The Impact of Extended Reproductive Time Horizons: Evidence from Israel's Expansion of Access to IVF

Naomi Gershoni* and Corinne Low†

PRELIMINARY AND INCOMPLETE

May 14, 2015

Abstract

Women who delay childbearing to make time-costly career and educational investments face a lower probability of having a child, since women's fertility significantly declines with age. In addition, they may be penalized on the marriage market for their lower "reproductive capital" and end up with a lower-quality spouse. Israel's 1994 policy change to make *in vitro* fertilization and other assisted reproduction technologies free created an exogenous shock to later life fecundity, providing women with a form of insurance against age-related infertility. This natural experiment can be used to study the impact of expected fertility decline on women's educational choices and marriage outcomes. We find that following the policy change, women are more likely to marry later, complete college education, and achieve post-college education. Moreover, after the change, the observed decrease in spousal quality for women who get married in their thirties rather than their twenties dissipates. This suggests that both men and women's decisions were affected by their updated perception of women's fertility prospects. More generally, our findings indicate that the asymmetry in later life fertility between men and women is an important force in explaining women's educational, career, and marriage outcomes, and thus policies that protect against later life infertility can have far-reaching impacts.

1 Introduction

Women who begin having children later in life face a lower probability of conception. Unlike men, whose fertility deteriorates gradually with age, women experience a dramatically sharp decline in fertility starting in their mid thirties until a complete loss of fertility at menopause. This asymmetry in later life fertility between genders may be a major source of inequality in outcomes

*Tel Aviv University, The Eitan Berglas School of Economics. Naomiger@post.tau.ac.il.

†University of Pennsylvania, The Wharton School. Corlow@wharton.upenn.edu. We are grateful for the advice and guidance of Analia Schlosser, Pierre-Andre Chiappori, Cristian Pop-Eleches, and Yoram Weiss. We thank Tal Gross, Alma Cohen, David Weiss, and Maya Rossin-Slater for helpful comments, and Ting Wang for excellent research assistance. We thank the staff of Tel Aviv University and the Israeli Central Bureau of Statistics for facilitating data access. Funding from the Wharton Pension Research Council, the Wharton Dean's Research Fund, and the University of Pennsylvania Population Studies Center is gratefully acknowledged.

and achievements, as it may discourage women from making time-costly career and educational investments that would delay marriage and childbearing. At the same time, women who make such investments may be penalized on the marriage market for their lower "reproductive capital," as shown in Low (2014). Ideally, to understand the impact of expected fertility on education decisions and marriage outcomes, we would observe women who were randomly assigned to have a longer or shorter period of fecundity, measuring differences in educational investments, age at marriage, and quality of marriage match. In lieu of perfect random assignment, Israel's unprecedented decision to provide full health insurance coverage for *in vitro* fertilization (IVF) and other assisted reproduction technologies through the 1994 National Health Insurance Law provides a natural experiment: after the policy change, women, and their prospective partners, expected a longer period of fecundity than before. [1] In the ensuing years, Israeli families made wide use of these services, with 1,657 IVF procedures per million people in 2002, compared to 126 in the United States (Collins, 2002). It should be noted that we focus on IVF funding rather than other ARTs since this was the technology that most significantly affected chances of conception for older women. Moreover, costs of IVF are much higher than those of other infertility treatments, making funding a crucial determinant of usage.[2]

We hypothesize that with public access to IVF making it easier for older women to conceive, younger women perceived a changed cost of career investments, resulting in increased education and earnings for women. Moreover, potential partners' estimation of women's fecundity horizons gradually changed, improving older women's marriage market outcomes. Note that our theory of potential effects does not rely on affected women using the technology themselves. Rather, we propose that women, and their potential partners, view access to the technology as a form of insurance against age-related infertility. Moreover, even without specific knowledge of the policy change, the large amount of media attention to couples having children older, and the experience of observing individuals becoming parents at older ages, may have created a *general* shift in beliefs regarding the time horizon of fertility, by both women and their potential partners. Thus, women's decisions may be impacted whether they eventually use the technology or not.

Using data from the 2008 Israeli population census, we study educational outcomes for birth cohorts before and after the policy change. We also use retrospective marriage data to examine how age at first marriage varied for women getting married before and after the date of the policy change. Finally, we match women to their spouses in the data, and examine how the "quality" of marriage, measured by husband's wages controlling for a variety of factors, changed for women who married before the age of 30 and after. Our identification strategy relies on looking for gender differential

[1] In addition to the effect of the policy change itself, there was also a concurrent improvement in technology and widespread media attention to assisted reproduction surrounding the time of the policy change.

[2] In the US for example, while costs of ovarian simulatory drugs are a few hundred dollars, a single IVF treatment cycle costs around 10,000 dollars and the overall cost of IVF treatments per delivery is estimated to be higher than 50,000 dollars (**?**).

changes in education rates and age-at-first-marriage, presuming that men's marriage timing and educational decisions should not be impacted by the policy change (or at least impacted drastically less than women's). For marriage market outcomes, we compare women who marry at an older age, whose reproductive capital significantly increased due to the policy change, versus women who marry when younger, whose reproductive capital remained essentially unchanged. Additionally, we look across genders in a triple difference specification.

For each of these outcomes, we examine changes over time starting in the year of the policy change, because while the law changed in a single year, awareness may have built up over time, as people observed more cases of older women having children and more usage of in vitro fertilization. The gradual information dispersion may be especially salient for outcomes that involve equilibrium on the marriage market, which crucially relies on men's perceptions of potential wives' reproductive fitness and may take longer to update.

We find statistically significant evidence that after the policy change women completed more education and delayed marriage. We also find a large change in marriage outcomes for women who marry when older, with the "older marriage" penalty, in terms of spousal income, drastically reducing. These findings are confirmed by event study graphs, that show a gender-differential change in education, starting exactly for the cohorts who were most likely to enter school the year of the policy change, and in age-at-first-marriage, starting the year of the policy change. These results bolster the theory that the time cost of education in terms of lost fertile years may be an important factor in women's educational decisions, and that fertility may be a valuable "asset" in attracting a more high-powered spouse on the marriage market. This research has implications for the economic understanding of women's career investment decisions, of the costs of aging to women and of income inequality between genders. It can also inform an analysis of the welfare implications of a policy like universal access to IVF, which appears to not only impact the women using IVF, but rather, affect all women who are insured against future infertility by access to the technology.

This research is related to previous literature on the impact of fertility on the timing of marriage and childbearing, and on educational, career, and marriage outcomes. The link between fertility and career and education has been up to now explored in the literature as a case of too much, rather than too little, fertility. This literature establishes that there *is* a career-family tradeoff, and therefore a payoff to delayed fertility in labor market outcomes (Loughran and Zissimopoulos, 2009; Buckles, 2008; Blackburn et al., 1993; Taniguchi, 1999; Gustafsson, 2003; Miller, 2011; Avellar and Smock, 2003; Wilde et al., 2010; Goldin and Katz, Goldin and Katz; Adda et al., 2011).

On the other hand, delaying fertility in favor of career investments could lead to problems on the marriage market, as suggested by Siow (1998); Dessy and Djebbari (2010); Bronson and Mazzocco (2013). Low (2014) shows that in the US in the '70s and '80s, women who earned graduate degrees married poorer spouses than women with only college degrees, potentially due to their lower fertility, and thus lower suitability as spouses. Moreover, Low's online dating experiment demonstrated that men valued fertility in potential dating partners—each year a woman aged was worth $7,000 in annual income to potential partners, with this effect being driven only by men who had no children already and had accurate knowledge of the age-fertility gradient. Low's theoretical work suggested, though, that if the decline in later-life fertility is abated, these marriage market penalties should also lessen. This, in turn, could lead to better marriage outcomes for women who delay marriage, and, in turn, more women choosing to do so.

Just as Goldin and Katz (Goldin and Katz) showed that a technology that allowed fertility delay led to more educational investments and better career outcomes, we can imagine that a technology that insures against infertility following a delay could create similar gains. However, the research on assisted reproduction technology has, to date, mainly focused on outcomes of women who actually use the technology, rather than younger women who perceive it as offering insurance.

A series of papers use the variation in the mandated insurance coverage of assisted reproductive technology (ART) across US states and over time to determine how more coverage affects IVF usage and outcomes (Vlez et al., 2014; Hamilton and McManus, 2012; Bitler and Schmidt, 2012, 2006; Bundorf, Henne, and Baker, Bundorf et al.; Buckles, 2013; Schmidt, 2007, 2005), offering suggestive evidence that when coverage goes up, more women use IVF, fertility rates for older mothers go up, and multiple births rise.

A much more limited literature explores the impact of such mandates on the timing of marriage and childbearing, which allows for the possibility that infertility treatments may impact women beyond those who actually use them to conceive. Ohinata (2011) finds that infertility insurance mandates resulted in 1-2 year delays in first birth among highly educated white women, and Abramowitz (2012, 2014) shows that increased access is associated with marriage delays for white women. The only evidence on education and career outcomes comes from Buckles (2007), which finds suggestive evidence that infertility insurance mandates led to increased labor force participation for women.

However, the approach of using state-year mandates to explore these perception-based outcomes has some significant limitations, especially when discussing general equilibrium shifts in perceptions of both men and women. Since these are small and localized policy changes, awareness is expected to develop very gradually, especially with young women who may not even be managing their own insurance yet. More importantly, there are mixed evidence on how state health insurance mandates influence insurance and labor market equilibrium. At least some suggest that mandates increase insurance premiums more significantly for the most affected workers and therefore negatively affect their wages and employment.[3]

Thus, our paper offers the first opportunity to study a large-scale policy change that may have

[3]In some cases workers would be willing to accept a wage cut that embodies the insurance benefit. In the case of infertility mandates the most affected workers are older women. **?** presents evidence on infertility mandates suggesting that wage shifts will not fully offset the increased premium costs for women in affected age groups, hence labor force participation for this group decreases.

changed not just the actual chance of getting pregnant when older, but, crucially, the beliefs about this chance by both young women considering career investments and men considering marrying them later on. Moreover, this is the first paper to empirically study the impacts of a shift in later-life fertility potential on outcomes resulting from the decision to delay childbearing, including educational investments and the marriage match quality. Since policy applies equally to all and insurance is publicly funded, there are no concerns that the observed changes in women's career investment are driven by a shift in employers' costs and preferences for employing older women.[4]

Because there are limited sources for exogenous shifts in women's later-life fertility, the importance of the asymmetric fertility trend across genders in explaining women's career investment decisions and subsequent outcomes is not well understood. In particular, if "reproductive capital" has economic value, its depreciation may represent a loss to women that will influence earlier investment decisions. Our findings indicate that mitigating older women's expected fertility decline alters women's educational and marriage decisions. Furthermore, the marriage market responds to the change, in a way that measurably impacts matching along the dimension of spousal income, showing the dollars-and-cents value of reproductive capital. Together, we hope these findings will lead to a better understanding of the importance of biological dimorphism in economic divergence, and the potential role of policies to blunt this impact.

The remainder of the paper proceeds as follows: Section 2 discusses the empirical setting for our project and the data we use; Section 3 presents results and tests their robustness, and Section 4 concludes.

2 Setting and Empirical Approach

2.1 IVF in Israel

Since the emergence of IVF technology in the early 80s, Israel has been in the forefront of research and actual usage of IVF.[5] However, usage of the technology was still relatively low, and technological advances were slow in coming. In 1994 a significant change in funding policy of assisted reproduction in Israel, accompanied by technology improvements and greater public knowledge of IVF availability, caused a sharp increase in IVF usage. The 1994 law provided *full funding* of all assisted reproduction services or up to two "take-home babies," the most generous IVF coverage anywhere in the world. Figure 1 shows the sharp increase in live deliveries using IVF following the 1994 policy change. Although the benefits of the law came into effect in 1995, Figure 2 shows that the increase in the number of IVF treatment cycles began in 1994, with the large amount of press coverage regarding IVF availability.[6]

[4] Hence observed changes in women's career investment cannot be a result of the changed terms in labor markets

[5] The first Israeli "test tube baby" was born in 1982. She was the fifth worldwide.

[6] The common measure of usage is the number of IVF treatment cycles relative to the size of fertile women population. Since there is no documentation of the number of women treated each year, it is impossible to assess

