

CHANGING THE COST OF CHILDREN AND FERTILITY: EVIDENCE FROM THE ISRAELI KIBBUTZ*

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Prior to 1996, Israelis in collective communities (kibbutzim) shared the costs of raising children equally. This article examines the impact of privatising costs of children on the fertility behaviour of young couples. Exploiting variation in parental cost-sharing across kibbutzim, we estimate that lifetime fertility declined by 0.65 children. We also examine the exit decisions of members, and find that couples were most likely to leave the kibbutz if they were either higher income or lower fertility. This pattern is also observed among Israeli emigrants, in which higher educated and lower fertility couples are more likely to leave Israel.

To what extent do economic considerations affect fertility decisions? Following Becker's (1960) seminal work on the economics of the family, economists regard financial incentives as crucially important to explaining fertility choices. Models of home production generally regard the price of childbearing as a key factor in predicting fertility. Since many countries have also experimented with subsidies (e.g. France) or special tax levies (e.g. China) on childbearing, the question has policy relevance as well.¹ However, estimating the magnitude of this effect is challenging and even demonstrating the existence of a link is a difficult empirical exercise.

In this article, we exploit dramatic changes in the cost of childbearing to parents on Israeli kibbutzim (collectives) to examine the relative importance of cost considerations in fertility choices. The fertility patterns among kibbutz members differed in two important respects from the patterns exhibited by other Israeli Jews. First, on average, women in kibbutzim had roughly 0.45 more children than their counterparts in Israeli cities. Second, as observed by Ben-Porath (1973) analysing data from earlier cohorts, unlike the rest of Israel's population, the traditional negative correlation between education and fertility is not observed (see Figure 1).² Ben-Porath attributed this to the fact that parents on the kibbutz faced no private budget constraint. Since members shared all earnings equally, time spent raising children required no sacrifice in consumption, and so mothers with higher potential wages had no more to lose by having another child than other mothers. Furthermore, since parents on the kibbutz

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¹ See Laroque and Salanie (2012) for a thorough analysis of France's subsidy policies and Ebenstein (2010) for an examination of Chinese fertility responses due to financial punishments associated with the One Child Policy.

² Fertility is expected to decline with parental education if higher educated parents have a comparative advantage in having higher quality children, rather than having a higher quantity of children. This will generate a negative correlation between fertility and parental education (Moav, 2005). But this simple theory predicts no such correlation if the cost of education is covered by the kibbutz.

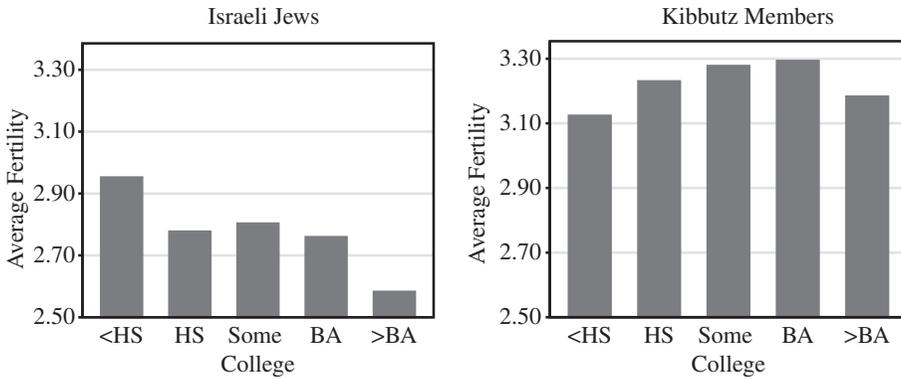


Fig. 1. Comparison of Fertility Patterns among Israeli Jews and Kibbutz Members

Notes. The sample comprises Jewish women born in Israel between 1930 and 1945. Fertility information is taken from the 1995 census.

Source. Israel Central Bureau of Statistics (1995).

were insulated from the direct financial cost of childbearing, they were further incentivised to have large families.

Traditionally, the cost of raising children was borne fully by the collective, with all costs of daily life shared equally among members. Food, medical and day care, clothing and education were funded by the collective. Parents with more children were allocated larger housing units by the kibbutz, insulating parents from virtually any (financial) cost of having an additional child. Moreover, since the accumulation of private property was banned and all income was transferred to the collective, raising children did not involve a time cost of foregone earnings either. This system generated a context for a ‘free-rider’ effect, in which the insulation from costs led to higher fertility in kibbutzim relative to cities (Abramitzky, 2011).

Beginning in the late 1980s, however, the movement encountered crisis and the system unravelled quickly. As a result of increasing interest rates and a change in government policies towards subsidising kibbutzim, all but the wealthiest kibbutzim were faced with financial ruin (Plessner, 1994; Schwartz, 1995). The response by most kibbutzim was ‘privatisation’, transferring the costs of food, day care, and clothing from the collective to the private individual and shifting the kibbutzim to a system where members receive individual differential pay to fund these services (Russell *et al.*, 2013).³ Between 1996 and 2005, 166 of the 267 kibbutzim were privatised, providing a unique opportunity to examine how fertility responds to changing the costs to childbearing.

Prior to the movement towards privatisation, all the kibbutzim participated in a system of ‘mutual guarantee’ where the other kibbutzim in their ideological movement would guarantee the debt of the other member kibbutzim (Berenbaum and Skolnik, 2007). The anticipated assistance from other kibbutzim allowed the poorer kibbutzim to take on debt, resulting in a weak relationship between a kibbutz’s income and

³ Most privatised kibbutzim still had in place differential pay ‘limits’, in which the ratio of the income between members was constrained to not exceed a certain ratio.

expenditure. The crisis led to the virtual disappearance of this security blanket, creating a situation where kibbutzim needed to adopt fiscal discipline and this varied by the wealth level of the individual kibbutz. As we demonstrate, the variation across kibbutzim in their financial situation led to stark differences in the subsidies provided by kibbutzim towards members, including those related to the costs of children.

Previous empirical examinations have concluded that financial incentives have a substantial impact on fertility, with a range of elasticities estimated. These studies generally exploit changes in government subsidies to fertility to identify the price elasticity of demand for children (Mulligan, 2005; Laroque and Salanie, 2012; Manski and Mayshar, 2003; Cohen *et al.*, 2013).⁴ Others have concluded that the effects are more modest (Demeny, 1986).⁵ However, these studies, while important, generally share several drawbacks. First, many rely on small changes to the financial incentives to childbearing, where parental incentives change by a tiny fraction of the cost of raising a child. As such, these studies reflect decisions made at the margin and it may also be worthwhile to examine large changes in the cost of childbearing, if the elasticity is not constant. Second, these studies are generally conducted by exploiting the introduction or increase in a means-tested incentive to childbearing, where individuals beyond a certain income or wealth level are not eligible for the subsidy. As a result, they may be providing information relevant for only a subset of the population and the findings may not be generalisable to the overall population. Third, the data collected in large household surveys often fail to capture lifetime fertility accurately, if children have left the home or if parents have not completed fertility. Therefore, data limitations often prevent a full examination of the impact of incentives on lifetime fertility.

This study, which examines the change in fertility among the membership of Israeli kibbutzim, improves on the existing studies in several ways. First, in our study, we exploit a relatively large change in the costs associated with raising children. Prior to privatisation, kibbutzim essentially insulated parents from any marginal financial costs to having an additional child. The traditional kibbutz allowed parents to have as many children as they liked, with communal resources being used for every type of expense. As such, our natural experiment represents a large shift in the financial incentives to childbearing, from close to zero to a substantial share of disposable income. Second, our study is based on a large sub-population of Israel that is broadly similar to the population in the country. The membership of kibbutzim was generally composed of

⁴ Mulligan (2005) studied the effect of the introduction of a pronatalist tax policy in the Canadian province of Quebec on fertility. He estimated that the fertility of those eligible for the new programme increased by 12% on average and by 25% for those eligible for the maximum benefit. Laroque and Salanie (2012) developed a structural model of female labour force participation and fertility and used the variation in the tax-benefit system in France to identify the effect of financial incentives on fertility. They found that financial incentives play a notable role in determining fertility. Manski and Mayshar (2003) exploit changes in child subsidies to Israeli parents, finding effects of lump-sum transfers on fertility among ultra-Orthodox Ashkenazi Jews. While being careful in their inference, Manski and Mayshar (2003, pp. 192–3) write, ‘Other analyses of our sample data reinforce the impression that the completed fertility rates of ultra-Orthodox Ashkenazi Jews substantially increased in the period around the 1975 tax reform’. Similarly, Cohen *et al.* (2013) found that the mean level of child allowance accounted for a nearly 8% increase in fertility, with all of it concentrated in the bottom half of the income distribution.

