

Till College Do Us Part

*Exploring the link between divorce
and rising college attainment for women*

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In the 1970s, the divorce rate in the United States increased sharply, largely because of changes to divorce laws that permitted one partner to dissolve the marriage without the other's consent. At roughly the same time, the share of women with college educations also rose steeply, and since then women's college attainment has accelerated while men's has stalled. Women's rising education has coincided with an enormous increase in labor force participation by married women.

Could there be a link between divorce and women's college achievement? And could relations between husbands and wives also explain changes in the labor market over the past half century, including the mass movement of wives into the workforce?

Recent research by Minneapolis Fed visiting scholar Fatih Guvenen and Michelle Rendall, an economist at the University of Zurich in Switzerland, indicates that marital distress is indeed intimately related to the strides women have made on campus and in the workplace. In "Women's Emancipation through Education: A Macroeconomic Analysis" (Minneapolis Fed Working Paper 704), the researchers find that education can insure women against the consequences of a failed marriage. Through higher education, women who would otherwise remain trapped in matrimony achieve financial independence. This insurance is worth more to women than to men; and it has the added benefit of helping women to avoid a bad marriage in the first place.

Guvenen—who also is an associate professor of economics at the University of Minnesota—and Rendall construct a complex economic model in which divorce reform interacts with other trends in the U.S. economy and society to substantially increase college attainment for women. In the model, today's college achievement rate for women is about 40 percent higher than it would be if divorce laws had not changed. Divorce reform also is a key factor in the rapid rise of married women in the labor force and the decline in marriage rates over the past generation.

In their model, change occurs slowly at first, but gathers momentum through strong feedback mechanisms. For example, educated wives' growing financial independence leads many in troubled marriages to file for divorce; as the divorce rate rises, more women pursue education to insure themselves and their children against a breakup.

Guvenen and Rendall's work adds to a growing body of knowledge about family economics—how economic forces at work within the household affect both families and broad social and economic trends. Their research shows that domestic phenomena such as marital discord, the dating game and the evolution of love within marriage can help explain outcomes that have long puzzled economists, such as women's ascendance in higher education. Today more U.S. women than men earn college degrees—a reversal of college gender ratios in the 1960s.



... hmmm, maybe college.

“Our model, with this force—education as insurance against a bad marriage—has first-order implications for the reversal of the college gender gap, for which there’s no generally accepted explanation,” Guvenen said in an interview.

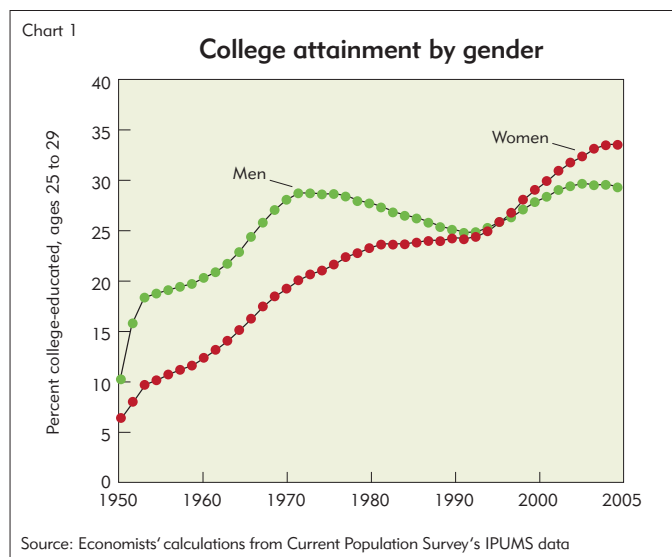
All in the family

In the early 1980s, Gary Becker, an economics and sociology professor at the University of Chicago, proposed a theory of household production in which wives and husbands specialize in either home or market work. A woman who has a comparative advantage in market work will supply more time to the market, and less to the household, than her husband. Alternatively, if a man’s comparative advantage lies in the office or the factory, he will devote more time to market work than his wife. Yet spouses aren’t pure specialists; they share household tasks and spend leisure time together.

Becker’s (1981) book *A Treatise on the Family* is a foundational text for economic research that explores the nexus between household decisions and what goes on in labor markets and the broader economy. Understanding economic forces at work in the household is important because women in the United States and many other countries have experienced immense social and economic change since the 1950s. (Becker is interviewed in the June 2002 *Region*, online at minneapolisfed.org.)

When John Kennedy was president, less than 8 percent of women in their 20s had four-year college degrees, less than half the college attainment rate of men (see Chart 1); by 2005, a higher proportion of women than men were college educated. Women have made comparable advances in the workplace. Labor force participation by married women has soared: In 1960, just one-third of married women worked outside the home; by 1990, almost 70 percent worked for pay. Although women on average still earn about 23 percent less than men, the wage gap has shrunk markedly since the days of bouffant hairdos and 30-cents-per-gallon gasoline.