Figure 1

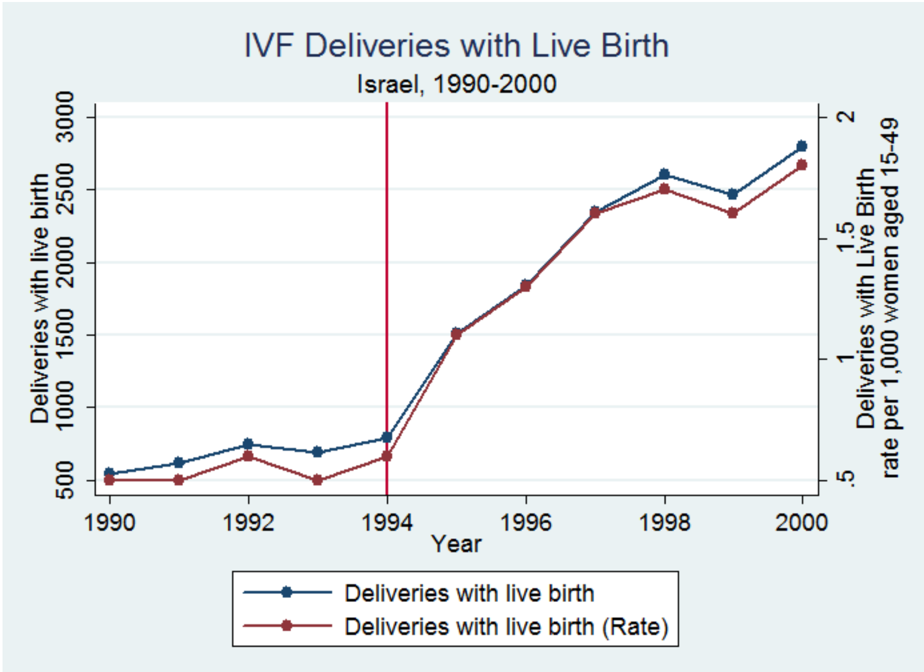


Figure 2

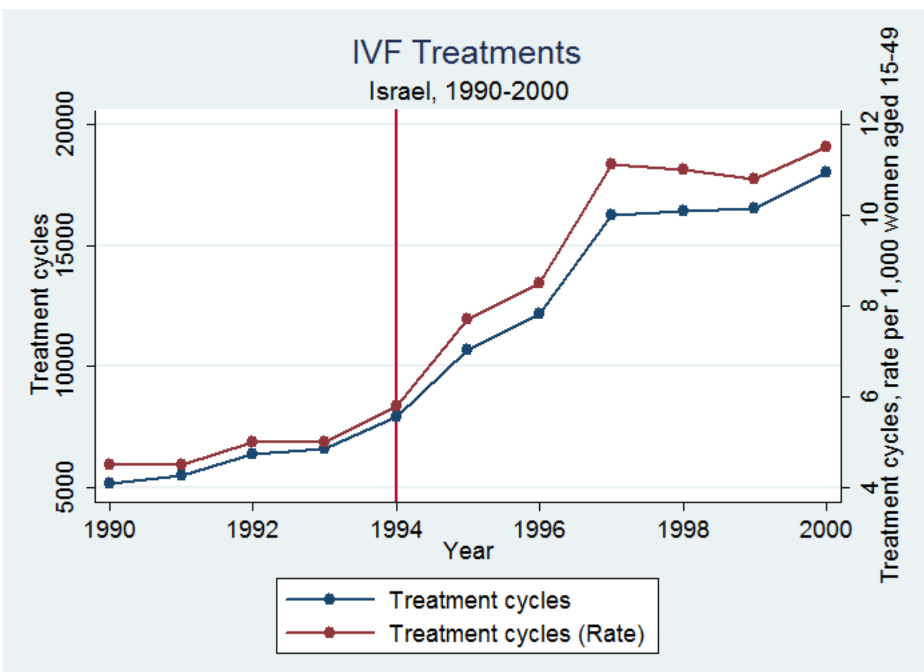
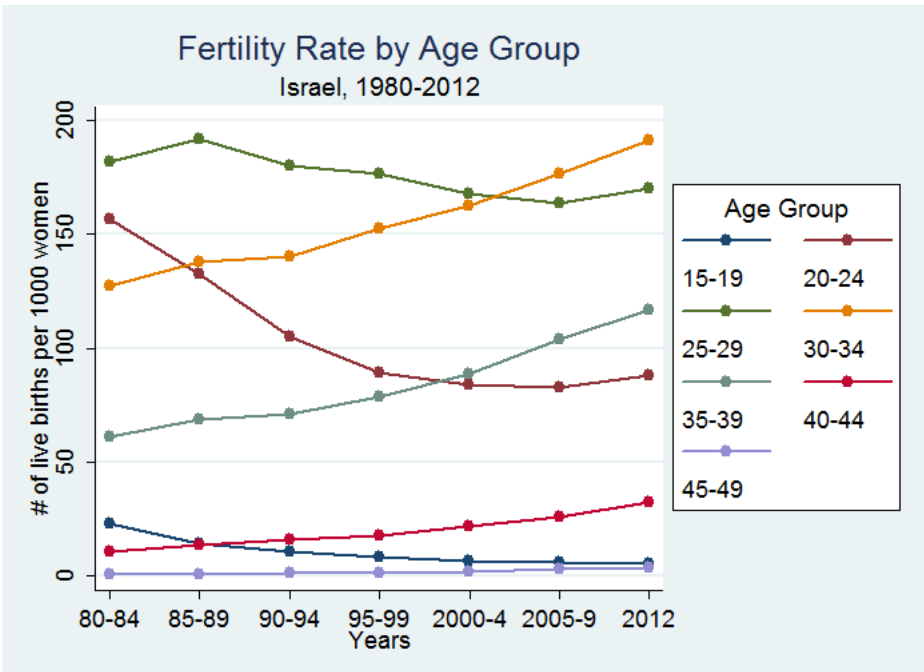


Figure 3 goes further to describe changes in Israeli women's fertility rates for different age groups over the last decades. Clearly fertility rates for women in their thirties increase more rapidly after 1994. A more moderate but similar change is apparent for women in their forties. At the same time a decrease in fertility rates is displayed for younger women. As our paper will demonstrate, this may indicate that the policy change not only affected women or couples experiencing infertility, but also influenced other women to postpone childbearing, due to this new form of insurance against later-life infertility.

Figure 3



The 1994 law ushered in an era of expanding usage and technological improvement worldwide, providing access to IVF that is unmatched anywhere in the world. This funding policy is a part of an entire set of "overtly pronatalist" reproductive policies designed to support and endorse Israel's tradition of familism.[7] A significant support of these policies was offered by the Israeli Supreme Court's ruling that a person's right to have a family and be a parent is one of the constitutional human rights.[8]

The emphasis Israelis put on family is also demonstrated by the unusually high marriage and

whether the sharp increase in usage stems from an increase in the number of women undergoing IVF treatments, or from an increase in the number of attempts each IVF patient makes. It is reasonable to assume that it is a result of a combination of these two, especially given the large increase in IVF-assisted births.

[7]Other examples of such policies are governmental child allowances and maternity grants, broad legal protection of working mothers' rights, extended funding of prenatal care and various tax benefits for parents. For an elaborate discussion of those policies and their evolvement over time see Birenbaum-Carmeli (2003)

[8]See for example High Court 7052/03 Adalla vs. Ministry of Interior

birth rate in comparison to other developed countries.[9] Israel also stands out with an unusually young average marriage age for both genders.[10] This early marriage and high birth rate means that even early educational investments, such as completing college, may infringe on a woman's planned reproductive years, and potentially limit family size. Moreover, Israelis tend to complete education later than in other OECD countries, due to mandatory military service following high school.[11] Thus, in Israel more than in other countries, the decline in probability of successful childbearing that comes with delaying motherhood may have been a salient and significant cost to women considering further educational or career investments.

Following a widely covered, public debate, the 1994 National Health Insurance Law (NHI), enacted by the Kneset, included IVF tests and treatments in the list of free health services that health plans must provide. Like other services specified by the new law, IVF services are provided by the health plans and subsidized by the government. Until 1994, five percent of Israel's residents had no health insurance at all. The other 95 percent were members of four health plans and received funding according to their different policies. There was practically no competition among the different funds since transferability was highly limited. Membership was often the result of political agenda. IVF treatments were covered at least to some extent by the four health plans. The coverage varied both by the number and frequency of covered treatment cycles, and by the terms of eligibility (such as age, marital status and qualification period). The most generous coverage was offered by the largest health plan ("Clalit") which placed almost no limitations on usage.[12] The other health plans offered a limited number of treatment cycles and placed age restrictions and other barriers for eligibility.[13] Therefore, the new law practically applied the Clalit's generous policy on all Israeli residents.

The first contribution of the law was that it clearly stated the scope of treatment entitlement:

> IVF treatments for the purpose of the birth of two children for couples who do not have children from their present marriage, as well as for childless women who wish to establish a single-parent family.[14]

[9]For example, according to UN data, between 2000-2005 Israel's total fertility rate was 2.91, the highest among all 35 OECD current member countries, and way above the OECD average which was 1.65. According to OECD data, at 2009 the marriage rate in Israel was 6.3 per 1000 residents compared to an OECD average of 5.0

[10]According to the Israeli Central Bureau of Statistics report "Women and men in Israel 1990-2009" the median age of first marriage in Israel is 3-4 years lower than in western countries.

[11]According to OECD data, in 2011 Israel's median age at first graduation was slightly above 27 whereas the OECD average was slightly below 25.

[12]Interestingly, this generosity was a result of "faulty computer infrastructure (that could not trace women's treatment and entitlement efficiently) rather than from professional or social conviction" (Birenbaum-Carmeli, 2004)

[13]For example in the "Leumit" health plan the number of treatment cycles was limited to six and the maximal age was 40 (an exceptions committee was authorized to approve up to 3 cycles for women aged 40 to 42, 2 cycles to women aged 42-44 and 1 cycle to women aged 45). In all health plans egg donations required an exceptions committee approval.

[14]In practice, public funding covers approximately 85% of total treatment costs. Private and complementary health insurance programs of the health plans offer additional coverage, and also cover treatments for third and fourth child.

The law, as originally written, did not place any restrictions on the age of women, or the number of attempts that could be made. This is in stark contrast to most IVF coverage, which usually entitles beneficiaries to a certain number of *treatments*, rather than a certain number of children. Only in 1998, following the report of a professional committee, the funding was limited to women until the age of 45 for women using their own rather than donor eggs. When using donor eggs the age limit was placed at 51 and in 2010 it was raised to 54. The same committee also suggested restricting the number of treatment cycles each woman can get public funding for, however this suggestion was not adopted. Any attempts made in the following years to abridge or condition coverage were instantly blocked by vigorous public protest, backed by the aforementioned court rulings (Shalev and Gooldin, 2006).[15]

The Israeli policy change was preceded by rapid improvement in assisted reproduction technology which led to greater use, success, and media coverage worldwide.[16] Starting in the early nineties the media was flooded with IVF success stories, the most eye-catching being extreme advanced maternal age cases.[17] In Israeli press, local success stories were celebrated as "national accomplishments and symbols of local scientific excellence" (Birenbaum-Carmeli, 2004). This was topped off by the considerable amount of attention devoted by the press to the introduction of the NHI law, and within it the highly debated IVF funding issue.[18]

Personal experience with relatives or friends having successful older-age births coupled with media coverage of the new fertility possibilities and of extreme cases of older parenting appear to have updated Israelis' beliefs regarding women's fertility horizons, even yielding on average an over estimation of later life fertility success rates. A study examining Israeli students' knowledge regarding age-dependent fertility decline, found a significant overestimation of the likelihood of pregnancy, especially for women over 40, with or without the aid of IVF (Hashiloni-Dolev et al., 2011).[19]

The new and unique Israeli funding policy facilitated fast adoption and increased usage of the new fertility possibilities. The three forces of improved access, publicity, and technology improvement reinforced each other, leading to an IVF boom in Israel. The large amount of press coverage

[15]In 2014 a limitation on number of treatment cycles was placed for the first time, but it applies only to women over 42 and when 3 consecutive cycles using the woman's own eggs did not reach the embryo transfer stage and only if a committee of experts suggests that it will be useless to continue.

[16]The most eminent improvement was the ICSI technology (Intra-cytoplasmic sperm injection) first introduced in 1992.

[17]For example, "World record: woman aged 60 gave birth to girl, Yedioth Aharonoth 22.2.94"; After 44 failed test-tube fertilizations, a 60-year-old woman gave birth to a baby girl in early 1994.

[18]The Ministry of Health expressed its intent to limit coverage to seven treatment cycles and provoked public protest. The press covered this conflict using personal stories of women over 40 that had children only following dozens of IVF treatment cycles and others who are still trying after a number of failures (Birenbaum-Carmeli, 2004)

[19]The study compared the students' estimations to medical data. The survey was taken by participants at 2009. Of course, since we don't have similar studies conducted prior to 1994, we can't conclude how perceptions changed. Similar studies in other countries also found overestimation of conception probability but not necessarily for the over 40 age group. In addition, those studies did not specifically target IVF success rates (see for example Bretherick et al. (2010)).

led to greater awareness and trust of the new technology which due to the generous funding policy translated into more actual usage. In turn, the increased demand for fertility treatments promoted the establishing of new fertility clinics and raised incentives to invest in training, research and development. These led to more frequent positive outcomes of assisted reproduction, which were also covered in the press. This course of events drove a rapid and ongoing change in Israelis attitudes and perceptions regarding IVF success rates, causing the aforementioned sharp increase in IVF usage starting at 1994, the year the NHI law was approved.

In the following years additional rules and regulations were enacted, standardizing practices surrounding IVF and their funding. This legal progress, considered innovative and liberal in a global prospective, supported the ongoing expansion of IVF usage.[20] Nowadays, there are 25 IVF clinics spread throughout Israel. Most public hospitals have an IVF unit, making treatment very easily accessible for most residents of Israel. Israel is the world leader in the rate of IVF treatment cycles and in the percentage of babies born following IVF treatments: approximately 4% of all babies born in Israel are conceived using IVF (Hashiloni-Dolev, 2013).[21] This makes Israel an ideal setting for the study of the impact of extended reproductive time horizons offered by IVF technology on women's decisions and outcomes.

2.2 Data and Empirical Approach

Our data comes from the 2008 Israeli population census. The census is an approximately 20% sample of Israeli households. It is based on data from administrative sources integrated with sample data gathered in surveys.[22]

We present most of the analysis that follow for Israeli-born Jews, given that other population groups reportedly responded differently to the changes in IVF policy (Remennick, 2010).[23] In addition, there are significant differences between Israeli Jews and Arabs (which are the majority of the non-Jewish population) and between native born and immigrants in culture and norms surrounding family and gender issues (see for example Danziger and Neuman (1999)). It is important to note that intermarriages between Jews and other religions are extremely rare in Israel. Moreover, in our sample and relevant period, percentage of marriages between native born and immigrants is very low.[24]. Nevertheless, our results are robust to using an expanded sample, including all population

[20]The most distinct example is the 1996 Embryonic Carrying Agreement Law, officially legalizing and regulating surrogacy for the first time in the world (Simonstein, 2010).

[21]Compared to approximately 1-2% of the children are born in this way in other countries wealthy enough for women to afford IVF treatment.

[22]The survey began at the end of 2008 and was concluded in July, 2009.

[23]This difference is partially attributed to religious beliefs, as Muslim religion does not support all ART practices (especially surrogacy and ova donations) and the Roman Catholic church bans all types of ART(Birenbaum-Carmeli, 2003). However, at least some of the documented difference should be attributed to other sources since country of origin also affects behavior in this context.

[24]This is partially due to a large incoming flow of immigrants from the Former Soviet Union during the nineties which allowed this population to form segregated communities, with institutions designed to retain distinct cultural

Table 1: Summary Statistics

	All Women		
	Mean	SD	N
Age	37.80	14.40	172,762
College Plus	0.29	0.45	172,762
Highly Ed	0.09	0.28	172,762
	Women with spousal matches		
	Mean	SD	N
Age	41.3	12.3	107,136
College Plus	0.36	0.48	107,136
Highly Ed	0.11	0.32	107,136
Income 2008	84,375	85,930	89,060
Spouse's Age	44.2	12.9	107,136
Spouse's Income	166,934	160,846	91,983
Age at 1st Marriage	23.60	4.11	101,592
Married Older	0.08	0.27	101,931
Ever Gave Birth	0.89	0.31	107,023

2008 Israeli population census (20% sample), restricted to Jewish, Israeli-born women.

groups.

Table 1 shows summary statistics for the women in our sample. Note that we limit most of our analysis to specific cohorts so these figures are presented only to provide a general description of the complete sample and of how our matched sample characteristics compare to the regular sample.

We start by testing the impact of the 1994 policy change on women's decisions including college attainment, graduate degree attainment, and marriage age. We then further examine the impact on the marriage market equilibrium, by looking at the effect on spousal quality for women who marry when older. Our empirical approach for education outcomes and age at first marriage is to compare women's outcomes before and after the policy change using men as a comparison group. Panel A of each analysis shows a "naive" difference-in-differences specification, that measures the average difference between the "before" and "after" time period, according to the following equation:

$$Education = \beta_0 + \beta_1 fem + \beta_2 post + \beta_3 fem \times post + \beta_4 time + u$$

Panel B does more to examine the timing of the impact, testing both for a change in levels at

characteristics of this community. This in turn induced family formation within those communities and prevent marriages to native born Jews or to immigrants from other origins the time of the policy change and a change in the time-trend of the outcome variable:

$$Education = \beta_0 + \beta_1 fem + \beta_2 post + \beta_3 fem \times post + \beta_4 time \\ + \beta_5 post \times time + \beta_6 fem \times time + \beta_7 fem \times post \times time + u$$

For educational outcomes, we also add year-of-birth fixed effects in addition to controlling for time linearly. For age at first marriage, the specification is similar, but "time" represents year of marriage, and we add corresponding fixed effects.