⁵ Demeny (1986) reviewed earlier evidence on the effect of pronatalist measures taken in Western Europe on fertility and concluded that the effects are negligible.

descendants of Jews from Eastern Europe and Central Europe, with residents being generally similar in terms of ethnicity and family background to the other European Jews who immigrated to Israel. While their membership was somewhat more secular, they more closely represent the overall population in terms of social status than individuals eligible for means-tested incentives. Third, we exploit an arguably exogenous change to the costs of childbearing that occurred during a short period of time due to privatisation (Abramitzky, 2008). The magnitude of the crisis also varied widely across kibbutzim. Since wealthier kibbutzim had a presence in more profitable industries and greater financial reserves, they were markedly less likely to privatise in the wake of the crisis; as such, kibbutz wealth and per member income has a strong first-stage relationship with a kibbutz's decision to privatise, providing us a candidate instrument for kibbutz privatisation.

In this article, we focus on a set of parents and prospective parents who were most affected by the kibbutz financial collapse and privatisation, and examine how their lifetime fertility responded to the privatisation of costs for children. We focus primarily on young women aged 25–40 at the time of the 1995 Israeli census. These cohorts presumably had their expectations shift during the early 1990s, as the kibbutzim encountered financial crisis and it became clear that the movement would not have sufficient resources to provide the lifestyle afforded to their parent's generation. We anticipate that the largest effects would be borne by those aged between 30–40 in 1995, the group which would have had most of their fertility window occur after the financial crisis, and have completed their fertility by 2008. Since it is unclear exactly when members internalised that they would no longer enjoy the full subsidies on children, we focus our analysis on fertility behaviour between the two census samples, rather than annual data.⁶

In our empirical analysis, we find that privatisation led to an extremely large decline in fertility among those affected. Using kibbutz wealth as an instrument for the probability of one's kibbutz privatising, we find that fertility declined by as much as 0.65 children per woman at privatised kibbutzim, after controlling for observable features of the parent such as age, education, and immigrant status. Note that this occurred during a period of slightly increasing fertility among the secular Jewish population of Israel, indicating that concurrent trends cannot be responsible for our results (Hleihel, 2011).⁷ The effect is largest among those with lower human capital, suggesting that the crisis and new system of differential pay involved a more pronounced decline in the affordability of children for parents who would receive the largest income decline from the shift to differential pay. We also find that the relationship between kibbutz wealth and fertility is strongest at large kibbutzim, presumably where parents would be least likely to internalise the cost of fertility suggesting that, prior to privatisation, 'free riding' was less prevalent at smaller kibbutzim where social pressure may have served to limit the number of children born

⁶ We have also found using aggregated fertility data by kibbutz and year that fertility declined in kibbutzim that eventually privatised in the years immediately prior to privatisation. These are available from the authors upon request.

⁷ The total fertility rates in the general Israeli population among Jews is roughly stable between 2.9 and 3.1 children but decreased during the period 1995–2008 among ultra-religious women and rose modestly among secular women who are most similar culturally to the kibbutz population we analyse.

to each couple. Interestingly, we find no relationship between kibbutz wealth and fertility prior to the kibbutz financial crisis and wave of privatisation, consistent with an interpretation that we are not simply capturing a correlation between kibbutz wealth and fertility associated with an income effect. Our results suggest that insulating parents from the cost of childbearing can have a very large impact on fertility. This has relevance for understanding the importance of cost considerations in fertility, and may help explain the large decline in fertility among most states of the Former Soviet Union following its collapse.⁸ We then examine the role income and fertility considerations played in people's decision to either stay or leave the kibbutz. We find a strong relationship between both income and fertility on kibbutz exit decisions, with parents of either low income or high fertility electing to stay on the kibbutz at significantly higher rates. Relative to the full-sharing kibbutzim, this selection pattern became less pronounced at privatised kibbutzim, with lower responsiveness of exit to both fertility and income. One interpretation of this finding is that the 'free rider' effect of fertility in the kibbutzim forced all but the wealthiest to weaken the incentives existing in the full-sharing kibbutzim. Insofar as high fertility and low income members strain kibbutz resources, only kibbutzim with vast financial reserves would be able to keep the sharing model in place.

We also find that the fertility decline observed among parents at kibbutzim facing financial hardship was borne to a large extent by those leaving both the sharing and the privatised kibbutzim. This is logical, since the privatised kibbutzim still offered child services at a discounted price relative to the city. For parents with high desired fertility, staying at the privatised kibbutz would still offer financial savings over moving to the city, albeit smaller savings than prior to the reform. Consistent with this type of selection, we find that fertility is especially low among those who exit the sharing kibbutzim, who elected to forego fully subsidised children and presumably had lower desired fertility than members who stayed.

In light of the striking pattern of selective exit from the kibbutz based on fertility tastes and potential income, we examine the decision of Israelis to emigrate. Relative to the US, a common destination of Israeli emigrants, Israel offers its citizens the ability to have children at a low cost, with state provision of education at all levels and free universal health care. Similar to the kibbutz, however, Israel has higher tax rates on personal income.⁹ We observe a striking similarity in the composition of those who exit the kibbutz and emigrants from Israel, with those leaving having significantly lower fertility and higher human capital than those who choose to stay. The results highlight the importance of the cost of children in migration decisions and represents further evidence of the importance of financial considerations in the joint determination of fertility and the cost-sharing context.

The rest of the article is organised as follows. In Section 1, we provide background on the kibbutz movement in Israel and the privatisation process that the movement underwent. In Section 2, we describe our empirical strategy and defend our instrumental variable. In Section 3, we describe our data. Section 4 presents our

⁸ Fertility declined below replacement in almost every country that was part of the Former Soviet Union, following its collapse. For a good summary of economic interpretations of these trends, see Billingsley (2010).

⁹ http://cbs.gov.il/reader/shnaton/templ_shnaton.html?num_tab=st28_20&CYear=2010

results on the relationship between privatisation and fertility, and heterogeneity across groups in their responses to privatisation. In Section 5, we examine the impact of privatisation on exit decisions among kibbutz members, and the role that desired fertility and potential income played in these decisions. In Section 6, we conclude.

1. Background

Many of the Jews who immigrated to Israel at the beginning of the twentieth century were single, young, and arrived with very few or no possessions. Some of them began forming new collective settlements (kibbutzim) on land purchased with donations from Jews living abroad and based them on the principle of perfect equality. All members forfeited their income to the kibbutz, including whatever wealth they had prior to joining and any presents or inheritance they might receive thereafter.¹⁰ The kibbutz, in return, distributed its resources equally among its members in the form of goods and services. All members dined in a communal dining room, received their clothes from the kibbutz and were allocated equally sized housing units. Until the late 1960s, all of the children lived together from a very early age, first in a nursery and then in group houses for the kibbutz children. The kibbutz granted vacations, a trip abroad, and the right to use a kibbutz-owned car for short trips. Kibbutz members even voted on who would be permitted to study at university and what academic disciplines they could pursue.

The first kibbutz Degania Alef was founded in 1910, ushering in a period of Jewish immigration into Palestine and the founding of many kibbutzim in the 1930s and the 1940s. At their height, they comprised about 5% of the Jewish population in Israel. In recent years, the share of the population living in a kibbutz has declined and their membership today is roughly 118,000 people living on 267 kibbutzim. The movement has also evolved over time, with many kibbutzim moderating in their attitudes towards private living and acquisition of private property. In the late 1960s, kibbutzim began to gradually abolish the children houses, allowing children to reside with their parents, with kibbutz housing being allocated according to family size. By the late 1980s, special houses for kibbutz children had been completely eliminated and, in the early 1990s, many kibbutzim began giving vouchers for food that could be used either in the communal dining room, or for purchasing groceries to be prepared at home.

The kibbutz movement experienced a severe decline in their political power in the wake of the Labour Party's defeat in 1977, which was historically affiliated with the kibbutz movement. As a result of Labour's loss of control, the kibbutzim, like many other state-sponsored sectors of the economy, lost economic privileges such as subsidised state loans and exclusive rights to growing certain profitable crops. During the early 1980s, the kibbutzim were instead forced to turn to banks to provide sufficient capital to expand housing for their member's families and increasingly accrued debt to maintain the quality of their amenities (e.g. dining halls). However, in 1985, the Bank of Israel raised interest rates to control high inflation at the same time that the

¹⁰ In some of the early kibbutzim, marriage was forbidden as it was perceived to be unnecessary and a form of possession. The resulting conflicts convinced the members that they would be better served by allowing marriage.

government cut drastically its subsidised loans, which forced the kibbutz movement into the 'kibbutzim crisis' (Abramitzky, 2008).

The crisis forced each kibbutz to function independently and in a financially self-sufficient manner, abandoning the previous security provided by the national government along with the guarantee of support from the broader kibbutz movement. This led to tremendous heterogeneity in the wealth of the kibbutzim and in their ability to maintain their traditional lifestyle. Some kibbutzim had entered highly lucrative manufacturing industries, such as arms production, medical equipment and sophisticated agricultural equipment. Many other kibbutzim were less fortunate. As a result of poor management and excessive debt burdens, they faced crisis. These kibbutzim were forced to trim expenses aggressively, including those related to subsidised child care.

