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THE POWER OF THE PILL: ORAL CONTRACEPTIVES AND WOMEN'S CAREER AND MARRIAGE DECISIONS

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ABSTRACT

The fraction of U.S. college graduate women entering professional programs increased substantially around 1970 and the age at first marriage among all U.S. college graduate women soared just after 1972. We explore the relationship between these two changes and how each was shaped by the diffusion of the birth control pill among young, single college educated women. Although "the pill" was approved in 1960 by the FDA and diffused rapidly among married women, it did not diffuse among young single women until the late 1960s when a series of state law changes reduced the age of majority and extended mature minor decisions. We model the impact of the pill on women's careers as consisting of two effects. The pill had a direct positive effect on women's career investment by almost eliminating the chance of becoming pregnant and thus the cost of having sex. The pill also created a social multiplier effect by encouraging the delay of marriage generally and thus increasing a career woman's likelihood of finding an appropriate mate after professional school. We present a collage of evidence pointing to the power of the pill in lowering the costs of long-duration professional education for women. The evidence consists of the striking coincidences in the timing of changes in career investment, marriage age, state laws, and pill use among young single women. The connection between changes in the age at first marriage and the pill is further explored using state variation in laws affecting young single women's pill access. We also evaluate alternative explanations for the changes in career and marriage.

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The careers of women and their age at first marriage both changed significantly in the United States with cohorts born just prior to 1950. Women first began to enter professional programs, such as medicine and law, in large numbers in 1970 and their entry caused the fraction female in these programs to rise steeply. Women were 10 percent of first year law students in 1970, but were 36 percent in 1980. The fraction married among young college graduate women decreased for the same cohorts. Among the cohort of female college graduates born in 1950, almost 50 percent married before age 23, but fewer than 30 percent did for those born in 1957.

We ask whether the birth control pill and the legislation that enabled young women to obtain it altered women's career plans and the age at first marriage. Our answer is that they did. The empirical argument relies on the timing of various changes. Legal changes in the late 1960s and early 1970s enabled the diffusion of the pill among young single women. Their pill use first began to increase with cohorts born around 1948 and we explore, with cross-section data from 1971, the role of law changes in enabling pill use. Beginning in 1972, and continuing to 1979, the fraction of college women marrying a year or two after graduation plummeted. The pill encouraged the delay of marriage through several routes and we establish the connection by estimating the effect of law changes in a state fixed-effects framework. The pill directly and immediately lowered the costs to women of engaging in long-term career investments by giving them almost complete certainty and safety regarding the pregnancy consequences of sexual activity. The delay of marriage, beginning a year or two later, endowed the pill with a "social multiplier" or indirect effect by reducing the costs in the marriage market to women who delayed marriage to invest in careers. The relative increase of women to men in professional programs began its rapid ascent in 1970, just as the first pill cohorts began to graduate from college.

Our framework, therefore, confers two effects on the pill. The first, which we term the

direct effect, is that the pill greatly increased the reliability of contraception and its ease of use. In the absence of reliable contraception, young women embarking on a lengthy professional education would have to pay the penalty of abstinence or cope with considerable uncertainty regarding pregnancy. The pill enabled women to invest in expensive, long-duration training and not pay as high a price.

The second role for the pill is termed here the *indirect* (or social multiplier) *effect*. The pill affected all women, not just career women, and affected men as well. With the advent of the pill *all* individuals could delay marriage and not pay as large a penalty. Women who invest in a lengthy education often delay marriage until completing their initial career preparation. If in the interim most everyone else marries, the pool of eligible bachelors will be reduced and career women will have to settle for a lesser match at the end of the training period. If, instead, others delay marriage, the career woman will pay a smaller penalty. The pill, by encouraging the delay of marriage for most youth, created a "thicker" marriage market for career women. Thus the pill may have enabled more women to opt for careers by indirectly lowering the cost of a lengthy career investment period.

The first issue we explore is the diffusion of the pill among single women and the legal reasons for its delayed dissemination. We then formally model the potential effects of the pill on marriage and career. We establish next that the timing of the pill's diffusion among young, unmarried women was caused, in part, by legal changes in the age of majority and mature minor statutes. We then ask whether the turning points in the pill usage time series are also present in the series on the age at first marriage and career investment. We establish a prima facie case that the diffusion of the pill among single college women led to an increase in the fraction of women undertaking lengthy professional programs. We explore evidence for the indirect role by

analyzing the relationship between the age at first marriage and state variation in laws affecting contraceptive availability to youth. Alternative explanations, including abortion law changes, the resurgence of feminism, affirmative action and other anti-discrimination laws, are assessed.

I. The pill and the single woman

A. The birth of the pill

In 1960 the Food and Drug Administration (FDA) approved the use of norethynodrel, a synthetic progesterone, as an oral contraceptive for women.[1] The product was christened Enovid by its manufacturer, but nearly everyone else called it and its successors "the pill." Oral contraceptives — aka "the pill" — remain among the greatest miracle drugs.[2] (See Table 1 for the history of the birth control pill and landmark decisions regarding contraception.)

The pill diffused rapidly among married women in the United States. By 1965, only five years after its release, more than 40 percent of married women younger than thirty years were "on the pill."[3] So rapid was its diffusion that the fraction of all married women using the pill peaked around 1967. But by the time the pill had reached its maximum diffusion among married women, it was only just beginning to be used by young *single* women.

B. Pill diffusion among single women

Both legal and social factors were responsible for the delayed dissemination of the pill among unmarried women.[4] Until the late 1960s single women, below the age of majority and

[1] A closely related drug, norethindrone, had already been approved for medical uses, not contraception, two years before. On the history of the pill, see Asbell (1995) and Watkins (1998).

[2] *The Economist* (Dec. 31, 1999) named the pill the greatest science and technology advance in the twentieth century.

[3] Westoff and Ryder (1977), table II-3. The figure only includes couples using any form of contraception, including sterilization, rhythm, and withdrawal. Of *all* married women less than 30 years old, 26 percent were on the pill in 1965.

[4] It should be noted that the fraction of *all* women who *ever* used the pill reached a peak of 85 percent

without parental consent, were often denied access to the pill and other forms of contraception.[5] Before the late 1960s was it was not legal under the Common Law for a physician in any state to prescribe the pill as a contraceptive device to an unmarried woman below the age of majority without consent of her parents.[6] But by 1972, on the heels of the 26th Amendment (1971), the "age of majority" had been lowered to 18 years old in most states. Beginning in the late 1960s, "mature minors" in many states were enabled, by judicial decision and statute, to obtain contraceptive services. The extension of family planning services to minors and changes in local norms regarding appropriate practice had reinforcing effects.

The pill diffused rapidly among single women after they were able to obtain it. In 1976, 73 percent of all ever-contracepting single women 18 and 19 years old had used the drug.[7] Despite numerous "pill scares" concerning medical complications, the pill has remained the contraceptive method of choice among fertile women independent of marital status.[8]

State laws did not prevent the determined single woman from obtaining contraceptive devices and information. Physicians understood that the pill would not be effective unless taken before sexual relations began and thus they routinely prescribed the pill to patients who were engaged. Pretending to be engaged was therefore one method of obtaining the pill.[9] The pill

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with the cohort born in 1948 and then declined to around 80 percent (calculated from the 1987 National Health Interview Survey; ICPSR 1990). Lifetime pill usage does not decrease much after the 1948 cohort and appears to have stabilized at 80 percent. Because the survey was taken in 1987 even the 1948 birth cohort has an incomplete history of pill usage.

[5] Massachusetts and Wisconsin even had legislative proscriptions against the sale of contraceptive devices to *any* unmarried individual. Not until 1972 was the Massachusetts law overturned by the U.S. Supreme Court in *Eisenstadt v. Baird*.

[6] No record exists of a doctor's successful prosecution under a criminal statute regarding contraceptive service provision to minors (U.S. Department of Health, Education and Welfare 1974, p. 70).

[7] Zelnik and Kantner (1977), p. 63. Among single, 18 and 19 year old females in 1976, 30 percent had taken the pill and 60 percent had among those who had ever been sexually active. *Source*: ICPSR (1982).

[8] In 1995, 49 percent of all non-sterile contracepting, never-married women (15 to 44 years old) were on the pill, as were 22 percent of all non-sterile women in that age group (U.S. Department of Commerce 1998, p. 90).

[9] See, for example, Scrimshaw (1981).

was also used to regulate menses and some single women obtained the pill by convincing a physician that they had irregular periods.[10] We recognize that single women used the pill before the change in state laws, but we will show that their numbers were small and that the increase with the change in state laws was substantial.

State laws in the 1960s were also in force to directly regulate the sale of contraceptives. These laws were the legacies of a federal anti-vice law passed in 1873, known as the Comstock Law. That law was relatively unimportant but it served to fuel state "Comstockery" so that even by 1960, 30 states prohibited advertisements regarding birth control and 22 had some general prohibition on the sale of contraceptives. These laws reflected social norms and must have had a larger effect on minors whose ability to obtain contraceptives was constrained in other ways.

The laws and social norms that prevented single women from obtaining the pill until the early 1970s are also barriers to our obtaining information on their use of the pill. A major survey of fertility and contraception taken in 1970 — the National Fertility Survey — excluded unmarried women.[11] Only two surveys prior to the 1980s inquired of the contemporaneous and recent sexual practices and contraceptive use of young and primarily unmarried women.[12]

Just two data sets exist that enable the calculation of pill usage or family planning services for a large national sample of women regardless of current and prior marital status. Because our interest is in professional career choice, we focus almost exclusively on the

[10] Pretending to be engaged or lying about a medical condition is a demeaning act. Because a pill prescription had to be maintained on an annual or semi-annual basis, it was a demeaning act that would have to be repeated regularly.

[11] According to the authors of the 1965 and 1970 NFS: "The ideal, of course, would be to include all women of reproductive age, but the problems inherent in asking questions about fertility and contraception of never-married young girls have deterred us. The first such national study of teen-aged girls has since been conducted by John Kantner and Melvin Zelnik … the profession may be close to reconsidering this whole question" (Westoff and Ryder 1977), p. 4. The 1970 NFS asked pill usage retrospectively but only for women who were married a month before the date of the question.

[12] Zelnik and Kantner (1972, 1977, 1989), ICPSR (1982). We later use both surveys (taken in 1971

diffusion of the pill among college graduate women. Both data sets give retrospective answers on pill and/or family planning service usage. Each has the virtue that it enables the tracking of cohorts born from the late-1930s to the late-1960s and contains information on education and religion, among other relevant variables. There are, however, deficiencies in both surveys. (Table 2 describes the data sets we draw on for pill and family planning service use.)

One of the surveys is the cancer risk factor supplement to the National Health Interview Study (NHIS; ICPSR 1990). The almost 13,000 women interviewed in 1987 were asked, among other questions, their history of birth control pill usage. They were not asked their age at first marriage but did record the age at which they had their first birth. The fractions of college graduate women who first used the pill at various ages are graphed in Figures 1a and 1b. We consider these data to be the best we can compile concerning the diffusion of the pill among young (and likely to be unmarried) college women. Only women who did not experience a first birth before age 23 are included to minimize the fraction already married.

Because the NHIS survey did not ask age at first marriage and because marriage ages rose beginning with the late 1940s birth cohorts, single women's pill usage levels will be overstated especially so for the earliest cohorts considered. Even though we condition on not having a first birth before age 23, the degree of bias could still be significant. The percentage of college graduate women who had no births before age 23 but who were already married by age 22 was around 25 percent for cohorts born from 1940 to the early 1950s, but was only about 15 percent for the birth cohorts of the late 1950s and early 1960s.[13] Thus our graphs understate the increase in pill use by single women by including more married women in the older cohorts.

