

The

Changing the course

The Pill – the female oral contraceptive – turned 40 last year. It is a middle-aged medical miracle. Slimmed down to contain between one-tenth and one-twentieth the progesterin, and one-third to one-sixth the estrogen of Enovid, the original birth-control pill, it remains the contraceptive of choice of American women. Some 44 percent of non-surgically contracepting women took The Pill in 1995, while 51 percent of those 15 to 24 years old used it as a contraceptive. Almost 80 percent of women now between 45 and 55 years old have taken The Pill at some point.

In its December 1999 millennial issue, *The Economist* chose The Pill as the greatest science and technology advance of the 20th century. It has been credited with the resur-

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Pill

of women's education

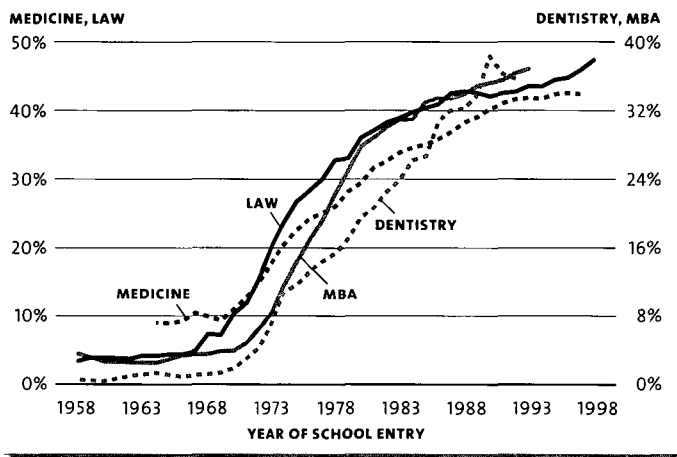
gence of feminism in the 1960s, and the social and sexual revolutions of the 1970s. But no era of monumental social, political and economic change has a simple explanation. Major forces, with origins independent of The Pill, also had enormous impact on society in the late 1960s. The civil rights movement, for example, laid the foundations for the greater equality of women, while the war in Vietnam led to the expansion of the rights of youth.

Our goal, though less grand than explaining the upheavals of the late 1960s, is grand nonetheless: understanding a part of the mid-20th century democratization of American society. It concerns fundamental change in the lives of women, and how the aspi-

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rations and career choices of young women were altered in the late 1960s. Real change in the economic and social status of women in the United States did not emanate simply from their increased participation in the paid labor force, for women have always worked. Rather, it came from their acceptance as equals in the most highly paid and demanding occupations – the professions.

PERCENTAGE OF FEMALE FIRST YEAR STUDENTS IN PROFESSIONAL PROGRAMS



A critical part of the change in women's economic status can be seen in the expansion in women's investment in professional careers. There was a sharp change around 1970 in the percentage of females among first-year students in medical, law, dentistry and MBA programs. Until around 1970, fewer than 10 percent of medical students were women, while the comparable figures for law (4 percent), dentistry (1 percent) and business (3 percent) were even lower.

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Just a decade later, the share was about one-third in medicine and business, more than one-third in law, and one-fifth in dentistry. And by the early 1990s, women represented more than 40 percent of all first-year medical and law students, and more than 35 percent of all first year MBA and dentistry students. Progress continues: according to *The New York Times*, women will outnumber men entering law school this fall. This increased flow of women into the professions, in turn, altered the total number of professionals who are women. In 1999, 27 percent of all physicians were women, while 29 percent of all lawyers and judges were women.

Did The Pill play a role in this decision by millions of women to invest in professional training and pursue careers? We think the answer is a resounding "yes." Beginning in the late 1960s, safe, reliable, easy-to-use, female-controlled contraception enhanced the ability and willingness of young women to enter careers that involved extensive, upfront

time commitments to education.

A college woman contemplating a lengthy professional education had to consider all of the costs of the investment. In addition to the financial costs of education and forgone income, she also had to evaluate its social consequences. If she did not marry before her professional education began and lacked an almost foolproof contraceptive such as The Pill, she would have to pay the penalty of abstinence or cope with uncertainty regarding pregnancy. If she delayed marriage while training for her career (as many did, relative to all college-graduate women), she would also have to consider the social consequences

of a depleted marriage market.

The Pill thus enabled a larger group of women to invest in expensive, long-duration training without paying a high social price. It accomplished this feat through a least two routes. First and most obvious, The Pill is a highly reliable form of contraception that allows women to engage in sexual relations without having to worry about unintended pregnancies that could disrupt career plans. We consider this impact to be The Pill's *direct* effect.

The increased certainty regarding pregnancy that was gained from using The Pill need not have been enormously large to have

had a great impact. But The Pill, particularly in its early high-dose incarnation, was monumentally more reliable than were other methods of contraception, especially so for the sexually inexperienced. The diaphragm has seven times the failure rate in typical use, while the condom has four times the failure rate.

