Career and Family: Collision or Confluence

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ABSTRACT: Career and family are the twin goals of many college graduate women today. Women graduating college from the late 1960s to 1980 were the first to aim for family and career. Their delay of marriage and family in pursuit of career resulted in a high fraction without children by age 40. They have been followed by cohorts of college graduate women who are more reluctant to forgo family for career and who have had, in consequence, more children than prior cohorts. The good news is that the fraction of women who have achieved success in both family and career has increased across birth cohorts and has also increased across their lifetimes. But the bad news is that the fractions are still low for younger women with children. With an increase in the fraction of cohorts who are college graduates and an increase in their career and family commitment, an impending collision course is on the horizon. I discuss four aims of policies that have been proposed to turn a looming collision into a confluence of desires. All have some benefits but none will succeed if the costs of temporal flexibility are not decreased.

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**Twin Goals of Women and Nations**

Most women have the same two goals and most nations have two related ones. For women the goals concern employment and children. It is generally called career and family. For nations the goals are labor market efficiency and adequate resources for young children.\(^1\) My paper concerns why these twin goals (career and family) are in greater conflict now than ever before and why they are of increasing importance personally and nationally.

Why have these twin goals collided with such force? It is what I term a "collision course" of careers and kids. There are more women planning careers and the will be more kids among the career-oriented group.

These issues have received considerable attention recently. Consider the fanfare around Anne-Marie Slaughter’s 2015 book *Unfinished Business*; the much heralded California Fair Pay Act signed into law in August 2015 and effective January 2016; the announcement in the Summer 2015 by Netflix of its new unlimited parental leave policy and the buzz surrounding the *NYT* recent exposé claiming that Amazon is a very family-unfriendly place in which to work. And now with the Presidential race heating up, Hillary Clinton has alluded to a plan for 12 weeks of paid family and medical leave.

Many people, in the U.S. and elsewhere, believe that women can be helped to achieve the twin goals in a variety of ways. One is by having generous family and parental leave policy, with some of it paid through social insurance. Another is by mandating firms to remunerate women on par with men (known as pay equity or pay fairness) and ensuring that firms not retaliate if employees compare earnings and bonuses with each other.

Family leave by protecting jobs during absences serves to reduced turnover and search costs. But the policies mainly affect parents of newborns and kids unlike most consumer durables last more than one or two years. Policies that incentivize fathers to take family leave may have additional beneficial effects. But most of these policies can do little for women’s earnings relative to men’s, their advancement, employment and their ability to combine career and family. Something else is needed and that is to change the cost to firms and to workers of temporal flexibility.

By “temporal flexibility” I mean an amenity that gives an employee the ability to work a more flexible schedule. The flexibility could mean working fewer days or fewer hours per day. But it could also mean working particular hours, such as in the evening rather than during the day. Individuals who are self-employed often do not have much

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\(^1\) For nations the goal of “family” is often linked to increasing the birth rate, as in current-day Japan.
flexibility since they are residual claimants and are on-call. But some self-employment operations have only the owner, a cell phone, a desk at the neighborhood café, and considerable flexibility.

There is no simple solution. But the landscape is not entirely bleak. Various sectors and occupations are getting it right. Many of the firms and occupations that have succeeded in reducing the costs of temporal flexibility are parts of the growth industries of our day: high technology and health. Advances have arisen primarily because of various technological changes that have reduced the cost of temporal flexibility and have improved the ability of employees to be effective substitutes and better “puzzle pieces” for each other. Teams of substitutes, often highly trained professionals, rather than teams of complements have been cost reducers. But, in addition, change has also come about because a critical mass of employees has convinced firms and institutions to change, as appears to have been the case in certain medical subspecialties.

I will begin with why the collision course is greater today than ever. I will then address the history of career and family among college graduate women and show how success at both has changed across birth cohorts and as women age. Good news: success at career and family has improved in both cases for cohorts born from the 1930s to the 1960s. But improvement is not enough. Current generations are anticipating even greater career access and will be having more children than before. I then ask how we can do even better.

Although much of this paper concerns college graduate women, similar issues confront those who have not attended or graduated from college in terms of conflicting work and family time. But it is the college graduate group that has made “career” one of her chief goals.

**Collision Course**

The reasons that these issues are of great relevance today concerns what I am calling the “collision course.” Although we have been on this collision course for some time, it has never been as consequential. The reasons concern three components: (1) There are more college graduate women and thus more career-oriented young women; (2) College graduate women have increasingly delayed marriage and motherhood, which has allowed them more time to develop career potential; (3) There are more babies among college graduate women mainly because of a reduction in childlessness in this group. Each of these factors is today at an all-time high and the union of the three indicates the strength of a

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2 Throughout this piece the term “college graduate” means graduating from a four-year institution. It does not mean completing a two-year course even if it granted teaching or other credentials.
potential collision.

More Careers

First, I will address the “more careers” component. The fraction of (U.S. native-born) women who have graduated from college by 35 years old is now 38%. Since a 35 year old today was born in 1980, what are the percentages for the more recent cohorts who are not yet 35? Extrapolations indicate that females born in 1990 will have college graduation rates at 35 years old of almost 45% (see Figure 1 for the actual and projected values), a high fraction of women with the potential for career aspirations.

What fraction actually has (or had) a career is something I will construct for men and women using a definition (and many assumptions). The fraction continuing with their education to obtain advanced and professional degrees is one indication of the group that has career aspirations. To get an estimate of the magnitude of the career-oriented group I take the number of post-BA degrees (including MBA, PhD, MD, JD, DDS, and PharmD) earned in a year and divide by the number of bachelor’s degrees four years earlier. I do this for men as well, and the two lines are graphed in Figure 2 for 1974 to 2013.

The latest data show that 24% of BA women and 29% of BA men have successfully pursued these degrees whereas 30 years ago the figures were 15.5% for BA women and 32% for BA men. The desire for career is at an all-time high among women with BA degrees and the fraction of women earning BA degrees is also at a historical peak. These facts taken together imply a greater desire for careers.

Later Babies, More Babies

College graduate women have been getting married later in their lives for some time and are having children later (if at all). The recent trend to later marriages among college graduate women began with birth cohorts in the 1950s. The median college graduate woman born in 1948 married at 23 years old and that was approximately the case back to cohorts born in the early 1930s. But by the cohort born in 1955, the median was around 25 years and by the cohort born in 1961 it was about 26 (see Goldin and Katz 2002, fig. 5). More recent data show that the median is just above 27 for cohorts of college graduate

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3 I use the number of BA degrees four years prior to each of the advanced degrees even though some degrees take more time, and some less. I exclude all MA degrees other than MBA because of the large number of foreign students. Foreign students are, by necessity, included in other degrees but will be a lower fraction of the total.

4 See Sources and Notes to Table 2.
women born in the early 1980s.\textsuperscript{5}

Births among college graduate women have also been progressively delayed in the last half century. Among college graduate women born in the 1930s, fully 60\% had a child by the time they were 25 to 29 years old (see Figure 5.A). But by the cohort born in the 1940s, 50\% did and for those born after 1960 just 25\% have. Looking at the median age for a first birth, the median was about 26 years for cohorts born around 1945. For cohorts around 1950 the median was 29 years old and for cohorts born around 1955 the median was around 31 years.\textsuperscript{6}

The majority of college graduate women born before the late 1940s married a year or two after receiving their BA and began their families soon after. There was little intervening time for them to start careers and pursue professional and advanced degrees. The age at first marriage and first birth then began to rise. Later marriage and later kids (or no kids) increased the time college graduate women had to invest in their careers and that, in turn, meant greater career commitment throughout their working lives. I later discuss some of the reasons for the increasing delay of marriage and children.