Although men's and women's outcomes may follow different trends prior to the policy change, our results are robust to the inclusion of gender-specific time trends, in Panel B.[25]

For marriage market outcomes, we compare husbands' income for marriages of women over age 30 that took place before and after the policy change to those of women who got married under age 30, over the same time period. First without differential and period-specific time trends in Panel A:

$$Spouse\_inc = \beta_0 + \beta_1 older + \beta_2 post + \beta_3 older \times post + \beta_4 time + u$$

And then with them in panel B:

$$Spouse\_inc = \beta_0 + \beta_1 older + \beta_2 post + \beta_3 older \times post + \beta_4 time \\ + \beta_5 post \times time + \beta_6 older \times time + \beta_7 older \times post \times time + u$$

In this specification as well, time represents year of marriage, which is also added as fixed effects.

Finally, we use men as a second control group in a triple-differences specification:

$$Spouse\_inc = \beta_0 + \beta_1 older + \beta_2 post + \beta_3 older \times post \\ + \beta_4 fem + \beta_5 older \times fem + \beta_6 post \times fem + \beta_7 older \times post \times fem + u$$

Because there may have been other long-term societal trends that could have divergent effects for men and women, we perform a few different types of analysis to provide further evidence that the 1994 policy change drives our results. First, we use event study graphs, charting the impact over time around the time of the policy change, to show that a pre-trend is not driving our results, and rather that the observed effects only become significant after the policy change. Secondly, we use a Quant Likelihood Ratio (QLR) test[26] to search over all possible break dates, and show that our "treatment year" is indeed identified as the break among candidate dates. Finally, we rely on the specific combination of outcome variables to bolster the evidence that IVF access is the

[25] In addition we use event studies to make sure that there is actually a change in trend for women and that the results we see are not only due to different gender-specific time trends.

[26] See Andrews (1993).

driver behind the changes. While there are a few other mechanisms that may have an effect on one of the outcomes we study, none of those can be expected to impact *both* women's educational and marriage decisions *and* marriage outcomes for older women. We review the most prominent alternative explanations in more detail in section 3.3.

As one final note on methodology, we use 1994 as the first year of the treatment period. As mentioned before, we expect changes in our outcome variables to occur regardless of individuals' actual usage of IVF but rather as a consequence of their updated expectations. Therefore, our "treatment" kicks in as soon as women became aware of the insurance coverage rather than when coverage was actually implemented. Due to the large amount of press surrounding the approval of the law in 1994, we find it to be the turning point in the gradual process of perceptual change regarding female later life fertility, although the law only came into effect in the beginning of 1995. We use 1994 as our cutoff for outcomes that are measured over years. For outcomes that are measured by cohort, the treated cohort is the group that learns, at the time they are making a specific decision, that they will have access to assisted reproduction technology *later in life*. Accordingly, we set a 30 year study period, from 1978 to 2008 for marriage decisions and outcomes, and birth cohorts from 1950 to 1980 for education decisions. These periods were chosen so that the before and after treatment periods are as similar as possible and so our individuals are mature enough at the census year 2008 to make education and marriage decisions.[27] Nevertheless, our results are robust to using longer or shorter time frames.

3 Results

3.1 Women's Decisions

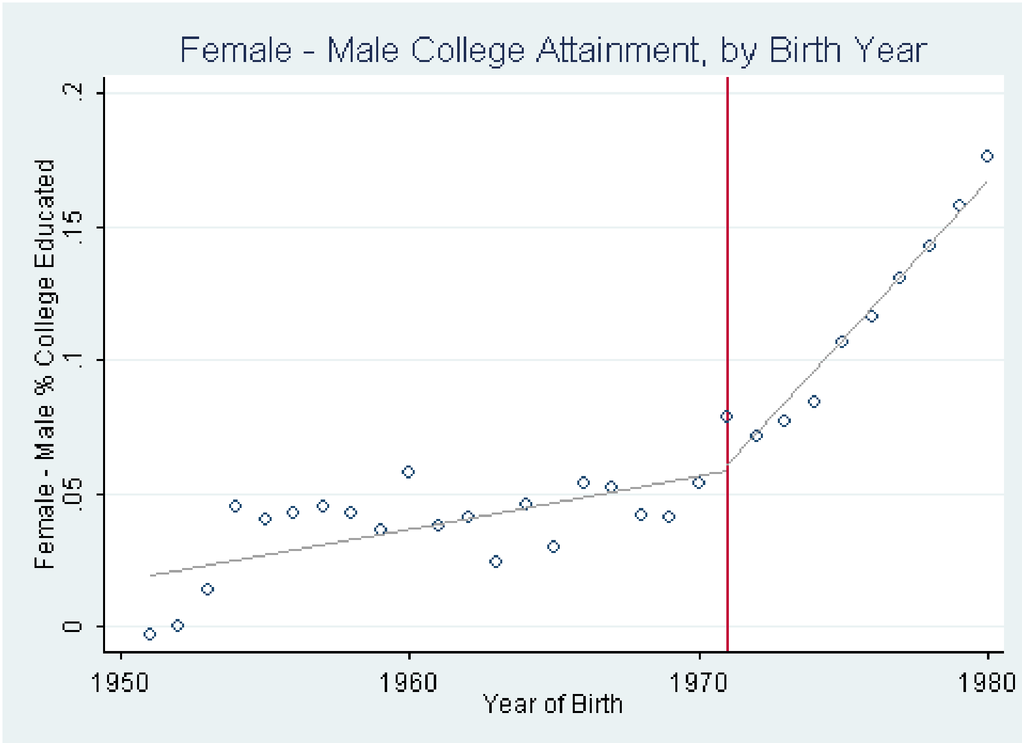
We first examine the impact of the policy on women's decisions regarding education and marriage timing. We do this using a difference-in-differences framework, where women's outcomes before and after the policy change are compared to men's outcomes before and after.

College Education The first outcome variable is completion of college education. Figure 4 shows the raw data used in this analysis, charting women's college completion compared to men, by year of birth. Because the median age for college entry for women in Israel is 22.5, we use the cohort born in 1971 as the first treatment year, as they would have been 23 and thus still able to be influenced in completing college by the change to their reproductive time horizon. Most women born in earlier cohorts would have already been past the age of making decisions about college completion at the time of the policy change.[28]

[27]As we explain when discussing education outcomes, we also limit our youngest cohort to be old enough to complete college, in order to minimize censoring.

[28]Men's median age for college entry is 24. Because men enter college slightly later, we experiment with shifting the treatment year for men as one of our robustness checks, discussed below.

Figure 4



As Figure 4 clearly shows, there is a sharp increase in women's college completion rates relative to men beginning with the first treated cohort.

These results are presented formally in a regression in table 2. Panel A shows a difference-in-differences specification, with men as the control group. The coefficient on the interaction with being female and of college-entering-age after the year of the policy change is positive and significant. This effect remains stable when year of birth fixed effects and clustered standard errors are introduced. Panel B demonstrates that this effect is robust to including gender-specific time trends, and that the impact evolves over time. When discontinuous time trends are allowed for, we see that the effect is driven by an increased slope for the rate of women completing college. Rates of college completion have been increasing over time, but they begin to increase much more steeply following the policy change, at a time when men's entry rates appear to decrease.

Because the outcome is a binary variable for whether the respondent has completed college, we also run these same regressions using logit and probit specifications, which appear in the appendix, in Tables A1 and A2.

Graduate Education We next examine whether more women completed graduate education following the policy change. For this outcome measure, we again use the median age of students

Table 2: College graduation rates

	Dependent variable: college education					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
	(1)	(2)	(3)	(4)	(5)	(6)
fem × post × time				0.00836***	0.00838***	0.00838***
				(0.00139)	(0.00138)	(0.00147)
fem × post	0.0767***	0.0768***	0.0768***	0.00889	0.00853	0.00853
	(0.00474)	(0.00473)	(0.0106)	(0.00921)	(0.00921)	(0.00956)
fem × time				0.00202***	0.00205***	0.00205***
				(0.000510)	(0.000510)	(0.000458)
post × time				-0.00937***	-0.00985***	-0.00985***
				(0.000960)	(0.00142)	(0.000558)
post	0.00449			0.0508***		
	(0.00482)			(0.00645)		
female	0.0326***	0.0330***	0.0330***	0.0526***	0.0532***	0.0532***
	(0.00296)	(0.00296)	(0.00390)	(0.00598)	(0.00597)	(0.00483)
time	0.00429***	0.00240***	0.00240***	0.00408***	0.00429***	0.00429***
	(0.000238)	(0.000314)	(0.000186)	(0.000359)	(0.000545)	(0.000229)
Constant	0.324***	0.295***	0.295***	0.322***	0.343***	0.343***
	(0.00318)	(0.00455)	(0.00351)	(0.00418)	(0.00702)	(0.00238)
YOB FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	206,921	206,921	206,921	206,921	206,921	206,921
R-squared	0.020	0.021	0.021	0.021	0.022	0.022

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

entering that educational level to guide us, treating the 1966 cohort as the first treated year.[29] The raw data is shown in Figure 5, showing again a clear increase in women's completion relative to men starting in the younger birth cohorts, who have not completed their educational decisions before they learn of expanded access to IVF.

Figure 5

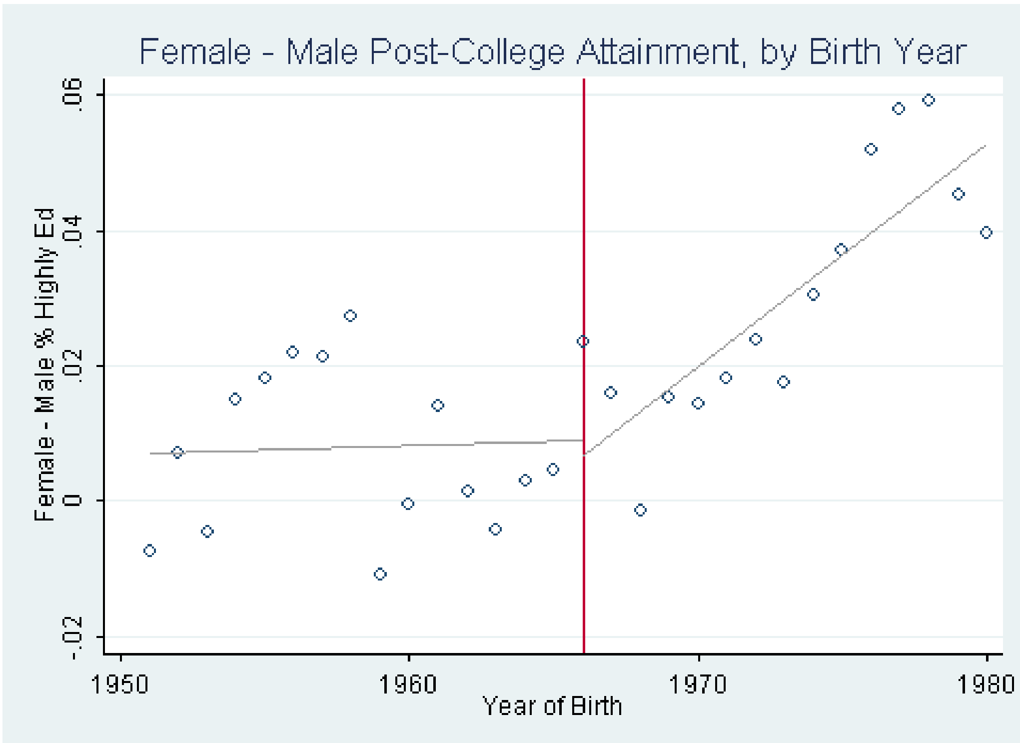


Table 3 tests formally whether women are more likely to complete graduate degrees following the expansion. We again find, in a differences-in-differences framework, presented in Panel A, that women are significantly more likely to complete graduate degrees following the expansion than before. Both the significance and magnitude of the coefficient are robust to including year of birth fixed effects and clustered standard errors. When allowing for a discontinuous slope change, in Panel B, the main effect diminishes, and we find that it is driven by an increase in the rate of women completing advanced degrees. Once again, this shows that the impact evolves over time, but the increase starts in 1994, rather than being driven by a female-specific pre-existing trend (which is important since it is likely that women and men's educational rates have followed a different trend over time).

Since women who were already married at the time of the policy change may have been less able to change course and pursue additional education, in the appendix in Table A3 we restrict our

[29]The median age for second degree applicants in Israel is 28.2 for women and 29.7 for men.

Table 3: Rates of post-college education

	Dependent variable: graduate education					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
	(1)	(2)	(3)	(4)	(5)	(6)
fem × post × time				0.00379***	0.00390***	0.00390***
				(0.000723)	(0.000722)	(0.00101)
fem × post	0.0265***	0.0267***	0.0267***	0.00565	0.00512	0.00512
	(0.00313)	(0.00313)	(0.00573)	(0.00657)	(0.00656)	(0.00779)
fem × time				-0.000511	-0.000511	-0.000511
				(0.000568)	(0.000568)	(0.000564)
post × time				-0.00730***	-0.00763***	-0.00763***
				(0.000508)	(0.000801)	(0.000651)
post	0.0267***			0.0292***		
	(0.00363)			(0.00471)		
female	0.00408*	0.00422*	0.00422	0.000247	0.000277	0.000277
	(0.00241)	(0.00241)	(0.00310)	(0.00509)	(0.00508)	(0.00458)
time	-0.00238***	-0.00248***	-0.00248***	0.00106**	0.000889*	0.000889***
	(0.000176)	(0.000200)	(0.000100)	(0.000412)	(0.000490)	(0.000287)
Constant	0.0890***	0.0690***	0.0690***	0.115***	0.118***	0.118***
	(0.00223)	(0.00284)	(0.00147)	(0.00373)	(0.00483)	(0.00319)
YOB FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	206,921	206,921	206,921	206,921	206,921	206,921
R-squared	0.002	0.006	0.006	0.004	0.006	0.006

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Conditional rates of post-college education, difference-in-differences

	Dependent variable: graduate education — college					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
	(1)	(2)	(3)	(4)	(5)	(6)
fem × post × time				0.0111***	0.0119***	0.0119***
				(0.00199)	(0.00199)	(0.00224)
fem × post	0.0354***	0.0399***	0.0399**	0.0264	0.0222	0.0222
	(0.00853)	(0.00849)	(0.0153)	(0.0178)	(0.0177)	(0.0212)
fem × time				-0.00484***	-0.00488***	-0.00488***
				(0.00166)	(0.00166)	(0.00145)
post × time				-0.0224***	-0.0209***	-0.0209***
				(0.00147)	(0.00223)	(0.00160)
post	0.0563***			0.0266**		
	(0.00974)			(0.0132)		
female	-0.0219***	-0.0230***	-0.0230*	-0.0596***	-0.0598***	-0.0598***
	(0.00717)	(0.00713)	(0.0116)	(0.0145)	(0.0145)	(0.0146)
time	-0.0114***	-0.0103***	-0.0103***	0.00176	-0.000558	-0.000558
	(0.000461)	(0.000589)	(0.000293)	(0.00122)	(0.00141)	(0.000754)
Constant	0.317***	0.268***	0.268***	0.417***	0.396***	0.396***
	(0.00643)	(0.00835)	(0.00426)	(0.0108)	(0.0129)	(0.00849)
YOB FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	71,858	71,858	71,858	71,858	71,858	71,858
R-squared	0.020	0.028	0.028	0.026	0.029	0.029

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

analysis for graduate education to those who were unmarried at our cutoff age (27) at the time of the policy change—as expected, the magnitude of the coefficient is increased, nearly doubling.