In the mid-1990s, the kibbutzim were granted permission from the movements to begin a process of 'privatisation' to stabilise their finances. Each kibbutz was authorised to hold a vote wherein the membership would choose whether to keep the existing system of shared living costs in place, or to move to a privatised system where families would be responsible for their own cost of living, and earn private income. Privatised kibbutzim pay differential salaries in their enterprises and allow members to work outside the kibbutz, with only a proportion of their external income (typically around 10%) appropriated by the collective. Privatisation also requires each member to pay for food, clothing and housing, though often at subsidised rates, with the subsidy varying by kibbutz.¹¹ Hence, whereas before privatisation there was very little material cost of raising children, after privatisation the family bore almost the entire cost of children, with the exception of services that continued to be provided by the state, such as education and health care. As we will demonstrate, kibbutz financial wealth represented an important factor predicting whether a kibbutz privatised and the degree of cost sharing among members.

2. Empirical Strategy

2.1. Specification

Our strategy is to estimate OLS and 2SLS models where we examine fertility responses to privatisation. In the simplest specification, we compare fertility among individuals at privatising kibbutzim *versus* those that did not.

$$k_i = \alpha + \beta P_j + \Lambda x_i + \epsilon_{ij}, \quad (1)$$

where k_i is the number of children ever born to woman i at kibbutz j , x_i includes years of education and other observable factors that may affect fertility, and P_j is a dummy variable that takes the value 1 if kibbutz j privatised by 2005 and 0 otherwise. For reasons discussed in the following Section, we treat the privatisation outcome as endogenous to fertility considerations and exploit its relationship with kibbutz wealth, denoted W_j .

¹¹ While most kibbutzim granted residents ownership over their current housing at the time of privatisation, families were no longer provided additional free housing upon the birth of a child.

This produces a first-stage specification of the following form:

$$P_j = \alpha + \delta W_j + \Lambda x_i + u_{ij}. \quad (2)$$

We also present estimates of the direct relationship between wealth and fertility (3), and our main specification of 2SLS estimates (4) using the fitted values from (2).

$$k_i = \alpha + \gamma W_j + \Lambda x_i + v_{ij}, \quad (3)$$

$$k_i = \alpha + \gamma P_j + \Lambda x_i + v_{ij}. \quad (4)$$

Our identifying assumption is that kibbutz wealth affects fertility only through the mechanism forcing the kibbutz to privatise. We discuss the validity of this assumption in the following subsection.

2.2. Was Privatisation Exogenous to Fertility Tastes?

In an ideal situation, the econometrician would randomly assign the economic organisation type (fully sharing *versus* privatised) across kibbutzim and compare fertility among the two groups. Unfortunately, this is not the case and a key challenge to our study is to assess whether privatisation can be treated as exogenous to the fertility tastes of its members. As we describe, it is unlikely that privatisation was entirely random and so an instrumental variables strategy is required.

The process of privatisation, which began in 1996, was rapid. For a kibbutz to privatise, 75% of the adult members had to agree to the switch. While in 1995, all of the kibbutzim were fully sharing, by 2005, 70% of the kibbutzim were privatised (see Figure A1 in the online Appendix). The rapid adoption of the new policy regime is beneficial to our identification strategy, as it makes it less likely that other concurrent trends materially affected the financial cost to childbearing. We are also able to observe for a subset of kibbutzim the exact vote share in favour of privatisation.¹² If many kibbutzim converted with relatively close votes on this matter, the privatisation outcome can be thought to have a random component, consistent with a view that privatisation is not strongly correlated with the fertility tastes of the membership. Indeed, the vote shares shown in Figure A2 in the online Appendix, suggest that, to some extent, privatisation was controversial.¹³ However, the potential correlation between fertility preferences cannot be ruled out and suggests that the use of an instrument is necessary to evaluate the impact of privatisation.

In this article, we use measured kibbutz wealth as of 2001 as an instrument for privatisation. As we will show in the empirical results, kibbutz wealth has a very strong first stage relationship with the probability of privatisation, with wealthier kibbutzim avoiding privatisation either entirely or for a full decade after the crisis (Abramitzky, 2008). Insofar as variation in kibbutz wealth is primarily driven by factors exogenous to fertility tastes, such as the kibbutz's industrial profits, this strategy is reasonable.

¹² These data were collected through direct phone calls and emails to kibbutzim, of which a subset had recorded the vote share and provided us the exact share in favour of privatisation. The majority of kibbutzim, unfortunately, did not make these data available to us.

¹³ Discussions with kibbutz administrators suggest that the privatisation initiative was more critical to the elderly, who feared a total collapse of the kibbutz would leave them having no formal pensions and a massive exodus from the kibbutz.

However, if kibbutz wealth directly affects fertility demand, this will invalidate our instrument.

In the context of this discussion, we think it is important to distinguish between the classical income effect that operated on an individual's fertility choice, *versus* the impact that shared kibbutz wealth would have on its members. The classical income effect predicts a positive relationship between private wealth and fertility because, given their budget constraint, parents forego consumption due to the cost of an additional child. Richer households may afford more of both children and consumption goods. In the traditional kibbutz, however, there is no trade-off between children and other consumption goods, at least not from the perspective of the individual household, since the cost of children is borne by the entire kibbutz. Indeed, it may be that households living in a wealthier kibbutz consume more of all the other goods, but having another child does not entail giving up consumption of other goods, as a result of firm adherence to the socialist credo that each member should receive 'according to his needs'. Viewed in this light, it is clear that the classic income effect should not operate in our context.

However, it may be that shared kibbutz wealth does affect fertility demand directly. Shared kibbutz wealth would affect fertility if, for example, kibbutz wealth enabled the purchase of public amenities that had complementarities with children. For example, a swimming pool may make children more attractive to parents. In this context, we would observe a relationship between kibbutz wealth and fertility that was not related to the impact of privatisation on fertility, invalidating our instrument. This can be examined empirically, since we observe fertility and proxies for kibbutz wealth in the period prior to privatisation, where the classical income effect would not have operated. Therefore, we ideally would compare the elasticity of fertility to kibbutz wealth before and after the privatisation movement to evaluate the relevance of this potential concern regarding our instrument. If shared kibbutz wealth affects fertility, it would presumably be correlated with the fertility of older cohorts who had their fertility window before privatisation, whereas if the relationship between kibbutz wealth and fertility was driven by privatisation, it would only be correlated with the fertility of women who were young at the time of privatisation.

In Figure 2, we examine the relationship between kibbutz wealth and average fertility across the kibbutzim for both young and old women. The younger cohorts were aged 25–40 in 1995, which was several years prior to privatisation. In our 'control' group, we observe older women, who were aged 50–75 in 1995, implying that they completed their fertility prior to any anticipation of privatisation. As predicted, we find a strong positive relationship ($p = 0.042$) between kibbutz wealth and fertility among young women but almost no relationship for older women ($p = 0.49$).¹⁴ This is suggestive evidence in support of our instrument but we explore this issue in greater detail in the empirical results, including estimation of models with kibbutz fixed effects and placebo exercises examining cohorts of women who should not have been affected by kibbutz wealth.

¹⁴ For this falsification exercise to be valid, kibbutz wealth must be time-persistent, so that our measure in 2001 is a proxy for the financial situation of the kibbutz when these older women were making fertility decisions. We later present evidence that the kibbutz financial situation a decade earlier was similar to 2001.

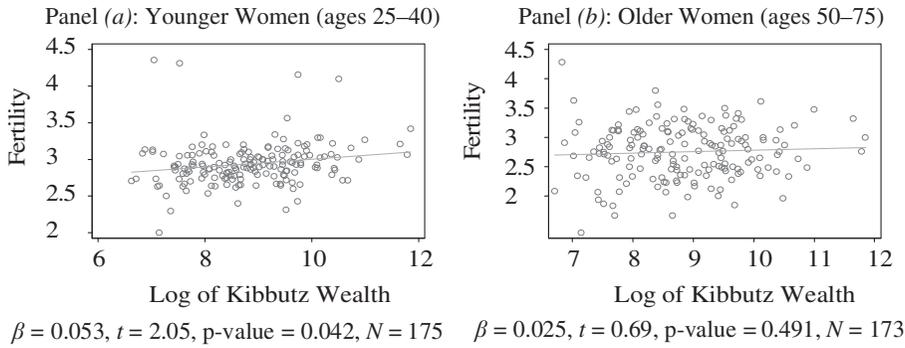


Fig. 2. *Completed Fertility by Kibbutz Wealth among Young and Old Women Living on the Kibbutz*
Notes. The Figure plots the relationship between fertility and kibbutz wealth among young women (aged 25–40) and old women (aged 50–75) in 1995, when the kibbutz faced financial collapse and the privatisation movement began. Wealth data are taken from Matei Hesder Hakibbutzim, the organisation is responsible for the financial restructuring of the kibbutz. *Source.* Israel Central Bureau of Statistics (1995, 2008), Organization for the Financial Restructuring of the Kibbutz (2001).