As more women started their families later in life, a substantial fraction had no births by their early forties and, for many, no adopted children. Whether this was because they decided not to have children or waited too long to do so are interesting questions. Whatever the reasons, the fraction with no children reached a peak with cohorts born in the late 1950s when it was around 30\% (see Figure 3). It should be noted that this high watermark is for all college graduate women, not just for those with advanced and professional degrees. For those with a degree beyond the BA, the decrease in childlessness has been even greater.

Although the delay of marriage and births for college graduate women is not new, the delay is no longer producing as large a group without births. In fact, the fraction not having any children by 40-44 years old today is almost as low as it was during the peak years of the Baby Boom. It decreased by 10 percentage points from its high point and is now around just 20\%.\textsuperscript{7}

More college graduate women are now having children, but conditional on having at

\textsuperscript{5} Source: CPS June Fertility Supplements, Micro-data. Only cohorts born before 1985 have had 30 years to complete a BA, however, and those in the later cohorts who completed it earlier may have different marital histories from those who complete it later.

\textsuperscript{6} The medians were derived from the CPS June Fertility Supplements, Micro-data.

\textsuperscript{7} Shang and Weinberg (2013), using U.S. Vital Statistics Birth Data and the CPS, demonstrate that the college graduate women of Cohort 5 are having more children than previous cohorts because they have increased childbearing into their forties.
least one child the mean number of births has not changed much (see Figure 4). By the
time they are 40-44 years old conditional on having at least one, the mean college graduate
woman has had 2.2 children. But the mean number of births for the entire group increased
from around 1.5, at its nadir, to about 1.75 today.

Although much of my story concerns college graduate women, a related one
corns women who are not college graduates. Rising inequality has made them more
dependent on their own earnings. Their rates of having children have not declined but
their marriage rates have. For them, it is more babies, more jobs, and fewer dads.
Although this is another type of collision course, it is not the one I will discuss.

Let me reiterate. I have thus far demonstrated that a greater fraction of U.S. women
today are “career potential” than ever before and also that a greater fraction of the career
potential group has children. These two trends have produced a potential collision course.
Note that college graduate women with career aspirations and children have always
experienced these tensions. My point is that this group is considerably larger now and the
fraction having children has increased greatly. But how did the college graduate collision
course evolve and what fractions have managed to navigate the course successfully?

I now provide a mini-history of the evolution of career and family for college
graduate women. I will also estimate the fraction of college graduate women (and men) in
various birth cohorts who achieved career and family during periods of their lives.

Generations of Change

Throughout the course of the last 125 years college graduate women shifted from
aspiring to attain family or career to family then job (but not career), to career then family,
and (eventually) to career and family. Their objectives were tempered by the barriers they
faced at work, at home and earlier in their families of origin. Their changed goals largely
reflect changing constraints.

I categorize cohorts of college graduate women based on their stated aspirations
and their ultimate achievements in terms of family and career. The categorization is data
driven using the fraction married, fraction with children and fraction with employment and
earnings at various ages (see Goldin 1997, 2004). But the categorization also pays
attention to the goals of women as they expressed them. I will also address whether
college is essentially a “treatment” of sorts or whether the changing demographics are

8 There are, however, large differences in marriage and child-bearing trends between college
graduate and non-college graduate women. See, for example, Lundberg and Pollak (2015).
simply a function of changing selection regarding who went to college. The case for selection among most cohorts born before the 1950s is weak.

The characterizations of college graduate women during the twentieth century are given in Table 1. The table ends with college graduates in the year 2000 because the goals of career and family make the most sense if individuals have at least 15 years after graduation to have achieved them.

Early on, college graduate women either had families or careers. Few had both. Only about 50% of the women in Cohort 1, who graduated around 1910, ever had a birth. They had family or career. This stark reality then began to change with cohorts born around 1920. College graduate women started to marry and have families at a rate more like those who did not attend college at all. Cohort 2 is that transitionary group. By Cohort 3, only about 17% never had a birth. These “mothers of the Baby Boom” mainly put family first and had jobs primarily after their children were grown. I categorize them as having family then job.

Cohort 3 married early and had children at rates that rivaled those of women who had not attended college (see Goldin 1997). Perhaps because they made the “family” part of the equation look so easy, the subsequent cohort put off family in its quest for career, often not considering biological realities.

By Cohort 4, graduating from the late 1960s to 1980, careers became central to many women's lives and women greatly delayed marriage and family. The group aimed for career then family. But the delay in having family led to the high fraction of women who never had a birth. In consequence many could not have succeeded in having career and family by their early forties. Cohort 5, however, appears to have resolved to have both career and family. As we will see, its success has been greater than that of prior cohorts (although we cannot yet follow the group very far in their lives).

The transitions just outlined from Cohort 1 to Cohort 5 can be seen in Figures 5.A to 5.C for an important variable—the fraction without a birth by age group. The fraction of college graduate women who have not yet had a first birth is given by five-year age groups for 25-29, 30-34, 35-39, and 40-44 year olds in Figure 5.A. Because couples often delay births during bad economic times but later make up for that lost time, the two youngest age groups have considerable high frequency noise. A smoothed version for those age groups is given in Figure 5.B, which also includes cohort demarcations and characterizations for the last three cohorts. The last three cohorts will feature prominently in the discussion of what college graduate women have achieved.
Wide variation exists in the fraction without a first birth by age group. The fraction without a first birth by age group is initially high for Cohorts 1 and 2, even for the older age groups. The no-birth fraction then declines, especially with the mothers of the Baby Boom (Cohort 3) and then increases with cohorts born in the 1940s (Cohort 4). The fraction without a first birth by 40-44 years old then takes another, rather abrupt, turn. Only around 20% of college graduate women today have no births by ages 40-44.

One might wonder whether selection into the group who graduated from college is largely responsible for the substantial changes in fertility from Cohort 1 to Cohort 3 or 4. The answer is that it is not. Using two large reunion surveys done at Radcliffe in 1928 and 1977 and my own Harvard and Beyond Survey, I can piece together the fraction of Radcliffe/Harvard women without a first birth by around age 40 and above for the first four cohorts. Radcliffe women who graduated from 1900 to 1919, thus born from 1878 to 1897 (and part of Cohort 1) had family backgrounds very similar to those who graduated Radcliffe in the 1950s to the mid-1960s, thus born from around 1924 to 1943 (and part of Cohort 3). Yet the fraction of these women without a first birth by their forties closely tracks the aggregate data for college graduates.

College graduate women had increased their numbers in the nation from about 8% for the 1930 birth cohort to 20% for the 1945 birth cohort (see Figure 1). There appears to be little room for a story of selection in generating the changing demographics of college graduate women.

This is not the place to go into great detail on the reasons for the changing demographics of the nation’s women and of college graduate women in particular. They are examined elsewhere (e.g., Goldin 1997, 2004, 2006; Goldin and Katz 2002). Among the most important was the introduction of the Pill and its increased accessibility by young unmarried women. Before that time, college women could not easily and reliably delay childbirth and have an active social (and sex) life. The putting off of marriage and children, while investing in a career, was fraught with difficulty until the 1970s. It was, as well, potentially costly in terms of marriage (Goldin and Katz 2002). When the constraints on effective fertility control were greatly relaxed, the marriage age rose.

There were, to be sure, a set of important related factors, some preceding the

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11 One indication of family background is whether the woman had graduated from a private high school. The fraction who did actually increases across Cohorts 1 through 3.
12 The excess number of births to these women for Cohorts 2 and 3 may be due to the fact that women with children are often those who choose to attend reunions. Note that the data from the Harvard and Beyond Survey (used for birth years from the late 1940s) closely track the aggregate data for college graduate women.
advances in fertility control and some coincident. These related factors include changed expectations of young women about their future labor force participation (Goldin 2006), increased high school math and science courses and improved grades by secondary school females (Goldin, Kuziemko and Katz 2006), the opening of various elite colleges to women (Goldin and Katz 2011a), and the women's movement and related changes in federal anti-discrimination laws.