Economists have struggled to explain these momentous changes in women’s lives. Many have sought answers in family dynamics, blending observations of societal trends with insights into family formation, intrahousehold bargaining and the sexual division of labor. In the pro-



cess, researchers have adapted some of Becker’s premises to the world as it is today.

Claudia Goldin of Harvard University has attributed the reversal of the college gender gap to several factors, among them improved job prospects for women and delayed marriage, facilitated by the wider availability of birth control. Explanations proposed by other scholars for women’s education and workforce gains include a narrowing of the gender wage gap, a shift in labor demand from brawn to brain, the introduction of labor-saving home appliances and intergenerational changes in women’s beliefs about the payoffs of market work. (Goldin is interviewed in the September 2004 *Region*, online at minneapolisfed.org.)

To test their theories, economists develop computer models—virtual worlds in which individuals interact and make decisions in response to different social and economic scenarios. For example, a study by Greenwood et al. (2012) analyzes the impact of advances in home technology—microwaves, dishwashers, frozen foods—on college attainment, hours worked and other household characteristics. In the model, improved technology reduces time spent on household chores, freeing more married women to work in the market—and to attend college to increase their earnings.

In this framework and models developed by other researchers in recent years, higher incomes due

to increased education also make women more discriminating in their choice of mates, lowering marriage rates and increasing the incidence of divorce.

Divorce American style

Long before he became an economist, Guvenen was aware of the implications of divorce for education and labor decisions. Growing up in a household with three sisters, he heard much talk about the consequences of a bad marriage—the choices women faced between staying in the marriage and leaving. Striking out on their own was a fearful prospect for women without the means to support themselves and their children. Later in life, Guvenen met women whose unhappily married mothers urged them to earn multiple college degrees so they wouldn't suffer the same fate.

"I kept hearing the same story, of women who are trapped in marriages because of financial reasons," Guvenen said. The moral of the story: Go to college, just in case.

Economists have long noted the correlation between education and the risk of divorce; since the early 1980s, college graduates have divorced at a lower rate than those without college degrees. But little, if any, research has considered divorce—or the anticipation of it—as a major driver of large increases in women's education and labor force participation over the past 50 years.

Guvenen and Rendall (who studied under Guvenen as a university student) began their investigation in 2008. Their main objective was to test their intuition about the role of education as insurance against marriages gone wrong. Has that role grown over time, and can its effect on women's welfare be measured? To what extent did divorce reform increase the value of education for women, leading them to attend college and earn higher wages upon graduation? But the researchers soon realized that the answers to those questions could also shed light on the reversal of the college gender gap and the storming of the workplace by married women.

The simulation Guvenen and Rendall construct is a "search" model, a type developed to analyze frictions in labor markets. Computing advances over the past decade allow researchers

to build models capable of teasing out the subtle, dynamic interplay among myriad variables—a level of analysis not possible before. "The mechanics of these models are very rich and so interdependent," Guvenen said. "When you change one thing, it creates all these ripple effects."

A model life

In the model, over half a century of economic and social evolution plays out, viewed from the perspective of men and women making important life choices—whether to go to college, how many hours to work, whom to marry, if and when to divorce. Numerous forces represented by mathematical equations affect these decisions. Chief among them are divorce reform and the narrowing of the gender wage gap.

Until the late 1960s, most U.S. states required both husband and wife to consent to divorce. Then, over the next decade, state legislatures across the country passed laws permitting one spouse to file for divorce without the other's consent. By 1980, almost all states had some form of "no-fault," or unilateral, divorce statute. Divorce reform allowed women to escape unhappy marriages; but it also exposed them to the risk of a divorce filing by their husbands. In either case, women had to be prepared to support themselves after divorce. Women bear a disproportionate share of the costs of a breakup, in large part because mothers usually have custody of children after divorce. This fact is also captured in the Guvenen-Rendall model.

In the 1960s, women in the U.S. workforce earned an average of 60 cents for every dollar earned by men. In the 1970s, that disparity started shrinking, and by 2005 women earned about 77 percent of men's pay. The closing gender wage gap is also in the model, but Guvenen and Rendall don't address the question (a burning one in labor economics) of why the gap narrowed. But an addendum to their paper, based upon earlier work by both authors, proposes that technological progress in the workplace favoring cognitive skills over strength lifted women's wages relative to men's.

Other key elements of the model include the college wage premium—the higher pay college graduates receive compared to those who only

completed high school—and the advantages of education in attracting desirable spouses. The college wage premium has risen over the decades, especially for women. And the college-educated tend to marry individuals who are similarly well schooled—a process called positive assortative matching.