Finally, note that our reliance on kibbutz wealth as our instrument implies that we are essentially identifying a local average treatment effect, with the effect of privatisation being estimated for kibbutzim induced to privatise due to financial considerations, rather than other factors that might have led to privatisation (Imbens and Angrist, 1994).¹⁵ In this sense, our IV estimates are capturing the fertility decline associated with a ‘forced’ privatisation, which may have a larger impact on fertility than privatisation related to (for example) a dis-preference for income sharing in general.¹⁶

3. Data

Our analysis uses data matched for this project by the Israel Central Bureau of Statistics (CBS) taken from the official Population Registry of Israel, the 1995 and 2008 censuses, and the Bureau’s ‘Income files’ and ‘Matriculation and Higher Education Entitlement files’. For every person living on a kibbutz in 1995, the CBS provided information on the individual’s kibbutz of residence location in 1995 and in 2008, whether they had left, and a set of demographic variables: gender, year of birth, year of immigration, education, personal income in 2008 and the birth year for each of their children.¹⁷ We merge these data with a set of kibbutz-level variables that we assigned to our individual membership data. These include the year of privatisation, the financial wealth of the kibbutz in 2001, the ideological movement that the kibbutz is associated with, the region where the kibbutz is located and the year it was established.

¹⁵ Note that this interpretation additionally requires monotonicity, meaning that wealth only exerted a negative probability on the impact of privatisation (Imbens and Angrist, 1994).

¹⁶ Some argue that the high-tech boom in Israel in the late 1990s led to an increase in the differential wages available in Israeli cities, pressuring the kibbutzim to allow for differential salaries among members to retain members who would be able to earn high salaries in the technology sector. This pressure did not exist in the 1960s and 1970s, where pay in Israel had lower inequality.

¹⁷ The analysis was carried out on a secure terminal in the research library at the Israeli Central Bureau of Statistics, as required by CBS due to the confidential nature of the data.

Privatisation timing, ideological movement and the year of establishment were provided by Shlomo Getz of the Israeli Center for Research on the Kibbutz at Haifa University and kibbutz wealth was obtained from an agency that was established to handle a debt agreement between each kibbutz, the Israeli banks who had lent to the kibbutzim and the State of Israel ('mate hesder hakibbutzim' in Hebrew). Our measure of kibbutz wealth is defined as the total value of a kibbutz's financial portfolio in 2001.¹⁸

Table 1 presents summary statistics for two groups of cohorts of kibbutz members, stratified by their age in 1995 and by whether they were living on a kibbutz that eventually privatised. The first group, kibbutz members ages 25–40, was young enough to adjust their fertility in response to privatisation whereas the older group, ages 50–75, had already completed their fertility. As shown in Table 1, the membership in the kibbutzim that eventually privatised was relatively similar to the population in the kibbutzim that were able to remain sharing kibbutzim along the primary dimensions that one would expect to be correlated with fertility such as age, education and immigrant status. It is worth noting that other life decisions, such as those related to human capital formation (Abramitzky and Lavy, 2014), may have also been affected by privatisation and the resulting increase in returns to education. However, the Table provides suggestive evidence that prior to privatisation the demographic characteristics of the membership at sharing and privatised kibbutzim was broadly similar, both among the younger and older cohorts. One difference observed between the two sets of kibbutzim is the somewhat higher exit rates from kibbutzim that privatised: 28% *versus* 24% for the younger cohort, possibly owing to the better financial condition of kibbutzim that were not forced to privatise costs, or because privatisation implied that members had to re-evaluate whether they wanted to be part of the kibbutz under these new terms.

As expected, the results reflect a large difference in financial wealth among kibbutzim that never privatised. Note that we would ideally have a measure of kibbutz wealth prior to privatisation, since this would better capture the kibbutz's likelihood to privatise and would not be affected by privatisation itself. We unfortunately have no information on kibbutz wealth in this earlier period. However, other measures of the kibbutz's financial situation in 1993 are highly correlated with our wealth measure in 2001, suggesting kibbutz wealth is persistent over time. It is also worth noting that the majority of kibbutzim privatised after 2001 (shown in Figure A1), suggesting that privatisation did not directly affect wealth in 2001. Therefore, we proceed with the 2001 wealth level as the best available measure of the kibbutz's vulnerability to the crisis and its likelihood of privatising.

We also observe that Artzi kibbutzim, which had a stronger leftist orientation on ideological grounds than other movements (e.g. those affiliated with Takam), had lower rates of privatisation. Lastly, we observe that older kibbutzim are somewhat less likely to be privatised, presumably because they are more ideological and wealthier than the kibbutzim established more recently.¹⁹

¹⁸ Our data contain 259 of the 267 kibbutzim. Wealth data is available for 175 kibbutzim.

¹⁹ Note that older kibbutzim also generally had larger plots of land and stronger ties to the government funding sources.

Table 1
Sample Statistics among Ever-married Kibbutz Members

	Ages 25–40		Ages 50–75	
	Sharing kibbutzim	Private kibbutzim	Sharing kibbutzim	Private kibbutzim
	(1)	(2)	(3)	(4)
<i>Panel (a): individual characteristics</i>				
Age	33.68 (4.25)	33.91 (4.24)	59.04 (6.83)	59.39 (7.16)
Male (1 = yes)	0.45 (0.50)	0.44 (0.50)	0.49 (0.50)	0.48 (0.50)
Degree (1 = yes)	0.36 (0.48)	0.34 (0.47)	0.09 (0.28)	0.07 (0.26)
Immigrant (1 = yes)	0.28 (0.45)	0.27 (0.44)	0.51 (0.50)	0.56 (0.50)
Years of education	13.88 (2.27)	13.77 (2.26)	12.48 (3.15)	12.21 (3.21)
Children	3.28 (1.24)	3.00 (1.03)	3.22 (1.41)	3.03 (1.36)
Personal income in 2008 (log 000s)	4.34 (1.31)	4.50 (1.13)	9.51 (1.46)	3.40 (1.46)
Left the kibbutz (1 = yes)	0.24 (0.43)	0.28 (0.45)	0.03 (0.17)	0.04 (0.20)
<i>Panel (b): kibbutz characteristics</i>				
Kibbutz wealth in 2001 (log 000s)	9.44 (1.09)	8.73 (0.97)	9.51 (1.05)	8.76 (0.94)
Kibbutz population	546.40 (249.20)	481.34 (238.60)	618.89 (218.27)	558.96 (244.50)
Year of establishment	1945.05 (14.77)	1945.36 (14.53)	1939.98 (11.21)	1939.92 (10.53)
Artzi (1 = yes)	0.33 (0.47)	0.27 (0.45)	0.43 (0.49)	0.32 (0.47)
Central (1 = yes)	0.17 (0.37)	0.21 (0.40)	0.13 (0.34)	0.21 (0.40)
Observations	6,218	10,037	5,895	9,966

Notes. The sample is composed of individuals ever married ages 25–40 and 50–75 in the 1995 census living on a kibbutz. A kibbutz is classified as private if it privatised any year prior to 2005. Age and status as being a new immigrant are taken from the 1995 census, and children are taken from the 2008 census. Central area includes the area near Tel Aviv and Jerusalem.

Source. Israel Central Bureau of Statistics, Kibbutz Research Center of Haifa, Organization for the Financial Restructuring of the Kibbutz.

4. Privatisation, Kibbutz Wealth, and Fertility

In this Section, we examine the relationship between the increased cost of childbearing and fertility, exploiting variation in the intensity of the kibbutz financial crisis. We posit that wealthier kibbutzim would have been more able to protect members from the increased costs related to children that followed the privatisation process. We reported evidence in Figure 2 consistent with an interpretation that the mechanism by which kibbutz wealth affected fertility was through the mechanism of increased cost sharing. We investigate the relationship between fertility, kibbutz wealth and privatisation more rigorously in Table 2.