These changes allowed many college graduate women to strive for career then family. Considerably more managed to succeed at career than in previous generations. But not that many college graduate women could achieve both in part because the rate of childlessness among college graduate women had greatly increased.

Cohort 5 has managed to reduce the fraction without a birth to a considerable degree although its women have not had a first birth at a much different point in their lives. They may, in addition, be doing somewhat better in terms of career. I now explore the degree to which these cohorts actually did succeed in their careers.

**Success at Career and Family**

**Defining Career and Family**

The two last cohorts are of greatest interest for the argument here. Cohort 4, born from 1944 to 1957 and characterized as aspiring for career then family, is now 58 to 71 years old. Cohort 5, born from 1958 to 1977 and characterized as aspiring for career and family, is now 38 to 57 years old. For Cohort 4, and a small part of Cohort 5, we can determine what fraction actually achieved “career and family” and when they did so.

In some earlier work on this subject I used the NLS Young Women (also known as the NLS68), which surveyed young women 14 to 24 years old beginning in 1968, thus born from 1944 to 1954 (Goldin 1997, 2006) and also the NLSY79, which surveyed young women 14 to 22 years old starting in 1979, thus born from 1957 to 1965. Using the NLS68 I estimated whether college graduate women had achieved career and family when they were 34 to 44 years old. I did the same for the NLSY79 for women 39 to 46 years old. In both cases I created a working definition of “success” in career and in family.

Family was the easier one. I defined achieving family in terms of having a child (and, in some versions, adoption before age three). Many individuals achieve success in “family” by having close relatives, great friends, a loving spouse/partner or a pet. My measure is not just one of convenience. It is what many young women state they aspire to have.

Career was the more difficult of the two. I used a definition that is related to the
notion that a career is achieved during a period of some length and that it also involves earnings that exceed a reasonably high level.

In my research using the two NLS data sets the career criterion involved earning above the level given by the 25th percentile of the full-time, full-year distribution for males in the same age and educational bracket. The male earnings data was obtained from the CPS. Thus a college graduate woman 40-44 years old would have to earn at least as much as a college graduate man 40-44 years old who was at the 25th percentile of his distribution (in the CPS). I also used whether that criterion was achieved for three (or two) consecutive years (or nearby years if the survey was biennial at the time).

I will employ approximately the same definition using the Health and Retirement Study linked to Social Security (and W-2) earnings data (Goldin and Katz 2015). The only difference is that I will define “career” in the HRS as meeting the earnings condition for at least three years in each five-year period. As will be seen, that appears to yield approximately the same “career” estimates as for the group of NLSY79 women.

Estimating Success Using the HRS

The Health and Retirement Study (known as the HRS) is a widely used data set begun in 1992 with a random sample of households in which one member was born between 1931 and 1941 and thus between 51 and 61 years old at the time. The first cohort is also known as the “HRS.” The “War Baby” (WB) cohort, born from 1942 to 1947, began to be surveyed in 1998 and the “Early Baby Boomer” (EBB) cohort, born 1948 to 1957, was added in 2004. Both WB and EBB cohorts were between 51 and 56 years old when they were first surveyed. The three cohorts mentioned (HRS, WB and EBB) have been surveyed every two years. At the time of this writing, the HRS data are available to 2012.

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13 Earning at the 25th percentile for men means that women earned about at the female median. See Goldin (1997), table 2.4 for a comparison of the hourly earnings (weekly earnings/ usual hours worked per week) of males and females in the CPS from 1980 to 1991. The male at the 25th percentile is about equal to the median female in most years and at most 6% less in the other years.

14 The actual definition is at least half of each five-year period since for a small group of respondents the entire period is not included in the records for that particular five-year age group.

15 My work on career and family had been criticized for not considering the career achievements of older women (Ferber and Green 2003). There were two reasons for the deficiency in my earlier studies. The first is that the data on older women in the cohorts I was considering did not exist since they were not yet old enough. The second, and more substantive, reason is that I was mainly interested in the achievement of family and career for women around age forty. I can now respond to Ferber and Green’s justifiable criticism.

16 Information on the Health and Retirement Study can be found at: [http://hrsonline.isr.umich.edu/](http://hrsonline.isr.umich.edu/). The sample is somewhat more complicated than just described
The various data sets, the HRS and the various NLS surveys, each have their merits and defects. The HRS data afford a longer period, than does the NLS, during which to observe women and track their careers. It also provides an equivalent group of men for purposes of comparison. The NLSY79 also has a large enough sample of comparable men, but the NLS68 does not because of the greater attrition of the original males. Because the latest HRS is 2012, the last cohort that can be studied to their fifties was born in 1957. The NLSY79 pertains to a somewhat earlier cohort, those born from 1957 to 1964.17

An additional and important virtue of the HRS data is that the earnings data are highly accurate since they come from Social Security and W-2 records (after 1977).18 One potential complication is that many college graduate women were teachers and some were not covered by Social Security. States and localities had the option of providing separate pension benefits and their public servants were allowed to be exempt from Social Security taxes and benefits. The use of the W-2 forms obviates this problem, but these data do not exist for all years and cohorts.19 In the analysis presented here, the affected birth cohort-age groups are the 1931-37 birth cohorts to age 44 and the 1938-44 birth cohorts to age 39. See Appendix I for further information on the procedures used for those cohorts.

In using the HRS, I divide the sample into four birth cohorts from 1931 to 1957. The earliest two of the cohorts map into an “early” Cohort 3 group (born 1931-37) and a “later” Cohort 3 group (born 1938-44). The two more recent of the cohorts map into an “early” Cohort 4 group (born 1945-50) and “later” Cohort 4 group (born 1951-57). The findings from applying the definitions of career and family to the HRS cohorts are given in Figure 6.20 Significant and meaningful change occurred across and within cohorts by age.

The achievement of “career” advanced almost steadily among women by cohort. Take, for example, the 40 to 44 year old group in the four cohorts born from 1931-37 to 1951-57 in Figure 6.A. Its achievement of “career and family” went from a paltry 9% to a

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17 In my earlier work, done around 2003, I analyzed the achievements of NLSY79 respondents who were 39 to 46 years old. I am planning to extend that work to track these men and women when they are 50 to 56 years old. The analysis using the NLS68 is of less value today since the group of male respondents had a high attrition rate and thus there is no comparison group of men.
18 Because the Social Security earnings records and related W-2 forms do not have information on the earnings of the foreign born and because the HRS does not have the year of immigration, I use only native-born individuals in the HRS.
19 In addition, the W-2 records in the HRS for 1978 and 1979 are incomplete, although those for all other years are complete for those who gave permission to have their records linked.
20 The child variable is the same for each respondent from ages 35 to 54. Most women would have had a child by age 35, although for a small fraction the child variable could increase. One can view these data as giving success at career and eventually at family.
considerably greater 20%.

It is reassuring that the success rate for the 1951-57 cohort as measured in the HRS is a bit lower than what I estimated it to be using the NLSY79 for approximately the same age group (39 to 46 years old) but for a somewhat more recent birth cohort (1957-64).\footnote{One major difference between the HRS and the NLSY79 that produces greater career and family for the HRS group is the greater fraction of college graduate women with children in the HRS relative to other data sets. The HRS specifically asked about biological children but it is possible that women also included children from their husband's prior marriage or adoptions.}

College graduate women in the HRS claim to have had more biological children than the CPS indicates they had as a cohort. The exact reasons for this empirical anomaly are still unclear. Because of this incongruity, I also compare the HRS “career” success rate to that calculated using the NLSY79, rather than using only the “career and family” rates.\footnote{For the 1951-57 birth cohort in the HRS 79.9% of college graduate women had at least one biological child by around age 50 whereas for the 1957-64 NLSY79 cohort 71.8% did by age 39 to 46 years. HRS women were not supposed to include “step” children and it is not clear what accounts for this different when using appropriate person weights.} It is reassuring that the career-only numbers in the HRS are somewhat less than in the NLSY79 for the same age groups: 34.7 percent for the NLSY79 and 30.7 percent for the HRS. The somewhat lower level in the HRS indicates progress in career attainment from Cohort 4 to Cohort 5. Together with the greater fraction having births in Cohort 5, the numbers achieving both career and family must have risen even more than given by career success alone.