We also look at whether rates of women gaining graduate education *conditional* on obtaining college education have increased, in table 4. Doing this seeks to understand whether graduate education has increased as a natural consequence of the increase in college education, or whether there has been an increase in graduate education over and above the mechanical impact of increasing the pool of college graduates. Once again, the difference-in-difference specification finds positive and significant effects. But, more surprisingly, in Panel B, we find that rates of graduate education conditional on college education had been declining for women before the policy change, but are boosted following the policy change.

Finally, in the appendix, we use an ordered logit to show that the policy change increased the educational category that women achieved (shown in Table A4).

Reevaluating Education Outcomes Using Longitudinal Data With all educational outcomes, one may be concerned about data censoring since we use data collected in a single year and therefore compare individuals of different ages, some of whom may not have completed their educational attainment. To minimize this problem, the youngest cohort we use in our estimation is 28 at the census year. Moreover, we use a second data set to verify that censoring is not what drives the result. The data we use in Figure 6 is from the Israeli Annual Labor Force Survey, for the years 2001 to 2011. This sample is representative of the population, but much smaller than the Census sample. We look at two birth cohorts per survey year only (using only a single year yielded too little data), to compare between individuals in the same two-year age group before and after policy change. We choose ages to be high enough so we can be confident that there is minimal censoring due to ongoing education, but even if there were censoring, due to the panel data, it would affect all years in the graph equally.[30] Figure 6 presents the percentage of college graduates in each cohort, separately for men and for women. We clearly see that while men stay on the same moderately increasing time trend, women's time trend becomes steeper starting with the 1970 cohort. This is very similar to what we see in the Census data, except that the break of trend there starts with the cohort of 1971. Since we used women's median age at college entry to establish the first affected cohort, it makes sense that the cutoff cohort moves between two consecutive cohorts when using different sources and types of data. This result refutes the possibility that the results we presented above are the result of data censoring which is more severe for men.

Age at First Marriage We next examine the impact on women's decision to marry. If women indeed feel more confident about their reproductive prospects later in life, they may be more willing to delay marriage, which could be a mediating mechanisms allowing greater rates of college and graduate education. Here, time represents the year the marriages are taking place, and each data point is a single marriage with an attached age for the woman or man. Thus, the treatment year is 1994, exactly the year of the policy change. This decision can be shown by year of marriage, using retrospective analysis from the 2008 census. Figure 7 shows that women's marriage age was declining relative to men's until 1994, when women's marriage age begins to rise sharply.

Since the new policy mainly affected expectations for women's fertility over the age of 35 (when female fertility starts to decline steeply), we expect it not only to change the average age at first marriage, but also to shift the distribution of first marriage age in a specific way. Figure 8 indicates that the percentage of women getting married at their early twenties decreased significantly during the eighties and early nineties, prior to the policy change, whereas the percentage of women getting married in their late twenties and early thirties decreased rapidly in the decade following the policy change. Since the percentage of women ever married in their forties remains practically unchanged, we can conclude that following the policy, women delayed marriage, but did not forego it. This

[30] We use two-year age groups to increase the number of observations per year and decrease variation.

Figure 6

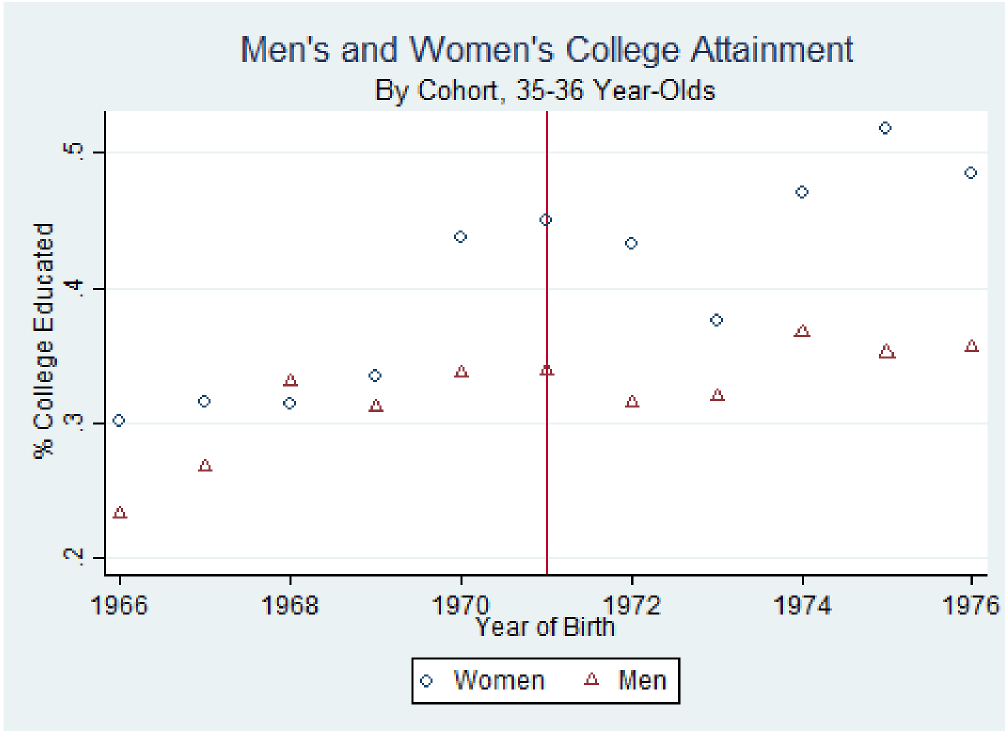
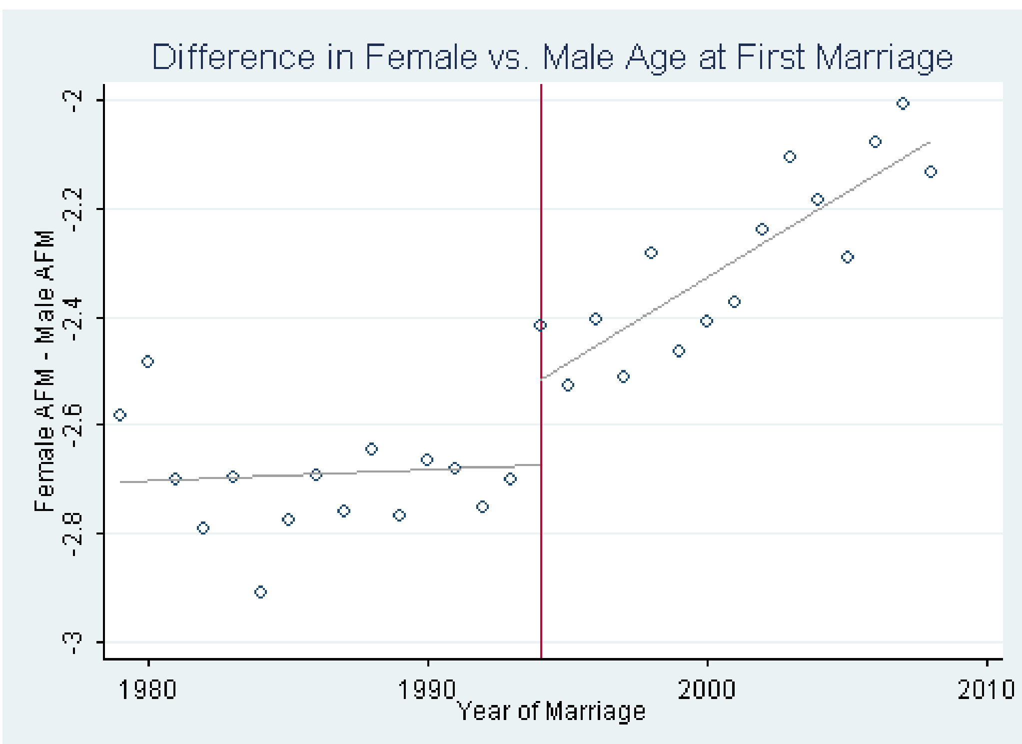


Figure 7



course of change fits our hypothesis that the new fertility horizons allowed women to delay marriages to their thirties, which delays childbearing even further (to late thirties and early forties).

Figure 8

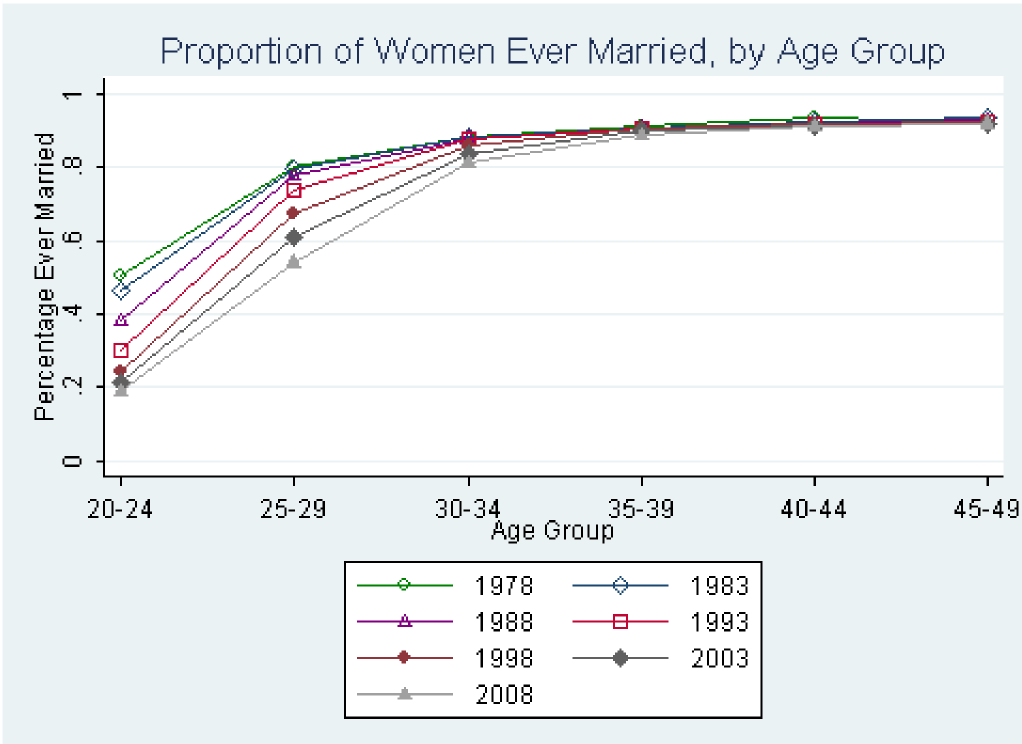


Table 5 analyzes this change using a regression, in both a simple difference-in-differences framework, and an analysis demonstrating the change in the time trend. We find that women marry about a third of a year older on average, relative to men, after the policy change. This change, as the others, appears to be driven by a slope shift beginning at the time of the policy change.

Quandt Likelihood Ratio breakpoint test To confirm that what we are picking up is truly a discontinuous shift in these outcomes—a break in the time series—rather than more gradual time trends, we perform and Quandt Likelihood Test to "search" for the most likely break year in the data, over our entire sample period except for 15% "trimming" on either end, to account for limited data at the beginning and end of the sample period. We do this for college education and for age at first marriage, since the break should occur for different years, since one is based on year of birth corresponding to entering college cohort, while the other is based on year of marriage. To implement the test, we run a loop of regressions identical in specification to our panel B, column 1 regressions, except the "break" year changes in each regression. We then perform an F-test for whether the two "break" parameters—slope and intercept—are different from zero. Finally, we search for the maximal F-stat among these tests. The test for college education returns 1971 as the

Table 5: Age at first marriage, difference-in-differences

	Dependent variable: age at first marriage					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
	(1)	(2)	(3)	(4)	(5)	(6)
fem × post × time				0.0301***	0.0308***	0.0308***
				(0.0104)	(0.0104)	(0.00980)
fem × post	0.342***	0.345***	0.345***	0.0967	0.0976	0.0976
	(0.0454)	(0.0454)	(0.0496)	(0.0905)	(0.0904)	(0.0860)
fem × time				0.000773	0.000376	0.000376
				(0.00657)	(0.00656)	(0.00784)
post × time				0.00811	0.00655	0.00655
				(0.00763)	(0.0119)	(0.00696)
post	-0.385***			-0.270***		
	(0.0513)			(0.0668)		
female	-2.686***	-2.687***	-2.687***	-2.682***	-2.685***	-2.685***
	(0.0316)	(0.0316)	(0.0284)	(0.0597)	(0.0596)	(0.0734)
time	0.137***	0.131***	0.131***	0.126***	0.126***	0.126***
	(0.00259)	(0.00305)	(0.000899)	(0.00480)	(0.00652)	(0.00412)
Constant	26.83***	26.62***	26.62***	26.74***	26.54***	26.54***
	(0.0305)	(0.0432)	(0.0129)	(0.0439)	(0.0692)	(0.0382)
YOM FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	173,750	173,750	173,750	173,750	173,750	173,750
R-squared	0.136	0.137	0.137	0.136	0.137	0.137

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Quandt Likelihood Ratio test for break point

Age at first marriage		College education	
Year of Marriage	F-stat	Year of Birth	F-stat
1982	6.74	1954	0.41
1983	6.9	1955	2.92
1984	6.99	1956	4.08
1985	7.09	1957	5.9
1986	6.38	1958	10.1
1987	6.26	1959	11.9
1988	6.36	1960	11.5
1989	6.31	1961	19.4
1990	6.26	1962	19.9
1991	6.02	1963	20.4
1992	5.8	1964	19.3
1993	6.41	1965	22.1
1994	**7.68**	1966	20.8
1995	5.38	1967	23.2
1996	4.92	1968	23.3
1997	4.01	1969	24.5
1998	4.39	1970	24.6
1999	2.82	**1971**	**24.8**
2000	2.99	1972	23.9
2001	2.63	1973	23.9
2002	2.84	1974	23.8
2003	2.13	1975	23.6

Quandt-Likelihood ratio test using difference-in-differences regression specification as in all panel B, column 1, with break point at given year. The QLR critical value at 5% significance with 15% trimming and two restrictions (the slope and intercept break) is 5.86

maximal F-stat, exactly the year when students would have been "treated" by the policy change at a time when it could still impact their college completion. The test for age at first marriage returns 1994, the year of the policy change, and our treatment year. The procedure for the QLR specifies comparing this "sup F-stat" to a table of critical values adjusted for the number of tests– the critical value for two restrictions and 15% trimming is 5.86, whereas the QLR statistic for age at first marriage for the "break" year is 7.68, and the statistic for college education is 24.8, as shown in Table 6.

3.2 Marriage Market Equilibrium

The additional reproductive years afforded by access to assisted reproduction technologies may have impacted not only women's decisions, but also men's marriage choices. Low (2014) show that men respond to prospective mates' expected fertility when choosing a partner, trading off between so-called "reproductive capital" and more traditional human capital traits like income and education. As a result, women who are high-earning, but older, may marry poorer men than lower-earning, but younger, women. Because the increase in access to IVF technology lessens the perceived fertility cost of waiting to marry, "high-quality" men may have been more willing to marry older women following the policy change. If this is the case, we can expect equilibrium matching to adjust so that these women will match with higher quality partners.