The economists set the parameters of the model from selected U.S. Census data, such as wages by gender and education, the average number of children living in postdivorce households and college attainment rates in 1950. Then they set their simulation in motion to see how it performs in generating transformative trends for women, such as the reversal of the college gender gap and the leap in workforce participation by married women.

Harriet goes to college

The results of Guvenen and Rendall's experiment capture with remarkable fidelity the socioeconomic changes that have swept the nation since World War II. The basic model replicates marriage and divorce trends seen in the Census data—the 1970s divorce outbreak, a falling marriage rate, marriages later in life. The model also predicts the increase in the labor supply of married women, producing about 90 percent of the rise in market hours worked by wives since 1950 (in the model and in the actual labor force, hours put in by single men and women change little).

Most important for the economists' thesis, the college gender gap closes and then reverses in the model. In line with the data, women's college attainment increases at about twice the pace of men's, allowing women to surpass men by the mid-1990s.

In the model, divorce reform coupled with a rising female-to-male wage ratio brings about these changes. Revamped state divorce laws combined with greater returns for women from paid labor starts a chain reaction that ultimately transforms the gender makeup of colleges and workplaces, the division of labor within households, even the reasons people marry.

As in Becker's Treatise, married couples in the model split their time between market work and home activities. If the gap between male and female compensation is large, only the spouse with the higher wage (typically, the husband in the "Ozzie and Har-

riet" economy of the 1950s) works outside the home. But when the gender wage gap begins to shrink—as it did in the 1970s—some wives hang up their aprons and go to work in offices, shops and factories.

Work experience leads women to improve their education, so they can earn higher wages. Divorce reform bolsters this trend by making it more likely that married women and women contemplating marriage will have to start over; single women as well as wives respond by seeking a college degree as an insurance policy. In a positive feedback loop, the higher wages of educated wives trigger more divorces, because women in strained marriages now have other options. For mothers especially, higher earnings due to education provide the means to form a new household after divorce. "If the husband or ex-husband turns out to be a bad provider, education gives women the power to raise their children on their own," Guvenen said.

As divorce rates rise—increasing an individual's perceived chances of a breakup—women invest even more heavily in education. This self-reinforcing process also increases labor force participation by married women, because only women who work outside the home can realize their higher earning potential.

Thus, in the model, divorce reform amplifies trends already affecting education and labor decisions—not only the closing gender wage gap, but also a rising college wage premium and swelling personal income that made postsecondary education more affordable.

Other economists, including University of Minnesota economists Larry Jones and Ellen McGrattan, also a Minneapolis Fed consultant, have found that a narrowing of the gender wage gap alone can account for rising female educational attainment and distaff advances in the workplace. (See Minneapolis Fed Staff Report 317 and "Wives at Work" in the December 2003 issue of *The Region*.) But Guvenen and Rendall view divorce reform as an additional, powerful driver of those developments. "If you don't have this force—the divorce law change—we argue that [the model] cannot generate much action," Guvenen said.

In the model, divorce reform accounts for almost half of the increase in college attainment by women from 1950 to 2005. It has an even bigger impact on market hours worked by married women over the same period.

For love or money

If a college education is the path to emancipation for women, how much do women benefit by taking that path? Guvenen and Rendall run a series of experiments to estimate the value of education as (1) insurance against a star-crossed marriage and (2) a means of attracting more desirable spouses.

To do this, they tweak variables in their model that represent beliefs about the value of education and ask a hypothetical question: How much would an educated husband or wife have to be compensated so as to be willing to be uneducated and face the same risk of divorce?

The results of this thought experiment show that the insurance value of education is greater for women than it is for men, because of the higher costs borne by women after divorce. Low-wage women gain the most compared with men because college substantially increases their incomes. Insurance benefits increase after divorce reform, although the gender insurance gap narrows for people earning higher wages. But in dollar terms, the welfare gains over time from education are large for top-earning women. The insurance benefit is almost \$15,000 annually for women in the top 10 percent of the wage distribution who marry after the mid-1970s.

Research by a number of economists, including Pierre-André Chiappori of Columbia University, has shown that increased education pays off in improving one's marriage prospects, both upon first marriage and after divorce. (See Chiappori, Iyigun and Weiss 2009.) In this arena, women also receive higher returns than men from education, according to the model.

Marrying an educated, higher-wage man increases total household income, which is shared in marriage. For the same reason—and also because of shared leisure interests—educated men often prefer educated women. Not only are educated women more likely to marry educated men, but they also have a better chance of meeting them. “If you're a highly educated person, you hang out in the same places as other highly educated people,” observed Guvenen, who met his wife as a college student.