Perhaps of more interest, career and family success increased \textit{within} each cohort of women. For example, among those born from 1951-57 career and family success was 16% by ages 35-39 but 41% by ages 50-54. In addition, career and family success increased for this cohort relative to the earlier 1945-50 birth cohorts for all but the oldest age group and some of the increase is due to the higher rate of motherhood among those in the “later” cohort.

For the most recent cohorts, almost the entire increase in career success, from their thirties to their fifties, was due to increased annual earnings, relative to the male standard. Virtually none of their greater success was due to an increase in their labor force participation rates. That is, advances in the intensive rather than the extensive margin were most important. For the earlier cohorts both the extensive and intensive margins expanded although increased success later in their lives came about far more because of higher relative earnings, given participation rates, than to increased participation rates.

I will not go into any great detail here about the reasons for the increase in “career”

\footnote{For the 1951-57 birth cohort in the HRS 79.9% of college graduate women had at least one biological child by around age 50 whereas for the 1957-64 NLSY79 cohort 71.8% did by age 39 to 46 years. HRS women were not supposed to include “step” children and it is not clear what accounts for this different when using appropriate person weights.}
across cohorts of college graduate women. Some are discussed in Goldin (2006) and concern the increased expectation of labor force attachment by young women and the concomitant change in college majors from those that were more consumption oriented (e.g., literature) to those that were more of an investment for future jobs (e.g., business).

Whether these rates of success are high or low depends on the figure for a comparison group. College graduate men in the same age and birth cohorts can serve that role for both the HRS and the NLSY79. In the HRS, men across the birth cohorts shown in Figure 6.B had an almost unchanging fraction achieving “success” in both family and career spheres across the four age groups. The most recent of the cohorts had a slightly lower rate of success than its predecessor cohort, in part because of a lower fraction of HRS college graduate men had children. Most of the change, however, is due to a lower fraction of men attaining career. That decrease could be due to more variability of income across years, a reduction in the fraction working full time or a change in the correlation of male income and fatherhood.23

For the most recent of the cohorts, the career and family success rate for men has hovered around 50%. Similarly for the NLSY79, 51.4% of men achieved both family and career. Therefore, although women 35-39 years old had a career and family success rate of just 33% that of men, women 50-54 years old had a rate that was 60% that of men, or almost double. Women narrow the “success” gap with men over their lives.

Career success, not surprisingly, differed greatly for women with and without children. For the cohorts born during 1951-57 career success was around 50% among women with no children and that figure is independent of the woman’s age. For women in the same cohorts with children career success increased from 20% for the 35-39 year old group to 38% for the 50-54 year olds. The statistic for men was 60-65% and was actually somewhat lower for the men without children.24

The bottom line is that cohorts born in the 1950s achieved career and family far more than did previous ones. Moreover, their success by the time they reached their fifties was about 60% the rate for men and the career success rate for women without children was almost equal to that for men by age and cohort. For the two most recent cohorts that can be examined, most of the gain within cohorts comes from advances at the intensive margin (hours, earnings) rather than the extensive margin (labor force participation).

23 The standard is the earnings of a male college graduate working FT-FY at the 25th percentile. If only one year of income were considered and all HRS males worked FT-FY, then success would have to be achieved by 75% of the group and there would be no change over time. But multiple years are considered here and there is no condition that the HRS group work FT-FY.

24 For men, the fraction with career is lower for those without children, consistent with a large literature about the positive impact of marriage and children on the earnings of men.

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College graduate women with children in the latest cohorts that can be tracked to their fifties have remained in the workforce during most of their adult lives (Goldin and Katz 2015). Their inability to achieve career came about, it appears, because the slowdown in hours and position after having children and the apparently large penalty from doing so. Some of that disadvantage was later reversed.

College graduate women in birth cohorts from 1945 to 1957, those that desired career then family, experienced setbacks with career early in their lives but then managed to regain some career advantage. Birth cohorts that followed and argued for career and family have had more children, as we saw using the CPS. But it is not yet clear whether they will surpass the career success rate, as I have measured it, of the cohorts now in their fifties and sixties. I now turn to the various solutions that have been proposed to forestall a looming collision course of an even larger group of college graduate women who desire career and who will have children.

Turning a Collision Course into a Confluence of Desires

What to Fix?

I began with the fact that there are more college graduate women now than ever before, a greater fraction who desire a career and a greater fraction who will have children. I have shown that for previous cohorts of college graduate women, most notably those now in their late fifties and sixties, the achievement of career came late if at all and the fraction having children was the lowest since the cohorts of the early twentieth century. The most recent cohorts are demanding more.

The demands of the most recent cohorts, those in Cohort 5, have been expressed in both voice and exit. Their rate of labor force exit, termed “opting out,” has been far lower than the popular press has presumed. For most, however, “exit” has not been out of the labor force. Rather, it has been a shift across employers to occupations and firms that enable more temporal flexibility. Most often the shift has decreased responsibilities and remuneration relative to comparable men (Goldin 2014, figure 1). How can the apparent collision course be turned into a confluence of desires?

Four main policy routes have been considered and many have been tried in some U.S. states and a large number of nations. The four aim to: (1) “fix the women,” (2) “fix the infants,” (3) “fix the managers,” and (4) “fix the dads.” I will emphasize that the most important way to turn the collision course around is to add: (5) “fix the organizations,” in particular reduce the costs of temporal flexibility. I will also note that infants are less of a problem than are older children and that “fixing school hours and school months” would be
a more beneficial route for children and their parents.

Those that aim to “fix the women” find fault with women’s ability to compete, bargain, negotiate and do math, among other so-called deficits. Those that aim to “fix the infants” emphasize that the limited length (12 weeks) of the current federal FMLA has led some women to exit the workforce, lose current jobs and bear additional search and training costs. In addition, the absence of paid family leave has led some women, often the lowest paid, to return to work when their babies are highly vulnerable.

The policies that aim to “fix the managers” assert that equal pay for equal jobs does not exist, possibly because of actual bias. Finally, those that aim to “fix the dads” argue that if gender differences in the care of children did not exist, gender differences in the labor market would evaporate. Policies that reserve weeks of paid leave to dads only could, according to this argument, serve to alter gender norms by having dads bond with their infants.

What is the evidence for why “fix the organizations” is the answer? First off, the majority of the gender gap in earnings comes from the gender gap within occupations rather than between occupations. In fact, only about 22% of the total gender earnings gap across all full-time full-year workers is due to differences between occupations, even when all 469 census occupations are used. Next, gender earnings gaps vary substantially across occupations. The main finding is that within-occupation differences are far more important to the gender gap in earnings than is the distribution of men and women by occupations.

Differences in Gender Earnings Gaps across Occupations

Differences in earnings by occupation, moreover, are related to aspects of the positions. To see this I first standardize by running a large regression using several years

25 Blau and Kahn (2013) explore the impact of FMLA policies across OECD nations and find that although these policies appear to allow retention of women, hours are often low and career progress lags in nations with extensive and generous family leave policies.
26 Dahl, et al. (forthcoming) show that the expansion of paid family leave in Norway from 18 to 35 weeks was fiscally regressive and did not have positive effects on measureable aspects of child well-being. However, Carneiro et al. (2015) show that the initial change in Norway beginning in 1977, from 0 to 18 weeks, did have substantial gains for children.
27 Patnaik (2015) considers the change in Quebec in 2006 with the introduction of QPIP and finds a change in dad’s time spent with children several years after the program. Bartel et al. (2015) find that California Paid Family Leave (CA-PFL) increased leave by dads but not by much in absolute terms, mainly for sons and only for the first born. The authors express skepticism about the long-run changes in social norms from CA-PFL.
28 See Goldin (2014). Differences across occupations are somewhat larger for the college graduate group.
of the American Community Survey (ACS) and including available controls (such as age, hours, weeks, race, gender), dummies for all occupations and an interaction of occupation with female. The coefficient on (female \times occupation) plus that on the main gender effect give the earnings difference by sex for each occupation.