Table 2
OLS and 2SLS Models of the Relationship Between Fertility and Privatisation

	Ages 25–29	Ages 30–34	Ages 35–39	Ages 40–44	Ages 45–49
<i>Panel (a): OLS models of the impact of privatisation on fertility</i>					
	–0.209*** (0.073)	–0.161*** (0.054)	–0.208*** (0.052)	–0.106** (0.050)	–0.138*** (0.052)
Observations	1,855	2,873	3,307	3,527	3,620
R ²	0.044	0.035	0.029	0.013	0.020
<i>Panel (b): first stage relationship between privatisation and kibbutz wealth (log thousands)</i>					
	–0.117*** (0.034)	–0.101*** (0.033)	–0.123*** (0.034)	–0.121*** (0.031)	–0.113*** (0.032)
Observations	1,245	1,954	2,291	2,520	2,713
R ²	0.142	0.113	0.128	0.141	0.166
<i>Panel (c): reduced form relationship between kibbutz wealth (log thousands) and fertility</i>					
	0.033 (0.026)	0.065** (0.025)	0.072*** (0.027)	0.047** (0.021)	0.017 (0.026)
Observations	1,245	1,954	2,291	2,520	2,713
R ²	0.034	0.032	0.021	0.015	0.017
<i>Panel (d): 2SLS models of the impact of privatisation on fertility using kibbutz wealth as an IV</i>					
	–0.278 (0.229)	–0.648** (0.319)	–0.587** (0.227)	–0.389** (0.189)	–0.148 (0.227)
Observations	1,245	1,954	2,291	2,520	2,713

Notes. See Table 1 for definitions of variables. Age is classified by the age in 1995. Each cell in the Table represents a coefficient from a separate regression. All regressions include controls (not shown) for a cubic in age, college degree, Artzi, Central, kibbutz population in 1995, and immigrant status. The sample is restricted to ever-married women. Standard errors are heteroscedastic-consistent and clustered at the kibbutz level.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Source. See Table 1.

4.1. Basic Results

In Table 2, we present our results from estimating (1)–(4). In each regression, we include individual controls for a cubic in age, college degree, immigrant status, and controls that vary by kibbutz, including kibbutz size, ideological movement, and location. We present the results stratified by age in the 1995 census, as we have a prior that individuals in their late 20s and early 30s would be most affected by the privatisation of the kibbutzim. These cohorts experienced the decline in kibbutz wealth and would have nearly completed fertility by 2008, which is the last year in our data. These parents and prospective parents would also likely be choosing between having the ‘marginal’ child at this point in their lives. For example, in our sample where average fertility is roughly 3, many parents were presumably considering having a third child in their late 30s. As such, it is likely that some parents were dissuaded from additional fertility due to privatisation.

In panel (a), we present our results using OLS of the impact of privatisation. We restrict our sample to ever-married women living on a kibbutz, whose fertility would be most likely to respond to privatisation. The results indicate a statistically significant relationship between privatisation and fertility, with the pattern across age groups consistent with an interpretation that the most affected cohorts were those beginning their prime fertility window at the time of privatisation. Specifically, our OLS estimates indicate that those aged 35–39 had –0.21 fewer children than their counterparts at kibbutzim that never privatised. However, these results are difficult to interpret as causal; since privatisation

was a decision made by the membership, it is likely endogenous to desired fertility. Another challenge in interpreting the OLS results is that privatisation may have involved regime changes not observed by the econometrician. For example, some privatised kibbutzim kept the communal dining hall free or heavily subsidised for members, implying that food remained free, whereas others did not. Insofar as we cannot observe these decisions, privatisation of costs will be measured with error and the OLS results will understate the magnitude of the fertility response to the reform.

In panel (b), we present the results of the first-stage relationship between privatisation and kibbutz wealth. As anticipated, we find that wealthier kibbutzim were significantly less likely to privatise, with the effect observed across the age groups. The similarity of the first-stage relationship between privatisation and kibbutz wealth across age groups is expected, since the variation in both variables is at the kibbutz level. However, this does confirm that there are no strange age dynamics in which the elderly are living at kibbutzim with very different privatisation rates or were less affected by the financial crisis. Note also that the R^2 suggests that privatisation was considerably affected by the wealth situation, though there is substantial heterogeneity in privatisation not accounted for. The membership's preferences for sharing were presumably also very important in determining privatisation, as some kibbutzim clung to the old model in spite of financial hardship and less tightly knit kibbutzim sought reforms to prevent exit from the kibbutz.

In panel (c), we present the reduced form relationship between kibbutz wealth and fertility. The results indicated a marked relationship, with wealthier kibbutzim having higher fertility. Each additional log point in kibbutz wealth is associated with additional 0.065 and 0.072 children among those aged 30–34 and 35–39 respectively. The effects are largest among those in their peak fertility windows, with more modest effects observed among those aged 25–29 and aged 40–44. This is logical, as many of the older cohorts would have already completed fertility by the time the kibbutzim privatised and some of the younger cohorts may not have completed fertility by the 2008 census (when they would have been 38–42 years old). An alternative explanation for a small effect in the younger group is that the impact of the 'shock' of privatisation in the 1990s had a smaller effect if parents could adjust their planning and human capital formation decisions knowing that they would be living in a privatised kibbutz (Abramitzky and Lavy, 2014).

In panel (d), we present our 2SLS results using financial wealth as an instrument for the probability of a kibbutz privatising. The results indicate a marked decline in fertility due to privatisation. We estimate that among those aged 30–34 and 35–39, the privatisation led to an average fertility decline of 0.65 and 0.59 children respectively, with somewhat weaker results for those aged 40–44, who experienced declines of 0.39 children, and mirroring the patterns in the reduced form results shown in panel (c). This result indicates that among parents in the peak affected age group (35–39), fertility dropped by roughly 20% relative to the 3 child average in the sample.²⁰

²⁰ Note that some of our included control variables, such as having a college degree or one's immigrant status, may be endogenous to fertility decisions. In a set of robustness checks, we verify that our core results are not changed substantially by the omission of these covariates, as shown in Table A1 in the online Appendix. As a second robustness check, we use an alternative measure of the kibbutz financial situation. In Table A2 in the online Appendix, we replace kibbutz wealth in 2001 with a measure of the kibbutz's financial situation in 1993 and reproduce the specifications in Table 2. While the results are largely consistent with the main analysis, the magnitudes are somewhat smaller, possibly due to this alternative measure being less closely associated with the kibbutz's financial situation and the need to privatise the costs of fertility.

Note that this is much larger than our OLS results. We offer two possible explanations. The first possibility is that kibbutzim that were forced to privatise due to financial hardship experienced larger fertility declines than kibbutzim that elected to privatise due to, for example, a preference for not sharing income. A second possibility is that privatisation is a crude measure of the privatisation of costs, missing the elements of cost-shifting that is likely to be highly correlated with kibbutz wealth, and so the 2SLS estimates suffer less attenuation bias. For example, an alternative channel through which kibbutz wealth affected fertility is through its impact on the timing of privatisation. The kibbutzim movement which was in great financial distress privatised first and some kibbutzim which eventually privatised were able to delay this decision, providing women several extra years of fertility under the sharing regime.

In order to examine further how the patterns of fertility were affected by privatisation, we analyse the data exploiting information on each child's year of birth. If privatisation had a causal impact on fertility, the divergence in fertility patterns for a given cohort of women should only emerge after parents internalised the increase in costs to childbearing. In Figure 3, we plot by year the lifetime fertility of the women aged 30–34 in 1995 living on kibbutzim that would eventually privatise as well as the lifetime fertility of women living on kibbutzim that remained sharing. As shown in the Figure, the divergence in fertility patterns begins roughly in 1995, as the movement towards privatisation began and raised expectations of a shift in the cost of raising

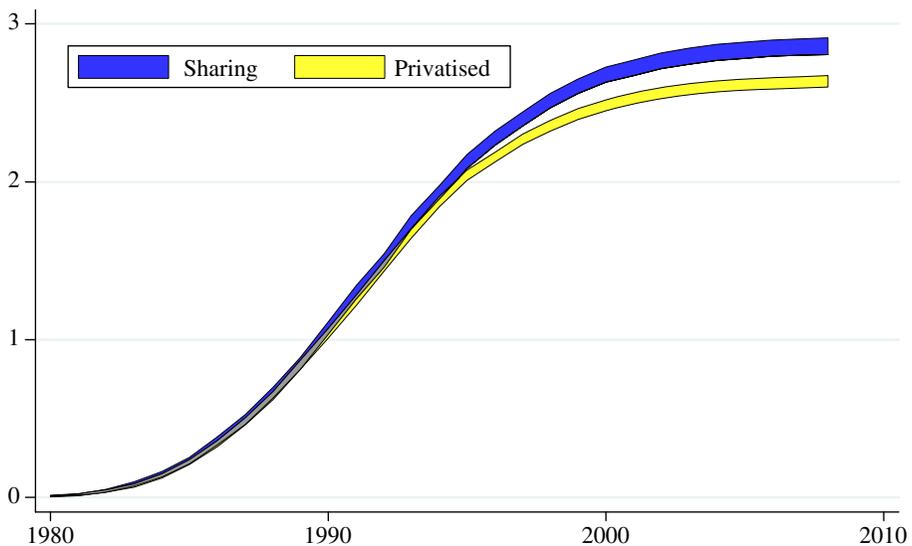


Fig. 3. *Life-cycle Fertility Among Cohorts Born Between 1960 and 1964 Comparing the Sharing Versus Privatised Kibbutz*

Notes. The plot reports the 95% confidence interval band of total lifetime fertility for the five cohorts born between 1960 and 1964, restricted to ever-married women who are living on a kibbutz in 1995. The sample is stratified by whether the woman is observed at a kibbutz that remains sharing or eventually privatised.