The Pill also had an *indirect* effect on women by encouraging an increase in the age at first marriage. A woman with a law degree who decides to marry at age 27, rather than just after college, may discover that the marriage market is rather thin if the age at first marriage among college graduates is low. But if the marriage age for graduates rises, as it



CHARLES GATEWOOD/THE IMAGE WORKS

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did throughout the 1970s, the delay in marriage would involve far less of a penalty.

To put it another way, The Pill lowered the cost of pursuing a career through its direct effect on the cost of having sex and its indirect effect of increasing the age at first marriage generally. Note that even women who were never on The Pill benefited from its existence if they wanted to delay marriage to invest in long-duration training: by enabling marriage delay, The Pill created a thicker marriage market for those wanting to marry after investing in a professional education.

The Pill had additional impact through other routes, which we do not directly exam-

ine. For example, it allowed the mentors of young women to be more secure in their belief that their female students, as undergraduates or in professional schools, would be able to control their fertility and not drop out to raise a family. By the same token, larger networks of female students may have made attending professional school more attractive for women.

Our challenge is two-fold. We must empirically locate the connection between The Pill and young women's careers in the early 1970s, and we must also confront why there was a lag of almost 10 years from the date of The Pill's availability as a contraceptive to the start of the career response.



CHARLES BONNAY/TIMEPIX

The explanation for the latter is simple: single women in the 1960s were thwarted from obtaining The Pill for contraceptive use by archaic state laws. As those laws were relaxed, young women were able to obtain The Pill and, subsequently, the marriage age rose and career aspirations changed.

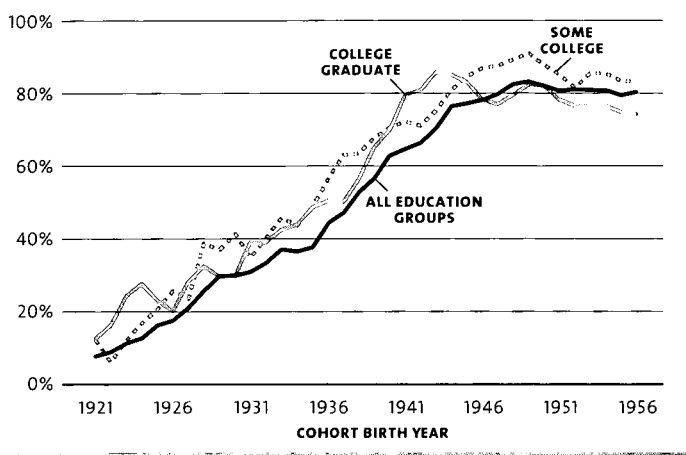
But isolating the impact of The Pill from other factors affecting the rise of women in the professions is more difficult. Some of our evidence consists of coincident turning points in various time series for Pill use by young women and the entry of women into professional programs. Reinforcing and convincing evidence is derived from the fact that there was considerable variation in state laws and judicial decisions that enabled young women to obtain The Pill – and that these laws affected the use of The Pill by young women and, in consequence, the age at first marriage among the college-educated.

A POPULAR DRUG WITH A DIFFICULT BIRTH

The road to an effective oral contraceptive involved scientific discoveries in physiology, completed in 1937 with the discovery of the role of progesterone in ovulation, and the synthesis of sex hormones. All sex hormones nest chemically in the class of steroid compounds, and the synthesis of one steroid, cortisone, in 1949 opened the way to the invention of synthetic progesterone (norethindrone was the first) in 1951. But the pharmaceutical companies were not fully committed to contraceptive research and developed synthetic hormones as therapeutics, not as a means of birth control. Cortisone, used to

relieve the symptoms of arthritis, was accurately forecast to be a highly profitable drug. Oral contraceptives, on the other hand, posed potential problems for drug makers in a country that still retained Victorian legislation at the state level and was about one-quarter Catholic.

PERCENTAGE OF WOMEN EVER TAKING THE PILL, BY EDUCATION (THREE-YEAR CENTERED MOVING AVERAGE)



Although the pharmaceutical makers employed scientists to work on synthetic sex hormones, they did not allocate much money to oral contraceptive research. In fact, research on The Pill was largely bankrolled by a wealthy philanthropist with no financial connection to the pharmaceutical industry. The philanthropist, Katherine Dexter McCormick, an admirer and friend of the tireless birth control pioneer Margaret Sanger, was persuaded by Sanger to fund part of the project. Thus it is said of The Pill that it had four fathers (Frank Colton and Carl Djerassi, who synthesized progesterone, and pill researchers Gregory Pincus and John Rock) and two mothers.

The 1956 human drug trials on the oral contraceptive were held in Puerto Rico, far from the prying eyes of potential opponents.

