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Comment

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I. Introduction

Jeremy Greenwood and his collaborators have been instrumental in highlighting the "second industrial revolution" that occurred within households. The key insight is that "engines of liberation," such as washing machines, microwave ovens, and prepackaged food, freed women from lives of domestic drudgery. Once you notice this revolution in household technology, you cannot help but be astonished by both how large these technical changes were and how they potentially hold the key to understanding our changing lives. The research agenda pursued by Greenwood and his collaborators involves sorting out just how much of twentieth-century social and economic history can be traced back to this important driving force. The first paper in this series (Greenwood, Seshadri, and Yorukoglu 2005) argued that it can account for the dramatic changes over recent decades in female labor force participation. Subsequent papers in this series argue that this also accounts for trends in fertility (Greenwood, Seshadri, and Vandenbroucke 2005), leisure (Greenwood and Vandenbroucke 2008), and now marriage and divorce. The ideas here are far-reaching and important, and so my task is simply to put the contribution of this latest contribution into a somewhat broader context.

In the next section I begin by characterizing the methodology pursued by Greenwood and Guner, noting that the typical metric of "success" in this type of exercise—that a sensibly calibrated version of the model is not inconsistent with the facts—amounts to a failure to falsify the authors' model. There is no test here of whether the driving force suggested by the authors yields a better or worse description than the many other alternatives. How convincing one finds this failure to falsify depends on the power of the test offered, and in Section III, I explore

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the mechanics of the model in greater detail. The authors bolt together a model of time allocation within the household, with a search-based model of marriage and divorce. However, the two models are not strongly connected, and almost any driving force would lead the marriage and divorce model to fit the facts; hence the quantitative exercise cannot be interpreted as a test of whether these engines of liberation are the driving force behind changing patterns of marriage and divorce. Indeed, the number of free parameters means that almost any driving force would predict the observed aggregate marriage and divorce patterns. In Section IV, I suggest some important facts that can be used to discipline any theory of marriage and divorce. Since the 1970s, theories have proliferated to explain the large run-up in divorce—including that offered by Greenwood and Guner. Yet divorce rates have been systematically falling over the ensuing three decades, and a useful theory should explain both the rise and subsequent fall in divorce over the past half century. And finally in Section V, I will offer a slightly different interpretation of what has driven changes in American family life (drawing on joint work with Betsey Stevenson).

This focus also yields a useful separation of labor: the accompanying comment in this volume by Stefania Albanesi focuses on the link between household technological change and time allocation. My comments focus exclusively on the implications of Greenwood and Guner's model of marriage and divorce.

II. What Is Being Tested?

The method pursued by Greenwood and Guner is very much in the tradition of freshwater macro and involves assessing whether a plausibly calibrated version of a model with this driving force can endogenously generate changes in marriage and divorce patterns consistent with the large shifts experienced since the 1950s. To rephrase this in the language of falsification, the authors are testing the null hypothesis that there exists a plausible calibrated model that can connect the second industrial revolution to the observed changes in economic and social life. This paper is a success in that it fails to falsify this null, inviting the appropriate inference that the "second industrial revolution" remains a viable explanation for the changes in family life observed since the 1950s.

Equally, no assessment is made of the relative power of alternative theories to explain the observed changes in family life. Moreover, there exists no shortage of existing explanations, and Stevenson and Wolfers (2007b) provide a useful summary of plausible explanations, including not only the potential of the technological change suggested by Greenwood and Guner but also reduced labor market discrimination against women; rising wage inequality; changes in the legal structure of marriage; diffusion of the pill and access to abortion; changing social norms and sexual mores; household bargaining; and shifts in matching technology, including the rise of sexually integrated workplaces and, more recently, Internet dating.

Describing the implications of this sort of exercise as a failure to falsify a candidate explanation is not intended as any kind of slight. The rigorous assessment of the quantitative implications of theories about changing family life occurs too rarely, and authors rarely do more than check whether their pet theory generates appropriately signed comparative statics. Some of the casual explanations bandied about as possible drivers of changing family life may well pass that weaker test but be unable to explain the large changes we have observed. That Greenwood and Guner show that the second industrial revolution can plausibly explain large changes in marriage and divorce (whereas other candidate explanations have yet to be shown to meet this threshold) should give one greater confidence that they have isolated a relevant driving force. Equally, it is difficult to be particularly precise about how much more confident one should feel about this candidate theory. Bayes' rule provides some guidance, suggesting that the increment to one's confidence that Greenwood and Guner have isolated the appropriate driving force depends on the number of competing explanations, how much discipline the model offered by Greenwood and Guner offers, and the probability that a competing explanation would be rejected by a similar exercise.

