Marital Instability and the Distribution of Wealth (Preliminary – Comments Welcome)

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July 9, 2004

Abstract

The levels of wealth differ significantly among people who are approaching their retirement both by current marital status as well as by marital histories. We develop an equilibrium model of marriage and divorce and household savings, in which the interplay between endogenous formation and dissolution of families and savings decisions plays a key role. We show that a calibrated version of the model can reproduce observed patterns of wealth inequality by marital status and marital history, and highlight the role of endogenous marriage formation in wealth accumulation.

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1. Introduction

It is well known that marital status and household wealth are strongly inter-twined; on the one hand married people are wealthier and save more, and on the other hand, household wealth is associated with both a lower risk of divorce among married households and a higher risk of marriage among unmarried ones. As stated by Waite and Gallagher (2000), a common view is that "when it comes to building wealth or avoiding poverty, a stable marriage may be your most important asset" (page 123). The empirical association between marriage and savings raises an important macroeconomic question: is the standard economic theory of marriage helpful for understanding wealth inequality? That is, can a simple theory based on optimal decisions explain these empirical associations, and if so, what are economic models of wealth inequality missing when they neglect the marriage matching process?

The magnitude of the empirical association between marriage and wealth is apparent from a number of recent studies of household wealth in US panel surveys. Lupton and Smith (2003) for instance find that, in the Health and Retirement Survey (HRS), median assets per person for people who are married are about double the level for never-married or divorced people, and that people who have been married 30 years or more have a median asset level that is 64% higher than that of people married 5 years or less. They also find that couples in the Panel Study of Income Dynamics (PSID) who were married in 1984 and then divorced by 1989 had wealth in 1984 that was less than half that of those couples who remained married. Using a regression analysis, they find that controlling for household income accounts for only about a half of the effect of marital status on savings. Furthermore, Gustman, Mitchell, Samwick, and Steinmeier (1999) show that wealth differences by marital status in the HRS are also apparent after accounting for social security and retirement wealth.

The mechanisms by which such associations arise are not fully understood, but many economic models of marriage rely on the fundamental assumption that consumption in marriage is a public good. Under this assumption, holding constant income per capita, marriage may increase savings rates by reducing the marginal utility of consumption; this implies married people would save more in anticipation of divorce or widowhood. Conversely, when consumption is joint, people with wealthier spouses will enjoy higher consumption. The marriage matching process therefore implies an additional motive for wealth accumulation, which is the return to being wealthier than the competition for a spouse. Although first marriages usually begin before the partners have accumulated significant savings, marital instability plays an important role among older people: about half of all marriages end in divorce; these are often followed by re-marriage. Thus the basic economic theory of marriage is consistent with both possible directions of causality: marriage causing savings and savings causing marriage.

While there are recent papers that explore the importance of marriage for aggregate savings and wealth inequality, these take the process for marital status as independent of wealth and other endogenous variables. Cubeddu and Ríos-Rull (1997) asks whether the decline of savings rates since the 1970s can be attributed to the decline of married couple's share of the population; they conclude instead that it is necessary to understand the change in the savings behavior of married couples. Cubeddu and Ríos-Rull (2002) note that data on bankruptcy show that divorce is one of the principal causes listed for bankruptcy filings under Chapter 7. They ask how important is the role of uncertainty about marital transitions in generating wealth inequality in the U.S. and finds that the savings incentives implied by marital risk are of at least the same order of magnitude as those implied by uncertainty over labor income.[1] This is consistent with growing evidence that expectations regarding divorce and retirement influence marriage and labor supply decisions, as reported by Johnson and Skinner (1986), Landes (1978), Eckstein and Wolpin (1989), and Honig (1998).

Such work demonstrates that marital status may have important effects on wealth accu-

[1]The role of marital status in wealth accumulation is also the subject of recent research, as summarised in Attanasio (1999). For instance, Attanasio, Banks, Meghir, and Weber (1999) finds that marital status helps to account for the hump-shape in the age-consumption profile.

mulation, but the literature largely neglects the possibility that the working of the marriage market may be a function of wealth inequality. This neglect is surprising given that economic theories of marriage, such as Becker (1991) imply that wealth should play a significant role in marriage decisions. Becker argues that efficient markets should give rise to negative assortment on spouse characteristics that are substitutes, but in environments with search frictions, positive assortment on market characteristics may be the equilibrium result (e.g. Burdett and Coles (1997)). In such environments, the return to savings includes a component that reflects the marginal benefit associated with improved marital prospects. To date however, we are aware of only two papers, both theoretical, that explore the implications of this point for wealth inequality in an equilibrium setting. In Laitner (1979) and Cole, Mailath, and Postlewaite (1992), people care about their wealth relative to their cohort because wealth affects marriage prospects. However neither paper develops a quantitative model that could be used to explore the importance of the marriage matching process for US wealth inequality, and neither considers the role of wealth as an influence on the risk of marriage or divorce.