Source. Israel Central Bureau of Statistics (1995, 2008).

children from the kibbutz to the family. The timing of the divergence is strongly suggestive that privatisation itself led to changing patterns in fertility, rather than a pre-existing difference in fertility tastes between the women at the two types of kibbutzim. It also suggests that it is the 'marginal' child that is foregone in response to privatisation.²¹

It is worth noting that the lack of an effect on fertility for women in the 1980s suggests that the financial crisis itself did not lead to a reduction in fertility, but rather the privatisation of the costs of children. A previous episode of crisis occurred in the kibbutz movement in 1985, after Israel's bout of hyperinflation in the early 1980s. However, although most of the kibbutzim plunged into a financial crisis in 1985, the costs to individuals of raising children remained near zero until the privatisation process began a decade later. If crisis itself was responsible for the decline in fertility, it would presumably have affected either women in their 20s or 30s in 1985. As shown in Figure 3, the women in their 20s had similar fertility patterns at both types of kibbutzim until 1995. As shown in Table 2, the women in the older age groups (e.g. 45–49) were unaffected by privatisation or by kibbutz wealth, although these women were in their prime fertility window during the 1985 crisis. This 'placebo test' of the earlier crisis suggests that the change in fertility behaviour in the later period was due to the changing nature of cost sharing, rather than the crisis itself. This provides credible empirical evidence in support of our instrument and suggests that kibbutz wealth in 2001 is capturing changes in the costs of childbearing, rather than the effects of the earlier crisis or some other violation of the exclusion restriction.

4.2. *Heterogeneity by Potential Income*

Due to the innovation of differential pay on the kibbutz, privatisation also raised the price of children by raising the value of time. Prior to the reform, time spent with children implied no foregone consumption. After the reform, this was no longer true. Privatisation also had a differential impact on parents with different levels of human capital, both by raising the opportunity cost of time from essentially zero and by allowing parents to keep more of their private income. Parents with above kibbutz average human capital experienced an increase in the price of child services and a large increase in the opportunity cost of their time but benefited from the differential pay allocation. However, for parents with below kibbutz average human capital, they experienced both an increase in the price of raising children and a decline in their income, providing an unambiguous prediction that fertility would decline for this group. Fertility declined by 0.81 children among those without a college degree in the 30–34 age group and a more modest 0.35 decline among those with a degree. One explanation is that selection had existed prior to the reform and the kibbutz was a particularly desirable place to have children among those who would earn less by moving to the city, since they would be shielded most by the sharing of costs. The

²¹ Further evidence confirming that the 'marginal' child was foregone is found in Table A3 in the online Appendix, where we demonstrate that the age at first birth was unaffected by privatisation. This implies that the margin of adjustment was only at higher parities, and privatisation did not affect fertility among younger women having their first child.

second explanation is that the treatment effect of the imposition of private prices on children and reduced income sharing led to reduced fertility.

4.3. *Heterogeneity by Kibbutz Size and the 'Free Rider' Effect*

If the privatisation of costs associated with raising children is what led to the decline in fertility after the reform, it stands to reason that the magnitude of this effect should be largest at larger kibbutzim. The smaller kibbutzim were presumably more able to socially pressure parents to not have very large families, since these costs would be borne by the other members. As such, the reform should have represented the largest change in incentives at large kibbutzim. In order to examine this, we stratify the sample based on whether an individual woman lived at a kibbutz above or below the median kibbutz size. The results in panel (b) of Table 3 indicate that the IV estimates are indeed largest at large kibbutzim. We estimate that among those aged 30–34, privatisation reduced fertility by 0.77 at large kibbutzim, but increased it by a very small and insignificant amount (0.16) at smaller kibbutzim. Interestingly, none of our results are statistically significant at the smaller kibbutzim but are significant and large at the larger kibbutzim. This is consistent with an interpretation that privatisation was necessary to prevent the 'free rider' effect of people having large families in response to not bearing financial costs of doing so, and not facing social pressure to restrain their fertility.

4.4. *Placebo Test Using the Kibbutz Post-fertility Population*

A key challenge in our study is that kibbutz wealth is highly correlated with the price of children but also may be capturing an income effect. As discussed

Table 3
Instrumental Variable Models by Education and Kibbutz Size

	Ages 25–29	Ages 30–34	Ages 35–39	Ages 40–44	Ages 45–49
<i>Panel (a): 2SLS results by education</i>					
Kibbutz members without degree	–0.021 (0.367)	–0.808** (0.353)	–0.501** (0.238)	–0.542** (0.241)	–0.068 (0.257)
Observations	703	1,192	1,513	1,831	2,178
Kibbutz members with degree	–0.494 (0.299)	–0.346 (0.426)	–0.774** (0.335)	–0.017 (0.231)	–0.479 (0.387)
Observations	542	762	778	689	535
<i>Panel (b): 2SLS results by kibbutz size</i>					
Kibbutz members at small kibbutzim	0.685 (0.591)	0.161 (0.525)	–0.49 (0.377)	0.014 (0.358)	–0.022 (0.443)
Observations	639	1,087	1,235	1,251	1,216
Kibbutz members at large kibbutzim	–0.590** (0.252)	–0.771** (0.300)	–0.555** (0.237)	–0.469** (0.197)	–0.13 (0.236)
Observations	606	867	1,056	1,269	1,497

Notes. See Table 1 for definitions of variables. The regressions are estimated in the manner specified in Table 2. The models in panel (a) are estimated separately among kibbutz members with and without a degree and those in panel (b) are estimated separately among kibbutz members at kibbutzim below and above the median kibbutz size. Sample is restricted to ever-married women. Standard errors are heteroscedastic-consistent and clustered at the kibbutz level. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source.* See Table 1.

previously, there is considerable qualitative evidence that the privatisation's reforms were largely related to increasing cost sharing among parents and not related to an income effect. However, as a falsification exercise, we examine the correlation between kibbutz wealth and fertility among older kibbutz residents who had already completed fertility. Presumably, an income effect would operate in a similar manner before and after the reform, suggesting that regressing kibbutz wealth on fertility among the population with completed fertility represents a natural way of examining the importance of income effects in this context. In Table 4, we present the same regressions as in Table 2, except that here we study these correlations for women who were at least 50 years old in 1995. Although fertility is somewhat lower among women living in kibbutzim that was later privatised, the magnitude is much smaller, about a third of the OLS results compared to Table 2, and are not significant for any of the cohorts. This is consistent with an interpretation that our main results are capturing the price effect of the reform, which did not have any bearing on the prices faced by those aged 50–74. It seems unlikely that the relationship between kibbutz wealth and fertility would change so dramatically after the reform, if it did not occur through the mechanism of the privatisation of costs of childbearing.

Table 4
Placebo Test using Elderly Kibbutz Members

	Ages 50–54	Ages 55–59	Ages 60–64	Ages 65–69	Ages 70–74
<i>Panel (a): OLS models of the impact of privatisation on fertility</i>					
	–0.087 (0.06)	–0.108 (0.08)	–0.038 (0.09)	–0.139 (0.09)	–0.076 (0.10)
Observations	2,530	1,727	1,427	1,287	1,064
R ²	0.024	0.053	0.053	0.031	0.023
<i>Panel (b): first stage relationship between privatisation and kibbutz wealth (log thousands)</i>					
	–0.098*** (0.04)	–0.104*** (0.04)	–0.154*** (0.03)	–0.172*** (0.03)	–0.116*** (0.04)
Observations	1,927	1,357	1,108	991	778
R ²	0.129	0.118	0.183	0.257	0.135
<i>Panel (c): reduced form relationship between kibbutz wealth (log thousands) and fertility</i>					
	0.006 (0.03)	0.02 (0.04)	0.042 (0.05)	0.035 (0.05)	–0.032 (0.04)
Observations	1,927	1,357	1,108	991	778
R ²	0.035	0.055	0.055	0.036	0.032
<i>Panel (d): 2SLS models of the impact of privatisation on fertility using kibbutz wealth as an IV</i>					
	–0.058 (0.32)	–0.198 (0.38)	–0.264 (0.31)	–0.197 (0.26)	0.249 (0.37)
Observations	1,927	1,357	1,108	991	778

Notes. See Table 1 for definitions of variables. Age is classified by the age in 1995. Each cell in the Table represents a coefficient from a separate regression. All regressions include controls (not shown) for a cubic in age, college degree, Artzi, Central, kibbutz population in 1995, and immigrant status. Sample is restricted to ever-married women. Standard errors are heteroscedastic-consistent and clustered at the kibbutz level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source. See Table 1.