A cynic might argue that these exercises almost always "succeed" in that the author usually concludes by noting that his or her model can match the relevant facts. In a world in which quantitative theorists very rarely fail to falsify their models, the failure to falsify one particular theory contains very little information. Of course, this cynical aside is unfair to Greenwood and Guner, who do actually go to the trouble of quantitatively specifying their intuitions, even as authors of competing theories have failed to do so. Nonetheless, it is worth following through the implications of the Cynical Bayesian. Perhaps there are five candidate explanations, one (but only one) of which is "true" (more on this below), and the true theory is never falsified (i.e., type I errors are never made). The Cynical Bayesian observed that only about one in five quantitative theory papers "fails to fit the facts" and hence rejects the model. Thus, for every five falsification exercises, the true model is never rejected, but neither are three of the four competing (but false) models. With five candidate theories, a flat prior yields a 20% chance that one's pet theory is true; if that theory survives a test with a 75% chance of a type II error, then the posterior rises to 25%. That is, the Cynical Bayesian notes that the low rejection rate in quantitative theory papers suggests that these are low-power tests.

The fact that this yields any power derives from the fact that the candidate list of theories is short, which reflects the implicit assumption that we are committed to exploring only monocausal explanations. But there is no reason to believe that changes in marriage and divorce reflect only one driving force. Thus the candidate list of plausible theories needs to be expanded to include the combination and interaction of several of these theories. Even if this approach is useful in falsifying a candidate driving force as a monocausal explanation, it may still be a crucial part of a multicausal explanation.

Of course, the Cynical Bayesian is taking a shortcut, applying a rate of type II errors that may be appropriate for the literature as a whole but not for the contribution of any specific paper. That is, a close reading of a particular research paper may reveal that it offers a particularly persuasive test of the model, with a particularly high chance of rejecting the theory if it is in fact false. The next section assesses whether this is true. The "success" of Greenwood and Guner's model (or the failure to falsify it) is described by the authors as follows: "The model's predictions for the time paths of labor force participation and vital statistics are compared with the U.S. data. It is found that the developed framework can potentially explain a substantial portion of the rise in divorce, the fall in marriage, and the increase in married female labor force participation that occurred during the later half of the twentieth century." However, I shall argue that the implications of Greenwood and Guner's model for marriage and divorce behavior come from how they fit a set of parameters unrelated to changes in household technology. Thus, the facts about marriage and divorce that the model "explains" could plausibly come from any driving force. (Again, let me stress that this is a statement about the implications of the model for marriage and divorce; the accompanying comment by Albanesi discusses the other implications about time allocation and labor force allocation.)

III. Understanding the Model

The authors are very clear about their modeling intentions: "a Becker (1965)–cum–Reid (1934) model of household production is embedded into a Mortensen (1988) style spousal-search model." This description is accurate, although the extent to which the spousal-search model is truly "embedded" is debatable. Indeed, it is the fact that the two models are only weakly connected that allows me to focus this comment on the search (marriage and divorce) model. In particular, the implications of the time allocation model are entirely independent of the model of marriage and divorce, a point that I now turn to illustrating, by writing down a stripped-down version of their search-based model of marriage and divorce.[1]

The authors identify two reasons to marry, match-specific marital bliss (b_i) and scale economies in consumption, which they describe in terms of a fixed cost of maintaining a household, c, and an equivalence scale parameter, ϕ. The details of these scale economies are not particularly important, so I simplify, summarizing both of these benefits of marriage in terms of their equivalent variation, c. Thus, the per-period utility functions are

$$U^{\text{single}} = U(C^{\text{single}}) \tag{1}$$

and

$$U^{\text{married}} = U(C^{\text{single}} + c) + b_i, \tag{2}$$

where C^{single} denotes spending on consumption goods by a single.

Each period, a single person meets a potential partner, who would bring some degree of marital bliss in the next period were they to marry. That is, marriage yields a guaranteed payoff during the honeymoon year (known prior to the decision to marry), and this payoff is drawn from a normal distribution

$$b_s \sim S(\mu_s,\ \sigma_s^2). \tag{3}$$

Once the couple returns from the honeymoon, marital bliss is drawn from a different normal distribution:

$$b_m \sim M(\mu_m,\ \sigma_m^2). \tag{4}$$

Equations (3) and (4) embed the essential assumption made by Greenwood and Guner: marital bliss early in a marriage is drawn from a different distribution than in the later years of a marriage (see their Sec. II.C). As we shall see, the former is particularly relevant for deciding whether to continue searching or to get married, whereas the latter is relevant for deciding whether to continue an ongoing marriage or to divorce. In fact, Greenwood and Guner allow a more complicated process in which marital bliss evolves through time according to an autoregressive process; but in order to focus on what is essential here, the above equation focuses on the special case of their setup in which last period's bliss is irrelevant (and hence in their notation, $\rho = 0$). As will be clear, this is not essential to my conclusions.