In this paper, we unite these two views of the marriage-savings association; we incorporate into a dynamic-equilibrium model of household formation both the standard view of savings as motivated by life-cycle and precautionary motives, and the view that marital outcomes depend on income and wealth. Our goal is to describe the various mechanisms that give rise to wealth differences by marriage, and to tentatively assess the relative importance of these mechanisms. We believe that the interactions between marriage and wealth are likely to be quite complex, given the two directions of causality suggested by previous research, and given the significant risks of transitions between married and single life to which US householders seem subject over the lifecycle. Hence we require a model environment that simplifies substantially from a literal description of the data, yet contains the basic elements of uncertainty over future income, anticipation of low income at the end of life, as well as matching with frictions that give rise to divorce and re-marriage.

As in Aiyagari, Greenwood, and Guner (2000), agents in our model meet randomly and decide to marry if the value of life with their match exceeds that of continuing life as a single. Similarly, married couples choose divorce if the value of single life is higher than that of remaining married. We abstract from parental fertility and investments in children, which is the main concern of Regalia and Ríos-Rull (1999) and Greenwood, Guner, and Knowles (2003). We also ignore the tax disincentives to marriage explored in the equilibrium model of Chade and Ventura (2002). Unlike previous equilibrium marriage models however, agents in our model take into account the anticipated wealth and savings decisions of the household when making marital decisions.

Whether such dynamic concerns should play a major role in marriage and divorce decisions depends on the magnitude of the association between marriage outcomes when young and consumption when old. Thus we begin our analysis by extending the empirical results regarding contemporaneous marital status to the consideration of earlier marital outcomes. Using wealth and marital history in the first wave of the Health and Retirement Survey, we find that marital status at age 30 is a strong predictor of wealth 20-30 years later, and remains significant even when controlling for later marital status and for educational attainment. Being divorced by age 30 is associated with 17% less wealth for men, and 34% for women. Furthermore we show that marital status is quite persistent, so that even the controls for later marital status reflect the effects of marital outcomes at age 30. Finally, to examine whether the effect on income is due to composition or behavior, we use the Panel Study of Income Dynamics to compare labor supply and wages over the life cycle by marital status when young. We find that while male labor supply and initial wages are both independent of marital status at age 30, those who become divorced have much lower wage growth, consistent with the assumption of our model, that negative productivity shocks destabilize marriage.

To analyze the channels that might explain these static and dynamic links between marriage and wealth, we calibrate our model to match a set of statistical features of the US data that are not directly related to household wealth inequality. These targets are selected to correspond to features of the model that are closely related to household behavior, but do not directly determine the relative wealth of households with different marital histories. These include the savings rate of married couples, the average labor supply per person, and the composition of the population by marital status. We then ask how the distribution of wealth across marital categories compares to the US data.

Our benchmark model, calibrated to data from the HRS and the PSID, shows that the basic model generates a distribution of wealth by marital status that corresponds well to that observed in the data: median wealth of single and divorced males is about 52% that of married couples, and the same figure for females is about 30%. Hence, we conclude that the simple view of marriage as based on economies of scale, combined with the standard neoclassical view of savings as motivated by life-cycle and precautionary motives is sufficient to explain the empirical association between marriage and wealth accumulation.

In the next section, we develop some preliminary measures of the dependence of wealth in old age on marital status and history. We then present a formal model of household and marital decisions. In the following section, we explore the quantitative implications of the model.

2. Empirical Analysis

In this section, we examine two issues: 1) the dependence of economic status at retirement on marital history, and 2) the joint evolution by age of marital status and economic status. The first part of the analysis is a cross-sectional snapshot based on the HRS 1992 wave, which has excellent wealth data for a large sample of people currently entering retirement, while the second part consists of trajectories through time based on the PSID, which has more limited wealth data and a much smaller sample of the HRS cohort, but has the enormous advantage that it follows given individuals from 1967 to 1999.[2]

As discussed in the introduction, previous empirical studies find that people in their 50's with long-established marriages are much wealthier than people who are single or recently married, controlling for age. While a model is required to determine how important is selectivity versus causality in explaining these associations, it is relatively easy to decompose the wealth differential by marital status into a component due to income, and a component due to savings rate differences; using the PSID for example, Lupton and Smith (2003) find that about half of the effect of marital status on wealth is associated with income differences; marriages of lower income people are more likely to end in divorce.