The regression is run across all occupations but my interest is in the top 100 or so occupations by male income since those are the ones for which careers will be the most important. They are also the ones that I can easily group by type. The groups are Business & Finance, Health, Science, Technology and a miscellaneous category termed “Other.” Since some occupations in Health have a large fraction of professionals who are self-employed, these constitute a separate group.29

The top earnings group of about 100 occupations contains around 20 that cannot be easily classified (the “Other” group). Figure 7 graphs the remaining 80 occupations with Business & Finance and Health (High Self-Employed) grouped together and the Health (Low Self-Employed) and Science & Technology occupations lumped together. I have included Lawyers in Business & Finance group and omitted the 19 others that cannot be easily classified. The occupations for each of the two groups are graphed ascending by the ratio of female to male earnings within each.

As seen in Figure 7, occupations in Business and Finance (including Law), as well as those in Health where there is significant self-employment have relatively low ratios of female to male earnings. Those in the Science and Technology occupations, as well as those in Health where there is almost no self-employment have considerably higher ratios of female to male earnings.

The mean differences are large: weighted by those in these occupations the average Business & Finance occupation has a ratio of 0.79 whereas the average in Science & Technology has a ratio of 0.90.30 There are only six Business & Finance occupations out of the 32 occupations included that have a gender earnings ratio that exceeds the lowest ratio for the Science & Technology group. It should be recalled that the calculation of the ratios holds constant many potentially confounding factors, such as the individual’s age, as well as work hours and weeks. The sample, moreover, includes only those that who are employed full-time (35 hours or more) and full-year (about 50 weeks or more) and who are between

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29 Self-employment fractions among male health professionals are: chiropractors (0.767); dentists (0.724); optometrists (0.679), veterinarians (0.553), physicians (0.325) and pharmacists (0.094). Source: 2006, 2007 and 2008 ACS.

30 These numbers are presented in Goldin (2014) in log form and in ratio form here. The unweighted means of the ratios for the two large groups are 0.789 for Business & Finance plus Health (high ownership) and 0.905 for Health & Technology plus Health (low ownership). These are very close to the weighted average without Health in the original paper.
25 and 64 years old.\textsuperscript{31}

\textit{Occupational Characteristics from O*NET}

Why are gender gaps so different by broad occupational groups? Occupations in Business & Finance generally offer little flexibility or flexibility at a high cost to the individual (Bertrand, Goldin and Katz 2010). Those in Science & Technology offer more flexibility and at prices that are not very high (Goldin and Katz 2012). The occupations that have significant self-employment (and involve important ownership responsibilities) also offer less flexibility and have higher penalties to lower hours.

How do I know that these differences are due, in large part, to the costs of temporal flexibility? I have examined occupational characteristics in the Department of Labor's Occupational Information Network (O*NET), the successor to the Dictionary of Occupational Titles (DOT). I find that increases in occupational characteristics that intensify the importance of "being there," contact with others, interpersonal relationships, greater time pressure, unpredictable hours, and a highly structured work environment are correlated with lower earnings for women compared with men.\textsuperscript{32}

The five O*NET characteristics given in the notes to Table 2 are normalized (zero mean and standard deviation of one) and summed to form an aggregate measure of the temporal, and related, demands in these occupations that are often in conflict with family time. As seen in the two regressions in cols. (1) and (2), the O*NET characteristics have a strong negative relationship with the gender earnings ratio, so that a one standard deviation increase lowers the ratio by about 5 percentage points. Figure 8 is the visual analogue to Table 2, col. (2), and graphs the (adjusted) ratio of female to male earnings for the 76 occupations against the sum of the normalized five O*NET characteristics.

The mean for the five O*NET characteristics in the Science & Technology occupations in the sample is almost one standard deviation below those in the Business & Finance group.\textsuperscript{33} The difference in the ratio of female to male earnings between the two groups is 0.11. Therefore, changing the characteristics of the Business & Finance group to be more like those in Science & Technology could serve to reduce the difference in these pay ratios by about one-half.

\textsuperscript{31} See the notes to Goldin (2014) figure 2A for the entire group of sample characteristics.

\textsuperscript{32} Other recent work that has used O*NET is Deming (2015), which examines the increased demand for social skills. Wiswall and Zafar (2015) find using experiments that women have a higher willingness to pay for greater time flexibility than do comparable men.

\textsuperscript{33} The mean for the 31 Business & Finance occupations is 0.263 and that for the 31 Science & Technology occupations is -0.631. Thus the difference is 0.894 of a standard deviation.
Half of the effect comes from differences between the occupations and half is due to within occupational group variance as can be seen by comparing cols. (3) and (4), which include occupational group dummies, with cols. (1) and (2). That is, the impact of the characteristics is about halved when dummy variables for occupational groups are added.34

A considerable amount of the gender pay gap, therefore, is due to the characteristics of occupations that indicate less temporal flexibility and presumably higher costs to predictability and low time demands. Elsewhere my coauthors and I have shown that occupations in the corporate and finance sectors are highly inflexible and that flexibility involves substantial costs (Bertrand, Goldin and Katz 2010). Other researchers have investigated the extent to which the increased premium to “overwork” has stalled the narrowing of the gender gap in pay (Cha and Weeden 2013) and yet others have hypothesized why firms would offer an inefficiently small number of low-hour jobs and use high-hour jobs to screen (Gicheva 2013).35

*Altering Job Characteristics*

What, then, can alter job characteristics? The example of pharmacy will be highly instructive. Pharmacy is a relatively high-paying occupation today (eighth highest median earnings occupation for men and third for women among full-time, year-round workers). Substantial change occurred in the past 40 years that increased workplace flexibility and reduced its cost to firms and thus to the worker (Goldin and Katz 2014). The female to male ratio for median annual earnings of full-time, year-round workers grew from 0.66 in 1970 to 0.92 in 2010 and the current gender earnings gap in pharmacy is smaller than in almost any other high-wage profession. Pharmacists who work more hours earn more, to be sure. But they earn more in a linear fashion. How did these changes come about to make this highly paid professional employment a most-egalitarian one?

Three somewhat unrelated reasons increased the substitutability of pharmacists for each other and reduced the premium to ownership. More standardized drugs and an effective use of information technology greatly increased the substitutability of one pharmacist for another. Few people go to a pharmacy today with a request for a particular pharmacist. All the information available to one pharmacist about a client’s request and prior prescriptions anywhere is also available to another pharmacist in that establishment.

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34 There are 90 occupations with all the relevant information available. The O*NET linkage led to the loss of about five occupations and some were omitted because of small numbers of either men or women in the ACS sample.

35 Less related to “fixing” the jobs is the related finding of Cortés and Pan (2015) that the increased ability of highly-skilled women to take long hours jobs is higher in cities with less expensive domestic help due to greater immigration.
In addition to the increased substitutability among pharmacists is that increased corporate ownership vastly reduced the fraction of pharmacists working in independent practice and owning their own business. About 5 percent of pharmacists are self-employed (owners or partners) today, whereas more than 35 percent of were self-employed in 1970 and 40 percent were in 1966. The fraction of pharmacists employed by independents (as owners, partners and employees) declined from more than 75 percent in the late 1950s to 40 percent in 1980 to just 14 percent in 2009.