This setup yields the usual "reservation wage" type decision rules: singles should marry if they find a partner who yields a sufficiently high level of marital bliss, and married couples should divorce if they obtain a sufficiently bad draw for the quality of married life next year. Consequently, the marriage rate will be equal to the proportion of the single population who find an acceptable spouse each period, whereas the divorce rate will depend on the proportion of couples who draw a sufficiently bad outcome:

$$\text{marry if } b_s > b_s^* \Rightarrow \text{marriage rate} = 1 - S(b_s^*;\ \mu_s,\ \sigma_s), \tag{5}$$

$$\text{divorce if } b_m < b_m^* \Rightarrow \text{divorce rate} = M(b_m^*;\ \mu_m,\ \sigma_m). \tag{6}$$

Moreover, the greater the advantage of married life over single life (recall that this is parameterized by c), the lower the marriage and divorce cutoffs should be, since it is relatively more attractive to either get or become married. In turn, this implies that

$$\frac{db_s^*}{dc} < 0 \Rightarrow \frac{d\text{marriage rate}}{dc} = -s(b_s^*;\ \mu_s,\ \sigma_s)\frac{db_s^*}{dc} > 0 \tag{7}$$

and

$$\frac{db_m^*}{dc} < 0 \Rightarrow \frac{d\text{divorce rate}}{dc} = \frac{m(b_m^*;\ \mu_m,\ \sigma_m)(db_m^*)}{dc} < 0, \tag{8}$$

where uppercase letters denote cumulative density functions (cdfs) and lowercase letters represent the corresponding probability density functions.

All told, the model has four free parameters (describing the distributions from which bliss during a honeymoon or marriage is drawn), and it has one driving force, c. How are these parameters chosen? The driving force, c, comes from the time allocation part of the model, which I have not discussed at all. Thus, in my simplified version of the marriage and divorce model, we can simply treat the decline in the value of marriage as a primitive. The four other parameters, μ_s, σ_s, μ_m, and

σ_m, are all estimated so as to maximize the ability of the model to fit the marriage rate, divorce rate, and fraction married, in the 1950 steady state and again in 2000. Because the ability of the model to fit these basic facts is used as a rough "test" of its explanatory power, it is worth describing the mapping between the free parameters and these moments in a bit more detail.

The first two facts that the authors wish to match are the marriage rates in 1950 and 2000. But note from equation (5) that the steady-state marriage rate is determined by the cdf of the honeymoon distribution, and so the 1950 marriage rate is given by $S(b_s^*(c_{1950}))$. By 2000, there has been a shock lowering the value of marriage to c_{2000}, which equation (7) suggests will make singles somewhat pickier, raising their cutoff from $b_s^*(c_{1950})$ to $b_s^*(c_{2000})$, and this in turn will lower the marriage rate to $S(b_s^*(c_{2000}))$. Hence the change in the marriage rate depends on the distribution of marital bliss drawn from the honeymoon distribution, $S(\cdot)$. Both the mean and variance of this distribution are free parameters, implying that for any decline in the value of marriage (c), an appropriate choice of μ_s and σ_s can match both the initial 1950 marriage rate and its change to its level in 2000.

The next two facts to match are the divorce rate (again in 1950 and 2000), and a similar logic applies, although divorce decisions are driven by the distribution of marital bliss for the next year rather than honeymoon bliss. Equation (6) shows that the divorce rate is determined by the cdf of the distribution of marital bliss, and hence the 1950 divorce rate is given by $M(b_m^*(c_{1950}))$. Equation (8) suggests that a shock lowering the value of married life will lower the bar for divorce from $b_m^*(c_{1950})$ to $b_m^*(c_{2000})$, which will raise the divorce rate to $M(b_s^*(c_{2000}))$. Hence the change in the divorce rate depends on the distribution of marital bliss drawn from the posthoneymoon distribution, $M(\cdot)$. Again, both the mean and variance of this distribution are free parameters, implying that for any decline in the value of marriage (c), an appropriate choice of μ_m and σ_m can yield predicted values of the steady-state divorce rate consistent with the data.

With this understanding in hand, it is worth making a few comments on what this exercise reveals.

A. This Is Not Really a Test of the "Engines of Liberation" Hypothesis

In the simple version of the model described above, the driving force is a decline in the value of married life relative to single life, parameterized by c. I have been deliberately imprecise about where this comes from. The Becker-cum-Reid model of household production written down by the authors suggests one possible source: laborsaving technological progress in the household sector can—under certain conditions—explain why the value of marriage declined. Equally, there are many competing explanations, also mediated by a declining value of marriage. For instance, reduced stigma about premarital sex may reduce the value of marriage. Declining labor market discrimination against women raises the opportunity cost of household specialization, reducing the value of marriage. The pill changed the consequences of premarital sex, reducing the value of marriage as insurance against unintended pregnancy. Continuing financial development has reduced the role of families as providers of credit. Easier access to divorce may reduce the value of formal marriage compared with cohabitation. The rise of prenuptial agreements also reduces the value of the default state-sanctioned marriage contract, now that alternative contractual forms are easily accessed. Indeed, conservatives even argue that the rise of gay marriage somehow undermines the value of heterosexual marriage.

Any of these factors could be driving the decline in c, which is sufficient for the model to deliver higher divorce and lower marriage rates. Of course, proponents of these alternative stories have not been as careful as Greenwood and Guner in quantifying just how much their pet theory yields a decline in the value of marriage. Unfortunately in this setting, the quantification of Δc does not really change the ability of the estimated marriage and divorce model to fit the facts, since the four free parameters in the search model can easily match data on actual marriage and divorce rates in 1950 and 2000 no matter how large Δc is. As such, any decline in the value of marriage would yield estimated parameters that quite effectively match these key facts.