Guvenen and Rendall adjust their model to isolate the benefits of education in the marriage market and find that they're significant—at

least one-third the insurance value of advanced schooling. But women gain more than men because as the share of women who are educated increases, a sheepskin becomes an even more important attractant for educated men, whose numbers are not rising at the same rate.

The insurance value of education combined with the edge it gives women in the mating game provides an explanation for why women not only caught up with men in college attainment, but passed them by. In the model, the narrowing gender wage gap provides the impetus for women to improve their education. But other incentives rooted in the marriage market drive women to invest more in education than men over time.

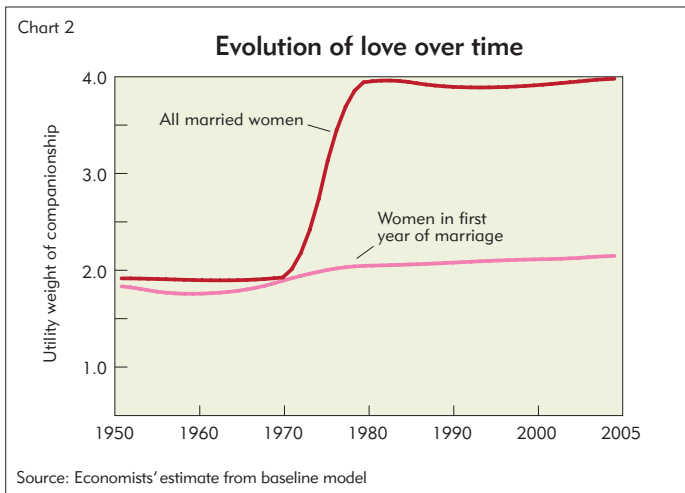
In recent years, economists have delved into the nature of connubial love—the x factor in family economics. Researchers such as Betsey Stevenson and Justin Wolfers of the University of Pennsylvania popularized the idea of “hedonic marriage”—a shift from shared production in households to shared consumption of leisure and social activities. The more shared consumption (love) there is in marriage, the more couples value joint free time, affecting market hours worked by spouses.

Breaking new ground in this area, Guvenen and Rendall quantify love in marriage and track its evolution over the decades. Looking at measures such as marriage and divorce rates in their model yields an estimate of changes in the magnitude of marital love.

It turns out that love so measured blossomed for U.S. married couples in the 1970s, concurrently with divorce reform (see Chart 2). This happened partly through selection—freedom to divorce means that unions light on love don't endure. But love also has become more important because increased education and wages let women marry for companionship instead of financial support. Consistent with the notion of hedonic marriage, the rise of love has coincided with an increase in leisure for Americans; studies have shown that since the 1950s, leisure time has risen by the equivalent of five to 10 weeks of vacation annually. (See Aguiar and Hurst 2007.)

Alternative histories

Guvenen and Rendall's work doesn't settle ongoing debates over why the college gender gap reversed and large numbers of married women entered the



labor market. But their model does propose an impulse that until now has received scant attention: the adoption of no-fault divorce. Divorce reform magnified social, economic and technological trends that took hold in the second half of the 20th century and continue to influence education and labor decisions today.

“Very few economic and social phenomena are driven by one force alone,” Guvenen said. “Usually it’s the interaction of forces that generates the trend. Divorce reform is one of those forces.” In the model, increased education opens the door to financial independence for women who would otherwise be trapped in a failed marriage. And a college degree gives women an advantage in the marriage (and remarriage) market.

The economists’ model isn’t a perfect microcosm of U.S. socioeconomic history. One shortcoming is that it predicts a 60 percent drop in market hours worked by married men over the past half century—a trend not borne out by Census data. This illustrates the intricacy and sensitivity of search models—a slight change in the assumptions built into the model can change the results in complex ways.

In this case, Guvenen and Rendall model husband and wife as perfect substitutes in home production—one can readily replace the other in child rearing, cooking and other household tasks. As more women improve their education and enter the workforce, this results in an underestimate of the market hours worked by men. Assuming instead that even educated, working women are more in-

clined to home production than their spouses would likely correct this flaw in the model, Guvenen said.

In ongoing research, the economists experiment with a version of their model that treats divorce reform not as the initial change agent in marriage and labor markets, but as a response to changes that were already under way. As the gender wage gap starts to close in the 1960s, leading more women to work outside the home and try to escape rocky marriages, the loss of welfare due to legal restrictions on divorce prompts state governments to undertake divorce reform. This in turn triggers more divorce and progressively larger investments by women in education.

“Although preliminary,” Guvenen and Rendall write, “we believe this work provides a sensible first step to acknowledging that laws also change for a reason—typically, in response to societal demands.” **R**

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