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The FDA gave Searle approval for Enovid for medical use in 1957 and for contraceptive use in 1960; by 1964, four pharmaceutical companies were marketing a version.

The Pill was an overnight success, even among Catholic women. It diffused rapidly through its target population of married women. Indeed, the fraction of married women (under age 35) who were on The Pill came close to its historic maximum just five years after its release.

The point is that the reliability and general safety of The Pill enable women to better plan for careers at an early stage and be taken more seriously by mentors, schools and employers.

But it was not so successful among young single women for another decade. Contemporaneous data reveal that the fraction of 18-year-old, never-married women who had ever taken The Pill was 10 percent in 1971, but 27 percent in 1976 (28 percent and 56 percent respectively for those who were not virgins). The portion of married women taking The Pill had already peaked by the mid-1960s, but the numbers for unmarried women continued to rise to the mid-1970s. The reasons for the delay were both legal and social.

Unmarried women did not begin to take The Pill in large numbers until the late 1960s and early 1970s, when almost all states lowered the age of legal majority and granted youth the rights of adults through “mature minor” decisions. Those legal changes were not driven by legislators’ or courts’ desires to extend family-planning services. Rather, they were motivated by factors similar to those that led to the ratification of the 26th Amend-

ment (which lowered the voting age to 18) in 1971. The Vietnam War awakened Americans to the inconsistency between the rights and responsibilities of young people, and they chose to extend greater rights to them.

We emphasize the changing circumstances of young, unmarried women because their altered perceptions of marriage and fertility enabled them to plan lives that were different from those of previous generations, and to do so early in their personal development. A disproportionate number of women in profes-

sional education programs, moreover, were (and still are) unmarried.

A brief digression is in order here to understand the constraints on women in broader context. The social and legal climate of the mid-20th century United States was influenced by the remnants of the late 19th century era of Comstockery regarding contraception and obscenity. The 1873 Comstock Law, named after its champion, the anti-vice crusader Anthony Comstock, made the importation and mail shipment of all forms of contraceptive devices and information a federal crime. The law was never very important and was effectively modified by judicial action in 1936 to allow the importation of contraceptives. Its real legacy was in state Comstock laws that had considerably more impact both on commerce in contraceptives and on freedom to use them.

As late as 1960, 30 states prohibited advertisements regarding birth control devices and

22 had some prohibition on the sale of contraceptives. One of those laws was struck down by the United States Supreme Court in *Griswold v. Connecticut* (1965), which affirmed the right of married couples to use contraceptives in the privacy of their bedrooms. The last surviving remnant was reversed by

doctrine by law or judicial interpretation, parental consent was legally required for a minor to obtain birth control devices, prescriptions and related information. A minor could be emancipated in various other ways, including marriage, and physicians sometimes used their own judgment in these mat-



another Supreme Court decision, *Eisenstadt v. Baird* (1972), which overturned a Massachusetts law prohibiting the sale of contraceptives to unmarried people. Although many of the Comstock laws were easily circumvented by married individuals, they had an important effect on minors, whose ability to obtain contraceptives was also limited by social norms. You don't have to be very old to remember tales of embarrassing confrontations between teenage boys and their unfriendly neighborhood druggists.

SEX, THE PILL AND SINGLE WOMEN

Unless a state recognized the mature minor

– although local norms often constrained and guided their decisions. College health services, however, paid more attention to the laws of their states, and few, if any, college health clinics made family planning services available to students before the 1970s.

With sufficient ingenuity, a determined young, unmarried woman presumably could obtain The Pill without benefit of enabling laws. But our cross-state statistical analysis for the year 1971 shows that Pill use among young women was considerably higher in states with lenient laws regarding the rights of minors.

The rights of minors began to expand

TARO YAMASAKI/TIMEPIX

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slowly in the 1960s, and then far more rapidly in the early 1970s with the reduction of the voting age to 18. The age of majority was less than 20 for women in just seven states in 1969. By 1971, this number had expanded to 18, and by 1974, 43 states set the age of majority below age 20.

In 1969, only three states had laws enabling a female younger than age 17 to obtain contraceptives; such laws existed in 12 states in 1971 and in 27 states in 1974. It should be noted that those laws only inadvertently applied to contraceptives. They either lowered the age of majority, which enabled youths to engage in transactions such as signing rental contracts, or they applied to a wide range of health services such as surgery, without parental consent.

The same forces that prevented young, unmarried women from obtaining The Pill in the 1960s hinder today's social scientists from studying those women's use of contraceptives. There are no contemporaneous surveys of Pill usage by young women in the 1960s, while just two exist for the 1970s – and they are of limited value.

To measure trends in Pill usage we employ, instead, two retrospective surveys from the 1980s. But these have drawbacks as well. Most important, the survey that gives direct information on Pill usage does not contain information on the age at first marriage. The second survey contains marriage age and the age at which family-planning services (of which obtaining The Pill is the most important) were first obtained.