B. *Why Doesn't the Model Exactly Fit the Facts?*

As described above, the model can take any decline in the value of marriage, Δc, and use the four free parameters to pin down the marriage and divorce rates in 1950 and 2000. In turn, these flow variables are arguments determining the steady-state fraction married (a stock). Thus it may not be clear why the model does not exactly fit the major facts. The key here is to realize that the free parameters are being estimated so as to maximize the match between the model and six facts, with the fifth and sixth facts being the fraction married in 1950 and 2000.

Thus the next fact to match is the fraction married in the 1950 steady state. However, by the usual stock-flow relationships, the fraction married in the steady state is simply a function of the aforementioned marriage and divorce rates, as well as the assumed mortality rate, δ:

$$\text{fraction married}^{ss} = \frac{\text{marriage rate}}{\text{marriage rate} + \text{divorce rate} + \text{mortality rate}}$$
$$= \frac{1 - S(b_s^*(c_{1950}))}{[1 - S(b_s^*(c_{1950})) + M(b_s^*(c_{1950}))](1-\delta) + \delta}. \tag{9}$$

Given that the model matches the marriage and divorce rates in 1950, it is only the auxiliary assumptions embedded in equation (9) that might lead to some mismatch between the model and the fraction married that we observe in the data. The first auxiliary assumption concerns the mortality rate, which is calibrated imposing an average life expectancy for an adult of 47 years. This value is certainly reasonable, although is worth noting that the authors do not allow this parameter to change between 1950 and 2000, despite large declines in mortality risk over this period. Moreover, figure 1 shows that there has been a rather dramatic increase in the incidence of marriage at later ages, suggesting that declining mortality may explain why the fraction married has not fallen further.

The second auxiliary assumption comes from the fact that we are comparing the model's steady-state values with actual data on the fraction

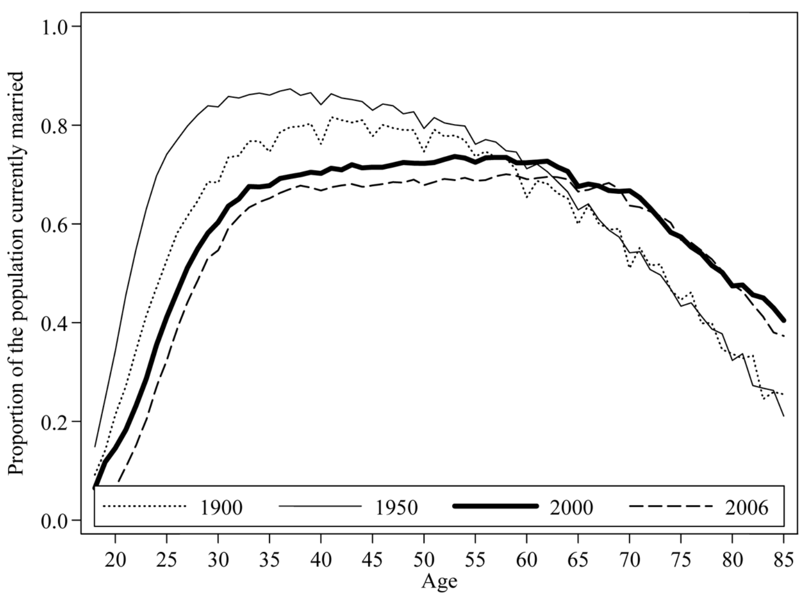

Fig. 1. Fraction of the population currently married, by age, 1900–2006. Sources: Decennial censuses of 1900, 1950, and 2000; American Community Survey, 2006.

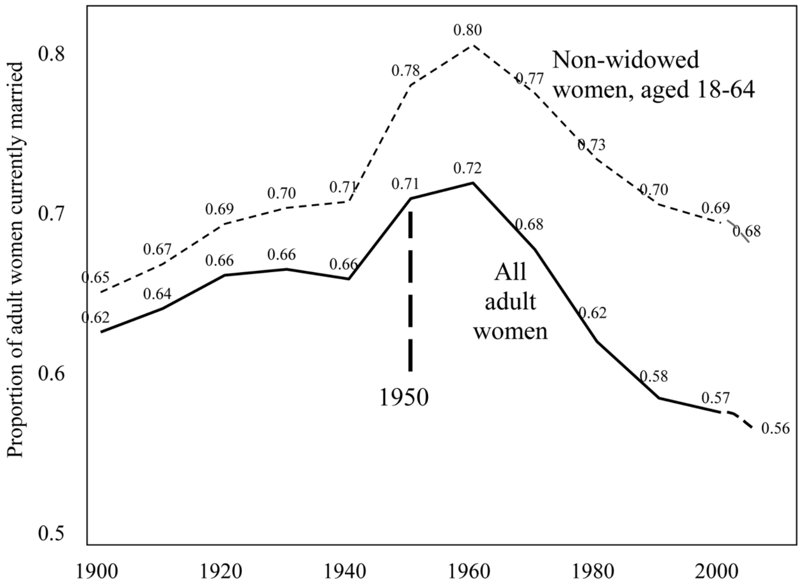

Fig. 2. Fraction of adult women married, 1880–2005. Sources: Decennial census, 1880–2000; American Community Survey, 2001–5 shown as dashed line.