There are many other examples of occupations that have successfully reduced the costs of substituting across employees. Many do so by creating teams of independent professionals who can be effective “puzzle pieces” for each other. Important examples are anesthesiologists, obstetricians, some in the banking and real estate sectors, and discount stockbrokers (Blair-Loy 2009; Briscoe 2007).

Not all occupations can be reformed in these ways. But many can be changed to reduce the costs of temporal flexibility. The changes have occurred in various ways. Some have changed “organically,” as in the case of pharmacists but in other cases a critical mass of professionals was necessary to create greater demand for change, as appears to have been the case among pediatricians. (Female pediatricians today work relatively low hours: about 35 percent of all female pediatricians work fewer than 35 hours per week.)

I began by noting that the methods proposed to increase women’s earnings relative to men’s can be divided into those that “fix the women” by making them more like men, “fix the infants” by making them less of a burden, “fix the men” by making them more amenable to caring for the own children and “fix the managers” by making them less biased. These are not necessarily bad policies, but they will not move the gender gap lever by much.

I noted that policies that “fix the infants” and extend FMLA in various ways do not confront the fact that children are not short-term durable goods. Bertrand, Goldin and Katz (2010) in their study of business school graduates 10 to 15 years after the MBA found that the decline in new mothers’ earnings and hours occurred several years after the birth.36 Policies that extend school age through universal pre-K, that expand school hours beyond 2 or 3 pm and that lengthen the school year beyond June would help working families. These, admittedly expensive, policies would be win-win since they would improve child outcomes and could serve to even the household playing field. But only methods that “fix the organizations” will do much to alter the gender gap in earnings and occupations.

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36 Most of the new mothers in the MBA study would have had far more extensive family leave than the average female worker.
Why Fixing Organizations and Jobs Matters

Why does the fixing of organizations and jobs matter so much to gender equity? The framework of compensating differentials due to Sherwin Rosen (1986; see also Goldin and Katz 2011b, 2012) will help show why fixing other parts of the equation may serve to widen the gender earnings gap even if these fixes have their intended beneficial effects. A verbal statement of the framework is the following.

Jobs come in two flavors: those with the amenity of temporal flexibility and those without it entirely. Individuals have heterogeneous preferences for this amenity and firms face heterogeneous costs to produce it (equivalently, heterogeneous costs to get rid of the disamenity of temporal inflexibility). Men have lower demands for the amenity than do women. In equilibrium men will disproportionately sort into occupations without the amenity and women will disproportionately sort into occupations with the amenity. Because the amenity costs something to produce, women’s wages will be correspondingly lower than men’s.

Consider the “fix the men” policy. If the policy is successful, more men will care for their children and more will increase their preferences for temporal flexibility. Their wives will still share in these family activities and will have the same preferences for temporal flexibility. Since the demand for temporal flexibility will increase but its supply will not have been altered, its relative price will rise. The compensating differential for those with the disamenity will increase because higher cost producers have been enticed to produce the amenity. Because some men will now be getting the lower wage in jobs that include the amenity, the aggregate gender wage gap could decrease. But it could also increase.

The direction and size of the gender wage gap depend on the supply price of the amenity as well as the fraction of men whose preferences shift. The greater the increase in the amenity price, the higher the relative wages of those in the inflexible jobs and the greater the gender gap in earnings.

Alternatively, decreasing the costs of producing the amenity will unambiguously increase the earnings of those who have greater preferences for it. Since these individuals are disproportionately women, the gender wage gap will shrink.

“Fixing the organizations and the jobs” does not mean having blanket “family friendly policies” without regard to costs that are ultimately imposed on those who take advantage of them. Firms are often proud to tout their part-time, flex-time, work-at-home

37 Women could decrease their preferences for the amenity and that would counterbalance the increased demand by men.
and no travel policies without disclosing what the consequences are of taking them.

Reducing the costs of temporal flexibility is not unidimensional. For example, it can involve making employees better “puzzle pieces,” so that they can hand off projects to each other with little loss in fidelity and deal with clients who treat them as nearly perfect substitutes. It can also be furthered by remunerating employees on the basis of outputs rather than not inputs. It can also be advanced by using information technology so that workers are better substitutes for each other. I should note that reducing the costs of temporal flexibility need not render workers less skilled and lower paid. In fact, many of the occupations mentioned are highly skilled ones. In addition, there will always be occupations for which the cost of temporal flexibility will be high and for which there are no effective “puzzle pieces.” The question is just what fraction of positions is in that category.

Summary and Conclusion

Women have sought career and family in large numbers ever since the 1970s, with cohorts born beginning in the mid-1940s. The earliest members of these cohorts aimed for career then family and they are now in their late fifties and sixties. That group was the first to delay marriage and family, in part to achieve greater education and career. A large fraction of them never had children. As a group they had limited career success when young, although they have achieved greater success in their later years.

The cohort that followed, born since around the early sixties, is on the verge of a collision course. It succeeded in greatly reducing the fraction without children, even without having its children at earlier ages. The career success of the group at younger ages looks slightly better than the previous cohort, but the group is not yet old enough to judge its lifetime achievement of career and family. The career and family success rates seem sufficiently disappointing to have sparked a call to action at various levels. I have termed the various proposals: “fix the women, infants, men and managers” and grab at the “low hanging fruit.” Only by reducing the costs of temporal flexibility will gender gaps in earnings and occupations be substantially narrowed and will the twin goals of family and career be achievable by a larger fraction of women and men.
Table 1: Career and Family among College Graduate Women

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Graduated from Four-Year College during</th>
<th>Birth Year</th>
<th>Characterization of Desired Family and Work Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1900 to 1919</td>
<td>1878 to 1897</td>
<td>Family or career</td>
</tr>
<tr>
<td>2</td>
<td>1920 to 1945</td>
<td>1898 to 1923</td>
<td>Job then family</td>
</tr>
<tr>
<td>3</td>
<td>1946 to 1965</td>
<td>1924 to 1943</td>
<td>Family then job</td>
</tr>
<tr>
<td>4</td>
<td>1966 to 1979</td>
<td>1944 to 1957</td>
<td>Career then family</td>
</tr>
<tr>
<td>5</td>
<td>1980 (to 2000)*</td>
<td>1958 (to 1977)*</td>
<td>Career and family</td>
</tr>
</tbody>
</table>

*Using 15 years out of college, or around age 38, as a minimum time to judge desired family and work path.

Sources and Notes: See Goldin (1997, 2004) for cohort delineations and reasons for the characterizations.
Table 2: O*NET Occupational Characteristics and the Ratio of Female to Male Earnings

<table>
<thead>
<tr>
<th></th>
<th>All Occupations in Sample</th>
<th>Female/Male Earnings (adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>O*NET (five) characteristics (normed and averaged)</td>
<td>-0.0491**</td>
<td>-0.0536**</td>
</tr>
<tr>
<td></td>
<td>(0.0100)</td>
<td>(0.0112)</td>
</tr>
<tr>
<td>Occupation group dummies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business &amp; finance</td>
<td>-0.0879**</td>
<td>-0.0879**</td>
</tr>
<tr>
<td></td>
<td>(0.0146)</td>
<td>(0.0156)</td>
</tr>
<tr>
<td>Health occupations with substantial ownership</td>
<td>-0.100**</td>
<td>-0.100**</td>
</tr>
<tr>
<td></td>
<td>(0.0277)</td>
<td>(0.0294)</td>
</tr>
<tr>
<td>Occupations not classified</td>
<td>-0.0316+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0185)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.847**</td>
<td>0.843**</td>
</tr>
<tr>
<td></td>
<td>(0.00697)</td>
<td>(0.00805)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>90</td>
<td>76</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.215</td>
<td>0.235</td>
</tr>
</tbody>
</table>