We have also used data on the take-up rate of The Pill for females 15 to 19 years old in 1971 and 1976. All of these series, taken together, show that the diffusion of The Pill among young unmarried women began more than five years after it did for married women,

and that it reached its highest levels among this group considerably later. They also show that Pill usage among single, college-graduate women began to soar with cohorts born around 1948.

The figure on the next page illustrates the trend, showing the percentage of women receiving their first family planning visit among those who eventually graduated from college and were not married by age 22. These data may slightly overestimate the fraction obtaining The Pill, since family planning visits were also used by those seeking other services, such as pregnancy counseling. Nevertheless, the data are fully consistent with other information on Pill usage and clearly show that the fraction of young, unmarried, college-graduate women obtaining family planning services greatly increased with those born in the late 1940s. These were precisely the women who first began to enter professional schools around 1970.

CAREERS, MARRIAGE AND THE PILL

The timing of the changes in the fraction of females among first-year professional students and the diffusion of The Pill could, of course, have been a coincidence. But we have additional evidence that suggests the relationship is causal.

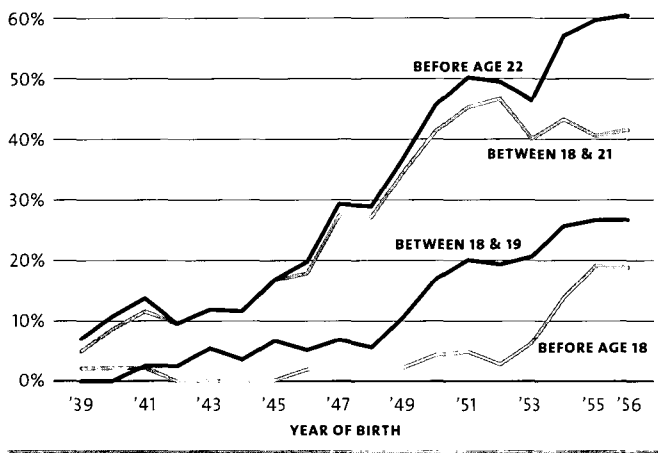
First, as previously noted, young unmarried women in states that lowered the age of majority or had passed legislation extending the mature minor decision (or had judicial rulings that did so), were considerably more likely to use The Pill. Second, the age at first marriage increased for college-graduate women who turned 18 around the time that the state laws changed. That is, the availability of The Pill to young college women appears to have led to an increase in the age of first marriage, as identified in a cross-state analysis that includes controls for year of birth and

state of birth, as well as state time trends. The Pill encouraged the delay of marriage through several routes – for example, by reducing the necessity to become engaged or marry in order to have sex without the risk of scandal, and by lowering the incidence of shotgun weddings.

The increased age at first marriage among college-graduate women is striking. Among women born from the early 1930s to the end of the 1940s, about 50 percent married before age 23. That is, half of all women who completed college married within a year or two of graduation. But among women born in 1957, only 30 percent married before age 23. The age at first marriage increased greatly between cohorts born in 1950 to 1957, and in those intervening seven years, The Pill greatly diffused among young, unmarried college women.

ceptive methods. The Pill was legalized in Japan in 1999 (!!), but fertility is very low and the marriage age rose considerably in the 1970s and 1980s. The Japanese case, however, may prove the rule: there has been very little real social change in the lives of Japanese women. The point is that the reliability and general safety of The Pill enable women to

PERCENTAGE OF (UNMARRIED) COLLEGE-GRADUATE WOMEN RECEIVING FAMILY PLANNING SERVICES



WAS IT ONLY THE PILL?

The case for The Pill as the primary factor driving women’s career decisions is strong. But it is not the only possible factor. There is also abortion, legalized nationwide in 1973 by the Supreme Court and permitted earlier than that by several states. We have found, however, that abortion was not as potent a factor as The Pill in encouraging later marriage for college women, although its impact on careers probably complemented that of The Pill.

Fertility reduction and later marriage ages do not require the widespread availability of a safe, reliable contraceptive. In the United States, fertility declined secularly and the marriage age rose during the 19th century, long before the diffusion of modern contra-

better plan for careers at an early stage and be taken more seriously by mentors, schools and employers.

Young American women in the late 1960s had hoped to follow in their mothers’ footsteps, but in just a few years their aspirations had changed radically. How much of this change was due to the resurgence of feminism, general social change, and the legacy of the civil rights movement, all reinforced later with policy changes such as affirmative action, and how much was due to The Pill? There is considerable evidence that The Pill had a large effect on career and marriage. Without The Pill, these changes would, presumably, have come later. How much later, though, we do not know. M

Supply and



Demand

An economist goes to