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and 1976), although they are of limited use because they are for 15 to 19 year olds.

[13] These estimates come from tabulations of the merged 1990 and 1995 Current Population Survey (CPS) Fertility and Marital History Supplements. If pill usage were 30 percentage points higher for married than single women, the overstatement for the older, relative to the younger, cohorts would be

According to these data, the fraction of women who started taking the pill after age 18 but before 20, that is during college but before the traditional age of majority, reached about 0.1 for cohorts born in 1945 (see Figure 1a). Some of these women were married, thus more able to obtain the pill, but even with this potential bias a discernable increase in pill usage can be seen for cohorts born after 1946. First pill usage in the 18 to 20 year interval reached 30 percent by the cohort born in 1950. After the cohort born in 1950, the increase in pill use among women younger than 21 years old came about entirely from those obtaining the pill before age 18, a group that had negligible use. By the cohorts born in 1952, pill usage before age 21 was about 0.35. Similar results, but with higher levels, can be found in Figure 1b where the upper cutoff point is now age 22 and thus the inadvertent inclusion of married women is greater.

We now present complementary series on family-planning services that, we believe, better reveal the timing of pill use among never-married women. The source is the National Survey of Family Growth, Cycle III, 1982 (NSFG82; ICPSR 1985), which contains the responses of almost 8,000 women. Because the survey asked the age at first marriage, the turning points for pill use among single women should be more accurate. But the data cannot be used to track first pill use.[14] Instead, we use information on the year family planning services were first used. Birth control is a family planning service, but so are pregnancy tests and sex counseling. The levels will, in consequence, be slightly higher than for first pill use.[15]

We graph, in Figure 2, the fraction of college graduate women receiving their first family planning services before and between various ages, among those not married before age 22. The

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about 3 percentage points.

[14] Akerlof, Yellen, and Katz (1996) use the NSFG82 to construct a time series on the fraction of unmarried women on the pill at first sexual intercourse.

[15] More than 74 percent of first family planning visits, among women who in 1982 were younger than 25 years old, were for birth control (NSFG82). The vast majority of those, we can infer from the NSYW71, were for the pill.

fraction receiving services between ages 18 and 19 remained at about 5 percent for cohorts born from 1943 to 1948. But after 1948, the fraction rose steadily to 27 percent for the 1956 cohort. Whereas only a small percentage received family planning services before age 18 until the birth cohort of 1952, 20 percent did by the 1955 cohort. The fraction receiving services between ages 18 and 20 rose gradually prior to the 1948 cohort, but it then rose steeply to the 1951 cohort.

Women between 18 and 20 years old would have been most affected by the changes in state laws regarding the age of majority and this group experienced a sudden and rapid increase in receipt of such services after the cohort born in 1948. Those receiving services before age 18 would have been most affected by changes in state laws regarding services provided to those below the age of majority. In both cases, the periods of most rapid increase coincide with periods when state laws changed, as will be demonstrated below.

The results from the two data sets give relatively consistent results. Not surprisingly, the levels are somewhat higher for first family planning services than for first use of the pill among college graduate women. The timing of the increase also differs slightly, by about two years. Among women who would eventually graduate from college, the increase in contraceptive services for those of college age began with cohorts born around 1948. Among pre-college women, the increase began for cohorts born around 1952.

Because the surveys on which we rely for the timing of first pill use or family planning services are retrospective, there may be doubts regarding their reliability. Women generally recall the year of their first birth, but do they reliably recall the year that they first took the pill? There is overwhelming evidence that they do.

We can compare the retrospective answers in the NHIS with more contemporaneous responses for women 15 to 19 years old by using the National Survey of Young Women 1971

and the National Survey of Adolescent Female Sexual Behavior 1976 (NSYW71, NSAF76). The NSYW71 is a nationally based survey of 4,611young women 15 to 19 years old in 1971. Because we do not know whether those in the NSYW71 eventually graduated from college, we compare all 19 year olds in the NSYW71 born in 1951 with all women in the NHIS born in 1952. Among those in the NHIS, 33 percent reported having taken the pill before age 20; among the group in the NSYW71, 34 percent claimed to have ever used birth control pills.[16] The NSAF76 is also a nationally based survey but about half the size of its predecessor version. We perform a similar comparison with it, but use women born in 1957. In the NHIS among those born in 1957, 48.2 percent took the pill prior to age 20; in the NSAF76, among those born in 1957, 51.2 percent had ever taken the pill.[17] Thus, the comparison offers convincing evidence that women do accurately recall the age at which they began taking the pill.

In sum, the use of the pill by unmarried, college-educated women between 18 and 21 years old took off with cohorts born around 1948. Pill usage among this group diffused rapidly within roughly five years. Contemporaneous pill use rates among married women peaked about five years earlier. The reasons for the differences in the diffusion of the pill concern laws affecting contraceptive services to minors, the age at majority, and social norms.

C. State variation in laws affecting contraceptive services

The provision of contraceptive services to unmarried women younger than 21 years was highly circumscribed before the late 1960s. The majority of physicians understood the law in most states to require parental consent before non-emergency procedures, including contraceptive services, could be given to a minor. In 1969 the age of majority for females was

[16] The figure using NSYW71 is computed for 19 year olds born Apr. to Dec. 1951. Since the survey was taken in March 1971, none had completed their nineteenth year. If we, instead, use 19 year olds born April to August 1951, the figure rises to 39 percent. Sample weights are used.

[17] The figure using NSAF76 is computed for 19 year olds born Mar. to Dec. 1956. If we, instead, use

21 years old in all but 9 states and was 18 years old in only 6 states (see Table 3). State laws providing family planning services to young women were altered after 1969 in three ways. The age of majority was lowered in almost all states between 1969 and 1974. Statutes and judicial decisions began to classify minors as "mature" enough to make decisions, and laws were passed that allowed family planning services to be used by minors without parental consent.

In addition to the 6 states in 1969 having an age of majority for women of eighteen years, 3 states (CA, GA, and MS) recognized the "mature minor" doctrine or provided family planning services to minors without parental consent. Thus in just 9 states could a woman of eighteen years old legally obtain the pill in 1969.[18] Just two years later, in 1971, 16 states had an age of majority of eighteen and 17 (an additional 14) had laws that allowed women below the age of majority to obtain contraceptive services. Thus, in 1971 a woman of 18 years could, without legal hindrance, obtain the pill in 30 states. Females 16 years and younger could obtain it in 12 states (see Table 3). In 1974, three years after the 26th Amendment was ratified, just 2 states had an age of majority that exceeded 18 years *and* did not have legislation emancipating minors.[19]

The legal changes of the late 1960s and early 1970s regarding the age of majority and the mature minor doctrine were not generally motivated by demands for teenage contraception. Rather, the war in Vietnam and the draft were the main reasons for the passage of the 26th Amendment and the related changes in the age of majority that preceded and followed its ratification.[20] Reductions in the age of majority, in turn, often led to extensions of the "mature

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19 year olds born March to July 1951, the figure rises to 56.1 percent. Sample weights are used.

[18] In 5 of the states (AR, ID, NV, OK, UT), the age of majority for females was traditionally lower than it was for males, probably because women often married young in these states.

[19] Today three states have an age of majority exceeding 18 years old (AL 19, MS 21, PA 21), but *no* state, it appears, has any binding legislation preventing a minor from obtaining contraceptives. See http://www.agi-usa.org/pubs/ib21.html the website of the Alan Guttmacher Institute.

[20] According to Paul, Pilpel, and Wechsler (1974, p. 142), "The past five years have seen a marked expansion of the legal rights of teenagers. Most significant has been the reduction of the age of majority

minor" doctrine. Of the 21 states that changed their regulations between 1969 and 1971, 10 resulted from reductions in the age of majority, 10 from extensions of the mature minor doctrine, and 1 was due solely to a comprehensive family planning act.[21]

Some ambiguity surrounds what these laws meant with regard to the provision of contraceptive services to minors. In no state in 1972, for example, was it per se illegal to prescribe or sell contraceptives to a minor.[22] Rather, the legality both before and after 1972 hinged on whether the minor was "emancipated" by marriage, parental status, parental consent, or statute. But even then, it often depended on whether a physician believed it was in the best interests of the patient and consistent with local practice.

The availability of family planning services to women in college is a crucial input to career change since it occurs when women are making career and family decisions. Universities and colleges viewed the legal ambiguity in the late 1960s as good reason *not* to provide family planning services and certainly not to advertise the availability of services offered on an individual basis. Only after the age of majority was lowered and the mature minor doctrine was established in various states did university health services began to offer family planning to undergraduates and to advertise its availability. Yale University was in the forefront and opened a family planning clinic in 1969, prompted by a change in student needs with coeducation (Sarrel

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... In the majority of cases, this development followed the adoption of the 26th Amendment to the U.S. Constitution which permits 18-year-olds to vote."

[21] The 1967 Amendment to Title IV of the Social Security Act (Aid to Families with Dependent Children) requires state and local welfare agencies to provide contraceptive services to eligible individuals without regard to marital status and age. But this law would not affect the ineligible population and it is unclear how it affected teenagers in states not recognizing the mature minor doctrine.

[22] Until 1966 it was illegal in Massachusetts to sell contraceptives to anyone, married or single. The law was modified after *Griswold v. Connecticut* (1965), and from 1966 to 1972 it was illegal in Massachusetts to sell contraceptives to an unmarried individual and to dispense them to a married person without a prescription. The revised law was deemed unconstitutional by the U.S. Supreme Court in *Eisenstadt v. Baird* (March 1972). A Wisconsin law prohibiting the sale of contraceptives to unmarried persons was overturned in *Baird v. Lynch* (1974, Civ. No. 71-C-254, W.D. Wis.). See U.S. Department of Health, Education, and Welfare (1974, 1978). There is no evidence that these laws were enforced.

and Sarrel 1971). Other institutions quickly followed.

According to the American College Health Association (ACHA), just 12 institutions in 1966 (3.6 percent of those reporting) would prescribe the pill to unmarried students (Barbato 1968, 1971).[23] In 1973, according to an extensive survey of institutions of higher education, 19 percent would provide family planning services to students regardless of age and marital status.[24] Because larger schools had a higher fraction providing services, about 42 percent of undergraduates would have been able to obtain such services (Hollis and Lashman 1974).[25] Thus, although in 1966 few colleges had student health services that routinely would prescribe the pill to unmarried women, by 1973 more than two-fifths of all undergraduates, regardless of marital status and age, could receive family planning services on campus and most others could obtain them locally without parental consent.

D. The impact of state laws on pill use

Did states with more lenient laws regarding access to contraceptive services by minors have higher pill use by young unmarried women? The NSYW71 is the only data set, of which we are aware, that pertains to the most relevant time period (the very early 1970s) and has information on pill use and state of residence for female teenagers.[26] We have coded the

[23] In the 1970 ACHA survey, about 35 percent of member institutions claimed they would prescribe the pill to unmarried minors at their institution (although a low reporting rate biases this statistic upward). The non-member institutions had far lower fractions prescribing to all students (12 percent) and also had even lower reporting rates than the member institutions (Hollis and Lashman 1974).

[24] No extant records of the 1973 survey exist, so institutional identities are not known. *The Wall Street Journal*, however, ran a story in January 1970 stating that various universities, among them the University of California at Berkeley, Davis, Los Angeles, Santa Barbara, and San Diego; the Universities of Michigan, Chicago, Illinois, and Washington; Cornell, Yale, and Northwestern Universities, and Goddard College, but not, claimed the article, the University of Texas and the University of Pennsylvania, had recently established, or were about to open, unrestricted family planning clinics for students.