married in 1950, which may not be a steady state. Indeed, figure 2 shows the fraction of all female adults married fluctuating markedly around 1950. Similarly, figure 3 shows large swings in marriage and divorce rates through this period. In fact, plugging the actual marriage and divorce rates in 1950 plus the assumed mortality rate into equation (9) suggests that the steady-state fraction married is 88% whereas the actual fraction married is 82% (or perhaps lower).[2]

Thus it is the failure of these ancillary assumptions that ensures that the estimation does not simply pick the values of the four key parameters that lead the model to exactly match the marriage and divorce rates. That is, asking the model to match the steady-state fraction married with the non-steady-state data on the fraction married changes the estimated marriage and divorce parameters, yielding estimates that do not closely match the marriage and divorce rates. More important, the ability of the model to match the fraction married in 1950 is not a test of the matching model, but rather a test of these auxiliary assumptions.

C. *Speed of Adjustment*

The final fact used to help fit the parameters is the fraction married in 2000. While the model predictions for 1950 reflected the assumption

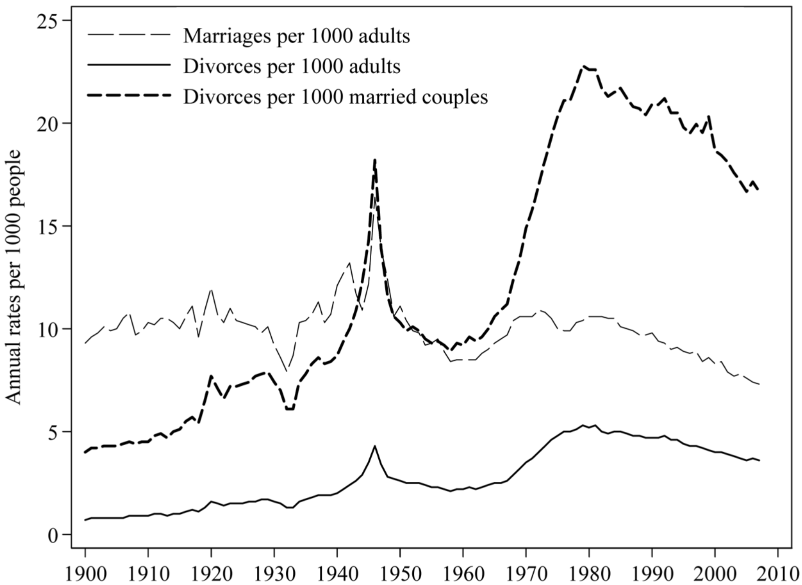

Fig. 3. Marriage and divorce rates in the United States, 1900–2007. Sources: Data for 1900–1919 are from Jacobson (1959); 1920–98 from Carter et al. (2006); 1999–2004 from U.S. Census Bureau (2007b); 2005–7 from Tejada-Vera and Sutton (2008).

that the model economy was in an initial steady state, the model predictions for 2000 reflect the dynamic response of the marriage stock to the assumed changes in the value of marriage. As such, the model's predictions for the fraction married in 2000—a stock variable—depend on the entire history of marriage and divorce rates (or flows) in the intervening period.

The model I have described so far is capable of endogenously generating a time path for the speed of adjustment of the fraction married, and this could be used to assess the model's fit by the year 2000. However, in my simplified version of the model, there are only two types of marriages: those in their honeymoon phase, whose "marital bliss" is drawn from the $S(\cdot)$ distribution, and those who have already celebrated their first anniversary, whose marital bliss for the next year will be drawn from the $M(\cdot)$ distribution. Because all marriages beyond the honeymoon are identical, any shock to the value of marriage can cause fairly rapid changes in the fraction married since all couples receiving a bad draw will immediately divorce. This likely yields extremely rapid (too rapid!) adjustment of the fraction married following a shock.