In this section, we implement a dynamic version of this decomposition: our goal is to measure the associations between marital status when young and economic status, meaning income, wealth and marital status, as household heads approach retirement age. First, we provide a picture of marital histories of the HRS cohort and document how marital histories affect the current wealth. Second, we also provide a joint picture of labor supply, earnings and marital histories for the same HRS cohort from the PSID. This allows us to generate a full life-cycle picture of the HRS cohort in terms of marital, labor supply and earnings histories.

The basic questions we wish to address are: 1) Is there a permanent effect of early marital events on income and wealth at retirement? 2) What fraction of this association is due to the effect of income versus savings rate differences? 3) Is the income of divorced people lower due to reduced wage growth or labor supply?

2.1. Wealth and Marital History in the HRS

We begin by analyzing data from the first wave of the public-release version of the HRS, starting in 1992. The HRS contains income, wealth and demographic variables, as well as

[2] The 2001 release of the PSID became available recently; we have not used it here. Nor have we used the waves of the HRS after 1995, which were also released in the last year.

self-reported pension information for a stratified sample of the population aged between 50 and 60 in 1992, and their spouses. When weighted using household weights supplied with the survey, the sample can be treated as a representative cross-section of U.S. households of that birth cohort.

Our analysis is based on the sub-sample of this data for which there were no marital changes across the three waves, i.e. from 1992 to 1995, and for which data on marital history, income and wealth are available. The size of the sample is 12,363 householders, of which 5745 are men, and 6618 are women. We classify people according to marital status at two points in time: age 30 and 1992. Since respondents are in their 50's in 1992, this ensures that the earlier marital variable dates back between 20 and 30 years.[3] We classify as singles those people who had never been married by the reference year, as married all those who were married at the time, even if it was not their first marriage, and as divorced all those who were not married but had been and were not widows. Average age in 1992 is 55 years for singles, but 57 for married men and 53 for married women.

Table 1 gives a basic statistical description of some other features of this sample, by marital status at age 30. 723 men were single at age 30, about 11% of the total, 623 were divorced and 4079 were married. Only 460 women were single at age 30, about 8% of the sample, while 920 (14%) were divorced. Men who at age 30 had been Single or Married had on average been married only once by 1992, while those who were divorced had been married 2.13 times on average. For women, the pattern differs only in that those who were single had been married only 0.69 times on average; hence women who were single at age 30 were much less likely to marry later.

People with different marital histories differ in other ways too. This is relevant because differences in race, religion or education may be related to differences in productivity growth or savings rates, so giving rise to alternative interpretations of the empirical marriage-wealth

[3] Actually, it is the heads of households who are in their 50's in 1992.

association. In regards to race, never-married people are more likely to be Black or Asian or Hispanic than are married people; for instance 14% of married men and 17% of married women are black, compared to 20% of single men, and 30% of single women. Since religions differ in the extent to which they condone divorce, it is not surprising to find the percent of respondents who report their religion as Protestant is higher for divorced than for married people, especially in the case of women. The converse holds for the Catholic religion. We label 'Religious' those respondents who attend church more than once a week; the table shows that divorced people are also less likely to be religious: 22% of divorced men, compared to 32% of married, and 36% of divorced women, compared to 43% of married.

In terms of years of education or high-school diplomas, the differences across marital class appear slight, but the share of respondents with Bachelor's degrees is highest for singles (27% for men, 24% for women) and lowest for divorced people (12% for men, 11% for women). Thus early marriage seems to be negatively related to college graduation. A similar pattern holds for master's degrees.

Table 2 shows that marital status is quite persistent over time. Men who were single when young have only a 33% chance of being married in 1992, roughly one-third of the rate for those who were married when young. Marriage is also a persistent state, since about 88% of men who were married at age 30 are also married in 1992. Men who were divorced when young on the other hand have an 81% chance of being married, so divorce is clearly a transitory state; remarriage must play an important role in the prospects of divorced men. For women, single status is even more persistent than for men; only 26% of young singles are married in 1992, compared to 2/3 of young married women. Women who were divorced by age 30 were 42% more likely (22% vs. 15%) than those who were married by age 30 to be divorced in 1992. About 67% of those women who were divorced while young were married in 1992, so remarriage must also play an important, though somewhat weaker, role in the prospects of divorced women.

In Table 3a, we show the distribution of wealth and income by marital status in 1992.