Sources and Notes: See Figure 7 notes for estimation of female to male annual earnings by occupation. “Not classified” is also referred to as “Other.” To make the graphing less complicated, the dependent variable here is the ratio, not its log. O*NET characteristics are from http://www.onetonline.org/ (Goldin 2014, table 2, note that “frequency of decision making” was incorrectly labeled as “freedom to make decisions”). The omitted occupation group is Health, with minimal ownership. Standard errors in parentheses. + = p<0.10; * = p<0.05; ** = p<0.01

The five O*NET characteristics are:
1. Time pressure: How often does this job require the worker to meet strict deadlines?
Lower pressure means worker does not have to be around at particular times.
2. Contact with others: How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?
Less contact means greater flexibility.
3. Establishing and maintaining interpersonal relationships: Developing constructive and cooperative working relationships with others, and maintaining them over time.
The more working relationships among workers and clients increases time demands.
4. Structured versus unstructured work: To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?
Highly structured jobs lower the probability of having close substitutes for a particular worker.
5. Frequency of decision making: How frequently is the worker required to make decisions that affect other people, the financial resources, and/or the image and reputation of the organization?
The more often the worker has to make decisions that greatly impact the firm, the greater the time demands on the worker to be “on call” and around at unpredictable times.
Figure 1: Fraction of College Graduate Women and Men by Birth Cohort

Source: CPS March Microdata files.

Notes: Dashed lines are extrapolations. Extrapolations use graduation rates at ages 25 and 30 for 1970 to 1978 birth cohorts and graduation rates to age 30 for the 1979 to 1983 birth cohorts and to age 25 for the 1984 to 1988 birth cohorts. The mean increase from 30 to 35 for the 1970 to 1978 cohorts is added to the values of those who are seen at age 30. The mean increase from 25 to 30 is added to those who are seen at age 25. Native-born population is used. Total population estimates are very similar.
Figure 2: Fraction of College Graduate Women and Men Earning Post-BA Degrees (MBA, PhD, MD, DDS, JD, PharmD), 1974 to 2013

Sources: U.S. Department of Education (2014). Tables used by degrees: BA and PhD (table 318.10); JD (table 324.50), MBA (table 325.25), DDS (table 324.50) and PharmD (table 325.25). Medical degrees (MD) are from AMA (various years) and are similar to those reported by the Department of Education.

Notes: The figure graphs the ratio of post-BA degrees in various fields to BA degrees earned four years earlier, even though some programs take more time and some less time. MA degrees other than MBA are excluded because of the large number of foreign students who earn that degree, although the inclusion of foreign students remains an issue in the other categories. The year given is that of the post-BA degrees. The last complete year for degrees is 2012/13.
Figure 3: Fraction of College Graduate Women with No Births by 35-39 and 40-44 Years by Year of Birth

Source: June CPS Fertility Supplement Microdata for 1973 to 2014

Notes: Three year centered moving average is shown.
Figure 4: Mean Number of Children for College Graduate Women: Total and Conditional on Having at Least One Birth

Source: CPS June Fertility Supplement, 1973 to 2014

Notes: Three-year centered moving average. Dashed lines are extrapolations based on data from 1960 to 1969
Figure 5.A: Fraction of College Graduate Women with No Births by Age, by Year of Birth from 1898 to 1985
Figure 5.B: Fraction of College Graduate Women with No Births by Age, by Year of Birth from 1898 to 1985 (with smoothed 25 to 29 and 30-34 year old lines and career and family characterizations)
Figure 5.C: Fraction of College Graduate Women with No Births by Age, by Year of Birth from 1880 to 1975


Notes: Three-year centered moving average shown. CPS Fertility Supplement is used for all cohorts born after 1932 for 40-44 year olds, 1938 for 35-39 year olds, 1943 for 30-34 year olds, and 1948 for 25 to 29 year olds. Numbers (and text) in Figure 5.B refer to the characterizations given in Table 1. The 25-29 and 30-34 year old lines in Figure 5.B have been (free-hand) smoothed.
Figure 6: Career and Family Success across Four Cohorts of College Graduate Women Born from 1931 to 1957

A. Females, College Graduate

B. Males, College Graduate
Source and Notes: Health and Retirement Study (HRS), restricted access version. “Success” in career is defined with respect to annual income using a male standard. “Success” in family means having at least one child. See Appendix I for a description of the computation of “success” in career and family.
Figure 7: Ratio of Female to Male Annual Earnings (Adjusted) by Occupation: 2009 to 2011, Full-time, Full-year Workers in 80 High (Male) Income Occupations

Source: American Community Survey 2009 to 2011. See Goldin (2014), figure 2A.

Notes: Sample consists of full-time, full-year workers 25 to 64 years old (2,603,968 observations) excluding those in the military using trimmed annual earnings data (exceeding 1,400 hours × 0.5 × 2009 minimum wage). Regression contains age in a quartic, race, log hours, log weeks, education levels, census year, all occupations (469) and an interaction with female and occupation. The adjusted ratio shown is the exponentiated value of the main female effect plus the coefficient on the interaction with occupation. Each of the symbols is an occupation for which the mean annual income for males exceeds $60K (current $) and is limited to occupations with at least 25 males and at least 25 females. Occupations (80) are ordered within the two main groups by the interaction with female (thus the conditional gender pay gap) exponentiated to produce the ratio. High self-employment health professions are chiropractors, dentists, optometrists, physicians, podiatrists and veterinarians. Occupation names given in the graph provide examples of those at the end points and in the overlap region or are some that are discussed in the text.
Figure 8: Ratio of Female to Male Annual Earnings (Adjusted) and O*NET Characteristics by Occupation: 2009 to 2011, Full-time, Full-year Workers in 76 High (Male) Income Occupations

Sources and Notes: See Table 2 for the five O*NET characteristics and Figure 7 for the computation of the adjusted annual earnings ratio. The dashed line given is the linear regression from Table 2, col. (2). The difference between the 80 occupations in Figure 7 and the 76 given here are four for which O*NET characteristics could not be computed.
References


Appendix I: Procedure for Determining "Success in Career" and "Success in Family" Using the Health and Retirement Study (HRS)

Success in Career

An individual is defined as having achieved "Success in Career" by comparing the individual’s reported earnings to that of a male at the 25th percentile (p25) of earnings in a particular year given the age group and education level. A woman, for example, is determined to have achieved success in career over a period if she earned at least the p25 earnings for similar men in at least 50 percent of years in that period.

To calculate the p25 male earnings, the following procedure is employed: for each year in the CPS, the population is divided into cells by five-year age groups and education level (HS or Less, Some College, and College Plus). The p25 earnings are computed in education by age-group cells for men who reported working full-time full-year (i.e., 50 to 52 weeks) the previous year. Each woman’s (or man’s, when the success rate is computed for men) earnings are then compared with the p25 earnings for men of the same education-level in her age-range. For instance, a college-educated woman aged 41 would be compared with college-educated men aged 40-44.

Four slightly different measures of p25 earnings were computed. The results were very similar across all four. The overall fraction of woman-years in the sample meeting the p25 male earnings differed by less than 1.5 percentage points (on a base of around 20 percent) across all four measures, and the same holds true when conditioning on education group. The results shown here use the first measure.

1. Wage Income for Non-Self-Employed (the baseline measure). The p25 wage and salary income (incwage) for FTFY men is used, excluding those who report they are self-employed.
2. Wage Income for Non-Self-Employed, Excluding Zeros: In a modification of the above measure, those who report zero wage income are excluded.
3. Wage + Business Income for All: In an alternative measure, the self-employed are included and the p25 of wage income plus business and farm income (incwage + incbus + incfarm) is used.
4. Wage + Business Income for All, Excluding Non-Positive: The above measure is modified by excluding anyone whose total income was zero or negative.