4.5. *Differences in Differences*

In this subsection, we present an alternative specification where we estimate the impact of privatisation on fertility in a differences in differences (DID) set-up, where we use older cohorts as a control group. This enables us to consider models which include kibbutz fixed effects, which absorb unobserved time-invariant features of a kibbutz. In order to estimate these models, we include all women aged 25–40 as our young cohort, and women aged 41–55 as the control group. In this set-up, the treated group is composed of young women living on a kibbutz which later privatizes. Note that in order to have sufficient observations to estimate these models, we pool women who are at different stages in their fertility cycles. Among our younger women, for example, those in their 20s in 1995 may not have completed fertility by 2008. Among those nearing 40 in 1995, some made their fertility decisions unaware of the impending privatisation. Both factors suggest that the coefficient estimates in this exercise will be smaller than our baseline results. However, evidence that fertility fell using a fixed effects strategy contributes to the evidence that privatisation reduced fertility.

In Table 5, we present the results of the DID regressions for both pooled OLS (column 1) and a model with kibbutz fixed effects (column 2). In each specification, we regress each woman's fertility in 2008 on a dummy indicator for her being young in 1995 (aged 25–40), a dummy indicator for her living on kibbutz that eventually privatised, and an interaction of the two, in addition to control variables from the main specifications. Our coefficient of interest here is the interaction of being a young woman at a kibbutz that privatised. In the first specification, we observe that kibbutzim that eventually privatised had lower fertility (–0.117), younger women had higher fertility (0.104), and the interaction of the two variables is negative (–0.082), and statistically significant at the 1% level. In our preferred specification with kibbutz fixed

Table 5
Differences in Differences and Fixed Effects Estimates of Privatisation's Impact on Fertility

	OLS	Kibbutz fixed effects
	(1)	(2)
Young woman in 1995 and living at a kibbutz that privatises	–0.082*** (0.03)	–0.079** (0.03)
Young woman in 1995 (1 = woman aged 25–40)	0.104** (0.04)	0.093** (0.04)
Living at a kibbutz that privatises (1 = kibbutz privatises)	–0.111*** (0.02)	N/A
Observations	18,062	18,062
R ²	0.04	0.03

Notes. Controls (not shown) in column (1) include a cubic in age, degree, Artzi, Central, kibbutz population in 1995 and immigrant status. The first row reports the coefficients on a variable which represents the interaction term of being a young woman living on a kibbutz in 1995 and living on a kibbutz that (eventually) privatises. The second and third rows report the coefficients on the main effect of (2) being a young woman (ages 25–40) and (3) living on a kibbutz that privatises. Sample includes ever-married women aged 25–40 (younger cohorts) and ever-married women aged 41–55 (older cohorts). In column (2), fixed effects for 259 kibbutzim are included. Standard errors are heteroscedastic-consistent and clustered at the kibbutz level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source. See Table 1.

effects, we observe that fertility declined by 0.079 children at the kibbutzim that privatised, significant at the 5% level.

The smaller magnitude of this estimate relative to our findings in Table 2 may be explained by several factors. First, it may be due to the aforementioned pooling of women across different age groups, who may have lower elasticity of demand. A second possibility, which may also explain why our 2SLS estimates are larger than the OLS, is that the 2SLS results are tracking the 'true' cost of children more closely by exploiting variation in kibbutz wealth that is missed by the dichotomous variable of whether the kibbutz ever privatised. It may be that kibbutzim varied in their privatisation of childbearing costs in a manner that is not perfectly captured by our dichotomous privatisation variable. For example, if wealthier kibbutzim were able to privatise later, this may have resulted in higher fertility among women than at poorer kibbutzim which were forced to privatise earlier. Both types of kibbutzim would be classified as having eventually privatised, in spite of the wealthier kibbutzim potentially having an extra decade in which fertility decisions were made in the sharing context.

In the online Appendix, we present a similar analysis with old kibbutz members, comparing those aged 50–62 with those aged 63–74, and find no significant difference in fertility among younger cohorts at kibbutzim that later privatise (Table A4 in the online Appendix). This is consistent with an interpretation that fertility behaviour was similar until the privatisation of costs at financially strapped kibbutzim and provides further evidence that privatisation, and not the financial crisis that preceded it, is responsible for the decline in fertility among women at these kibbutzim.

5. Wages, Fertility, and Exit from the Kibbutz

In the wake of the financial crisis, the kibbutzim experienced a large exodus between 1995 and 2008. The patterns of entry and exit at the kibbutzim, and the relationship with an individual's productivity, are richly described by Abramitzky (2008). As predicted by a simple Roy model, Borjas (1987) argues that immigration results in higher skilled individuals sorting into countries with higher returns to skill. Abramitzky argues that this fits the pattern observed at the kibbutzim very well, as they struggled to prevent the exit of their most skilled members in his sample, which was between the census surveys in 1983 and 1995. We use this framework but add in the fertility dimension to the model. For young parents, a salient feature of the kibbutz was the collective bearing of the burden of expenses related to children. Insofar as individuals vary in both their productivity and their desired fertility, the decision to exit the kibbutz may be related to the anticipated costs of fertility. This type of sorting implies that focusing narrowly on the response of fertility to taking price as given fails to capture the full relationship between fertility and prices. Examining mobility in and out of the kibbutz provides a unique opportunity to observe people choosing the price they will face for children. In Figure 4, we present a hypothetical relationship between entry and exit from the kibbutz in which members are choosing whether to leave the kibbutz based on their potential wage and their desired fertility. As displayed in the Figure, we posit that individuals with high wages and low desired fertility will be most likely to leave the kibbutz, as they will lose the most from income sharing and benefit least from subsidised child costs. Conversely, those staying at the kibbutz will be those

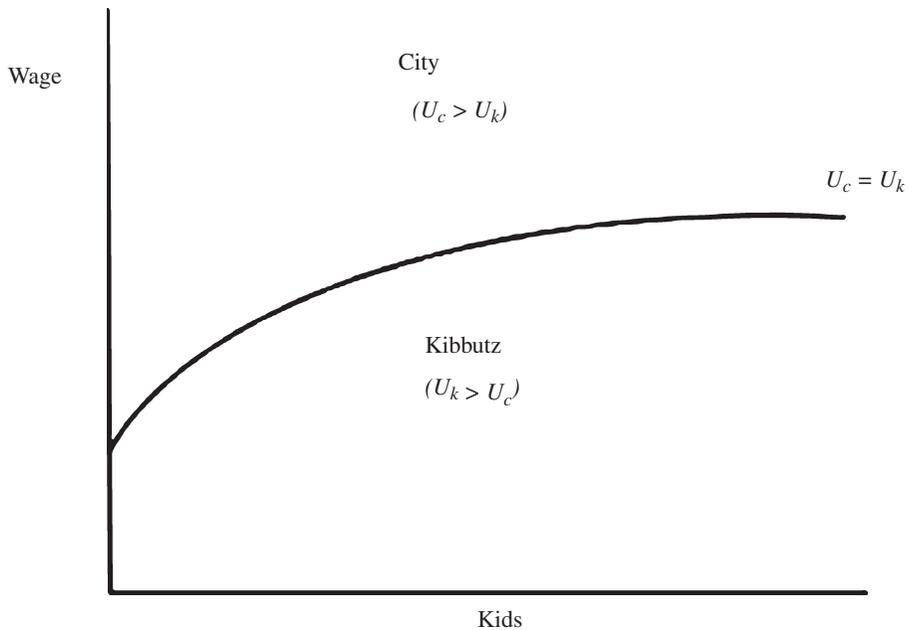


Fig. 4. *Hypothesised Relationship Between Individual Wages, Desired Fertility, and Exit from the Kibbutz Notes.* The Figure above represents a hypothetical relationship between an individual's potential wage outside of the kibbutz, desired fertility, and exit from the kibbutz. The region above the line is the locus of points where an individual would choose to exit the kibbutz.

who provide the least to the public budget constraint – low income and high fertility couples.

These predictions on exit from the kibbutz are borne out by the regression results shown in Table 6.²² In the regression, we include kibbutz fixed effects and examine how the probability of exit is affected by an individual's realised income and total lifetime fertility in 2008, after controlling for the available demographic covariates. We estimate that each child reduces exit probability by 5.9 percentage points from sharing kibbutzim and 4.2 percentage points from privatised kibbutzim. The exit probabilities are also more steeply increasing with respect to individual income at the sharing kibbutzim. A 1 log point increase in income increases exit probability by 7.6 percentage points at sharing kibbutzim and 4.8 percentage points at privatised kibbutzim. It is also worth noting that the results show stronger effects on exit probability of income for men and fertility for women. This may be related to women factoring in their husband's income when making exit decisions and so the smaller coefficient is related to a smaller share of household income. It also may reflect stronger preferences with respect to desired fertility than consumption.

²² In Figure A3 in the online Appendix, we plot the matrix of income/fertility combinations and the exit rates from each cell for both the sharing kibbutzim and the privatised kibbutzim. High income and low fertility couples are most likely to exit and low income/high fertility couples most likely to stay at both sharing and privatised kibbutzim. But the pattern is particularly striking at the sharing kibbutzim, where we observe exit rates rising sharply with individual income and falling with fertility.