The measure of wealth we use here is comparable to that used in other macro-economic studies of the US wealth distribution, such as Huggett (1996) or Diaz-Gimenez, Quadrini, and Rios-Rull (1997), in that it includes housing, financial wealth, investment in real estate and vehicles, but excludes pension and social security wealth.[4] For married households, we divide the wealth level by two, so that all entries in the table are in terms of wealth per spouse. Single men have about 79% more financial and about 45% more tangible assets than married, while divorced men have about 20% less home equity. Single and divorced women have much less of every category than married women: for instance financial assets are 27% less for single women and 45% less for divorced. In terms of net worth, which we take to be the sum of all assets minus debts, single men are the wealthiest category with $190,055, while single women are the poorest, with $84,005 on average. It should also be noted that the inequality at the median levels is even more marked than at the means. The median net worth of divorced men is roughly half that of married men, while the mean wealth is 90% that of married.

Household income in 1992 follows a stronger version of the same pattern. Earnings per spouse are $15,288 for divorced women, compared to $40,548 for married, and $23,994 for divorced men. Capital income per spouse for divorced or single women is about 20% that of married couples. These differences are sufficiently large to explain a good deal of wealth inequality even if households turned out to have the same savings rates.

Overall, the results of Table 3a confirm the findings of previous research such as Lupton and Smith (2003). Since wealth represents accumulation over time, what remains to be done is to repeat the exercise for a much earlier marital status. In Table 3b, we classify people

[4]While Gustman, Mitchell, Samwick, and Steinmeier (1999) find that this type of wealth, is roughly as large on average as the narrower definition of wealth, the pattern of inequality by marital status is not changed by including retirement entitlements. This is because while Social Security entitlements are progressively distributed, private pension entitlements are regressively distributed, as they are higher for people with high earnings.

according to marital status at age 30. Men who were divorced by age 30 have less wealth in 1992 than those who were single or married at age 30, regardless of their current marital status. On the other hand, those who were single at age 30 have higher mean wealth than those who were married at age 30, especially if they are also single in 1992. As in Table 3a however, a look at the medians makes the picture much clearer: the median wealth for those who remained single is only a half that of the median married household, and only 2/3 for those who married late. In other words, marital history does indeed help predict wealth far in the future.

It may be that both marital status measures are reflecting the same variation in wealth; for instance we know from Table 2 that marital status is persistent over time, so perhaps past marital status only matters in so far as it helps to predict current status. An easy way to test this is to estimate an OLS regression of wealth on marital status. This procedure also allows us to check to what extent marital status is acting as a proxy for income or education. Since wealth is distributed in highly skewed form, we exclude the top and bottom 1% of the wealth distribution, and take as dependent variable the log of household net worth per spouse.

In Table 4 we show the results for 3 models, estimated separately for men and women; all include an intercept and a polynomial in age, which are not reported, and dummy variables for whether the person was single or divorced at age 30. Widows have been dropped from the sample, so married people are the excluded category. Model 2 contains in addition dummy variables for marital status in 1992, and in Model 3 the log of household earnings in 1992 is added to the specification. The results show that being single or divorced at age 30 is associated with significantly less wealth, and that these effects survive controls for income and future marital status. Men who were divorced by age 30 have 17% less wealth in 1992; controlling for income reduces this by about 30%. Women who were divorced by age 30 have 34% less wealth; controlling for income reduces this again by about 30%. In both cases, the effect of marital status later on is larger and significant but appears to be almost independent of the effect of earlier divorce. Furthermore, this latter effect seems to be driven largely by the effect of income, as the coefficients fall by 75% for men and 40% for women when income is included.

To test for robustness, we report in Table 5 the results of the same regression augmented with education and race variables. For men, the effect of earlier divorce becomes statistically insignificant, while for women, the effect of earlier divorce is about 25% smaller, and still significant at the 0.001 level. Since the earlier regressions find strong marital status effects even after controlling for income, we interpret the effect of including education and race as reflecting collinearity with divorce propensities, rather than an alternative channel for explaining the association of wealth and marriage.

Overall, these results show that both current and past divorced status are associated with lower wealth, particularly for women. Since our regression results reflect conditional means, our earlier tables suggest that the effects tend to be stronger at the medians rather than the means. So we take the regressions to be underestimates of the likely effects of marital status. Furthermore, only about 1/3 of the effect of marital status is associated with income differences; the rest must be due to differences in savings rates.

2.2. Wages and Wage Growth in the PSID

So far we have looked at economic status in 1992, when respondents are in their 50s. The HRS cannot tell us how marital outcomes are related to wages and labor supply when young, as these variables are only present as of 1992. But to understand the significance of the connection between income and marital status, we need to know whether these income effects are present throughout life, and whether they precede or follow the marital events in question.