Greenwood and Guner's model is not so stark. Instead, marital bliss follows an autoregressive process with a persistence parameter, ρ, thereby ensuring that the distribution of marital bliss slowly transitions from being governed by the initial draw from the $S(\cdot)$ distribution to being governed by later draws from the $M(\cdot)$ distribution.[3] (I had set $\rho = 0$, which is what gave the stark divide between the honeymoon period and married life.) The extra parameter delivers some richness to the model, causing the distribution of marital bliss to depend on the number of years that a couple has been married. In turn, this slows down the adjustment process, yielding a smoother transition between steady states. Married life typically begins following an extremely positive draw from the $S(\cdot)$ distribution and in the long run will come to reflect the influence of repeatedly sampling from the $M(\cdot)$ distribution. Between the honeymoon and this long run is an intermediate period during which marital bliss stochastically makes its way from the high honeymoon levels to the lower longer-run levels. Note that these intermediate-duration couples typically enjoy greater marital bliss than the long-duration couples, yet they still use the same divorce threshold (b_m^*); hence the divorce threshold will be further in the left tail of the distribution of marital bliss. Thus the divorce rate of these intermediate-duration couples will be less sensitive to changes in the value of marriage. High values of ρ thus ensure that in the immediate aftermath of a shock to the value of marriage there are more couples further from the divorce threshold, thereby slowing down the response of the fraction married. As such, this ρ parameter effectively governs the speed of adjustment between steady states.

How does this change our analysis on previous pages? It is still the case that for any value of ρ, values of μ_s, σ_s, μ_m, and σ_m can be chosen (or estimated) to perfectly match marriage and divorce rates in any two steady states. All that is new is that the free parameter ρ is also estimated, allowing the model to also match the rate at which the model shifts between these steady states.

D. Duration of Marriage

Given the close mapping between the five free parameters (plus the calibrated mortality estimate) and the six facts that the matching model is estimated to fit, it is important to assess the fit of the model on other moments. The two extra predictions derived from the model are that the duration of marriage was 31 years in 1950 and 22 years in 2000. Because marriages can end only in divorce or death, the "average duration of marriages" in the steady state is equal to (divorce rate + mortality rate)$^{-1}$. It is this statistic—a simple transform of the previously discussed divorce rate and the calibrated mortality risk parameter—that the authors report.

Once again, if the calibration of the mortality rate is appropriate and the economy truly is in the steady state, the ability of the model to match this moment is simply a function of whether the model could match the divorce rate. As such, the success or failure of the model to match the data is largely a test of the validity of either the auxiliary mortality assumption or whether the data were generated by a steady state.

One further issue is worth noting. While the steady-state average marital duration is well defined within the model, the data that the authors match are quite different. The eventual duration of marriages occurring in either 1950 or 2000 will not be known for several decades to come: many of those couples are still both alive and married and hence still at risk of divorce. Thus the "data" on marital durations that the authors match are not in fact data, but projections based on specific assumptions. Specifically, the authors rely on fairly standard marital life table estimates. These tables typically take the marriage, divorce, widowhood, and death probabilities for each age group and marital status in a particular year and then simulate the life course for a hypothetical cohort. Thus the 1950 and 2000 estimates are not in fact based on the life course of either marriage cohort, but instead are projections based on the past experiences of even earlier cohorts. These "data" are very different from the moment that Greenwood and Guner generate from their model. One very simple way out of this mismatch would be for the authors to generate marital life tables from their model, so that they are comparing like with like.

IV. Sorting Out the Important Facts

At this point it should be clear that Greenwood and Guner's model has enough free parameters to fit most of the facts they identify. Given this, it would be useful to benchmark their model against a broader set of stylized facts. I now turn to describing a few of the key stylized facts that I believe are essential to any compelling explanation of changing American families.

The first of these facts is simply a more granular assessment of the time series of the divorce rate. Greenwood and Guner characterize this time path as if it were a continuous rise, noting that "except for a spike associated with World War II, the rate of divorce rose more or less continuously over the last century from about four per 1,000 women in 1900, to about 10 in 1941 (a doubling), to about 23 today (another doubling)." Stevenson and Wolfers (2007a) describe the belief that divorce has been continuously rising as "the great divorce myth," noting that the divorce rate peaked in 1979 and has subsequently fallen by one-third. Moreover, this is not simply an artifact of declining marriage rates; divorces per married couple have also fallen by 27% since 1979.

It should be clear that a model positing ever-increasing technological change in the household will struggle to adequately describe the decline in divorce rates that has occurred over the past 30 years. It is worth emphasizing that these lower divorce rates reflect more stable marriages. In particular, figure 4 shows that each vintage of marriages since the 1970s have been more stable than their predecessors and hence that marital stability—at each anniversary—has been rising for 30 years.

The role of marriage within the life cycle is also changing dramatically, and figure 2 illustrated that in recent years a greater proportion of those aged 65 years or older are married than at any point in the twentieth century. The other great shift is the rising age at first marriage, and figure 5 shows that much of the decline in the proportion of the population married reflects delayed marriage. In fact, for men, much of the rising age at first marriage simply reflects a reversal of the rapid decline in the immediate postwar period. Over the entire century, the median age at first marriage for men rose from 26 to 27.5. In this broader historical perspective,