We test this by examining the spousal quality of women who marry older versus younger before and after the policy change. If women's reproductive fitness is taken into account by men, we would expect the "spousal quality penalty" to older women to lessen once access to IVF expands.

We use a sample of women who are between 25 and 34 at marriage, and compare spousal quality, measured in a variety of ways, for women who were between 25 and 29 at the time of marriage versus women who were between 30 and 34 at the time of marriage. In practice we cannot use only first marriages for this analysis, since we only have spousal income data for the current spouse. This also means that we are excluding data from women who are divorced or widowed before the census year, which may become more likely as the year of marriage becomes longer ago. However, this affects only a small number of observations.

Our first measure of spousal quality is the husband's income percentile compared to men from his birth cohort. We use this as an outcome measure because income is an important quality that male spouses bring to the relationship (see, for example, Fisman et al (2006)).

The raw data for this analysis is shown in Figure 9, showing again a discontinuous increase in spousal income for women who marry when older, compared to women who marry when young.

Table 7 presents the results from a regression of spousal income percentile on marrying while older, before and after the policy change. Because older women's outcomes can be compared to younger women's outcomes, we do not use men as a control group in these initial analyses; we present a triple difference specification later in this section.

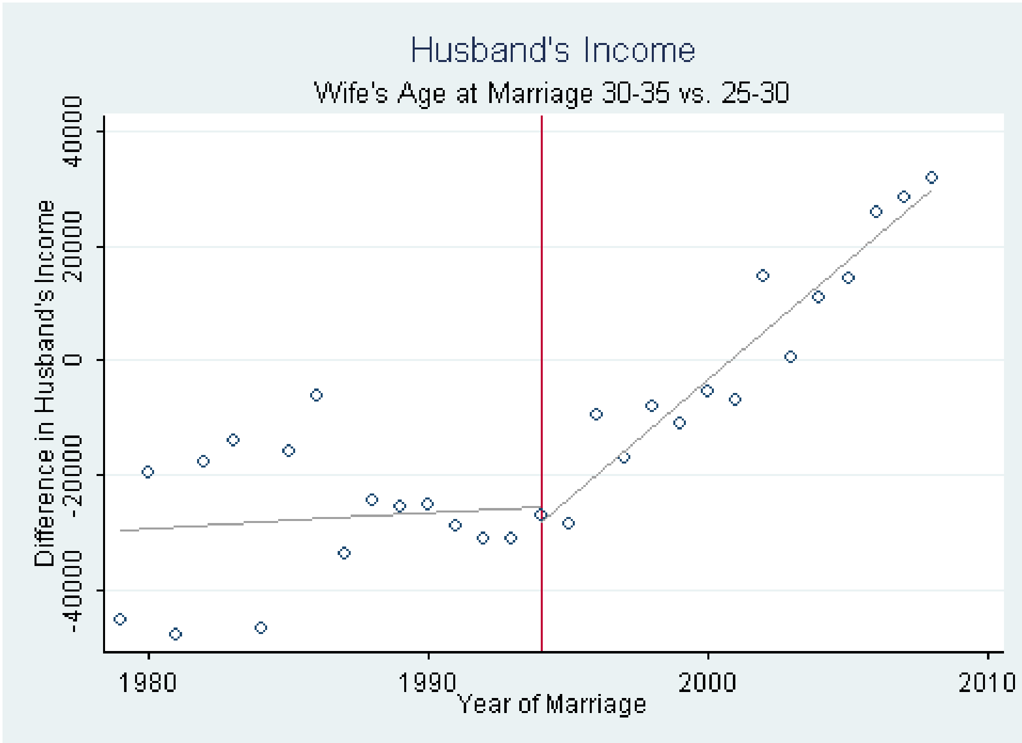
However, these results may be confounded by the fact that we are looking at income retrospectively, and therefore the income path of the spouses of women who married while older may be different than those who married while younger. We control for this in two ways: first by including controls for women's characteristics, and second by including fixed effects for the spouse's year of birth, to account for income varying with age and cohort. Table 8, Panel A, shows that even when controlling for women's education and other factors, women who marry when older see an increase in spousal income relative to younger women following the policy change. Panel B shows that the

Table 7: Spouse income, marrying older versus younger

	Dependent variable: spousal income in 2008					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
	(1)	(2)	(3)	(4)	(5)	(6)
older × post × time				5,845***	6,264***	6,264***
				(1,616)	(1,622)	(1,368)
older × post	36,274***	39,134***	39,134***	23,015*	18,677	18,677**
	(6,573)	(6,563)	(7,439)	(13,511)	(13,522)	(8,017)
older × time				-2,298	-2,199	-2,199
				(1,451)	(1,460)	(1,297)
post × time				-9,681***	-9,025***	-9,025***
				(686.8)	(1,209)	(172.0)
post	37,298***			14,625**		
	(4,988)			(5,868)		
marriedolder	-24,226***	-24,374***	-24,374***	-39,680***	-39,394***	-39,394***
	(5,968)	(5,958)	(5,498)	(11,305)	(11,343)	(7,088)
time	-5,858***	-2,709***	-2,709***	884.9	1,175	1,175***
	(250.6)	(386.8)	(56.99)	(618.1)	(843.0)	(120.9)
Constant	181,634***	158,331***	158,331***	227,570***	214,419***	214,419***
	(3,221)	(5,092)	(836.2)	(5,002)	(6,978)	(554.0)
YOM FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	31,245	31,245	31,245	31,245	31,245	31,245
R-squared	0.035	0.047	0.047	0.044	0.048	0.048

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 9



results hold when controlling for the spouse's year of birth, although the result is not significant in the final column, when a slope change is included in addition to spousal fixed effects and clustered standard errors.

Because the effects on people who marry older are being compared to those who marry younger here, we are able to introduce an additional control: the comparative gap between older and younger marriage for men. We do this by using a triple-difference specification, where spousal quality metrics for older versus younger women before and after the policy change are compared the same metrics for older versus younger *men* before and after the policy change. The results, presented in Table 9, show that not only do older women's marriage outcomes (in terms of spousal quality) improve relative to younger women following the policy change, but they also improve relative to the change in older *men*'s spousal quality.

Together, these results show that women delayed marriage and made greater educational investments after the policy change. At the same time, women who delayed marriage were penalized less on the marriage market for their older age at marriage. These profound effects are consistent with women believing the policy (and the technology that they learned about through the policy change) provided some insurance against age related infertility, altering both their decisions and the decisions of men who may have updated their beliefs regarding older women's fertility prospects.

Table 8: Spouse Income with Wife Controls and Spouse YOB FEs

	Dependent variable: spousal income in 2008			
	Panel A: Wife controls			
	(1)	(2)	(3)	(4)
older × post × time		4,847***	2,507***	2,507***
		(1,562)	(712.3)	(565.4)
older × post	35,790***	30,002**	10,213	10,213
	(6,374)	(13,083)	(9,746)	(8,093)
older × time		-2,206		
		(1,402)		
post × time		-9,266***	-7,893***	-7,893***
		(659.6)	(1,295)	(180.4)
marriedolder	-29,983***	-48,449***	-19,260***	-19,260***
	(6,790)	(11,589)	(6,305)	(6,538))
time	-4,687***	2,582***	476.4	476.4***
	(760.4)	(960.7)	(933.9)	(96.60)
post	32,521***	9,199		
	(4,791)	(5,627)		
Wife controls	Yes	Yes	Yes	Yes
YOM FEs			Yes	Yes
Clustered SEs				Yes
Observations	31,245	31,245	28,301	28,301
R-squared	0.101	0.109	0.122	0.122
	Panel B: Spousal YOB FEs			
	(1)	(3)	(3)	(4)
older × post × time		2,881*	3,198*	3,198
		(1,651)	(1,683)	(2,112)
older × post	13,907**	27,886**	26,336*	26,336
	(6,673)	(12,416)	(13,917)	(16,055)
older × time		-2,036	-2,016	-2,016
		(1,425)	(1,490)	(1,855)
post × time		-4,445***	-4,267***	-4,267***
		(875.5)	(1,332)	(1,427)
marriedolder	-15,946***	-34,692***	-35,598***	-35,598**
	(6,094)	(11,065)	(11,770)	(14,652)
time	-3,112***	-109.2	258.5	258.5
	(378.8)	(682.9)	(974.7)	(862.0)
post	6,567			
	(5,670)			
Spouse YOB FEs	Yes	Yes	Yes	Yes
YOM FEs			Yes	Yes
Clustered SEs				Yes
Observations	31,245	31,245	31,245	
R-squared	0.056	0.057	0.057	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Spouse income, triple difference

	Dependent variable: spousal income in 2008		
	(1)	(2)	(3)
older × post × fem	26,404***	22,759***	22,759***
	(7,019)	(7,007)	(6,995)
post	30,356***		
	(2,224)		
older × post	7,618***	12,941***	12,941***
	(2,507)	(2,532)	(3,055)
older × fem	-29,622***	-26,427***	-26,427***
	(6,354)	(6,341)	(5,836)
fem × post	-23,616***	-20,836***	-20,836***
	(3,247)	(3,236)	(7,460)
female	119,781***	117,825***	117,825***
	(2,944)	(2,926)	(3,579)
marriedolder	5,491**	2,389	2,389
	(2,238)	(2,251)	(2,000)
time	-3,783***	-2,195***	-2,195***
	(122.7)	(175.9)	(85.57)
Constant	75,987***	73,948***	73,948***
	(1,400)	(2,332)	(1,252)
YOM FEs		Yes	Yes
Clustered SEs			Yes
Observations	75,202	75,202	75,202
R-squared	0.149	0.154	0.154

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: College education, shifting birth years for men

	Dependent variable: college education			
	Panel A: D-i-D		Panel B: D-i-D with slopes	
	(1)	(2)	(3)	(4)
fem × post × time			0.00737***	0.00243*
			(0.00161)	(0.00140)
fem × post	0.0702***	0.0694***	0.00895	0.0102
	(0.00491)	(0.00477)	(0.00975)	(0.00927
fem × time			0.00205***	0.00331***
			(0.000510)	(0.000518)
post × time			-0.00242	-0.00173
			(0.00181)	(0.00156)
female	0.0345***	0.0353***	0.0539***	0.0677***
	(0.00300)	(0.00298)	(0.00589)	(0.00604)
time	0.00145***	0.00264***	0.000715	0.00209***
	(0.000487)	(0.000334)	(0.000738)	(0.000610)
Constant	0.337***	0.315***	0.322***	0.323***
	(0.00717)	(0.00476)	(0.00770)	(0.00771)
you FEs	Yes		Yes	
college cohort FEs		Yes		Yes
Observations	204,556	204,556	204,556	204,556
R-squared	0.022	0.021	0.022	0.022

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.3 Alternative Explanations and Robustness Checks

In this section, we perform robustness checks of our results and examine some potential alternative explanations for our findings.

Allowing for men's later college entry We first consider the possibility that men entering college later than women may create censoring in our data, where some men who may go on to complete a college degree have not yet done so at the time of the 2008 census. To allow for this, we shift data for men for one year, to account for the average lag in them entering college, compared to women (the approximate one-year lag may result due to the extra year of mandated military service for men). Table 10 shows these results for college education, while Table 11 performs the same exercise for graduate education. Both tables show our results are relatively stable when accounting for this lag, and that there still appears to be a strong increase in women's education after the policy change.

Table 11: Graduate education, shifting birth years for men

	Dependent variable: graduate education			
	Panel A: D-i-D		Panel B: D-i-D with slopes	
	(1)	(2)	(3)	(4)
fem × post × time			0.00445***	0.00147**
			(0.000766)	(0.000735)
fem × post	0.0261***	0.0199***	-0.00416	0.00152
	(0.00321)	(0.00316)	(0.00656)	(0.00659)
fem × time			-0.000511	0.000471
			(0.000568)	(0.000571)
post × time			-0.00663***	-0.00667***
			(0.000984)	(0.000893)
female	0.00119	0.00428*	-0.000366	0.00791
	(0.00243)	(0.00241)	(0.00494)	(0.00503)
time	-0.00304***	-0.00237***	-0.000642	0.000567
	(0.000310)	(0.000215)	(0.000651)	(0.000538)
Constant	0.0838***	0.0776***	0.120***	0.123***
	(0.00465)	(0.00306)	(0.00546)	(0.00539)
you FEs	Yes		Yes	
college cohort FEs		Yes		Yes
Observations	204,556	204,556	204,556	204,556
R-squared	0.004	0.004	0.005	0.005

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Event Study analysis The next potential confounding factor we explore is that long term time trends may be responsible for the effects we see. This is already partially addressed by the inclusion of group-specific time trends in our regressions. However, to further address this possibility, we perform an event study analysis (also known as distributed lag analysis), to pinpoint the timing of the changes we observe. We do this for our main outcome measures, college education, graduate education, age at first marriage, and spousal income for women who marry when older.

The difference between men and women for the lag just before the policy change is normalized to zero, so that subsequent effects show the relative difference in men's and women's outcomes compared to the period just before the policy change. To eliminate noise, we show these results with two years combined into a single data point on the graph. Results with every year are qualitatively similar.

These event study graphs, shown in Figures 10 and 11, show that prior to the policy change, outcomes were not significantly different from the period immediately prior to the policy change. In other words, there was no pre-existing pre-trend. In the case of college education, immediately after the policy change, outcomes begin to diverge from the pre-period in a statistically significant way. In the case of graduate education, the significant deviations do not become significant until several periods after the policy change.