[25] The 1973 survey was done by the National Center for Health Statistics and the ACHA and included 2,984 institutions (92 percent response rate). The 42 percent figure is our estimate based on a table in Hollis and Lashman (1974). Only the 1973 ACHA survey is sufficiently complete to provide an estimate of the fraction of undergraduates who could obtain family planning services on campus.

[26] The NSAF76 does not have state of residence and, even if it did, it would be too late.

respondent's state residence according to whether the state used the mature minor doctrine or had a comprehensive family planning statute, both of which would have enabled young women to obtain the pill. Twelve states fit that description in 1971 (see Table 3, col. 5).

The estimation in Table 4, it should be noted, is given for all never-married women (odd numbered columns) and for those who were ever sexually active (even numbered columns). The effect on pill use of being in one of the more lenient states, computed around the mean of the dependent variable, is virtually identical for the two estimations. Included in the regressions are covariates for age, education (except for the college women), current school attendance, religion, and race. Dummy variables for the southern census divisions are also included.

States with more lenient regulations regarding minors had greater pill use by young unmarried women. For 15 to 19 year olds there was a 30 percent greater pill use (cols. 1 and 2) and for the 17 to 19 year olds a bit more than 30 percent (cols. 3 and 4). The increase was greatest for college women. States with more lenient regulations had 40 to 45 percent greater pill use among young college women than did other states (cols. 5 and 6). The greater difference for college women may be due to the fact that most university health services, as noted above, were scrupulous in following the law. But when the law became more permissive or the age at majority was reduced, many university health services offered family planning services.[27]

In states with more lenient laws, young women appear to have had greater access to the pill. But despite our emphasis on law changes, we also recognize the porousity of the laws and the importance of social norms. Even before 1970 change was "in the air" regarding the rights of young people. The 1967 social security amendment that allowed poor women to obtain family

[27] The results in Table 4 are not fully robust to adding a control for state per capita income. A disproportionate number of non-southern states with enabling legislation for minors are states with high levels of income per capita. Thus, for states outside the South, the income variable and the state law variable are highly correlated.

planning services without regard to marital status or age was a signal to all physicians. States often had ambiguous laws that enabled county health departments to extend contraceptive services to all women (see Bailey 1997 on Kansas). Thus pill use by young single women began to rise about a year before the sea change in the laws regarding the age of majority.

II. Two illustrative models of the effect of the pill on marriage and career

We have established that the diffusion of the birth control pill among young unmarried women began in the mid to late-1960s and that its timing appears to have been related to changes in state laws regarding the age of majority and to a growing sense that young people were capable of making rational decisions. But how could the diffusion of the pill among young unmarried women affect the variable of interest — investment in a professional career?

The diffusion of the pill among young single women may have altered their career decisions through two routes we have termed the *direct* and the *indirect* effects. By the direct effect of the pill we mean the reduction in the cost of marriage delay. This effect operates through a change in prices. Delay and thus career investment become cheaper, and women with greater "career ability" become more attractive marriage partners. By the indirect effect of the pill we mean the lowering of the cost of career through the marriage market. This effect, in contrast, operates through a thickening of the marriage market for those who delay marriage and leads to better matches for women who invest in careers, as well as for some others. To simplify the discussion, we present separate frameworks that clarify the role of each effect.[28]

A. The direct effect of the pill

Consider a cohort of n women and n men, each initially unmarried, in a 2-period context

[28] See Bergstrom and Bagnoli (1993) for a related model of marriage delay decisions by men and the determinants of marriage age differences by sex. We examine models of single age cohorts of males and females and thereby abstract from the possible impact of the pill on sex differences in the age at marriage.

with no discounting. Members of each sex agree on the ranking of the other in terms of marriage partners. Each man brings Y_i (e.g., income), known to all, to marriage. Each woman brings N_j (e.g., nurturing), known to all, to marriage and can also contribute ε_j through a career; ε_j is treated as a household public good. We make the simplifying assumption that career investment by a woman is not possible if she is married in period 1. Delaying marriage sacrifices δ for each partner. We interpret δ as representing utility lost from abstinence (the "impatience factor") as well as from foregone home production. The impatience factor and the loss of home production are the same for all men and women, and $\delta = \delta_0$ prior to the introduction of the pill. Y, N, and ε are distributed among the *n* men and women such that $Y \sim [\underline{Y}, \overline{Y}]$, $N \sim [\underline{N}, \overline{N}]$, and $\varepsilon \sim [\underline{\alpha}, \overline{\alpha}]$, where $\underline{Y}, \underline{N}, \underline{\alpha} > 0$. The distributions of Y, N, and ε are known by all participants and each individual's attributes are perfectly observable.

Consider a match between male *i* and female *j*. If they marry in period 1, then the male gets N_j and the female gets Y_i. If they delay marriage to period 2 and the woman invests in a career, then the male gets $(N_j + \varepsilon_j - \delta_0)$ and the female gets $(Y_i + \varepsilon_j - \delta_0)$. If $\varepsilon_j > \delta_0$, then both benefit from delay and the woman invests in a career in period 1. If, instead, $\varepsilon_j < \delta_0$, they marry in period 1 and the woman has no career. Since there are no disagreements, we can unambiguously match men and women based on their value in marriage to the other sex.

Men's attractiveness to women is completely summarized by Y_i. Women's attractiveness to men, on the other hand, depends on $F_j = \max [N_j, (N_j + \varepsilon_j - \delta_0)]$. The marriage market operates at the start of period 1 by matching men and women by their ranking in terms of Y_i and F_j. The highest ranked male gets matched to the highest ranked female and so on down the distribution. As depicted in Figure 3, all women with $\varepsilon_j \geq \delta_0$ invest in careers and delay marriage until period 2; all others marry in period 1.

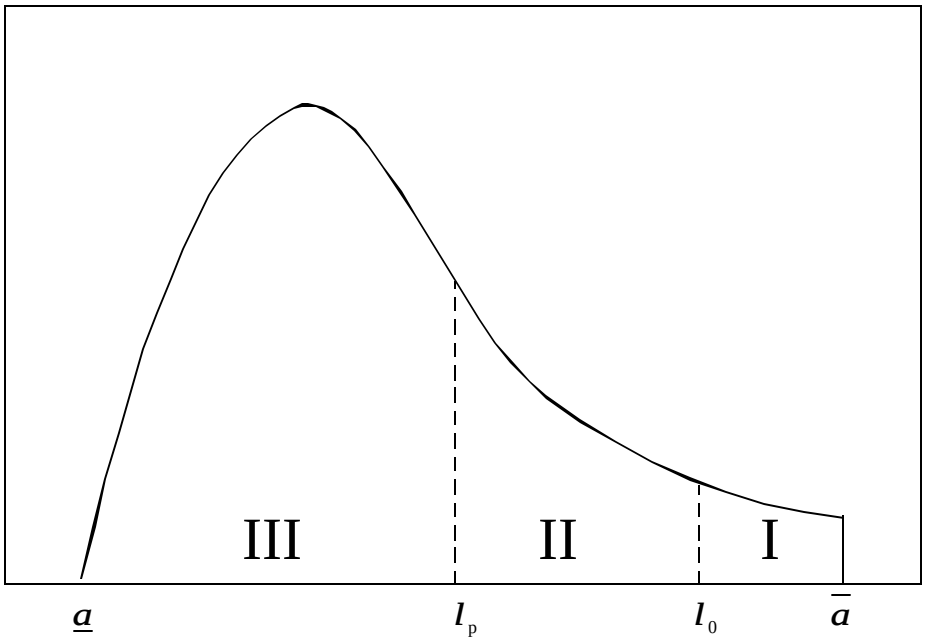

Figure 3: Distribution of "

The pill reduces 8 from 8_0 to 8_p and shifts down the cutoff point in the " distribution for careers. The fraction of women with careers and the fraction of women delaying marriage increase by the same amount. Even with no change in matching there will be an increase in marriage delay and in career investment. But matching will, in general, change because the relative attractiveness of women with high career values (higher $"_j$) is enhanced by the pill. Thus the F_j distribution will shift with the decline in 8.

Three groups of women can be distinguished. Group I are those for whom $"_j > 8_0$. These women delay marriage and have a career with or without the pill. The introduction of the pill increases the value of each woman in this group by $) F_j = 8_0 ! 8_p$. Group II women are those for whom $8_0 > "_j > 8_p$. In the absence of the pill, they marry in period 1 but they delay marriage and have a career with the pill. The introduction of the pill increases the marriage value of each woman in this group by $) F_j = "_j ! 8_p$. Group III includes those for whom $"_j < 8_p$. The women in this group do not have a career with or without the pill. The women in Group III lose from the

pill since some become matched to worse partners.[29] Men are unambiguous winners from the introduction of the pill. Women are, on average, winners, but those in Group III are losers.

The key unambiguous predictions from the direct effect of the introduction of the pill are an increase in the fraction of career women, an increase in the average age at first marriage, a decline in the average labor market ability of career women, and an increase in the extent of positive assortative mating by labor market ability.

B. The indirect effect of the pill

In our modeling of the direct effect, the pill lowered the price of delay and thus encouraged later marriages and more careers for women. All individuals engaged in optimal investing and matching given their attributes and the prices they faced. But the increase in the number of women who delayed marriage had no effect on the decisions of other women.

The pill can, however, have a social multiplier effect. If couples marry "too early," then the pill could produce a new equilibrium in which marriages are later, careers are more numerous, and matches are "better." By encouraging the delay of marriage, by men and even by women who do not invest in a career, one of the potential costs of a career — mismatch in the marriage market — is reduced. Thus careers are fostered in an *indirect* manner through a thicker marriage market for career women, even those who do not take the pill.

Consider, again, a 2-period model and a cohort of n men and n women each of whom would like to marry a member of the opposite sex. Each man and women has an idiosyncratic intrinsic attribute, $A_i^{f,m}$ (e.g., character, trust, taste), which is revealed to *all* only in period 2. Mating on A_i produces a gain of P, but *only* if a perfect match is found (i.e., $A_i^f = A_i^m$). We assume that the distributions of A_i^f and A_i^m are identical and that each value of $A_i^{f,m}$ is unique

[29] Akerlof, et al. (1996) develop related models of how abortion legalization (and contraceptive availability) change norms concerning shotgun marriages and out-of-wedlock births. Some women

within each sex.[30] The basic idea is that character and tastes are still being formed in period 1 (which might be interpreted as one's late teens and early 20s). If a couple marries in period 1, they mate for two periods (that is, there is no divorce) but cannot mate using attribute A and thus cannot obtain P.[31] Delay of marriage is costly, however, and involves an implicit payment of δ (the "impatience factor" and the loss in household surplus). A fraction (B) both of men and women has a high impatience factor (δ_h), and ($1 - B$) has a low impatience factor ($\delta_l < \delta_h$). The impatience factor (δ) and the intrinsic attribute (A_i) are orthogonal.

A woman who marries in period 1 cannot invest in a career, but if she delays for one period she can invest and receive a net return of π (convertible into a household public good of value π both to herself and her husband in period 2). In contrast to the direct effect framework, π here is assumed to be the same for all women. Search is costless and all unmarried men meet all unmarried women in each period. The probability of correctly matching on A_i, if one delays marriage to period 2, will depend on the fraction of individuals remaining unmarried to period 2.

1. Equilibrium in a no-pill world

When the lowest cost of delay exceeds the gains in marriage and career from delay, when $\delta_l > (P + \pi)$, no one delays marriage. Even if $[\pi + (1 - B) \cdot P] < \delta_l < (P + \pi) < \delta_h$, no one will delay and no woman will invest in a career. If, instead, $\delta_l < \pi$, all those with the low impatience factor will delay. Note that if those with the low impatience factor anticipate that all others in their group delay, the weaker condition, $\delta_l < [\pi + (1 - B) \cdot P]$, determines whether they delay.[32]

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benefit, whereas others, unwilling or unable to get an abortion or use the pill, are adversely affected.