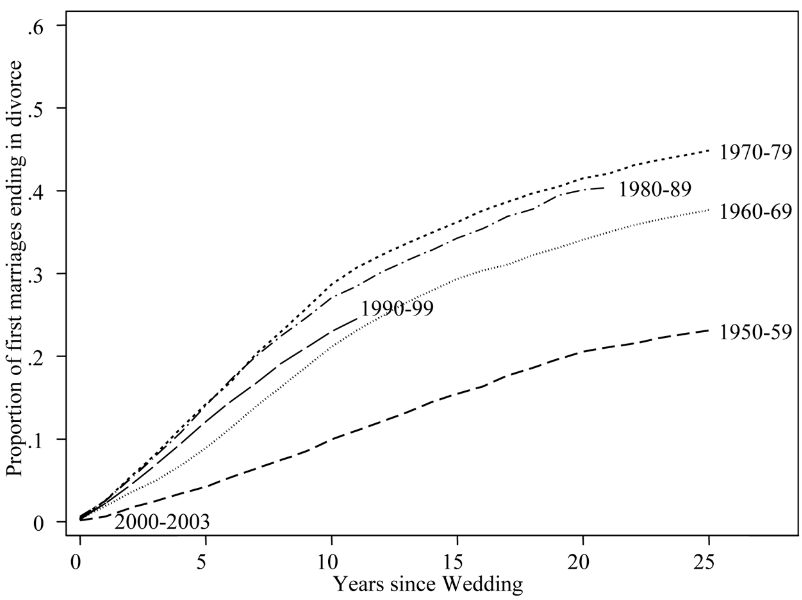

Fig. 4. First marriages ending in divorce, by year of marriage. Sources: Calculations by Stevenson and Wolfers (2008b), based on Survey of Income and Program Participation, 2004 panel, wave 2 Topical Module.

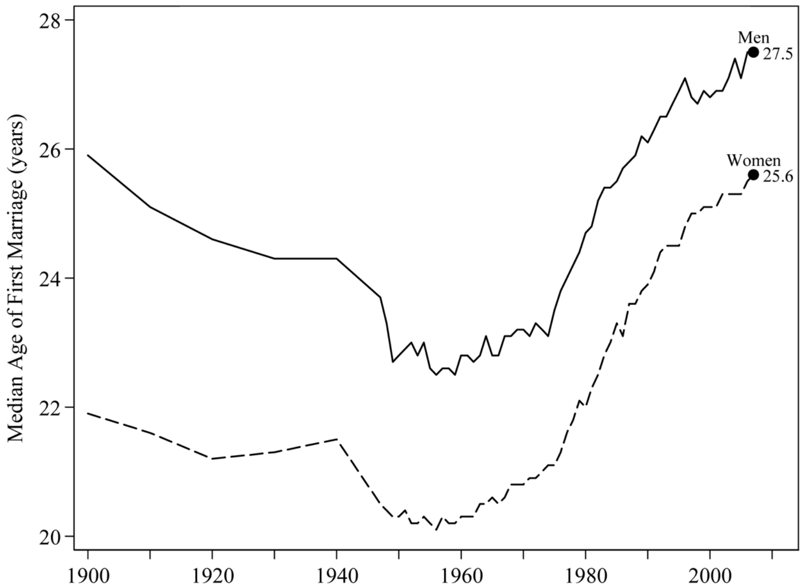

Fig. 5. Median age of first marriage, 1900–2007. Source: U.S. Census Bureau (2007a)

the relative youth of those marrying in the 1950s looks particularly striking. For women, the typical age of marriage has risen by nearly 4 years, and around half of this long-run rise reflects a narrowing of the typical age gap between husband and wife.

Even as marriage has been delayed, there remains little evidence that it is being forgone. The solid lines in figure 6 show the proportion of 40-year-old women who have ever married. While some retreat from marriage is evident in these data, it is important to note that this retreat is recent, the decline is rather small, and it is largely concentrated among African American women. A more granular analysis reaching this conclusion is developed by Isen and Stevenson (2008).

The final observation that merits emphasis is that these changes in family form have occurred to different degrees and at different times across industrialized countries. While Greenwood and Guner provide some cursory analysis of differences in household size across countries, their cross-country analysis undercuts their U.S. time-series exercise. In particular, their analysis of the U.S. time series demonstrates that a 20-fold decrease in the price of household durables is required to explain changes between 1950 and 2000, a period in which average household size declined from 2.14 to 1.65. This time-series decline in relative prices is about 100 times larger than the cross-country variation in the price of household