Figure 10

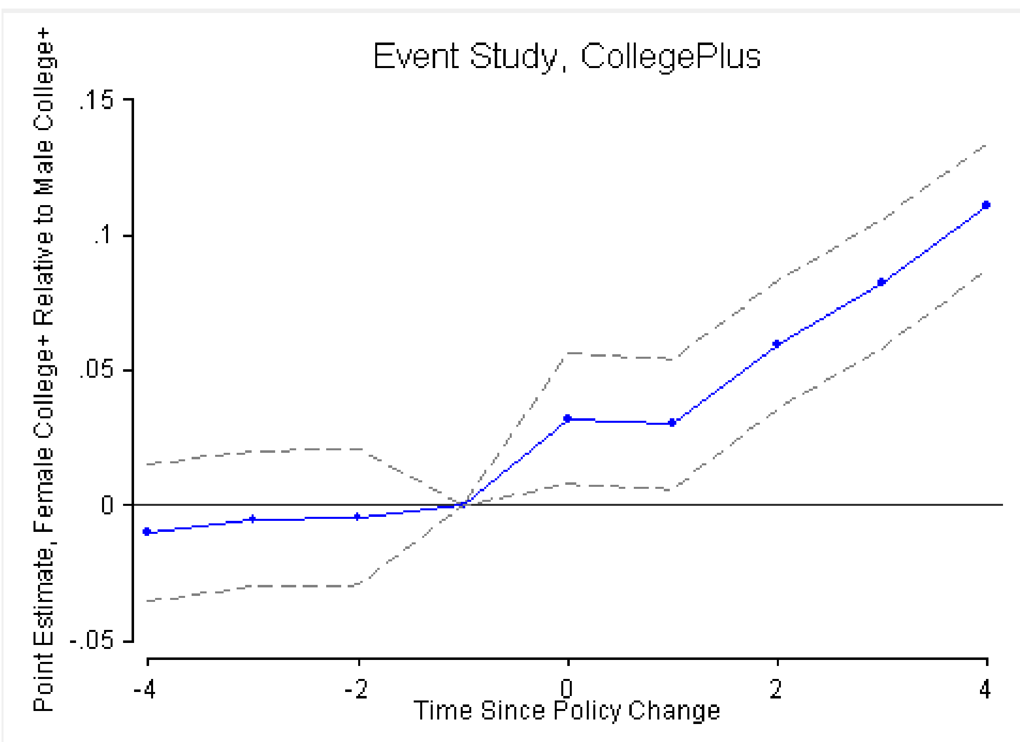
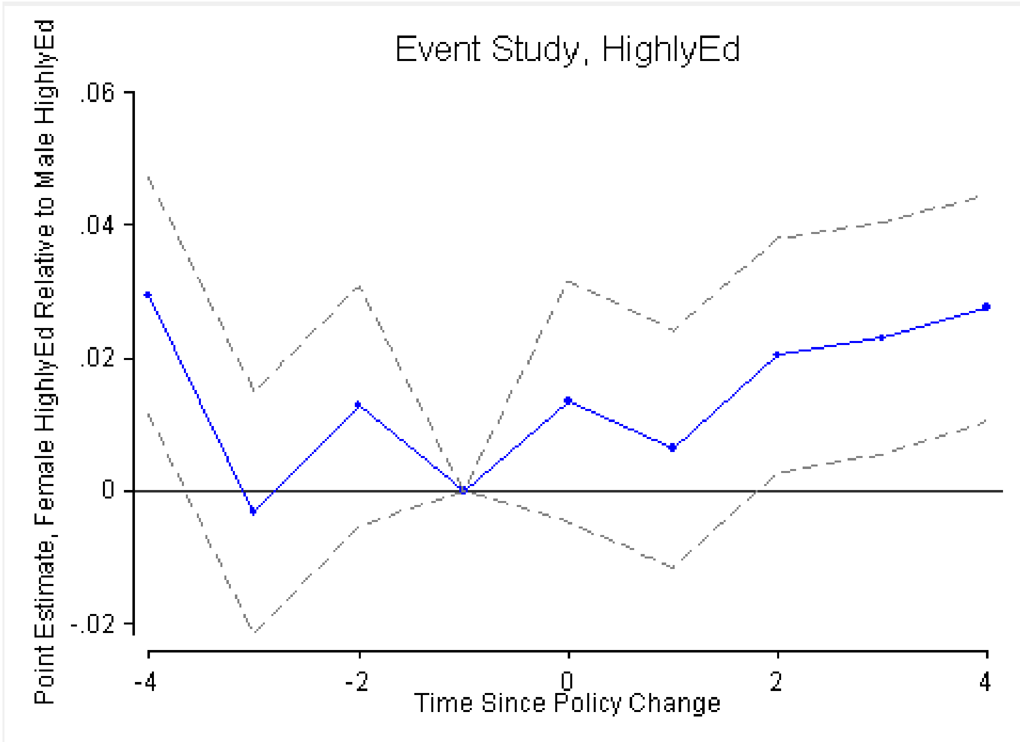


Figure 12 shows the same post-period divergence in outcomes for age at first marriage, although,

Figure 11



once again, the effects are not significant immediately after the policy change. This evidence is consistent with our hypothesis that outcomes took time to evolve following the policy change, due to information dispersal, and technological change. However, the event studies clearly affirm that there was no significant pre-period pre-trends prior to 1994 driving our results.

Figure 13 shows an event study analysis of the change in spousal income for women who marry older versus younger. In this case, the difference in spousal income percentile for older versus younger women is normalized to zero for the period immediately preceding the policy change. Again, there is a divergence of this trend following the policy change, although in this case is not significant. One possible explanation for this is that men's beliefs about fertility of older partners take longer to update: they first must observe older women getting pregnant and having children, which would come some time after the policy change, and thus effects would compound over time.

Next, we consider the possibility that other policy changes around the time of the expansion of IVF access could have been responsible for the changes we see. The two possible candidate alternative explanations are 1) an expansion of access to education, and 2) the other expansion of health services included under the 1994 law.

Placebo tests To verify that broader international trends during the nineties are not responsible for our effects, we conduct placebo tests in the United States as well as six other countries with

Figure 12

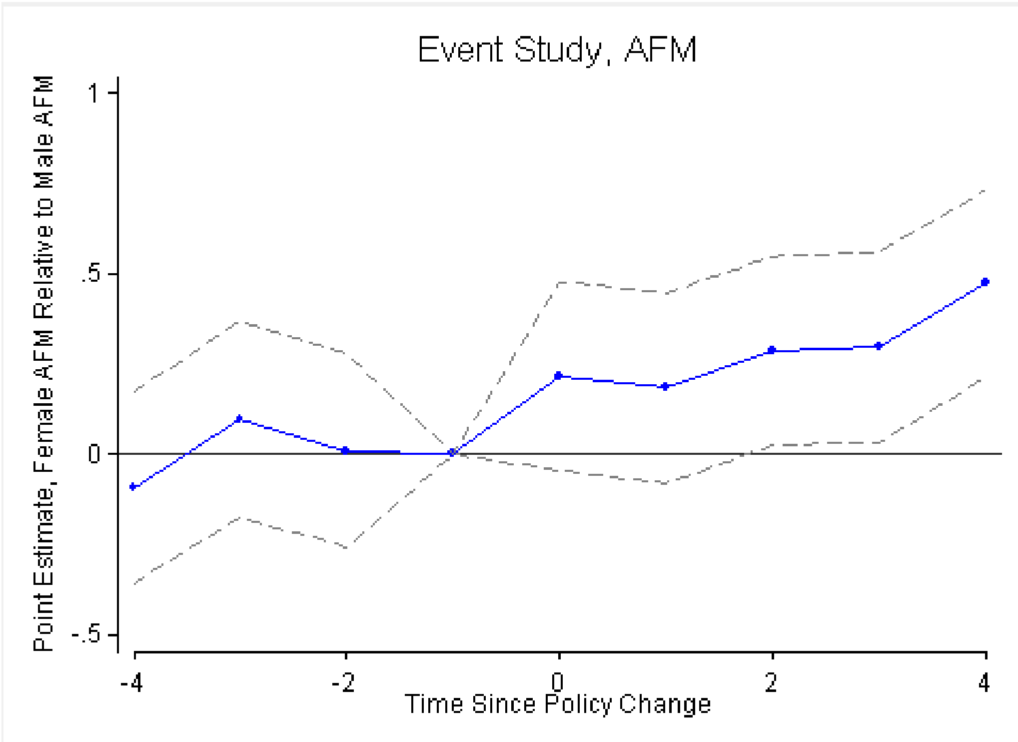
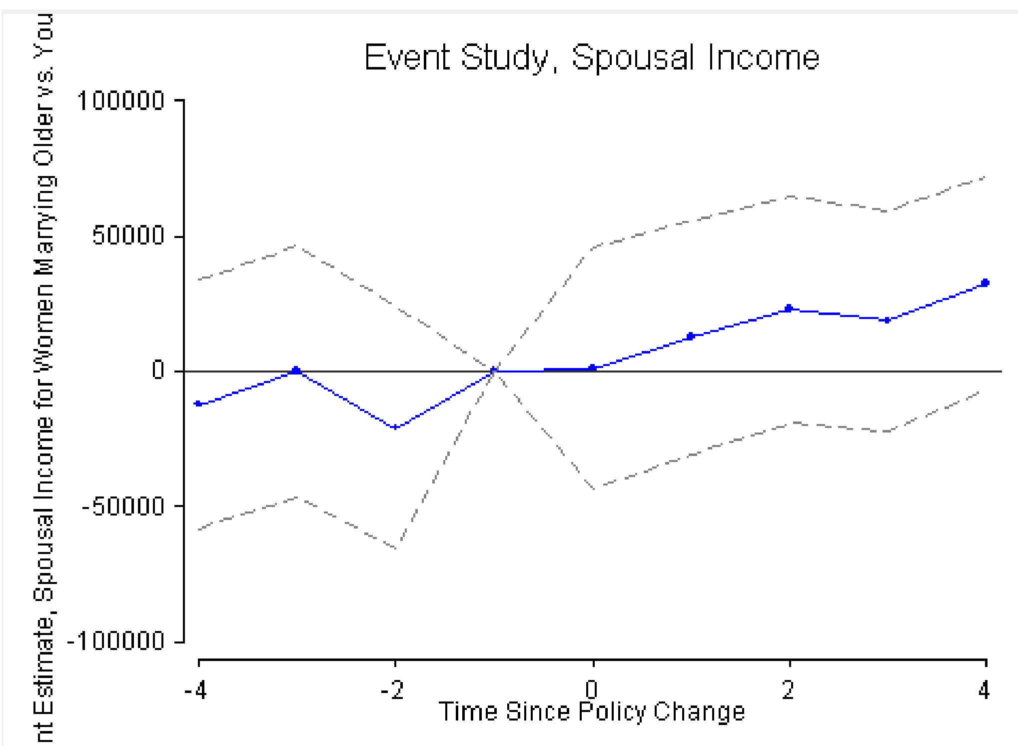


Figure 13



similar GDP per capita to Israel and Census data availability. We find no discontinuous changes in educational attainment for the relevant birth cohorts (see appendix for figures). We also conduct placebo tests on the marriage trends observed using the 2008 American Community Survey—we find no discontinuous changes in age at first marriage nor spousal income when marrying older versus younger in the United States.

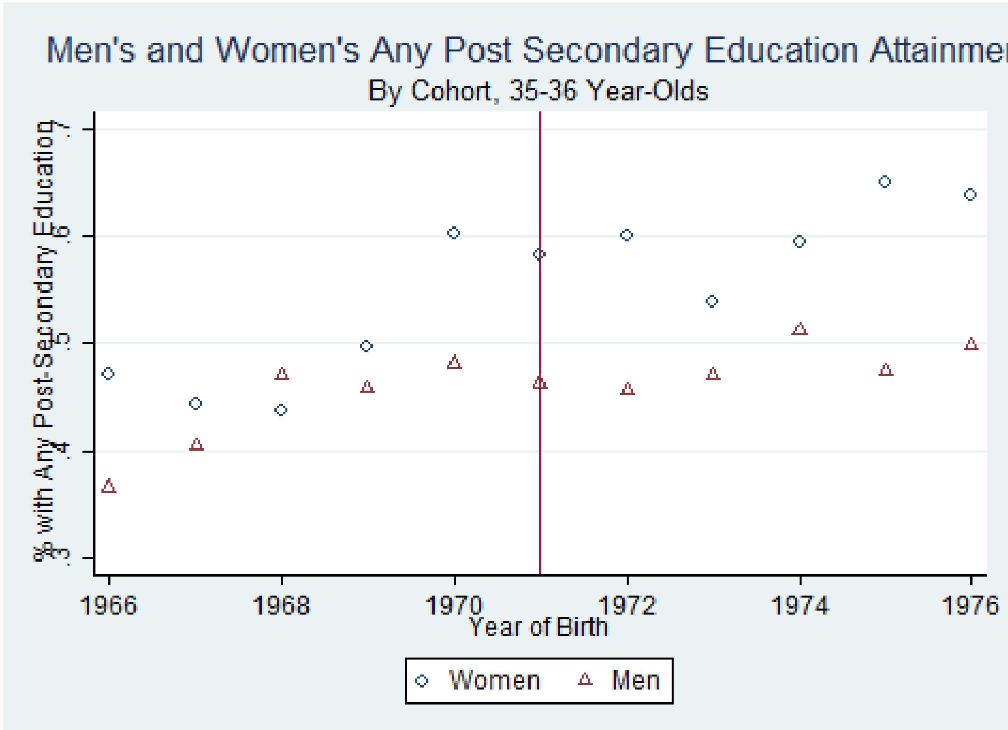
Higher-education reform The first alternative explanation that we consider is the higher education reform in Israel that was rolled out throughout the eighties and nineties, overlapping with our years of interest. Prior to the reform only the five universities could grant Israeli academic degrees. Starting in the seventies, slowly and gradually, colleges started to get permissions to grant academic degrees equivalent to the ones given by universities. This process accelerated during the eighties and early nineties, but only in the beginning of 1995 an official and comprehensive plan for the development of academic colleges was finally approved by all relevant authorities. Following the approval, the number of academic institutes and students increased dramatically. In the decade between 1992 and 2002 the number of students in academic programs approximately doubled (the effect of the reform was already apparent in the early nineties but really kicked in 1997-1998)(Volanski, 2005; Bernstein, 2002).

There are several reasons to dismiss this reform as an explanation to our results, which we list below. Nonetheless, to verify this cannot be entirely responsible for our findings, we use the panel data from the Labor Force Survey to graph the percentage of any post secondary education graduates, which will include those whose degree status would have been switched into the academic "college" category after the reform. Figure 14 shows that even if we add non-Academic degrees to our analysis, we get the same trends and the same change in level and trend only for women. If we did not see the same trends when using any post-secondary certificate, that would lead to the conclusion that women's investment in education did not really change, only the label on the certificate they receive for the same amount of schooling. However, we find the "jump" between cohorts is very similar between this graph and Figure 6, demonstrating that changes in degree status around this time do not appear to account for this result. This eases our concerns for higher education reform driving the results by turning once non-academic degrees academic (i.e. teacher's certificates).

In addition, we find this alternative explanation to be unlikely, due to the different socio-economic classes targeted by the two reforms. At the time of the education reform, women already constituted more than 50% of undergraduate students. The main purpose of the reform was to make higher education institutions more accessible to a lower socioeconomic status population, mostly concentrated at peripheral regions (Volanski, 2005; Shavit et al., 2007), and increase higher education supply to match the rapidly increasing demand.[31] In addition, numerous studies were

[31]The demand increase stems from the growing rate of high-school graduates that received certificates in matricu-

Figure 14



conducted to document the reform's consequences, none of which report a distinctive effect on women's participation in higher education (see for example Volanski (2005)). Over the years that followed the percentage of female students in colleges was actually lower than in universities.[32]

Moreover, similar reforms in other countries were not found to affect women differently than men. One example is the higher education reform in Spain, which was enacted at approximately the same years as in Israel, and did not change the trend of women's education or of women's marriage decisions.[33]

It should also be noted that there is no reason to expect the reform to affect the way women's marriage outcomes depend on their age. We find that the previously existing penalty for older marriage practically disappears, even if we control for women's level of education. This finding cannot be explained by the increased supply of higher education.

Other health expansions A different explanation of the improvement in marriage outcomes for older women might simply be the entire health services reform that the NHI law provided. Better

lation exams (which are needed when applying for college)

[32]The only exception is teacher's training colleges, where there is a vast majority if female students, however those colleges' academization process in the early eighties. In addition, the students in these institutions constitute only a small share of the number of college students overall.

[33]See for example More(1996). We also use data from UNECE to examine age a first marriage, which changes smoothly throughout the reform period.

health services can make age less important, if we believe that in the marriage market age is a proxy for health in general, rather than just fertility. However, decisions on education and marriage age should not be affected by the expansion of health services, especially since those decisions are made by young people who value those services less than older people. As far as the general insurance that better health insurance provides, there is no reason to expect that a health reform that provided the same benefits for all would have a gender divergent effect. Moreover, if anything, better public provision of health services could discourage educational and career investments, since health benefits will be provided regardless of future earnings.