To examine these questions, we turn to the Panel Study of Income Dynamics. We follow a sample of agents of roughly the same cohort as the HRS, from the first PSID wave in 1967, through the 1998 wave. This sample is of people age 45 to 65 in 1992, and is smaller than the HRS sample: 2415 men and 3087 women. In Table 6 we report the ages of their first and second marriages and first divorces, if any, by marital status at age 30. The results show that people married on average between ages 20 and 23 if they married before age 30 and around age 32-34 if they married after. Second marriages, except for those who remarried before age 30, tend to occur in the late thirties to mid forties; those who were married at age 30 re-married latest, a median age of 43. To keep the analysis of timing very simple, we will divide the subsequent analysis into two periods: 25-45, and 46-65.

Table 7 shows wages, hours and earnings by age, sex and marital status at age 30. The average wage in the first age interval (25-45) is about \$17 for men who were divorced by age 30, compared to \$21 for those who were married, and \$24 for those who were single. The effect of marital status is weaker at the medians however. For women, there is no apparent effect of divorce on median wages, while those who remarry have lower wages both at the mean and the median. For women, the weak divorce effect may be related to faster accumulation of human capital due to the higher average hours worked by divorced women, 1786 annual hours compared to 1316 for married women.

To clarify the relationship between wages and divorce, we present in Tables 8 and 9 two sets of regression estimations, the first relating to wage levels, the second to growth rates of wages. To reveal the timing of the effects, we sub-divide the first interval into narrow age ranges: 25-30, 31-35, and 36-45. In Table 8 the dependent variable is the log of average wages in the first period. In Table 9 the dependent variable is the growth rate of average wages between ages 30-35 and 36-45. The results in Table 8 show that initial wage levels are much lower for people who are single or divorced by age 30. Thus for men who are single, wages are 16% lower, while for divorced men, they are 9% lower. Controlling for the log of hours has little effect, but controls for educational attainment increase the effect of single status by almost one standard error. The wage penalty for divorced women is 16% but nearly 40% of this effect seems to refer to lower education of the divorced women. We conclude from this that a low wage when young is associated with a higher risk of divorce by age 30.

The growth-rate of wages however is unrelated to divorce when young. In Table 9 we show 4 models estimated separately for men and women. For women, the marital status variables are not statistically significant in any specification. For men who were divorced or single in 1992, however wage growth appears to be significantly lower, and this effect survives inclusion of controls for initial wage level and average annual hours worked, as well as education. With the full set of controls, the effect of being single in 1992 is wage growth that is 20% lower, while that of being divorced is 7.4%.

These results help to explain the income channel underlying the relationship between wealth and marital status that has been noted in previous research. Not only is low wages a good predictor of divorce when young, it appears that low productivity growth predicts unmarried status later in life. We saw in Table 7 that there was no systematic relationship between hours and marital status for men, but that for women divorce is associated with 20% more hours worked, however there is no significant relation between women's hours and wages, at least for this cohort.[5]

We take these facts as consistent with the view that marital status, past, current and future, influence savings behavior. However it is difficult to assess the importance of marital events on savings on this basis for two basic reasons: There may be counter-acting effects of marriage on savings, and marital status may reflect rather than cause the related wealth inequalities. In addition, there is an equilibrium issue: since marriage prospects depend on the decisions of potential spouses, it is possible that the importance of marital prospects for wealth accumulation are much greater than what may be inferred from the differences across marital status in a given equilibrium. For instance aggregate savings themselves may depend on marital equilibrium, not just the savings differentials. For these reasons, we now turn to an equilibrium analysis of marriage and savings.

[5] That the return to experience in terms of wages was insignificant for women before the 1980s has been noted before, cf Olivetti (2001), Blau and Kahn (1997), and Caucutt, Guner, and Knowles (2002).

3. The Model

Consider an economy populated by overlapping generations who live for three periods: first as young adults, then as old adults, and then non-working elderly. We label young adult period as 1, the old-age period as 2, and the elderly period as 3. There is a continuum of agents in each age group. Within each period, half of the agents are male, the rest female.

Each young adult is characterized by a productivity level. In the beginning of the first period each young agent meets a potential spouse from the same generation. At this meeting, the productivity of each potential partner is common knowledge, as is the quality of their match. If both parties agree, a marriage ensues; otherwise both remain single.