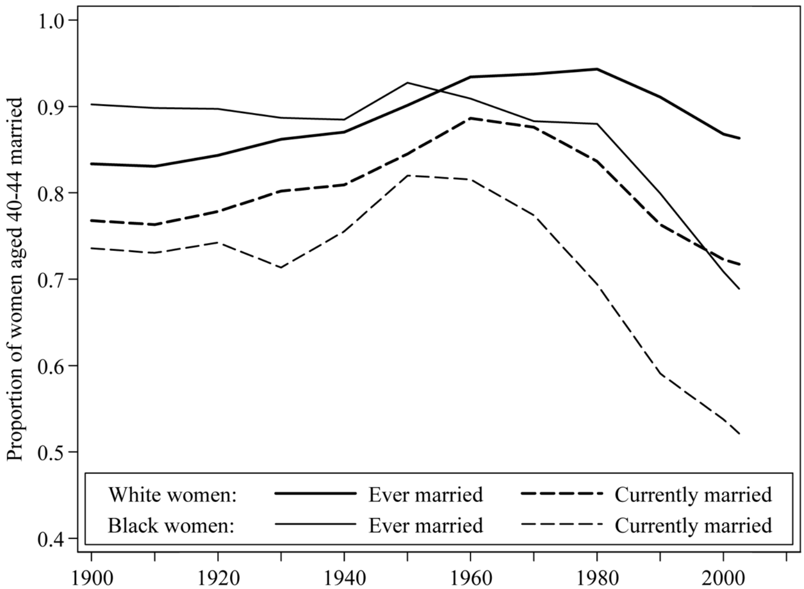

Fig. 6. Marital status of 40-year-old women by race, 1900–2005. Sources: Decennial census, 1900–2000; American Community Survey, 2001–5, combined to form final data point.

appliances, which lie within a range of about 20% (see their fig. 10). Given this, it is difficult to see how similar forces could explain more than a tiny fraction of the large cross-country variation in household size. Moreover, given the rough similarity across countries in the shocks to household technology, it is difficult to see how Greenwood and Guner's analysis could reconcile the very different time series across countries.

V. An Alternative Story

Finally, let me sketch an alternative to the Greenwood and Guner story, which I suspect is more easily reconciled with these stylized facts (drawing heavily from Stevenson and Wolfers [2008a]). Our characterization begins with the prewar period, which we believe is well characterized by a Beckerian model of marriage, emphasizing production complementarities (Becker 1981). Under this view, families were like small firms, and marriage facilitated productive gains due to specialization, with husbands typically specialized in market work and with their wives specialized in the domestic sphere. This model yielded the intriguing insight that opposites attract, since men who were successful in the market placed a high premium on women who were likely to be particularly productive in the home. In turn, marriage was not particularly valuable for career-minded women, which is consistent with low marriage rates among highly educated women in the prewar period.

Subsequent shocks have reduced the value of these production complementarities. Specific examples include a shift in gender norms that may be traced back to wartime efforts to engage women in market work ("Rosie the riveter"), declining labor market discrimination against women, and the emergence of the contraceptive pill (which made investing in female education a safer bet). The forces identified by Greenwood and Guner are also surely important, as the price of household capital goods fell. Technological change in the household may also have been "unskill-biased," as dishwashers and washing machines have transformed skill-intensive tasks into fairly straightforward tasks. The expanded reach of the market into food preparation plays a similar role. By this view, declining returns to investing in household skills reduce the value of specialization, and the forces identified as important in the Beckerian model of marriage have become decreasingly important.

What then drives modern marriage? Today's "hedonic marriage" reflects a shift from the family as a forum for shared production to shared consumption. In particular, love and companionship—or "consumption complementarities"—are increasingly valuable in an era of rising life expectancy and increased leisure. This idea is consistent with observed changes in the character of modern marriages (Coontz 2006) and also with the increasing trend toward likes increasingly marrying likes (by age, education, and occupation). Today's households are also less child-centric, and only 41% of married couples currently have own children present in their household, down from 75% in 1880. And while "productive marriage" was particularly valuable for women with few market skills, "hedonic marriage" offers less to the low-skilled, which may explain the retreat from marriage among less educated women documented by Isen and Stevenson (2008).

By this account, the sharp uptick in divorce in the 1960s and early 1970s reflects a transition, as those who had married the right partner for the old specialization model of marriage found themselves paired with the wrong partner for today's modern hedonic marriage. But those marrying in the 1980s and 1990s understood this new model of marriage, chose their partners accordingly, and have enjoyed more stable marriages. Consequently, divorce rates have fallen, and those marrying today are less likely to divorce than their parents. The decline in divorce rates is yet to show much evidence of slowing down, suggesting that we are still some years from the new steady state.

Endnotes

1. Indeed, this is a point made explicitly by the authors, who note that "the matching parameters, μ_s, σ_s, μ_m, σ_m, and ρ, do not even enter into the $L^m(\cdot)$ and $L^s(\cdot)$ functions." That is, the time allocation decisions of households (L^m measures time in the market if married; L^s, market time if single)—which is a function of their productive uses in the market, at home, or when enjoying leisure—are entirely independent of the model of marriage and divorce.

2. This sentence uses the data from Greenwood and Guner's table 3. However their "fraction married" actually refers to the proportion of nonwidowed women aged 18–64 who are married. Figure 2 illustrates that this is much higher than the fraction of all adult women who are married. Further, my own calculations suggest that the fraction of nonwidowed women aged 18–64 who were married is only 78% rather than their 82% number.

3. Formally, they assume $b_t = \rho b_{t-1} + (1-\rho)\mu_m + \sigma_m\sqrt{1-\rho^2}\xi_t$, with $\xi_t \sim N(0,1)$. With $\rho = 0$, this simplifies to $b_t \sim N(\mu_s,\ \sigma_s)$ in the first year of marriage and $b \sim N(\mu_m,\ \sigma_m)$ in subsequent years, as in my eqq. (3) and (4).

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