Two related issues concern missing earnings values for years prior to 1978, when access to W-2 data begins (although 1980 is the first year when W-2 data are fully complete). The first issue concerns teachers and other government workers for whom SS
earnings data will occasionally not exist and whose earnings, in consequence, appear as zero. Currently, these years are treated as missing. The determination of whether the woman has “Success in Career” is based on the remaining years in the relevant period. So, for instance, if a woman has a year between ages 40 and 44 that is missing, the determination of whether she had a “successful career” is based on whether she met the criterion in the remaining four. If a woman has missing earnings for all five years in the period, then she is excluded from the calculation for that five-year age group only.

Another issue is that there are some years when the SS earnings maximum fell below the p25 earnings threshold for several age-education cells (primarily those involving college and some-college workers). For those worker-years, the worker is assumed to have met the threshold if the worker achieved the Social Security maximum.

Because we also have the W-2 earnings data some of the issues raised with regard to Social Security exemptions and earnings thresholds do not apply. In the cohorts and age groups presented here, there are three groups for which the W-2 earnings data can either not be used entirely or not be used for about half of the entries. For the 1931-37 birth cohorts, no one in the 35 to 39 year-old group has W-2 data. For the 1938-44 cohorts half of the 35 to 39 year-old group cells have W-2 data. Similarly for the 1931-37 birth cohort and the 40-44 year-old group. Another complication with regard to the W-2 data is that some of the 1978 and 1979 data was not provided by SSA to University of Michigan and will appear as “missing” information for which the Social Security earnings will substitute.

A final issue concerns HRS respondents who were born outside of the United States for whom we may not have their full series of earnings data. To guard against this possibility, the foreign born \( \text{rabplace} = 11 \) are dropped. The exclusion affects approximately 9 percent of women and 8.5 percent of men in our sample. Note that the wages of HRS respondents are compared with the wages of workers of similar age and education in the CPS, some of whom are foreign-born.

**Success in Family**

A woman achieves “Success in Family” if she has ever had a birth \( \text{rakidsborn} > 0 \). About 4 percent of women in the HRS have missing values for this variable and are not included in the analysis.
Appendix II [incomplete]: U.S. Census Bureau Current Population Survey Fertility Supplements (June)

I have employed the microdata from the CPS (June) Fertility Supplements from the earliest (1973) to the most recent (2014). These are available from the U.S. Census Bureau and the National Bureau of Economic Research websites. They are available annually from 1973 to 1988, with the exception of 1978, and biennially from 1990 to 2014, except that 1995 takes the place of 1996. The key question on number of biological children was asked in all years and many other questions remain the same.

In 2012 the U.S. Census Bureau changed several aspects of their data processing with regard to the CPS fertility supplement. At the same time, the data revealed a sharp decrease in the fraction of women 35 to 44 years old who were childless from 2010 to 2012. Staff members at Census have determined that one of the changes made by the U.S. Census Bureau affected that statistic (see Monte 2015). In addition, the U.S. Census Bureau working paper suggests that the new procedure produces a more accurate estimate of childlessness and thus in prior years the fraction childless is deemed too high.

Of the various changes made by the U.S. Census Bureau the one that had an impact on childlessness concerns corrections when no answer, or an inconsistent answer, was given to the question on number of children ever born. Beginning in 2012 a woman who was known to have co-residential biological children was presumed to be their mother, even if the answer to the question on children was blank or it was reported that she had no children. The impact of correcting the response on the fraction childless for women 40-44 years old has been assessed to be around 2 percentage points, decreasing the estimate from around 17 percent to 15 percent (Monte 2015, figure 2).

Even though the effect of the change on all women 40-44 years old is substantial, the impact on college graduate women appears to have been minimal if it exists at all. Although Census staff did not estimate the impact by education level (e-mail correspondence from L. Monte 1/4/16), I have derived the following from the relevant June CPS data using the same weights and definitions as used by Census:

<table>
<thead>
<tr>
<th>Cohort born</th>
<th>CPS June Fertility Supplement Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>1966</td>
<td>0.226</td>
</tr>
<tr>
<td>1968</td>
<td>0.197</td>
</tr>
</tbody>
</table>

Each element is the fraction of all college graduate (and those with more than a BA) women who had no children by age 42 or 44. Therefore, the decrease from 2010 to 2012 for the
cohort born in 1968 is actually less than that, for the cohort born in 1966, from 2008 to 2010 when there was no change in editing. I added the 1970 birth cohort to show that the trend of declining childlessness continues even when the change in editing is the same.

The larger the group of women who are actually childless, and thus have no co-resident biological children, the smaller will be the editing change. In addition, the more accurate the question is answered by the woman or the respondent in the household, the less the editing change will matter. Both appear to have operated for college graduate women.

The effects for women without a BA, however, are very large. Thus it appears that most, if not all, of the change is due to an understatement of childlessness by women with lower levels of education.
Appendix III: Radcliffe/Harvard Data on Births

Information on the fraction of Radcliffe women without a first birth by at least age 40 comes from three sources:

- **1928 Radcliffe Questionnaire**, electronic data provided by the Henry Murray Center in 1993.

The **1928 Radcliffe Questionnaire** was used to obtain information on women born from the 1870s to 1880s. The **Radcliffe Centennial Survey**, executed in 1977, was used for women born from the 1890s to 1930s. Three classes from 1969-1972, 1979-1982, and 1989-1992 formed the **Harvard and Beyond Survey**. It is used for cohorts born in the late 1940s and late 1950s. The classes graduating around 1990 were slightly too young to be used in this analysis. Two of the cohorts in the Centennial data were quite old at the time of the survey and one is consistent with data from the 1928 survey of women who were in their late thirties.

<table>
<thead>
<tr>
<th>Survey Used</th>
<th>Age at Survey</th>
<th>Approximate Birth Year</th>
<th>Fraction without Children by Age at Survey, All Marital Statuses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>55</td>
<td>1872.5</td>
<td>0.655</td>
</tr>
<tr>
<td>1928</td>
<td>50</td>
<td>1877.5</td>
<td>0.594</td>
</tr>
<tr>
<td>1928</td>
<td>45</td>
<td>1882.5</td>
<td>0.580</td>
</tr>
<tr>
<td>1928</td>
<td>40</td>
<td>1887.5</td>
<td>0.601</td>
</tr>
<tr>
<td>Centennial/1928</td>
<td>85/35</td>
<td>1892.5</td>
<td>0.495 *</td>
</tr>
<tr>
<td>Centennial</td>
<td>80</td>
<td>1897.5</td>
<td>0.429</td>
</tr>
<tr>
<td>Centennial</td>
<td>75</td>
<td>1902.5</td>
<td>0.458</td>
</tr>
<tr>
<td>Centennial</td>
<td>70</td>
<td>1907.5</td>
<td>0.350</td>
</tr>
<tr>
<td>Centennial</td>
<td>65</td>
<td>1912.5</td>
<td>0.214</td>
</tr>
<tr>
<td>Centennial</td>
<td>60</td>
<td>1917.5</td>
<td>0.184</td>
</tr>
<tr>
<td>Centennial</td>
<td>55</td>
<td>1922.5</td>
<td>0.141</td>
</tr>
<tr>
<td>Centennial</td>
<td>50</td>
<td>1927.5</td>
<td>0.107</td>
</tr>
<tr>
<td>Centennial</td>
<td>45</td>
<td>1932.5</td>
<td>0.103</td>
</tr>
<tr>
<td>Centennial</td>
<td>40</td>
<td>1937.5</td>
<td>0.139</td>
</tr>
<tr>
<td>Harvard &amp; Beyond</td>
<td>58</td>
<td>1948</td>
<td>0.257</td>
</tr>
<tr>
<td>Harvard &amp; Beyond</td>
<td>49</td>
<td>1957</td>
<td>0.248</td>
</tr>
</tbody>
</table>

* Uses the Centennial data.