4 Conclusion

Increased access to *in vitro* fertilization offers women security of a second-line option in case they do not naturally achieve their desired level of fertility. Like any insurance, this guaranteed access to IVF causes individuals to be more willing to take actions that expose themselves to risk. Here that translates into women delaying starting families, using the time to pursue additional education and potentially other opportunities. The delay in starting families is shown by the stark increase in age at first marriage for women, following the policy change. The productive use of this time is demonstrated by the rise in completion of college and graduate education.

Moreover, the effect of this policy went beyond ameliorating women's tradeoff between human capital investments and fertility–it also appears to have updated men's beliefs about older women's value as partners. The evidence we show that older women marry richer partners after the policy is consistent with Low (2014)'s model of assortative matching among men and women along income dimensions being disrupted by fertility: when older women are expected to be less fertile, they may match with poorer spouses than younger women. However, with a lower decline in fertility with age, older women will match with higher income men. This shift in the marriage equilibrium may further reflect in women's decisions—knowing they will not lose as much reproductive capital by delaying marriage, and that their later-life marriage opportunities will be more favorable as a result, they will have fewer impediments to pursuing desired educational or career investments.

By testing what happens when the threat of later life fertility is attenuated, this research suggests that depreciating reproductive capital may represent a key source of asymmetry between men and women. When better insured against later life infertility, women delay marriage, invest in more education, and marry richer partners after doing so. In the absence of such insurance, this female-specific sharp decline in fertility may contribute to lower human capital investments by women during their reproductive years. In Israel, this manifests as women investing in more education, because women start families quite young. In other OECD countries, however, this underinvestment may take place after women have completed their education, but are required to pursue further on-the-job investments in order to climb the corporate ladder: late nights at the law firm, medical residencies, or the tenure sprint. Thus, depreciating reproductive capital may help to explain the lack of women in higher-level management positions as well as the upper-level gender wage gap. Policies that alleviate this burden through greater support for child-rearing in two-career households, access to maternity leave and career re-entry, or, as in Israel, insurance against later life fertility, could have far-reaching effects in increasing overall societal human capital, enabling firms to retain the best employees, while promoting social equity.

In regard to the specific Israeli policy we evaluate here, our findings demonstrate that the beneficiary population extends far beyond the women who actually use IVF or other assisted reproduction technologies. Rather, because the guaranteed access acts as insurance in case natural conception fails, all women considering further educational investments or delayed marriage may benefit. This is of critical importance because the cost per user of free IVF, due to Israel's generous policy, is enormous, and Israel is currently considering measures to limit the policy, having already placed age limits on use, and restricted the number of cycles for certain women. When taking into account the women who are provided insurance and subsequently obtain more education and marry richer husbands, not to mention those who are simply afforded peace of mind from having a backup option, the potential benefits to be weighed against those costs expand considerably.

One slight caution in regards to this cost benefit calculation is that the type of benefits we describe may not be what the Israeli government had in mind when they enacted the policy. The objectives of the policy were not to increase women's education and career outcomes, but were rather explicitly pro-natalist, aimed at increasing the birth rate of Israeli citizens.[34] Thus, policymakers should note that the behavioral response to IVF access may cause fertility effects to go in the opposite direction. If women do delay starting families, assured against the outcome of having zero children, they may nonetheless end up with a smaller overall family size, due to the late start. Moreover, since some evidence suggests individuals are *overly* optimistic about IVF's success rates, some women may delay, fail to conceive naturally, and go on to use the technology, only to be unsuccessful.

These questions of the tradeoff between further human capital investments and labor market productivity versus satisfaction derived from family and home life extend beyond Israeli policy-making. As more and more US companies consider measures such as paying for employees to freeze eggs, which similarly creates insurance against later life infertility, some women who are already planning to delay childbearing may be relieved by the benefit, while others could see a constantly moving finish line for how long they are expected to delay, to work at peak capacity, before starting a family. With the new knowledge that reproductive capital is a critical determinant in women's human capital investments and marriage market outcomes, the next frontier is to design policies that strike a delicate balance: working to remove the one-sided burden of depreciating reproductive

[34] The policy was defended in courts and described as a part of the fundamental human right to give birth and build a biological family.

capital on women without further burdening them with an impossible juggling act.

References

Abramowitz, J. (2012). Assisted Reproductive Technology and Women's Marriage and Birth Timing: Duration and Competing Risks Analyses. *Working Paper*.

Abramowitz, J. (2014). Turning Back the Ticking Clock: the Effect of Increased Affordability of Assisted Reproductive Technology on Women's Marriage Timing. *Journal of Population Economics 27*(2), 603–633.

Adda, J., C. Dustmann, and K. Stevens (2011). The Career Costs of Children. *CEPR Discussion Paper No. DP8697*.

Avellar, S. and P. J. Smock (2003). Has the Price of Motherhood Declined Over Time? A Cross-Cohort Comparison of the Motherhood Wage Penalty. *Journal of Marriage and Family 65*(3), 597–607.

Bernstein, S. (2002). The Rise and Fall of Private Higher Education in Israel. *Policy Studies 52*.

Birenbaum-Carmeli, D. (2003). Reproductive Policy in Context: Implications on Women's Rights in Israel, 1945–2000. *Policy Studies 24*(2-3), 101–113.

Birenbaum-Carmeli, D. (2004). 'Cheaper than a Newcomer': on the Social Production of IVF Policy in Israel. *Sociology of Health & Illness 26*(7), 897–924.

Bitler, M. and L. Schmidt (2006). Health Disparities and Infertility: Impacts of State-level Insurance Mandates. *Fertility and Sterility 85*(4), 858–865.

Bitler, M. P. and L. Schmidt (2012). Utilization of Infertility Treatments: the Effects of Insurance Mandates. *Demography 49*(1), 125–149.

Blackburn, M. L., D. E. Bloom, and D. Neumark (1993). Fertility Timing, Wages, and Human Capital. *Journal of Population Economics 6*(1), 1–30.

Bretherick, K. L., N. Fairbrother, L. Avila, S. H. Harbord, and W. P. Robinson (2010). Fertility and Aging: Do Reproductive-aged Canadian Women Know What They Need to Know? *Fertility and Sterility 93*(7), 2162–2168.

Bronson, M. A. and M. Mazzocco (2013). Cohort Size and The Marriage Market. *Working Paper*.

Buckles, K. (2007). Stopping the Biological Clock: Infertility Treatments and the Career-family Tradeoff. *Boston University, Unpublished Manuscript*.

Buckles, K. (2008). Understanding the Returns to Delayed Childbearing for Working Women. *The American Economic Review 98*(2), 403–407.

Buckles, K. S. (2013). Infertility Insurance Mandates and Multiple Births. *Health Economics 22*(7), 775–789.

Bundorf, M. K., M. Henne, and L. Baker. Mandated Health Insurance Benefits and the Utilization and Outcomes of Infertility Treatments.

Collins, J. A. (2002). An International Survey of the Health Economics of IVF and ICSI. *Human Reproduction Update 8*(3), 265–277.

Danziger, L. and S. Neuman (1999). On the Age at Marriage: Theory and Evidence from Jews and Moslems in Israel. *Journal of Economic Behavior & Organization 40*(2), 179–193.

Dessy, S. and H. Djebbari (2010). High-Powered Careers and Marriage: Can Women Have It All? *The BE Journal of Economic Analysis & Policy 10*(1).

Goldin, C. and L. F. Katz. The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions. *Journal of Political Economy*.

Gustafsson, S. (2003). Optimal Age at Motherhood. Theoretical and Empirical Considerations on Postponement of Maternity in Europe. In *Family, Household and Work*, pp. 345–367. Springer.

Hamilton, B. H. and B. McManus (2012). The Effects of Insurance Mandates on Choices and Outcomes in Infertility Treatment Markets. *Health Economics 21*(8), 994–1016.

Hashiloni-Dolev, Y. (2013). *The Fertility Revolution*. Ben Shemen: Modan Publishing House, in Hebrew.

Hashiloni-Dolev, Y., A. Kaplan, and S. Shkedi-Rafid (2011). The Fertility Myth: Israeli Students' Knowledge Regarding Age-related Fertility Decline and Late Pregnancies in an Era of Assisted Reproduction Technology. *Human Reproduction 0*(0), 1–9.

Loughran, D. S. and J. M. Zissimopoulos (2009). Why Wait? The Effect of Marriage and Childbearing on the Wages of Men and Women. *Journal of Human Resources 44*(2), 326–349.

Low, C. (2014). Pricing the Biological Clock: Reproductive Capital on the US Marriage Market. *Working Paper*.

Miller, A. R. (2011). The Effects of Motherhood Timing on Career Path. *Journal of Population Economics 24*(3), 1071–1100.

Ohinata, A. (2011). Did the US Infertility Health Insurance Mandates Affect the Timing of First Birth? *CentER Working Paper Series*.

Remennick, L. (2010). Between Reproductive Citizenship and Consumerism: Attitudes towards Assisted Reproductive Technologies among Jewish and Arab Israeli Women. *Kin, Gene, Community: Reproductive Technologies among Jewish Israelis 19*, 318.

Schmidt, L. (2005). Infertility Insurance Mandates and Fertility. *American Economic Review 95*(2), 204–208.

Schmidt, L. (2007). Effects of Infertility Insurance Mandates on Fertility. *Journal of Health Economics 26*(3), 431–446.

Shalev, C. and S. Gooldin (2006). The Uses and Misuses of In Vitro Fertilization in Israel: Some Sociological and Ethical Considerations. *Nashim: A Journal of Jewish Women's Studies & Gender Issues 12*(1), 151–176.

Shavit, Y., R. Arum, and A. Gamoran (2007). Stratification in Higher Education: A Comparative Study.

Simonstein, F. (2010). IVF Policies with Emphasis on Israeli Practices. *Health Policy 97*(2), 202–208.

Siow, A. (1998). Differential Fecundity, Markets, and Gender Roles. *Journal of Political Economy 106*(2), 334–354.

Taniguchi, H. (1999). The Timing of Childbearing and Women's Wages. *Journal of Marriage and the Family 61*(4), 1008–1019.

Vlez, M., M. Connolly, I.-J. Kadoch, S. Phillips, and F. Bissonnette (2014). Universal Coverage of IVF Pays Off. *Human Reproduction 29*(6), 1313–1319.

Volanski, A. (2005). *Academy in a Changing Environment*. Kotar, in Hebrew.

Wilde, E. T., L. Batchelder, and D. T. Ellwood (2010). The Mommy Track Divides: The Impact of Childbearing on Wages of Women of Differing Skill Levels. *Working Paper* (16582).

5 Appendix

5.1 Robustness Checks

In this section, we present logit and probit regressions for educational attainment as well as ordered logit regressions for total level of schooling. We also perform our regressions for becoming highly educated restricted to women who were unmarried at the age of 27, and thus would be most free to change their educational attainment based on the policy change.

5.2 Placebo Tests

In this section, we use countries that have Census's around the time of Israel's 2008 Census and similar GDP per capita as Israel to conduct placebo tests, showing that the cohort entering college in 1994 in other countries was not similarly affected (in each country, the red line is shifted according to typical college entry age of students in that country). This would be the case if broader international shifts in the nineties were responsible for the effects that we see. Moreover, we do not observe similar discontinuous increases in female versus male college attainment over time in any of the other countries.

The same lack of discontinuous trends is true when looking at graduate school attainment as well, although the data is somewhat noisier.

Similar placebo tests can be conducted for marriage, although in this case we are restricted by data availability, as very few censuses record year of marriage. We thus use only the United States' 2008 American Community Survey to show there are no discontinuous trends in age at first marriage, or spousal income when marrying after 35.

Table A1: College Education, Logit and Probit

	Dependent variable: college education			
	Panel A: D-i-D			
	Logit		Probit	
	(1)	(2)	(3)	(4)
fem × post	0.300***	0.300***	0.189***	0.190***
	(0.0211)	(0.0458)	(0.0129)	(0.0283)
female	0.156***	0.159***	0.0941***	0.0955***
	(0.0142)	(0.0176)	(0.00858)	(0.0108)
post	0.0196		0.0124	
	(0.0222)		(0.0135)	
time	0.0202***	0.0120***	0.0122***	0.00710***
	(0.00112)	(0.000844)	(0.000678)	(0.000513)
Constant	-0.741***	-0.872***	-0.459***	-0.540***
	(0.0149)	(0.0159)	(0.00899)	(0.00969)
YOB FEs with cluster		Yes		Yes
Observations	206,921	206,921	206,921	206,921
	Panel B: D-i-D with slopes			
	Logit		Probit	
	(1)	(2)	(3)	(4)
fem × post × time	0.0356***	0.0364***	0.0220***	0.0224***
	(0.00598)	(0.00717)	(0.00369)	(0.00431)
fem × post	0.0193	0.0158	0.0138	0.0121
	(0.0403)	(0.0441)	(0.0248)	(0.0269)
fem × time	0.00829***	0.00834***	0.00520***	0.00524***
	(0.00248)	(0.00236)	(0.00149)	(0.00140)
post × time	-0.0436***	-0.0448***	-0.0264***	-0.0273***
	(0.00432)	(0.00298)	(0.00265)	(0.00174)
post	0.220***		0.136***	
	(0.0292)		(0.0178)	
female	0.236***	0.238***	0.144***	0.146***
	(0.0276)	(0.0231)	(0.0167)	(0.0140)
time	0.0203***	0.0206***	0.0121***	0.0124***
	(0.00180)	(0.00121)	(0.00107)	(0.000709)
Constant	-0.740***	-0.653***	-0.461***	-0.406***
	(0.0199)	(0.0117)	(0.0120)	(0.00702)
YOB FEs with cluster		Yes		Yes
Observations	206,921	206,921	206,921	206,921

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A2: Graduate Education, Logit and Probit

	Dependent variable: graduate education			
	Panel A: D-i-D			
	Logit		Probit	
	(1)	(2)	(3)	(4)
fem × post	0.265***	0.269***	0.140***	0.144***
	(0.0319)	(0.0679)	(0.0166)	(0.0351)
female	0.0419*	0.0434	0.0216*	0.0229
	(0.0248)	(0.0322)	(0.0129)	(0.0168)
post	0.261***		0.138***	
	(0.0376)		(0.0194)	
time	-0.0239***	-0.0339***	-0.0128***	-0.0169***
	(0.00177)	(0.00132)	(0.000934)	(0.000681)
Constant	-2.307***	-2.638***	-1.340***	-1.501***
	(0.0238)	(0.0195)	(0.0123)	(0.0101)
YOB FEs with cluster		Yes		Yes
Observations	206,921	206,921	206,921	206,921