At the start of the second period the married people learn their next-period productivity levels and match quality; then, both partners either agree to stay together or divorce ensues. At this time, the second-period marriage market opens, and agents who remained unmarried while young and those who are divorced, meet new potential partners and can choose to marry. As with first-period matching, the productivity of each potential partner is common knowledge, as is the quality of their match. The second period productivity level of an agent depends on his/her first period productivity level. The productivity levels and marital status do not change from the second to the third period.

Both married couples and single agents decide how to allocate their time between work and leisure. They also decide how to allocate their income between consumption and savings. The elderly (3th period agents) spend all their time in leisure and all of their income on consumption, and hence make no decisions.

All agents make marriage and divorce decisions so as to maximize their discounted lifetime utility in each period. However, while single agents allocate time and income to maximize their own utility, the married couple's household decisions in the first and second periods maximize a weighted sum of husband's and wife's lifetime utilities.

3.1. Preferences

The arguments of the utility functions are consumption, leisure and match quality. In the first period the only source of income is labor income. In the second period in addition to their labor income agents may also have asset income, while in the last period they have no labor income and consume their assets. Consumption is a public good among coresident family members, but subject to congestion. Adult females have the following utility function:

$$F(c, \ell, \gamma) = u(c) + \nu(\ell) - \gamma,$$

where c is consumption, ℓ is leisure, and γ is the quality of match in a marriage. Females allocate l units of their time for market work. Thus leisure is given by $\ell = 1 - l$. The marriage-quality term is set to zero for singles.

Similarly, the utility function for males is given by:

$$M(c, \ell, \gamma) = u(c) + \nu(\ell) - \gamma.$$

Males allocate n units of their time to market work, and hence $\ell = 1 - n$.

For the elderly, the utility is the sum of utility from one's own leisure and consumption

$$M(c) = F(c) = u(c) + \nu(1).$$

Let the match quality γ take a finite number of values, $\gamma \in \mathcal{G} \equiv \{\gamma_1, \gamma_2, ..., \gamma_K\}$. A newly-matched couple draws their match quality from the following distribution

$$\Pr[\gamma = \gamma_i] = \Gamma(\gamma_i).$$

For a married young couple, the match quality when they become old depends on their initial draw and its distribution is given by

$$\Pr\left[\gamma' = \gamma_j \mid \gamma = \gamma_i\right] = \Lambda(\gamma_j \mid \gamma_i).$$

3.2. Productivity and Labor Income

Labor income per unit of time is determined by the realization of the productivity shocks $x \in \mathcal{X} \equiv \{x_1....x_N\}$ in the case of women, and $z \in \mathcal{Z} \equiv \{z_1....z_N\}$ in the case of men. Then labor income for a woman is xl and that for a man is zn.

The productivity in old age depends on the initial productivity draw and evolves stochastically according to:

$$\begin{aligned} \Pr\left[x' = x_j \mid x = x_i\right] &= \Delta^x\left(x_i, x_j\right), \\ \Pr\left[z' = z_j \mid z = z_i\right] &= \Delta^z\left(z_i, z_j\right). \end{aligned}$$

3.3. Savings and Asset Income

Adults can save for the future by storing some of their output; there is no asset market. The storage technology has a rate of return $r > 1$, which we call the interest rate; this is assumed to be fixed, and independent of the level of savings. This would be consistent with a small open economy, in which the interest rate is determined by a world market independently of the savings of the population with which we are concerned. Upon divorce the husband receives a fraction α of wealth and the wife receives the remaining fraction $(1-\alpha)$.

3.4. Consumption

Consumption is a public good within the household, but subject to congestion. For a young married couple per capita household consumption is given by:

$$c = \phi\left[(xl + zn) - a\right],$$

where a is the household savings, and $0.5 \leq \phi \leq 1$ is the congestion parameter. For an old married couple with an asset level w, consumption is given by:

$$c = \phi\left[(xl + zn) + w\right].$$

Similarly, consumption for a single young female is given by:

$$c = xl - a,$$

while that for an old single female with an asset level w, consumption is given by:

$$c = xl + w - a.$$

Finally for a single young male and for a single old male with assets w, consumption are given by

$$c = zn - a \text{ and } c = zn + w - a.$$

4. The Steady-State Equilibrium

The equilibria of this model must satisfy two conditions: optimality of the agent's decision rules given the household states and the probability distribution over future states, and consistency of the probability distributions with individual decision rules. In this section, we first characterize the decision problems, taking as given the probability distributions, and then we state the laws of motion for the probability distributions of each age-gender group. We then give formal definitions of the steady state equilibrium of the economy.

4.1. Household Decisions

There are two kinds of decision problems in this economy: matching decisions and the allocation of the household's resources over competing uses, such as consumption and saving. Since the decisions that young people make must be optimal, taking into account the consequences for the future, the solutions of the elderly agent's problems must be known in order to solve those of the young. Hence it is natural to proceed by backwards induction from the last period of life.