[30] Thus, one perfect match of the opposite sex exists for each individual.

[31] We assume *n* is sufficiently large that the probability of finding a perfect match with random mating in the first period is essentially zero.

[32] For this condition to hold, the participants in the marriage market have to know the various parameters, in this case the value of B.

2. Equilibrium in the age of the pill

The pill reduces the "impatience" factors to, say, δ^p_l and δ^p_h. In the extreme case, the pill renders $\delta_l = \delta_h = 0$. All men and women delay marriage and, thus, all mate perfectly on the meaningful attribute A_i. Each receives $(P + \alpha)$ and all women invest in careers.

More interesting is when the pill lowers δ such that: $\delta^p_l < \alpha < \delta^p_h < [\alpha + (1 - \beta) \cdot P]$. Since $\delta^p_l < \alpha$, all low-impatience individuals delay marriage regardless of their expectation concerning the marriage market. For the low-impatience types, the "direct" effect of a change in δ is all that matters. The more interesting effects concern the high-impatience types. In the absence of a change in δ for low-impatience types, no one in the high δ group would delay since $\delta^p_h > \alpha$. The pill doubly impacts those in the high δ group. Their change in δ (viz., $\delta_h - \delta^p_h$) has a "direct" effect. But there is also an "indirect" effect, $(1 - \beta) \cdot P$, caused by the higher expected value of matching given the delay of the low-δ types. That is, the "indirect" effect of a thicker marriage market can cause even women with small or possibly no change to δ to delay marriage and have careers. The "indirect" effect is at least $(1 - \beta) \cdot P$ since if each high-impatience type expected all others to delay, they would all delay if $\delta^p_h < (\alpha + P)$.

C. Lessons from the two models

Our two simple models illustrate how the introduction of the pill may have altered women's career and marriage choices. Because up-front, time-intensive career investments are virtually impossible to undertake for most women with child-care responsibilities, the pill fostered women's careers by virtually eliminating the risk of pregnancy. But the pill did far more than control the timing of births. It altered the marriage market.

The pill enabled young, unmarried men and women to put off marriage while not having to put off sex. Sex did not have to be packaged with the commitment devices of the past.

The decrease in the cost of marriage delay altered the rankings of women as potential marriage partners favoring those with good career prospects. The increased number of individuals putting off marriage created a thicker marriage market for those who delay. The indirect effect of a thicker marriage market for career women led even more women to opt for career and delay marriage — this is the social multiplier effect. An increase in the age of first marriage may also lead to higher quality matches if preferences are not fully formed at younger ages.

The key empirical predictions are that the introduction of the pill should have been associated with an increase in professional careers for women, the age of first marriage, and the age of first birth. Positive assortative mating on earnings capacity and compatibility among marriage partners, on average, should also have increased. The new equilibrium, however, is not completely "win-win." Women with poor labor market prospects may suffer a decrease in the ranking of potential marriage partners and be the losers in the era of the pill.

III. Evidence for the power of the pill

A. Career investment

The most obvious careers to study in the context of our framework are those that require extensive formal education, such as the professions of law, medicine, dentistry, and business administration.[33] We express the data on professional education in two ways. One method, given in Figure 4a, is to deflate by those receiving the baccalaureate in the same year. Another way is to divide by male first-year students (Figure 4b).

The results are striking. As a fraction of B.A.'s, female entrants to law and medical schools began a steep climb around 1970. The increase, moreover, peaked in about a decade.

[33] Although career investment can take place in a host of settings, we know of no way to determine if an individual is on a time-intensive career path unless it involves formal education or training.

Relative male first-year students, the ratios for all four programs — law, medicine, dentistry, and business — show a sharp break around 1970. Throughout the 1960s the ratio of women to men was around 0.1 in medicine, 0.04 in law, 0.01 in dentistry, and 0.03 in business administration. By 1980 it was in 0.42 in medicine, 0.57 in law, 0.24 in dentistry, and 0.39 in business.[34]

Career decisions of young women appear to have changed abruptly around 1970. The shift, moreover, did not arise from an increase in the fraction selected among female applicants, at least not in the case of medical students. The change in the sex composition resulted almost entirely from an increase in applications by women. As can be seen in Figure 5a, the ratio of admissions to applicants is almost identical by sex for the entire period considered. The ratio of female applicants relative to female B.A.'s (Figure 5b), not surprisingly, began to increase greatly in 1970. The potential reasons for the increase in medical school applications by women are several and we are emphasizing only one.

The large increases in women's enrollment in lengthy professional training programs, starting around 1970, resulted in a sharp rise in women's presence in law, medicine, and other professions across the past three decades. The percentage of all lawyers and judges who are women more than doubled in the 1970s (from 5.1 percent in 1970 to 13.6 percent in 1980) and was 28.6 percent in 1998. The share of female physicians increased from 9.1 percent in 1970 to 14.1 percent in 1980 and was 28.6 percent in 1998. Similar patterns are apparent for occupations such as dentists, architects, veterinarians, economists, and most in the engineering fields.[35]

[34] Note that the ratio of female to male professional school students continues to rise even when the percentage of female B.A.'s who enter professional school does not. The reason is beyond the scope of this paper and concerns the decrease in the percentage of male B.A.'s, and of all B.A.'s, entering professional schools. This decrease, moreover, has extended over a rather long period of time.

[35] The overall share of women in professional occupations (excluding K-12 teachers and health assessment occupations such as nurse), increased from 19.9 percent in 1970 to 27.4 percent in 1980 to 36.7 percent in 1998. In contrast the female share of these occupations barely changed from 1950 to 1970. The 1950 to 1980 data have been tabulated from the IPUMS data (Ruggles and Sobek 1997). Data

B. Age at first marriage, sex, and fertility expectations

Before the availability of the pill, young people devised means to make and secure commitments that enabled sexual relations. Girls and boys "went steady," fraternity men "pinned" or "lavaliered" coeds, and men and women got "engaged." If a pregnancy resulted, the couple generally got married (Akerlof, Yellen, and Katz 1996). For other young people marriage itself was the moment of first sex. The delay of marriage, or the absence of a commitment that would likely lead to marriage, meant the delay of sex in a world without effective contraception. In terms of our framework, the absence of the pill meant that θ was high. The pill loosened the constraints (and lowered θ). Marriages could be put off, couples could engage in sex, and commitments need not be made without much penalty. But did this happen?

Marriages were, in fact, delayed considerably beginning with the birth cohorts of the late 1940s, precisely those affected by the pill, and the moment of first sexual relations among the never-married also decreased by age, again in line with the cohorts affected by the availability of the pill. We first examine the descriptive statistics on these trends and then examine whether there is evidence for a causal relationship between changes in the laws and marriage.

1. Descriptive statistics on the age at first marriage and sex

We graph, in Figure 6, the fraction of college graduate women married before ages ranging from 20 to 30 years. About 50 percent of those born from 1941 to 1949 married before age 23 (age 22 is the college graduate's median age). After 1949, however, the fraction married before age 23 or 24 plummeted. By the cohort born in 1957, the fraction married before age 23 was just 30 percent, or fully 20 percentage points lower than in 1950. Thus the fraction of women who married a year after college graduation declined precipitously after 1972, the

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for 1998 are from the U.S. Department of Labor (1999, table 11).

moment when most states had changed their laws regarding access to contraceptives for youth.

The fraction engaging in sex before various ages is given in Figure 7, for which we analyze all women, not just college women, due to small sample sizes.[36] The evidence is strikingly consistent with the timing of pill availability to young, unmarried women. Sexual activity among the group under 20 years increased with cohorts born after 1947 and for the even younger group (under 18 years) the increase was with cohorts born around 1952.

Fertility expectations of college women also plunged between the mid-1960s and the early 1970s. In 1963 80 percent of non-Catholic female college students desired three or more children and 44 percent wanted at least four. Ten years later, in 1973, just 29 percent wanted three or more and almost 10 percent wanted none.[37] Neither cohort had as many children as they "desired," but the desires reflect tradeoffs they were willing to make between family and career.

The logic of our argument concerning the impact of the age at first marriage on career requires that women who invest in careers generally delay marriage. In lieu of a locating a representative sample of college graduate women, we have examined registration cards for Harvard University Law School students in the entering classes from 1962 to 1975. Because the registration cards were used for diplomas, names on them were routinely updated.[38] We find that the fraction married at the time of law school graduation was about one-third the national

[36] The source of the data is the NSFG82. Similar patterns are found when the sample is restricted to women with some college. To assess the accuracy of the information we also use a more contemporaneous measure from the NSYW71 and NSAF76 (given as solid markers). The two measures are, with one exception, remarkably consistent.

[37] For the 1963 data see Westoff and Potvin (1967, table 7). We use only non-Catholic women in nonsectarian schools since Westoff and Potvin oversampled religious institutions but do not give the population weights. The 1973 data are tabulated from the *National Longitudinal Survey of Women 14-24* (Ohio State University 1968-1991) and include all those who ever graduated from a four-year institution of higher education and who were of approximate college age in 1973.

[38] We cannot use these records after it became more common for women to keep their maiden names. Until 1972 the cards requested information regarding marital status at time of registration. The cards also listed the names of the parents and we were able to verify whether the woman's last name matched that of her father. It is possible that some women in the 1970 to 1972 classes married but did not change their

average by age and birth year for classes graduating from 1970 to 1972 (born from 1945 to 1947), but was average for those graduating between 1964 and 1966 (born from 1941 to 1943).[39] Thus, for the cohorts that greatly increased their numbers in law school, the marriage rate was significantly below average for college graduate women.

2. State law changes and the age at first marriage

Did the availability of the pill alter the age at first marriage? To assess this connection, we examine the relationship between pill access and the age of first marriage for college women by exploiting the substantial cross-state variation in the enactment of laws giving minors access to birth control services without parental consent (see Table 3). In particular, we examine the impact of state laws regarding birth control access for minors on the likelihood of getting married before age 23 for college educated women born in the United States from 1935 to 1957. Because major changes in abortion access also affected cohorts of women entering college in the early 1970s (abortion bans were repealed in 5 states in 1969/70 and everywhere in 1973 with *Roe v. Wade*), we control for the possible confounding changes in abortion laws.

We use a standard differences-in-differences model that includes controls for both state-of-birth and year-of-birth fixed effects. Dummy variables are included to account for the state laws regarding birth control and abortion access, in each individual's state of birth, that existed when they were 18 years of age, that is around the age of college entrance.[40] We use the Integrated Public Use Micro Samples (IPUMS) from the 1980 Census of Population.

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names and thus that we are understating the fraction who married while in law school.

[39] Entering marriage rates are much lower than the national average for college graduate women in all years. The marriage rates in law school are extremely high for the classes in the mid-1960s when there were only about 20 women in each class, thus about 18 male students for every female.

[40] Ideally, we would like to know the legal environment concerning birth control and abortion for each individual in their state of residence as a teenager and in college. The census provides information on state of birth and state of current residence only. Since the vast majority of females attending college reside in their state of birth at 18 and go to college in their state of birth, measures of the legal

The basic model we estimate is of the form:

$$M_{ist} = \alpha_s + \gamma_t + X_{ist}\beta + P_{st}\delta + A_{st}\theta + \varepsilon_{ist},$$

where *i* indexes individuals, *s* indexes state of birth, *t* indexes year of birth; the dependent variable M_{ist} is a dummy variable equal to 1 if individual *i* was married before age 23; X_{ist} contains demographic controls (race dummies); P_{st} is a dummy variable equal to 1 if *i*'s state of birth had a non-restrictive birth control law for minors by the time *i* was 18 years old; A_{st} is a dummy variable equal to 1 if abortion was legal in *i*'s state of birth at the time *i* was 18 years old; the α_s are state of birth dummies; and the γ_t are year of birth dummies.