	Panel B: D-i-D with slopes			
	Logit		Probit	
	(1)	(2)	(3)	(4)
fem × post × time	0.0497***	0.0586***	0.0256***	0.0292***
	(0.00734)	(0.0110)	(0.00385)	(0.00535)
fem × post	0.00405	-0.0531	0.00110	-0.0200
	(0.0626)	(0.0902)	(0.0331)	(0.0454)
fem × time	-0.00554	-0.00545	-0.00281	-0.00280
	(0.00585)	(0.00580)	(0.00303)	(0.00303)
post × time	-0.0815***	-0.111***	-0.0428***	-0.0551***
	(0.00543)	(0.00798)	(0.00282)	(0.00385)
post	0.307***		0.167***	
	(0.0460)		(0.0242)	
female	0.000943	0.00196	0.000995	0.00155
	(0.0511)	(0.0456)	(0.0266)	(0.0240)
time	0.0111**	0.0125***	0.00570**	0.00626***
	(0.00431)	(0.00332)	(0.00221)	(0.00169)
Constant	-2.034***	-1.963***	-1.197***	-1.164***
	(0.0378)	(0.0386)	(0.0196)	(0.0197)
YOB FEs with cluster		Yes		Yes
Observations	206,921	206,921	206,921	206,921

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A3: Graduate Education, Only Women Unmarried at 27

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: graduate education					
	Panel A: D-i-D			Panel B: D-i-D with slopes		
fem × post × time				0.000372	0.000772	0.000772
				(0.00146)	(0.00145)	(0.00200)
fem × post	0.0485***	0.0472***	0.0472***	0.0292**	0.0249*	0.0249*
	(0.00617)	(0.00616)	(0.00812)	(0.0129)	(0.0129)	(0.0136)
fem × time				0.000955	0.00104	0.00104
				(0.00123)	(0.00122)	(0.00143)
post × time				-0.00919***	-0.00841***	-0.00841***
				(0.000837)	(0.00148)	(0.000832)
post	0.0595***			0.0434***		
	(0.00616)			(0.00743)		
female	0.0122**	0.0147***	0.0147**	0.0218**	0.0223**	0.0223**
	(0.00513)	(0.00512)	(0.00628)	(0.0103)	(0.0103)	(0.0103)
time	-0.00468***	-0.00341***	-0.00341***	0.00126*	0.000390	0.000390
	(0.000312)	(0.000449)	(0.000113)	(0.000714)	(0.00102)	(0.000437)
Constant	0.0919***	0.0732***	0.0732***	0.134***	0.133***	0.133***
	(0.00376)	(0.00633)	(0.00163)	(0.00602)	(0.00851)	(0.00320)
YOB FEs		Yes	Yes		Yes	Yes
Clustered SEs			Yes			Yes
Observations	79,046	79,046	79,046	79,046	79,046	79,046
R-squared	0.009	0.015	0.015	0.011	0.015	0.015

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Education Level, Ordered Logit

	Dependent variable: educational category			
	Panel A: D-i-D		Panel B: D-i-D with slopes	
	(1)	(2)	(3)	(4)
fem × post × time			0.0273***	0.0274***
			(0.00500)	(0.00500)
fem × post	0.213***	0.213***	-0.00476	-0.00663
	(0.0180)	(0.0180)	(0.0357)	(0.0357)
fem × time			0.00614***	0.00629***
			(0.00218)	(0.00218)
post × time			-0.0406***	-0.0391***
			(0.00374)	(0.00559)
post	-0.00458		0.170***	
	(0.0197)		(0.0268)	
female	0.226***	0.228***	0.286***	0.289***
	(0.0125)	(0.0125)	(0.0242)	(0.0242)
time	0.0206***	0.0133***	0.0218***	0.0217***
	(0.000979)	(0.00128)	(0.00163)	(0.00242)
YOB FEs		Yes		Yes
Observations	198,666	198,666	198,666	198,666

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure A1: College Attainment by Birth Cohort in United States

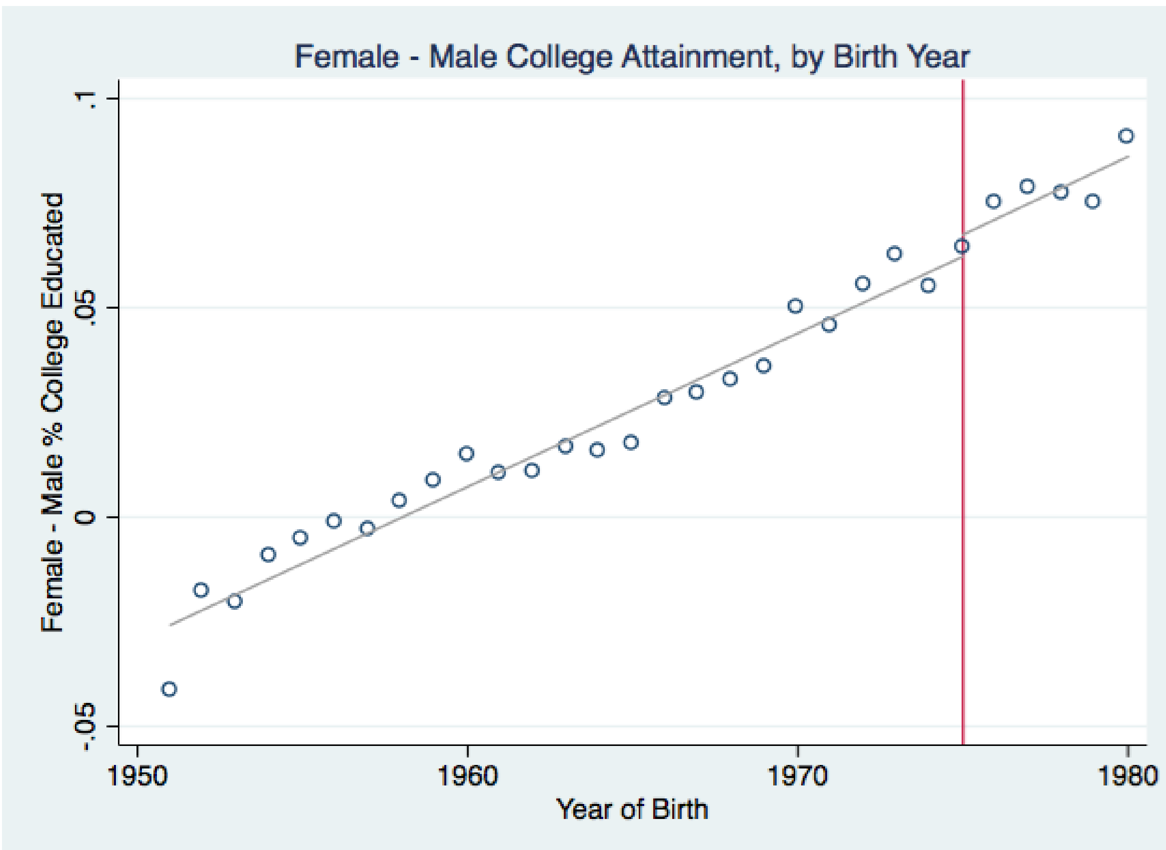
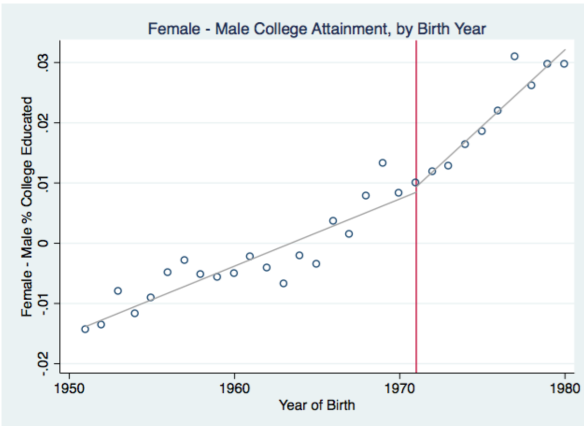
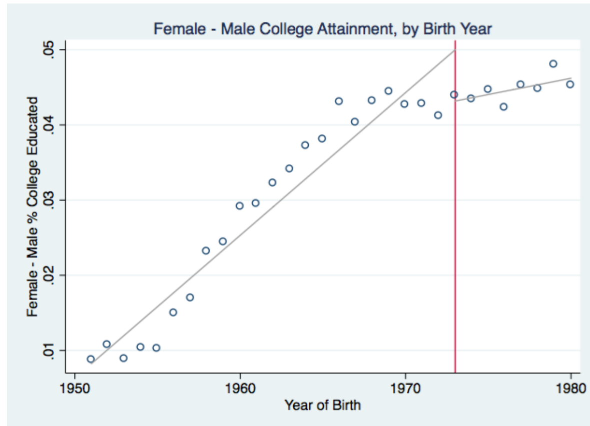


Figure A2: College Attainment by Birth Cohort in Comparable Countries

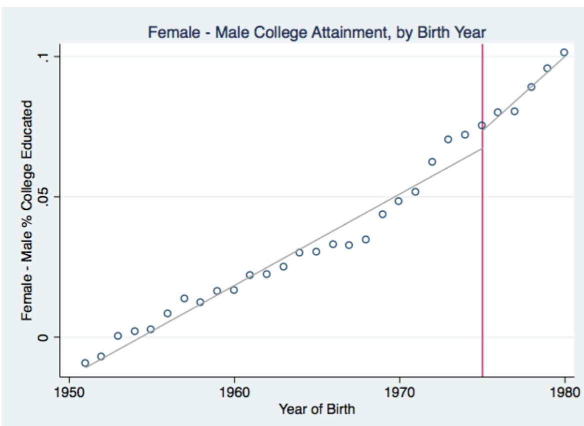
(a) Argentina



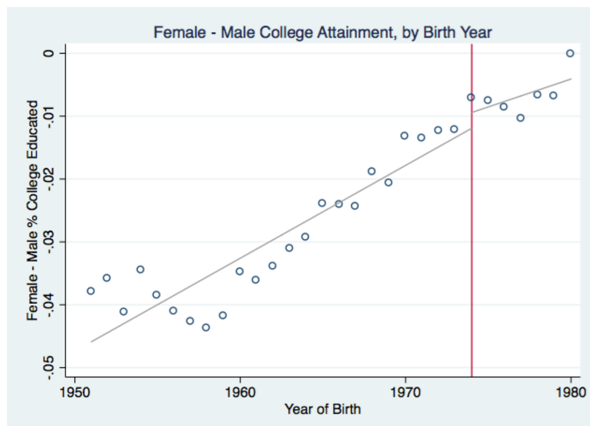
(b) Brazil



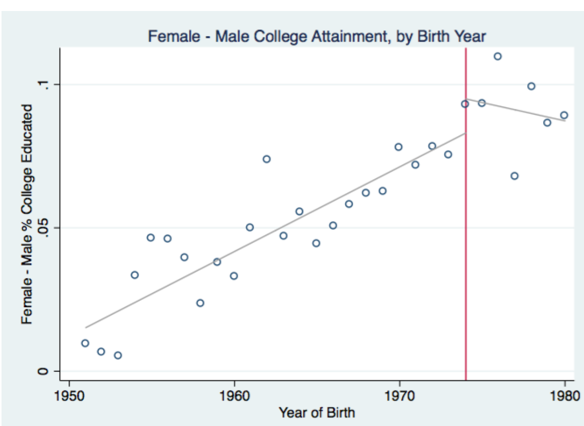
(c) France



(d) Mexico



(e) Panama



(f) South Africa

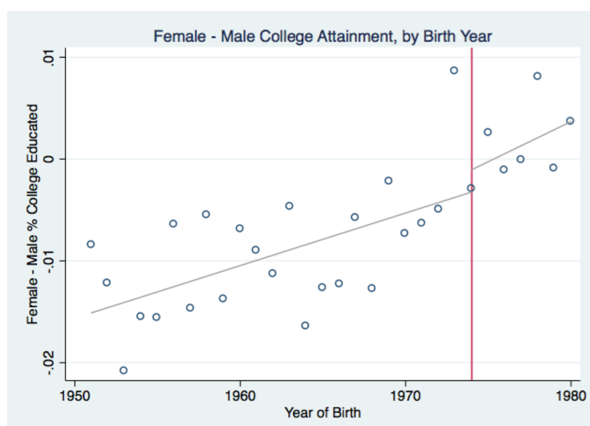


Figure A3: Age at First Marriage by Year in United States

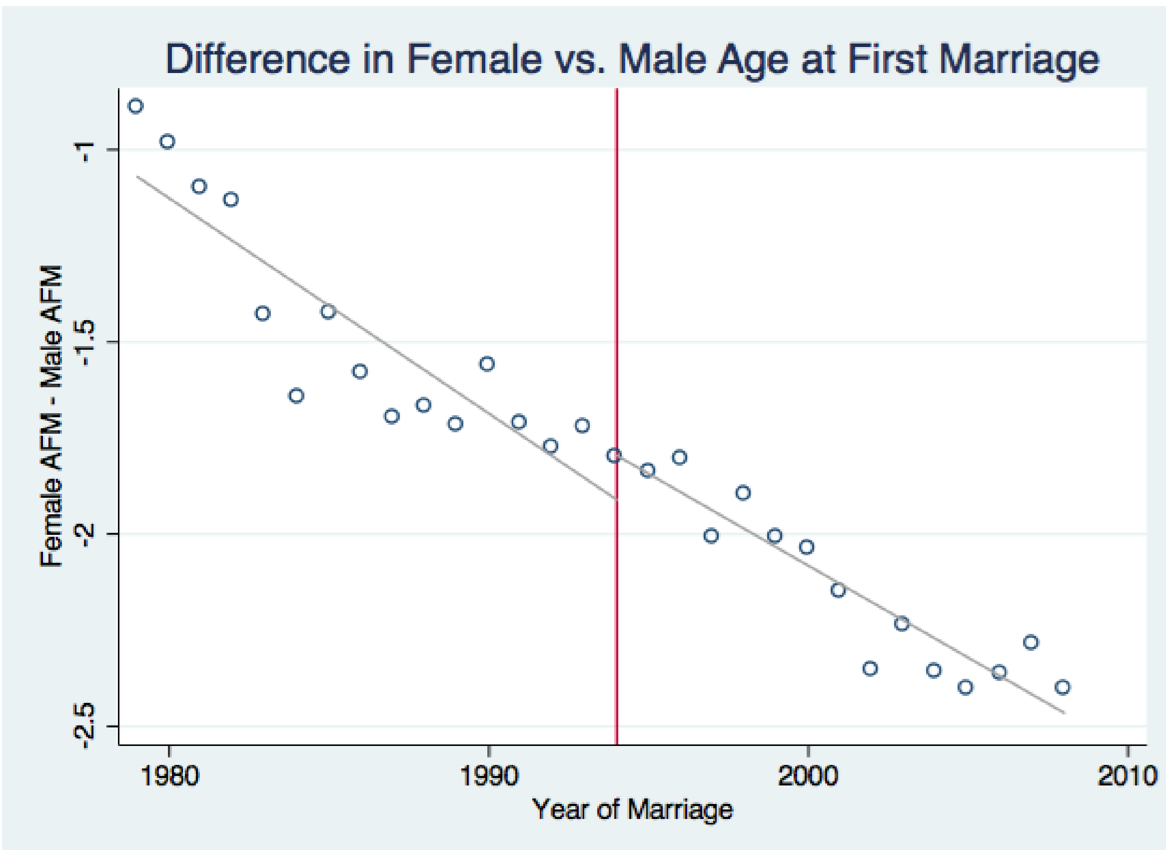


Figure A4: Spousal Income by Year in United States