Each agent in this economy is characterized by two variable: a productivity level and an asset level. Therefore, we will let $s_f = (x, w_f)$ be the state of the world for a single female, where x is her productivity level and w_f is her assets, and similarly let $s_m = (z, w_m)$ be the state of the world for a single male. Finally, the state of the world for a married couple is represented by $s = (s_f, s_m, \gamma) = (x, w_f, z, w_m, \gamma)$, where γ is the match quality, and w_f and w_m are the asset levels of each party as a single person.

Note that the elderly do not make decisions in the final period of life; however the earlier decisions of married couples, both young adults in the first period and the old in the second, are assumed to be given by maximizing a weighted sum of utilities. This assumption ensures that marital decisions are Pareto optimal.

Consider the problem of a matched couple. If we let the state of the matched pair be denoted by s, and the decision vector by δ, then we can denote the wife's and husband's utility from marriage as $W(s, \delta)$, and $H(s, \delta)$, respectively. They are determined by

$$\max_{\delta} \left[(1-\rho) W(s, \delta) + \rho H(s, \delta) \right],$$

where δ is a decision vector and s is couple's current state. The parameter ρ is the weight on the husband. It is given exogenously and is the same for all marriages.

Obviously, W and H will depend on the distribution of agents in the next period's marriage market. Let the probability distributions over singles of each generation be taken as fixed; later we will work out the stationary distributions implied by the decision rules. In particular, let $\Phi_1(x)$ be the distribution of young single females of type-x and $\Omega_1(z)$ be the distribution of young single males of type-z in the marriage market. When they are old (period 2), agents also differ in their asset holdings. Let $\Phi_2(x, w_f)$ be the distribution of single old females of type-x with an asset level w_f, and $\Omega_2(z, w_m)$ be the distribution of single males of type-z with asset level w_m in the second period marriage market.

4.1.1. The Elderly (Period 3)

The problems of the oldest agents are straight-forward and given by:

$$
\begin{aligned}
G_3(s_f) &= [u(w_f) + v(1)] \\
B_3(s_m) &= [u(w_m) + v(1)] \\
W_3\,(s) &= [u(\phi w) + v(1)] \\
H_3\,(s) &= [u(\phi w) + v(1)]\,,
\end{aligned}
\tag{P3}
$$

where, given our assumptions, $s = (x, w_f, z, w_m, 0)$ and $w = w_f + w_m$.

4.1.2. The Old (Period 2)

Consider a match between a type $s_f = (x, w_f)$ female and $s_m = (z, w_m)$ male in the second period. For this newly-matched couple, the state is given by $s = (x, w_f, z, w_m, \gamma)$. The individual asset levels, w_f and w_m, are determined by their saving decisions when they were young and single or by joint saving decisions when they were young and married (with someone else). The couple has to decide how much each partner should work and how much they should save. They know that they will also be married next period. Their decision vector $\{l, n, a\}$ solves:

$$
\begin{aligned}
&\max_{\{l,n,a\}} \{(1-\rho)\,[u(c) + v(1-l) - \gamma + \beta W_3(s')] \\
&+ \rho\,[u(c) + v(1-n) - \gamma + \beta H_3(s')]\}
\end{aligned}
\tag{P2m}
$$

subject to

$$c = \phi\,[(xl + zn + w_f + w_m) - a]\,,$$

and

$$s^{'} = (x, (1-\alpha)ra, z, \alpha ra, 0).$$

Let the newly married couple's decisions be represented by $L_2^m(s)$, $N_2^m(s)$, and $A_2^m(s)$. The value of being a married old person is then given by:

$$W_2(s) = u\left[c(s)\right] + v\left[1 - L_2^m(s)\right] - \gamma + \beta W_3(s'),$$

for the wife, and by

$$H_2(s) = u\left[c(s)\right] + v\left[1 - N_2^m(s)\right] - \gamma + \beta H_3(s'),$$

for the husband, where

$$c\,(s) = \phi\left(xL_2^m(s) + zN_2^m(s) + w_f + w_m - A_2^m(s)\right).$$

Now consider the value of being a single old female of type-x with an asset level w_f; this value is given by

$$G_2(s_f) = \max_{\{a,l\}}\left[u(xl + w_f - a) + v(1-l) + \beta G_3(s_f')\right], \tag{P2sf}$$

where $s_f' = (x, ra)$.