Because we are concerned with the possible endogeneity of birth control access laws to state trends in feminist views and attitudes towards women's careers, we examine the robustness of our results to including controls for (pre-existing) state-of-birth linear time trends. The earliest states providing birth control access for minors without parental consent were CA and GA in 1968; MS in 1969; AR in 1970; and CO, DC, IL, MI, NH, NY, OR, and TN in 1971 (see Table 3). The wide array of states suggests that idiosyncratic factors affected the passage of mature minor and family planning laws and not, for example, the strength of the women's movement in the state.

Table 5 presents our estimates of the effect of various state laws on the age of first marriage for cohorts of college women born before and after the diffusion of the pill to single women. The share of U.S. born female college graduates married before age 23 declined from 47.0 percent for those born from 1940 to 1949, to 38.3 percent for those born from 1950 to 1954, to 26.8 percent for those born from 1955 to 1957 (1980 IPUMS; see also Figure 6 which uses CPS data and is not restricted to the native-born). The timing of the decline is consistent with

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environment in the state of birth should be a reasonable proxy for the actual laws affecting these women.

the notion that greater access to the pill for single women led to a delay in marriage. But the question is whether states with earlier laws providing birth control access to minors experienced earlier declines in the age of first marriage for college women, and Table 5 assesses that.

The estimates in col. (1) of Table 5 indicate that the adoption of a non-restrictive birth control law for minors was associated with a modest (but statistically significant) 2 percentage point decline in the probability that a college graduate women was married before the age of 23. The estimates in col. (2) show similar modest negative effects of both birth control access and abortion legalization. The estimates in col. (3) indicate that the impact of birth control access is robust (even modestly increased) to including controls for state-of-birth trends. The coefficient on the abortion law variable, however, is now positive but statistically insignificant. Cols. (4) and (5) show modestly stronger results for the effects of birth control laws when the sample is limited to white college graduates. And the final column shows modestly attenuated results when the sample is expanded to include all women with a year or more of college (to address concerns of possible endogeneity of college graduation decisions to pill access).[41]

We conclude that there were modest but detectable increases in the delay of marriage of college-educated women in states where young unmarried women had greater legal access to the pill. The estimates of the effects of state laws on age of first marriage are not as large as are the sharp aggregate changes for cohorts with greater pill access, as shown in Figure 6. But this attenuation is to be expected given our crude measures of state laws and the broad increase in the availability of the pill to young single women in all states from the late 1960s to the mid-1970s.

C. A prima facie case for the power of the pill on career and marriage

Did the pill cause the increase in career investment and the rise in the age at first

[41] A similar pattern emerges when the dependent variable is an indicator for marriage before age 22, as well as when alternative measures of state pill-access laws are used (e.g., pill access for 18 year olds).

marriage among cohorts of young women in the early 1970s? We have built a prima facie case for the power of the pill based on the timing of changes and have offered some suggestive evidence on causality. Our argument goes as follows.

Despite FDA approval of the pill in 1960 for contraceptive uses and its rapid diffusion among married women, young single women did not greatly increase their pill usage until the late 1960s to early 1970s. The primary reason for the change was that states lowered the age of majority and increased the rights of minors. These legal changes, moreover, were largely independent of demands for providing contraceptive services to young women. They were caused, instead, by an enhanced awareness, due in part to the Vietnam War, that young people matured earlier than in the past and deserved increased rights. Although many physicians had not been in direct compliance, university health services generally did comply or at the very least did not broadcast, as they do today, that they offered contraceptives to all students without question. More lenient laws led to a greater use of oral contraceptives, particularly among college women.

The next link in our prima facie case is that more lenient laws directly led to an increase in the age at first marriage. The final link is that the timing of greater pill use among cohorts of college graduate women coincided with the initial increase of female first-year students in professional programs, such as law, medicine, dentistry, and business administration.

The power of the pill was twofold. Initially the pill decreased the cost of career investment in a direct manner and affected only women who were on the pill. But an additional effect — the social multiplier — evolved over time due to the increased age at first marriage. The impact of the pill spread even to those who were not on the pill. The pill reduced the cost to all women of delaying marriage for a career.

IV. Alternative explanations

We have offered a supply driven explanation for the increase in the career plans of young college graduate women around 1970. A related and complementary supply-side explanation is abortion reform. We showed in Table 5 that a dummy variable for the 5 states that underwent early abortion reform was negatively related to the age at first marriage, but that the variable for the pill states provided more power and was more robust to the inclusion of state specific trends. Two populous states (CA and NY), it should be noted, fall into both groups. The case for the greater importance of the pill is mainly that oral contraceptives had far wider impact than did abortion. Few college women depended on abortion, as they did the pill, as a safe, reliable, effective, convenient, and painless means of contraception. Yet, even though the fraction of women who ever took the pill vastly exceeded that who ever had an abortion, the rate of abortion use among college-going and young women was exceptionally high by 1976 and was high even in 1971. Its effect must have served to reinforce the pill's impact.[42]

Demand side explanations can also be offered, including the impact of the resurgence of feminism and of sex discrimination legislation. Although the Civil Rights Act of 1964 covered discrimination by "sex," the Equal Employment Opportunity Commission (EEOC) set up to investigate charges did little about sex discrimination until the early 1970s. The National Organization for Women was formed in 1966 to pressure EEOC to consider discrimination by

[42] The percentage of college-going, young women who ever had an abortion or used the pill is:

As of 1971	*Women attending college in 1971 born in 1952 or 1953*		
	All	*Only non-virgins*	*Non-virgins and single*
% ever had an abortion	2.5	6.9	7.7
% ever took the pill	12.8	35.5	35.2
As of 1976	*Women attending college in 1976 born in 1957 or 1958*		
	All	*Only non-virgins*	*Non-virgins and single*
% ever had an abortion	5.2	8.4	10.6
% ever took the pill	43.5	64.2	58.5

Sources: NSYW71, NSAF76.

sex and, whether as a result of that pressure or not, a substantial increase in sex discrimination complaints ensued, rising from about 3,150 in 1970 to 18,150 in 1973, and peaking at 29,450 in 1976 (Goldin 1990, fig. 7.1). Affirmative action in the form of Executive Order no. 11246 was amended in 1967 by Executive Order no. 11375 to cover women, but it took many more years before it was put into effect (Freeman 1975).

Any of these factors could have generated increased demand for women in professional positions and thus led to a rise in female enrollments in professional schools. The timing of the changes is fairly consistent with the career changes we described. A problem with demand-side explanations is that these factors cannot account for the other related changes. The increased age at first marriage could have stemmed from more career investment, but the rise in sexual activity among single women, beginning in 1970, would appear entirely unrelated.

V. Summary: A collage of evidence on career, marriage, and the pill

We have presented a suggestive collage of evidence for the impact of the pill on young women's career decisions and on marriage rates in general in the 1970s. The direct effect of the pill decreased the cost to women of remaining unmarried while investing in a professional career. The pill further reduced the cost of career investment for women by serving to increase the age at first marriage for a large fraction of all young people. The power of the pill in affecting women's careers was magnified by its impact on the age at first marriage.

But not all increases in the age at first marriage and decreases in fertility have involved genuine social change for women. There were, to be sure, prior moments of decreased marriage and fertility in the demographic history of the American people. But none led to vast increases in the fraction of women in professional occupations. Similarly, Japanese women have

experienced a substantial decline in fertility and an increase in the age at first marriage ever since the early 1970s. Yet there has been little change in the economic status of women in Japan and, until 1999, no legal oral contraceptives.

The pill is not necessary for demographic change. But a virtually foolproof, easy to use, and female-controlled contraceptive having low health risks, little pain, and few annoyances does appear to have been important in promoting real change in the economic status of women (see also Birdsall and Chester 1987). Moreover, women in the United States were well positioned to take advantage of the pill's side benefit. By the time the pill was available to unmarried women, about 28 percent of them were graduating from four-year institutions of higher education.[43] In most other rich countries, the fraction of young women capable of continuing to professional schools was small since college graduation rates were low compared with the United States.

The most persuasive evidence for a role of the pill is that its initial diffusion among single women coincided with the increase in the age at first marriage and with the increase in women in professional degree programs. Other factors were involved in these changes, to be sure. No great social movement is caused by one factor, certainly not something as small as a pill.

[43] See Goldin (1997, appendix table 2.1) for data based on the Current Population Survey, series P-20. The fraction graduating from college or university is about 28 percent for cohorts born in the late 1940s.

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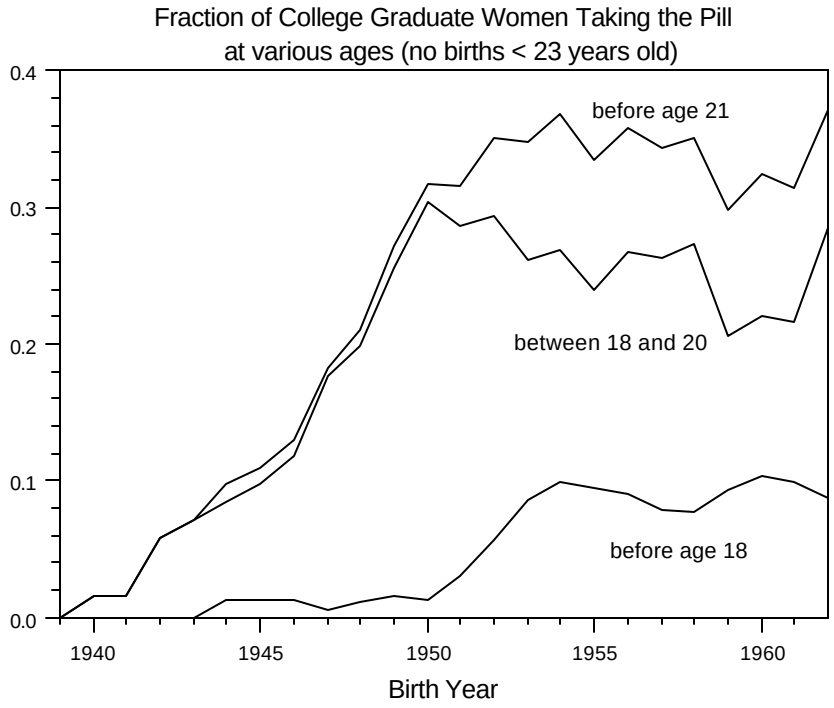

Figure 1a: Fraction of College Graduate Women Taking the Pill at Various Ages

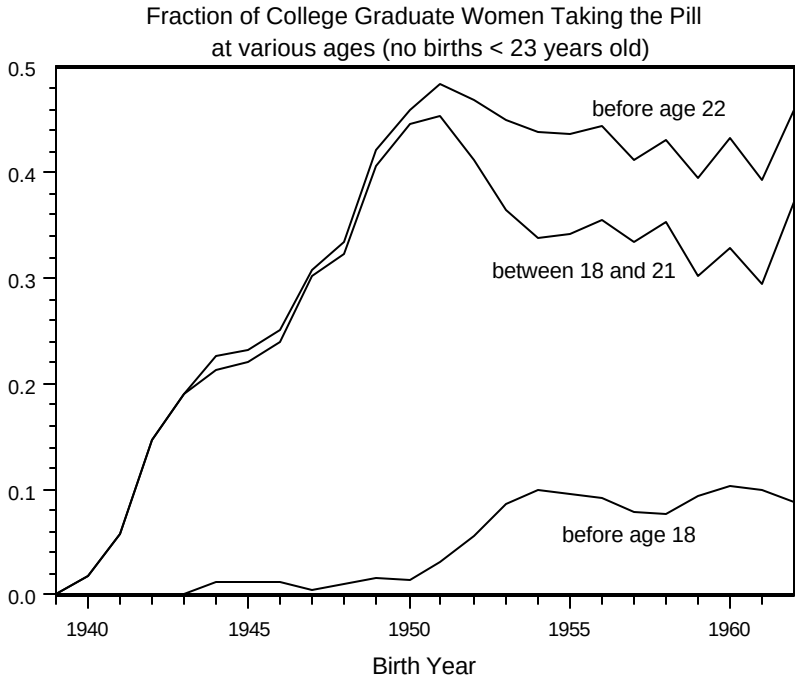

Figure 1b: Fraction of College Graduate Women Taking the Pill at Various Ages

Source: *National Health Interview Survey, 1987: Cancer Risk Factor Supplement, Epidemiology Study* (ICPSR 1990).