Table 6
Predicting Exit from the Kibbutz

	Sharing kibbutzim			Private kibbutzim		
	All	Men	Women	All	Men	Women
Children	-0.059*** (0.015)	-0.053*** (0.018)	-0.064*** (0.015)	-0.042*** (0.009)	-0.037*** (0.012)	-0.048*** (0.009)
Log salary (2008)	0.076*** (0.007)	0.094*** (0.011)	0.059*** (0.010)	0.048*** (0.005)	0.057*** (0.008)	0.035*** (0.007)
Observations	2,717	1,121	1,596	6,821	2,978	3,843
R ²	0.203	0.251	0.19	0.134	0.173	0.132

Notes. The sample is composed of ever-married individuals aged 25–40 observed in a kibbutz in 1995. The outcome in all regressions is a dummy for having left the kibbutz by 2008. Salary is taken from 2008. A kibbutz is classified as private if it privatised at any point prior to 2005. All models include kibbutz fixed effects and controls (not shown) include a cubic in age, degree, and immigrant status. Standard errors are heteroscedastic-consistent and clustered at the kibbutz level. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source. See Table 1.

These results should be interpreted with caution, however. Since exit decisions from the kibbutz are in part based on a couple's desired fertility, fertility and exit are simultaneously determined and the coefficients cannot be interpreted as reflecting causal relationships. They do, however, suggest that privatised kibbutzim represent a 'watered down' kibbutz in which fertility tastes and income potential have more modest effects on exit probability.

We examine the characteristics of who stays and leaves the kibbutzim in greater depth in Table 7. The results highlight key differences across the two groups indicating that fertility preferences may be importantly linked to the decision to exit the kibbutz. First, it is worth noting that leavers have fewer children than stayers, both at sharing and privatised kibbutzim. We also observe higher individual income among leavers than stayers at both types. This is logical, as both kibbutz types offered cheaper-than-city child services but higher-than-city tax rates on income. Second, the fertility difference between stayers and leavers is slightly larger among those leaving a sharing kibbutz. One explanation is that only those with very low desired fertility (or very high potential income) would leave a sharing kibbutz. Since those who leave the sharing kibbutz are foregoing a larger subsidy to children, they presumably are more different from stayers than those who remain on a privatised kibbutz. However, since these individuals may be leaving the sharing kibbutz for reasons other than concerns over the prices of raising children, such as for income opportunities or a preference for not sharing, this evidence is merely suggestive.

In order to examine the relevance of our hypothesised model of exit behaviour from the kibbutz further, we analyse the decisions of Israelis to emigrate in Table 8. Like a kibbutz, Israel offers its residents highly subsidised fertility and relatively low income inequality. A pressing issue in Israel is the exit of talented individuals, who can earn relatively higher after-tax wages in the US (Gould and Moav, 2007). However, fertility is also more costly in the US, since the state does not provide the same levels of subsidy in

Table 7
Sample Statistics among Stayers and Leavers

	Sharing kibbutzim			Private kibbutzim		
	Stayed	Left	Difference	Stayed	Left	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
Children	3.33	3.11	0.22	3.06	2.86	0.20
Log salary [†]	4.14	4.64	-0.50	4.41	4.69	-0.28
Kibbutz wealth [‡]	9.48	9.14	0.34	8.77	8.62	0.16
Degree (1 = yes)	0.32	0.43	-0.11	0.29	0.46	-0.16
Years of education [§]	13.74	14.31	-0.57	13.58	14.27	-0.69
Age	34.10	32.39	1.71	34.28	32.94	1.34
Male	0.44	0.48	-0.04	0.43	0.47	-0.04
Observations	4,700	1,518		7,215	2,822	

Notes. A kibbutz is classified as private if its privatises prior to 2005. Sample is composed of individuals aged 25–40 in the 1995 census. [†]Kibbutz wealth is measured in thousands of shekels and available for 2001. [‡]Personal salary information is only available in 2008. Age, marital status, and status as being a new immigrant are taken from the 1995 census. Degree refers to having a bachelor's degree (or more). [§]Years of education are available in 1995 and only for 20% of the sample. Children are taken from the 2008 census. Central area includes the area near Tel Aviv, population centres south of Tel Aviv ('Shfela'), and Jerusalem. All differences between the groups are statistically significant at the 1% level.

Source. See Table 1.

Table 8
Predicting Exit from Israel

	All cohorts	Born 1930–9	Born 1940–9	Born 1950–9	Born 1960–9
	(1)	(2)	(3)	(4)	(5)
Children	-0.336*** (0.02)	-0.105** (0.04)	-0.228*** (0.05)	-0.227*** (0.03)	-0.483*** (0.04)
Years of education	0.110*** (0.01)	0.023* (0.01)	0.014 (0.02)	0.052*** (0.01)	0.261*** (0.03)
Observations	139,858	9,744	19,219	54,693	52,730
R ²	0.006	0.001	0.002	0.002	0.006

Notes. The sample is composed of all ever-married Jews born in Israel who are observed in the 1995 census sample and have valid reported years of education (long form survey). The dependent variable is a dummy for having emigrated from Israel. The coefficients are inflated by a factor of 100. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source. Israel Central Bureau of Statistics (1995).

health care and education.²³ As observed in Table 8, those who exit Israel are more educated but have lower fertility than those who stay in Israel.²⁴ We observe that each child reduces the probability of leaving Israel by 0.34%, whereas each year of education increases the probability by 0.11%. Similar to the results in Table 6, these results suffer

²³ Note that many Israeli Jews send their children to religious schools that are funded by the state. In the US, private Jewish schools are very expensive and so, for parents who would not use the US public schools, the difference in costs of schooling is large.

²⁴ This pattern is also shown graphically in Figure A4 in the online Appendix, which indicates that those who stay in Israel are of lower human capital and higher fertility than those who emigrate, very similar to how kibbutz residents compare to those who exit.

from simultaneity bias. Since the decision to leave Israel and fertility are likely jointly determined, the coefficients cannot be interpreted in a causal manner. They do, however, suggest that the types of Israelis who leave Israel are similar to those who leave the kibbutz: those with relatively high income and relatively low fertility.

Interestingly, this pattern where individuals with high potential income exit Israel has become more striking in the last several decades, as rising wage inequality in the US presumably led to an even stronger selection effect among the most talented Israelis. For example, among individuals born in the 1960s, each year of education increases exit probability by 0.48%, whereas each child reduces the probability by 0.26%. While most discussion of Israeli emigration focuses on the high human capital of this group, they clearly exhibit lower fertility than those who stay as well (Gould and Moav, 2007).

6. Conclusion

This article examines the privatisation of Israeli kibbutzim and the impact of the reform on fertility and the importance of fertility consideration in the entry and exit of its membership. In our analysis, we exploit the large impact of kibbutz wealth on the decision to privatise and the degree of cost sharing forced among young parents. Specifically, wealthier kibbutzim were able to leave the generous subsidies in place, and able in some circumstances to avoid privatisation altogether. This rapid transformation in the late 1990s and early 2000s provides a 'natural experiment' to observe the impact of a large increase in the price of children on fertility. We present evidence that privatising the costs of childbearing has a large impact on fertility, with fertility falling by as much as 0.65 children among young parents, or roughly 20% relative to the 3 child mean in the sample. We find the largest effect among those who had low human capital and would be most adversely affected financially by the reform which also led to differential wages. The effects on fertility are also larger at bigger kibbutzim, where social pressure to curb fertility would presumably be lowest and the need for financial incentive mechanisms, such as prices, would be greatest.

We complement our analysis of fertility responses to privatisation by examining how young parents and prospective parents make entry and exit decisions. Specifically, we expand on Abramitzky (2009), who presents evidence in favour of the Borjas (1987) selection model and considers how children affect the decisions of couples to stay or leave the collective. Our results suggest that desired fertility may be an important consideration. High fertility and low productivity members were most likely to stay at the kibbutzim, pressuring the kibbutzim financially and forcing all but the wealthiest to privatise costs to diminish the exit of low fertility and high productivity members. This pattern is also found among Israeli emigrants, who are often of higher income and lower fertility than those who stay, putting pressure on the national budget.

We interpret the results as indicating that the kibbutz privatisation initiative was at least motivated by stabilising the kibbutz population and preventing the 'free riding' observed at the full-sharing kibbutz. Only at wealthy kibbutzim could this 'death spiral' be prevented, as the kibbutz's capital provided for a system of sufficient

generosity that made staying attractive. Our study builds on existing scholarship that has found mixed results regarding the importance of price in fertility decisions, and indicates that very large price changes on fertility can have very large effects. We interpret this as evidence of the economic nature of fertility decisions, emphasising the role of incentives relative to other factors, such as culture. Our results also highlight the endogeneity of cost-sharing regimes *vis-à-vis* children, as voters in democratic countries may be choosing the price of children to suit the tastes of their citizenry.

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Additional Supporting Information may be found in the online version of this article:

Appendix A. Data Sources and Additional Empirical Results.

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