5.0	5.5	5.6
Observations	115,489	356,354	57,873
Adjusted R^2	0.035	0.029	0.040
Orthodox Jewish			
Effect on prob of pregnancy of	1.20***	0.54***	0.48***
150 NIS increase in subsidy x 100	(0.35)	(0.34)	(0.62)
Log net household income x 100	-0.34***	-2.41***	(1.72)
	(0.44)	(1.42)	(5.04)
Mean prob. of pregnancy x 100	10.6	11.5	10.2
Observations	115,489	356,354	57,873
Adjusted R^2	0.035	0.029	0.040
Ultra-Orthodox Jewish			
Effect on prob of pregnancy of	0.45**	0.34*	0.13**
150 NIS increase in subsidy x 100	(0.42)	(0.42)	(0.62)
Log net household income x 100	-5.09***	-35.36***	(1.08)
	(0.62)	(4.67)	(7.98)
Mean prob. of pregnancy x 100	27.1	20.8	17.7
Observations	115,489	356,354	57,873
Adjusted R^2	0.035	0.029	0.040
Muslim			
Effect on prob of pregnancy of	1.49***	1.49***	1.32***
150 NIS increase in subsidy x 100	(0.27)	(0.43)	(0.50)
Log net household income x 100	-0.76***	-16.44***	4.43*
	(0.24)	(7.54)	(4.80)
Mean prob. of pregnancy x 100	14.7	14.5	11.5
Observations	115,489	356,354	57,873
Adjusted R^2	0.035	0.029	0.040

Notes: Additional controls include reference fertility, education controls, mother's age at first birth, months since last birth (linear and squared), husband's age, number of children, log(net household income), and year dummies. Standard errors are clustered by year x children age's distribution. Stars denote the level of statistical significant: *** for 0.01, ** for 0.05, * for 0.10.