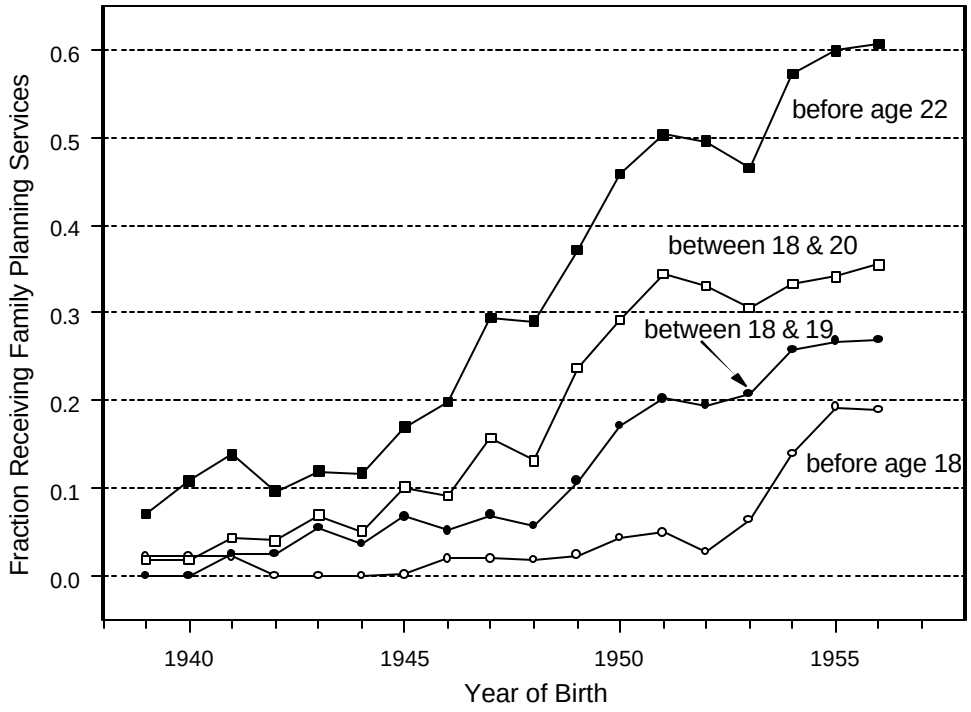

Figure 2: Fraction of College Graduate Women Receiving Family Planning Services at Various Ages, among Those Not Married by Age 22

Source: *National Survey of Family Growth, Cycle III, 1982* (ICPSR 1985).

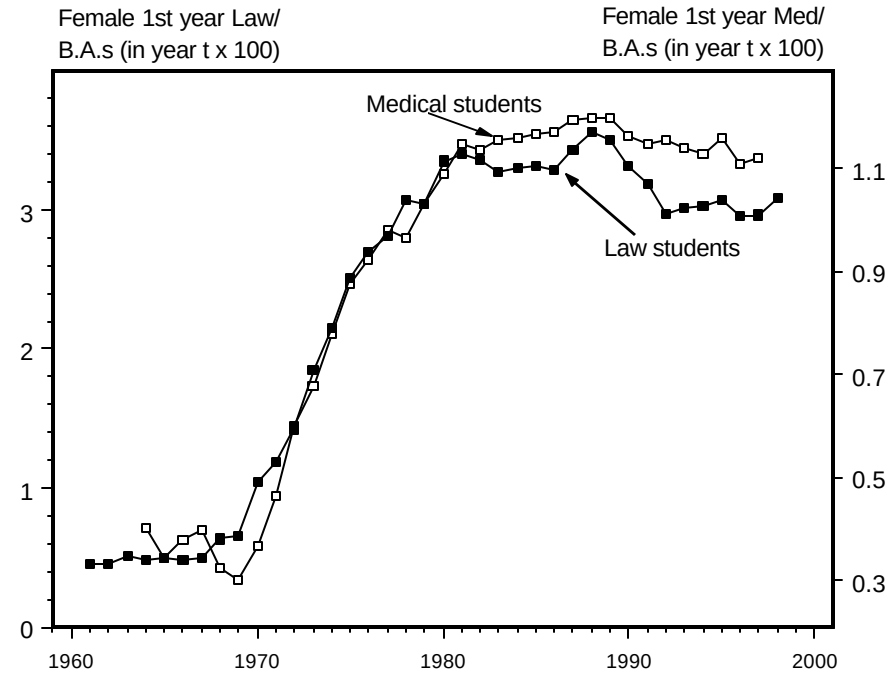

Figure 4a: First-Year Female Law and Medical Students as a Percentage of Female B.A.s

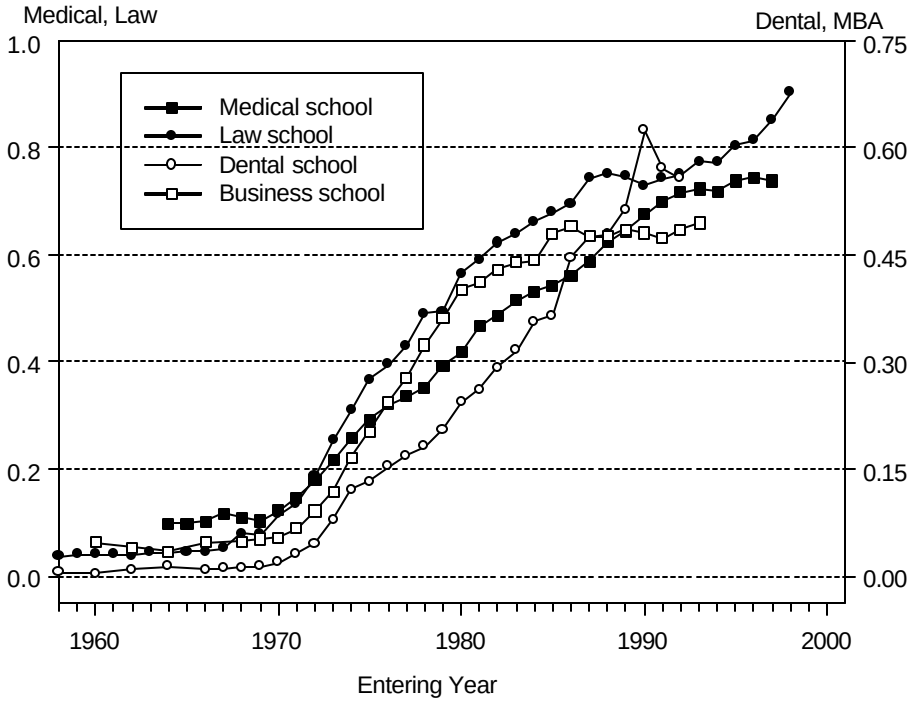

Figure 4b: Ratio of Female to Male First-Year Students: Law, Medicine, Dentistry, and Business

Sources: B.A. degrees: U.S. Department of Education (1998), table 244. First-year medical students: *Journal of the American Medical Association* (various years). First-year law students American Bar Association website http://www.abanet.org/legaled/femstats.html . First-professional degrees in dentistry: U.S. Department of Education (1998), table 259. Earned degrees in business: U.S. Department of Education (1997), table 281.

Notes: Data for first-year dental and business students are derived from first-professional degrees lagged four years for dental students and three years for business students. The data, for years of overlap, are similar to those on first-year students in U.S. Department of Health, Education, and Welfare (various years). The procedure, moreover, produces similar values for the two professional schools (medicine and law) for which we have first-year student time series.

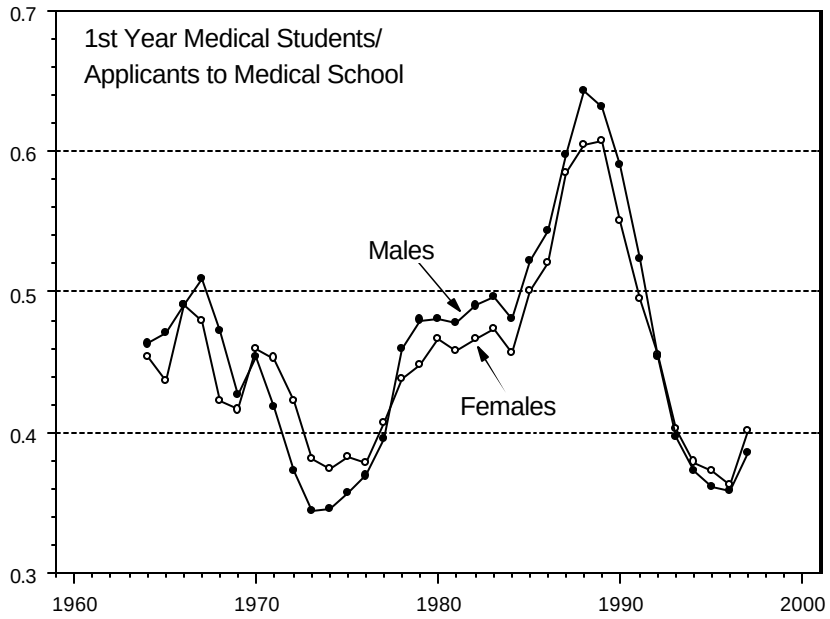

Figure 5a: First-Year Female and Male Medical Students as a Percentage of Applicants

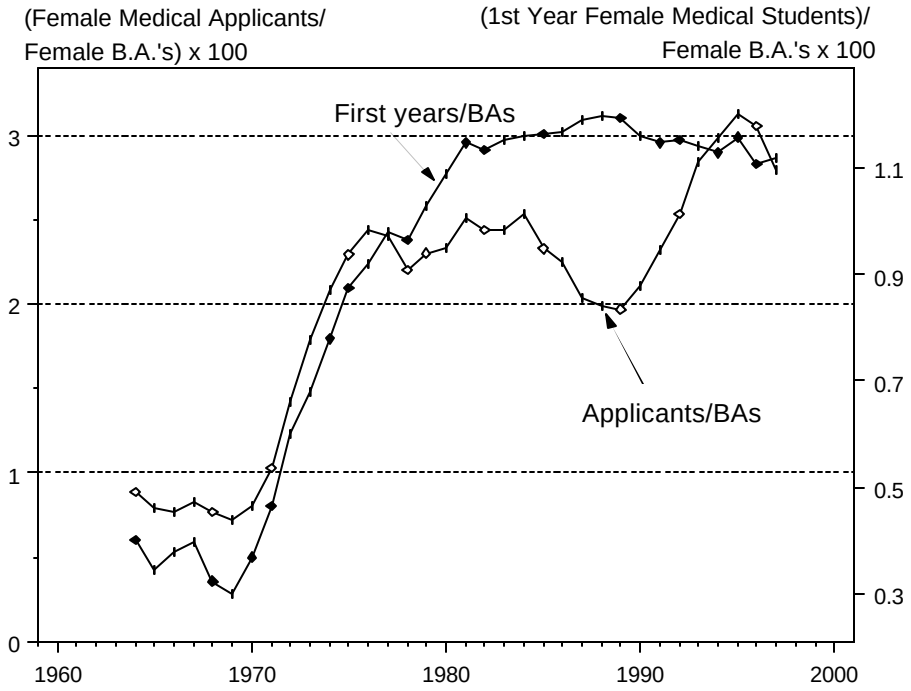

Figure 5b: First-Year Female Medical Students and Applicants as a Percentage of Female B.A.s
Sources: See Figures 4a, 4b.

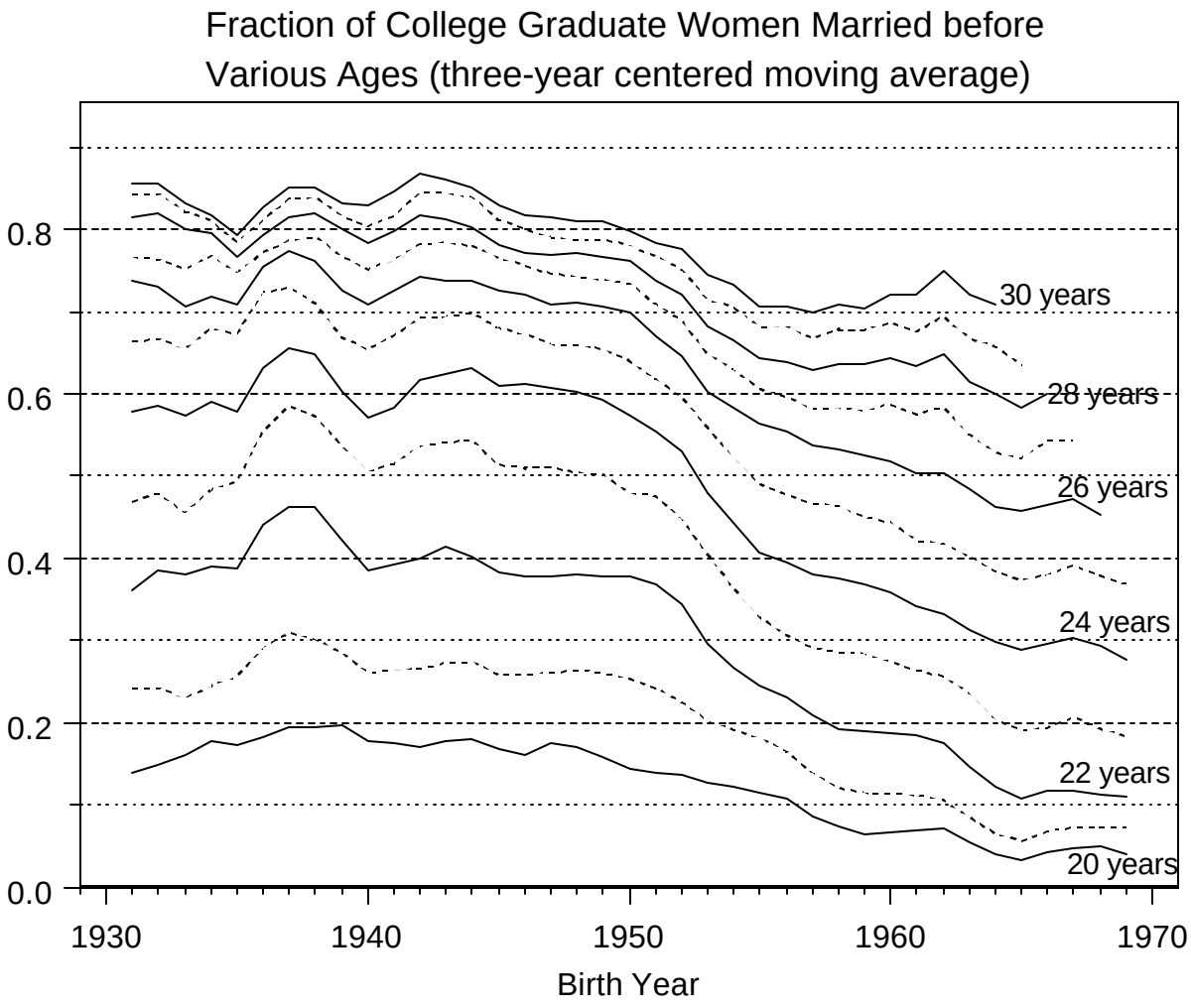

Figure 6: Fraction of College Graduate Women Married before Various Ages

Source: Current Population Survey, Fertility and Marital History Supplement, 1990 and 1995.

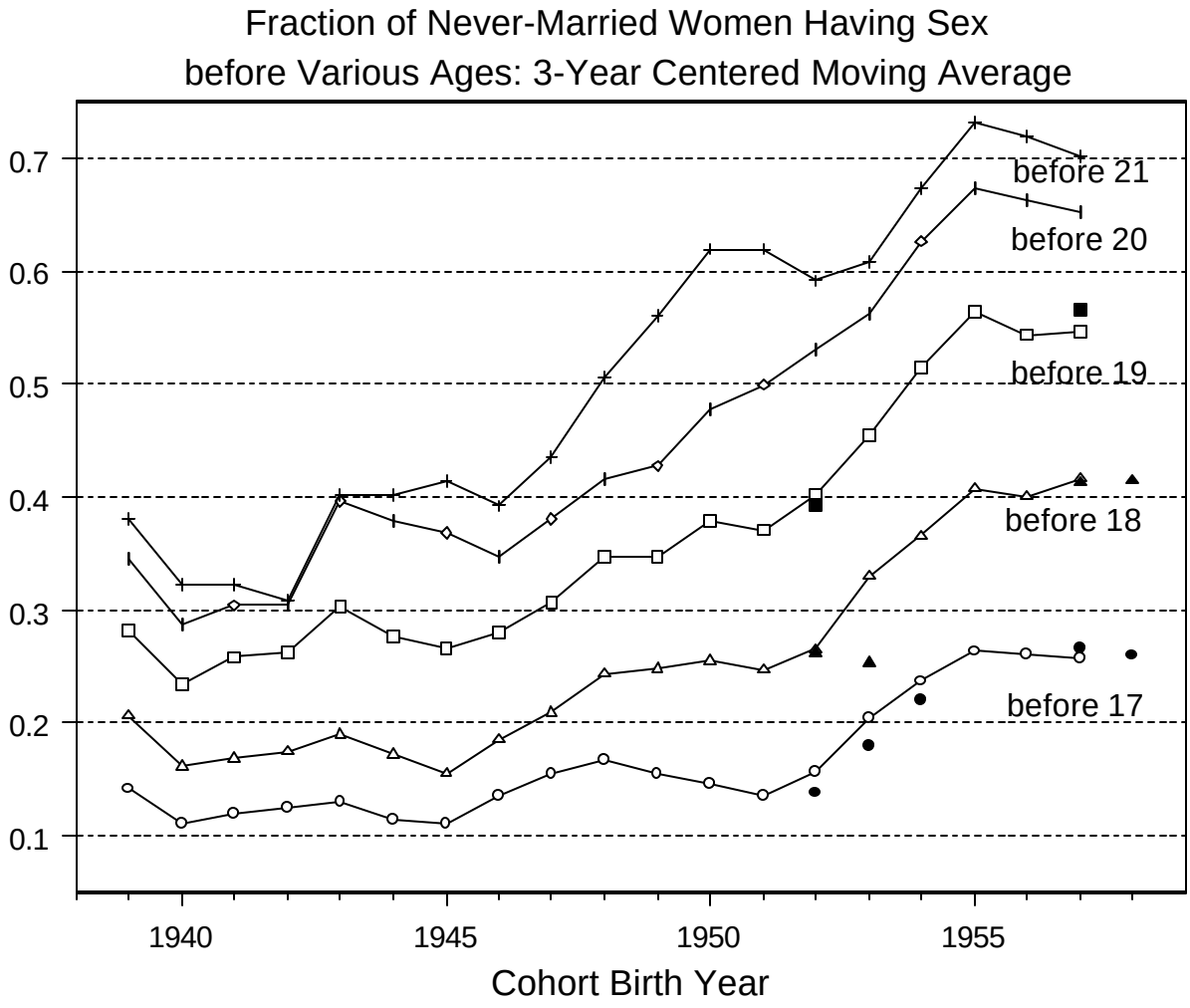

Figure 7: Fraction of Never-Married Women Having Sex before Various Ages, 3-Year Centered Moving Average

Sources: All but the solid markers, National Survey of Family Growth 1982 (ICPSR 1985). Solid markers for birth cohorts of 1952, 1952, and 1954, National Survey of Young Women 1971 (Zelnik and Kantner 1989). Solid markers for birth cohorts of 1957 and 1958, National Survey of Adolescent Female Sexual Behavior 1976 (ICPSR 1982).

Table 1
Landmark Events and Decisions Regarding the Pill and Contraceptive Use

Year	*Event or Landmark Decision*
1873	Congressional passage of the "Act for the Suppression of Trade in, and Circulation of Obscene Literature and Articles of Immoral Use," also known as the 'Comstock Law.'
1916	In direct violation of the Comstock Law, Margaret Sanger opens, in Brooklyn, the first birth control clinic.
1936	U.S. Circuit Court of Appeals modifies the fifty year-old Comstock Law to allow the dissemination of birth control information and devices.
1937	University of Pennsylvania Researchers discover the function of progesterone in inhibiting ovulation.
1949	Russell Marker synthesizes inexpensive cortisone for the treatment of rheumatoid arthritis.
1950	Margaret Sanger convinces the heiress Katherine McCormick to fund research on "the pill."
1951	Carl Djerassi at Syntex synthesizes norethindrone, an orally active progestational hormone.
1952	Chemist Frank Colton at G. D. Searle and Company develops norethynodrel, chemically similar to norethindrone and also a synthetic progesterone.
1953	Katherine McCormick promises Gregory Pincus (researcher and Searle consultant) to fund his project to develop a birth control pill through its completion.
1954	Researchers John Rock and Gregory Pincus conduct the first tests using norethynodrel and norethindrone to prevent ovulation.
1955	Searle's Colton awarded a patent on norethynodrel.
1956	Large-scale trials begin to assess the drug's effectiveness as a contraceptive.
1956	Syntex's Djerassi awarded a patent on norethindrone.
1957	Searle buys a company to manufacture the steroids used in norethynodrel production.
1957	The Food and Drug Administration (FDA) approves Syntex's Norlutin (norethindrone) and Searle's Enovid (norethynodrel) for treatment of hormonal and other medical disorders.
1960	FDA approves the use of norethynodrel (Enovid) as an oral contraceptive for women.
1961	Searle begins to advertise Enovid as a contraceptive.
1961	The first reports of thromboembolism attributed to the pill surface in Britain.
1962	Ortho Pharmaceutical Corporation enters the oral contraceptive market.
1963	The Food and Drug Administration concludes there is no connection between Enovid and thromboembolism.
1964	Parke-Davis and Syntex enter oral contraceptive market.
1965	The FDA declares no evidence for a positive or negative association between cervical cancer and contraceptive pills.
1965	The U.S. Supreme Court in *Griswold v. Connecticut* overturns a Connecticut law prohibiting the use of contraceptives on the grounds that it violates a married individual's right to privacy.
1968	Papal encyclical is issued enjoining Catholics from using the pill.
1969	Yale University begins one of the first college birth control programs in the Fall 1969.
1970	Senator Gaylord Nelson holds hearings investigating the health risks of oral contraceptives.
1970	FDA orders manufacturers to include an informational pamphlet on health risks with every package of birth control pills.
1971	On July 1, 1971 the 26th Amendment is ratified allowing those 18 years and older to vote. Most states follow by lowering the "age of majority."
1972	The U.S. Supreme Court in *Eisenstadt v. Baird* overturns the Massachusetts law prohibiting the sale of contraceptives to unmarried individuals.
1974	In Wisconsin Federal District Court, *Baird v. Lynch* overturns a law prohibiting the sale of contraceptives to unmarried individuals (Civ. No. 71-C-254, W.D. Wis.).

Sources: Asbell (1995), Dienes (1972), and Watkins (1998).

Table 2
Data Sets Containing Information on Contraceptive Use, 1955 to 1987

Data Set (abbreviation)	*Year(s)*	*Number of observations*	*Sample characteristics*
National Fertility Surveys (NFS)	1965 1970 1975 followup	5,617 6,752 3,403	Currently married women, married prior to age 25; retrospective information on contraceptive use was taken only for periods in which respondent was married.
National Survey of Young Women (NSYW71)	1971	4,611	Young women, never married and ever married, 15 to 19 years old. Contains current state of residence.
National Survey of Adolescent Female Sexual Behavior (NSAF76)	1976	2,193	Young women, never married and ever married, 15 to 19 years old. Does not contain current state of residence.
National Health Interview Survey (NHIS)	1987	12,747	Women born 1929 to 1969 (aged 18 to 67 years old). Contains information on age at first pill use, but none on age at first marriage.
National Survey of Family Growth, Cycle III (NSFG)	1982	7,969	Women 15 to 44 years old. Contains information on age at first family planning visit and age at first marriage.

Table 3
State Laws Regarding Contraceptive Services to Minors and the Age of Majority, 1969 to 1974

State	Age of majority			Earliest legal age to obtain contraceptive services without parental consent		
	1969	1971	1974	1969	1971	1974
AL	21	21	21	21	17	17
AK	19	19	19	19	19	14 or 19[b]
AZ	21	18	18	21	18	18
AR	18[a]	18[a]	18[a]	18	14	14
CA	21	21	18	15	15	15
CO	21	21	21	21	14	14
CT	21	21	18	21	18	18
DE	21	21	18	21	21	18
DC	21	21	21	21	14	14
FL	21	21	18	21	21	14
GA	21	21	18	14	14	14
HI	20	20	20	20	20	20
ID	18[a]	18[a]	18	18	18	14
IL	21	18	18	21	14	14
IN	21	21	18	21	21	18
IA	21	21	18	21	21	14 or 18[b]
KS	21	21	18	21	21	14
KY	18	18	18	18	18	14 or 18[b]
LA	21	21	18	21	21	14
ME	21	18	18	21	18	18
MD	21	21	18	21	18	14
MA	21	21	18	21	21	18
MI	21	21	18	21	14	14
MN	21	21	18	21	18	18
MS	21	21	21	14	14	14
MO	21	21	21	21	21	21
MT	21	19	18	21	19	18
NE	20	20	19	20	20	19
NV	18[a]	18[a]	18	18	18	18
NH	21	21	18	21	14	14
NJ	21	21	18	21	21	18
NM	21	18	18	21	18	14 or 18[b]
NY	21	21	18	21	16	16
NC	21	18	18	21	18	18
ND	21	18	18	21	18	18
OH	21	21	18	21	21	14
OK	18[a]	18[a]	18	18	18	14 or 18[b]
OR	21	21	18	21	15	15
PA	21	21	21	21	18	18
RI	21	21	18	21	21	18
SC	21	21	21	21	21	16
SD	21	21	18	21	21	18

State	Age of majority			Earliest legal age to obtain contraceptive services without parental consent		
	1969	1971	1974	1969	1971	1974
TN	21	18	18	21	14	14
TX	21	21	18	21	21	18
UT	18[a]	18[a]	18[a]	18	18	18
VT	21	18	18	21	18	18
VA	21	21	18	21	21	14
WA	21	18	18	21	18	18
WV	21	21	18	21	21	14 or 18[b]
WI	21	18	18	21	18	18
WY	21	21	19	21	21	14 or 19[b]
Sum-mary	states < 20: 7	states < 20: 18	states < 20: 43	states # 16: 3	states # 16: 12	states # 16: 27[c]

[a] Age of majority is 18 for females and 21 for males.
[b] The state has a comprehensive family planning program that does not exclude the provision of contraceptive services to minors, but there is either no mature minor doctrine in the state or no clear decision by the state attorney general concerning the legality of such provision.
[c] Seven states are ambiguous cases.

Sources:
1969: Pilpel and Wechsler (1969)
1971: U.S. Department of Health, Education, and Welfare (1974).
1974: Paul, Pilpel, and Wechsler (1974). The coding of the laws is as of June 1974.
1974: U.S. Department of Health, Education, and Welfare (1978).

Notes: "Obtaining contraceptive services" means the ability to get the birth control pill. Some states had a different age for voluntary sterilization, and abortion laws occasionally differed as well. We use an age of 14 when the law was interpreted to mean that any minor could receive contraceptive devices without parental consent.

Notes specific to the 1971 coding for Table 4 for potentially ambiguous cases:
AL: Law allows high school graduates and married women to obtain contraception, but not any female under the age of majority, therefore an age of 17 years old is coded.
AR: Age of majority is 18, but recent law allows all women can get state family planning services except single women at college away from home who should go to private doctor
CT: Age of majority was reduced to 18 in 1972. An earlier law enabled any minor of 18 or older to obtain health services.
KS: Legislation in 1966 allowed a physician to prescribe birth control to any woman at a public clinic, but the law was not universal. See, however, the discussion in Bailey (1997) that discusses the case of Lawrence, KS.
KY: A "mature minor" decision was effective in 1972.
ME: Physician must find "probable health hazard," thus the law is not universal.
MD: Age of majority is 21 but consent rights are given to those 18 years and older for contraceptive services.
MI: Age of majority is lowered to 18 in 1972.

MN: Law states that minors living apart from their parents can give consent to health services, thus the age in 1971 is given as 18 since it does not provide blanket coverage for 14 to 17 year olds.
NJ: Age of majority is lowered to 18 in 1973.
NY: Pharmacists may sell contraceptives to minors of 16 and older. The law was ambiguous with regard to physicians and parental consent.
OH: Ohio has a mature minor doctrine established in 1956, but its relevance to birth control is unclear in 1971.
PA: Minors 18 years and older (or high school graduates) may consent to any medical care.
VA: Age of majority is lowered to 18 and any individual under age 18 may consent to birth control services, except abortion and sterilization, effective July 1972.
WI: The restriction on contraceptives to unmarried individuals was put in question after the *Eisenstadt v. Baird* (1972) decision regarding a similar Massachusetts law.

Table 4
State Laws and Pill Use among Never-Married Female Youth
in the National Survey of Young Women, 1971

Dependent variable: 1 = ever taken the birth control pill	*15 to 19 years old*		*17 to 19 years old*		*17 to 19 years old and attends college*	
	(1) All	*(2) Sexually active*[a]	*(3) All*	*(4) Sexually active*[a]	*(5) All*	*(6) Sexually active*[a]
Mean of dependent variable	*0.0652*	*0.245*	*0.106*	*0.304*	*0.145*	*0.406*
State law (1 = non-restrictive for minors)	0.0200	0.0727	0.0355	0.0955	0.0653	0.166
	(0.00808)	(0.0258)	(0.0180)	(0.0346)	(0.0329)	(0.0748)
Education variables:						
8th grade	-0.0351	-0.165				
	(0.0227)	(0.0717)				
9th grade	-0.0338	-0.151				
	(0.0194)	(0.0574)				
10th grade	-0.0351	-0.160				
	(0.0170)	(0.488)				
11th grade	-0.0460	-0.144				
	(0.0143)	(0.0406)				
12th grade	-0.0912	-0.155				
	(0.0195)	(0.0481)				
College			0.0606	0.161		
			(0.0177)	(0.0430)		
Currently attends school	-0.0784	-0.0566	-0.0658	-0.0704	-0.184	-0.270
	(0.0158)	(0.0365)	(0.0189)	(0.0407)	(0.0835)	(0.157)
Catholic	-0.0119	-0.0236	-0.0217	-0.0387	-0.0242	-0.0676
	(0.00843)	(0.0287)	(0.0149)	(0.0375)	(0.0334)	(0.0793)
African-American	0.0741	0.0541	0.0925	0.0164	-0.0153	-0.215
	(0.0111)	(0.0280)	(0.0193)	(0.0376)	(0.0505)	(0.0945)
South Atlantic	0.0201	0.0448	0.0355	0.0668	0.0968	0.179
	(0.0106)	(0.0311)	(0.0142)	(0.0409)	(0.0370)	(0.0787)
East South Central	-0.0242	-0.0740	-0.0340	-0.0613	-0.103	-0.376
	(0.0164)	(0.0574)	(0.0304)	(0.0776)	(0.0692)	(0.278)
West South Central	0.0170	0.0908	0.0529	0.200	0.106	0.521
	(0.0143)	(0.0467)	(0.0266)	(0.0665)	(0.0749)	(0.195)
Number of observations	4211	1314	2226	890	647	245
R^2	0.0801	0.0985	0.0534	0.0619	0.0427	0.0868

[a] "Sexually active" means that the individual had ever had sexual intercourse.

Source: National Survey of Young Women, 1971 (NSYW71).

Notes: Standard errors are in parentheses. Ordinary least squares estimates are given. Dummy variables for single years of age are also included. Some women in cols. (5) and (6) were not currently attending college. Non-restrictive state laws allowed minors to receive birth control services and devices without parental consent. For state law information see Table 3.

Table 5
State Laws and the Age of First Marriage for College Women
(U.S. natives born from 1935 to 1957)

	College Graduates					*Some College or More*
Dependent variable: 1 = married before age 23	*(1) All*	*(2) All*	*(3) All*	*(4) Whites*	*(5) Whites*	*(6) All*
Non-restrictive birth control law by age 18[a]	!0.0196 (0.00737)	!0.0166 (0.00782)	!0.0225 (0.00931)	!0.0207 (0.00817)	!0.0258 (0.00965)	!0.0123 (0.00614)
Legalized abortion by age 18[b]		!0.0153 (0.00939)	0.00183 (0.00968)	!0.0139 (0.00990)	0.00283 (0.0100)	!0.00755 (0.00746)
African-American	!0.108 (0.00763)	!0.108 (0.00763)	!0.107 (0.00762)			!0.107 (0.00528)
Other race	!0.0962 (0.0182)	!0.0959 (0.0182)	!0.0929 (0.0183)			!0.104 (0.0140)
State of birth dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year of birth dummies	Yes	Yes	Yes	Yes	Yes	Yes
State specific linear trends	No	No	Yes	No	Yes	No
Number of observations	60,714	60,714	60,714	55,392	55,392	130,335
R^2	0.0458	0.0458	0.0469	0.0437	0.0447	0.0434

Source: 1980 Census of Population, IPUMS, 1% sample (Ruggles and Sobek 1997).

Notes: Huber-White robust standard errors allowing for clustered errors by state/year-of-birth cells are in parentheses. College graduates are those with sixteen or more years of completed schooling; some college or more means thirteen or more years of completed schooling.

[a] The non-restrictive birth control dummy variable equals 1 for individuals born in a state that ,by the time the individual was 18 years old, had a non-restrictive law allowing minors (older than age 15) to receive birth control services and devices without parental consent. See Table 3.

[b] The legalized abortion dummy equals 1 if abortion was legal in the individual's state of birth by the time the individual was 18 years old. In five states (AK, CA, HI, NY, and WA) abortion was legally available starting in 1970 (thus affecting cohorts born after 1951). In the other states, abortion was made legally available after *Roe v. Wade* in 1973 (affecting cohorts born after 1955). On abortion laws see Levine, Staiger, Kane, and Zimmerman (1996, table 1).