Finally, the value of being an old single male of type-z with an asset level of w_m is given by

$$B_2(s_m) = \max_{\{a,n\}}\left[u(zn + w_m - a) + v(1-n) + \beta B_3(s_m')\right], \tag{P2sm}$$

where $s_m' = (z, ra)$. Let the old single decisions be represented by $L_2^s(s_f)$, $N_2^s(s_m)$, $A_2^{sf}(s_f)$ and $A_2^{sm}(s_m)$.

The indicator function for a second period match with state $s = (x, w_f, z, w_m, \gamma)$ is then given by:

$$I_2(s) = \begin{cases} 1, \text{ if } W_2(s) \geq G_2(s_f) \text{ and } H_2(s) \geq B_2(s_m) \\ 0, \text{ otherwise.} \end{cases}. \tag{I2}$$

Now consider the decisions of an old couple contemplating divorce. Let w be their household wealth. If they divorce, they will split their household wealth and each can have a new draw in the marriage market. Therefore, the state vector for the couple is

$s = (x, (1-\alpha)w, z, \alpha w, \gamma)$, while as singles in the second period marriage market it will be $s_f = (x, (1-\alpha)w)$ for the wife and $s_m = (z, \alpha w)$ for the husband. Then, the expected value of getting a divorce is given by

$$\begin{aligned} & W_2^d(s_f) \\ = \quad & \max\{\sum_{s_j}\sum_{\gamma}\left[W_2(s_f, s_j, \gamma)I_2((s_f, s_j, \gamma)), G_2(s_f)\right]\Omega_2(s_j)\Gamma(\gamma)\}, \end{aligned}$$

for a female and by

$$\begin{aligned} & H_2^d(s_m) \\ = \quad & \max\{\sum_{s_j}\sum_{\gamma}\left[H_2(s_j, s_m, \gamma)I_2(s_j, s_m, \gamma), B_2(s_m)\right]\Phi_2(s_j)\Gamma(\gamma)\}, \end{aligned}$$

for a male.

Hence, a divorced agents will have a new draw from the market, and if the other party agrees he/she can remarry. Otherwise, the agent will remain single next period. A married couple will remain together if

$$I_2^d(s) = \begin{cases} 1, \text{ if } W_2(s) \geq W_2^d(s_f) \text{ and } H_2(s) \geq H_2^d(s_m) \\ 0, \text{ otherwise.} \end{cases} . \tag{I2d}$$

Note that the only difference between the indicator functions (I2m) and (I2d) is in the values of not accepting the current match. It is given by the value of being single for a newly-matched couple, while it is the value of getting divorce (and potentially getting remarried) for a couple contemplating a divorce.

4.1.3. Young Single Females

The state variable of the young unmarried female is $s_f = (x, 0)$, which transits to $\left(x', w_f'\right)$ next period with a probability distribution that depends on her current productivity level and saving decisions this period. She will marry next period, if her value of marrying her match exceeds that of remaining single and if her new match agrees. While young, the unmarried female also decides how much to work, and how much to save. Thus the value of being in state s_f is given by the solution of the following problem:

$$G_1(s_f) = \max_{\{a,l\}} \{[u(c) + v(1-l)] + \beta G_1^c(a; s_f)\}, \tag{P1sf}$$

where

$$\begin{aligned} G_1^c(a; s_f) &= \sum_{s'_m, s'_f, \gamma} \Big[\max\left\{I_2(s'_m, s'_f, \gamma) W_2(s'_m, s'_f, \gamma), G_2\left(s'_f\right)\right\} \\ &\quad \times \Pr\left(s'_m, s'_f, \gamma | a; s_f\right)\Big], \end{aligned}$$

and subject to

$$c = xl - a \ ,$$

where $s'_f = (x', w'_f)$ is her next-period state. The transition function $\Pr\left(s'_m, s'_f, \gamma | a; s_f\right)$ tells us the probability that a type-x single female will transit next period to state s'_f, meet a male with state s'_m, and have a match quality of γ. This is constructed in the following way:

$$\Pr\left(s'_m, s'_f, \gamma | a; s_f\right) = \Pr\left(s'_m\right) \Pr\left(s'_f | a; s_f\right) \Gamma\left(\gamma\right),$$

where

$$\Pr\left(s'_m\right) = \Omega_2\left(z, w'_m\right),$$

and

$$\Pr\left(s'_f | a; s_f\right) = \Delta^x\left(x' | x\right) \Theta\left(w'_f | a\right),$$

where $\Theta\left(w'_f | a\right)$ indicates the probability of next period asset level is w'_f given that the current saving decision is a. Let the decisions for a young single female be denoted then by $L_1^s(s_f)$ and $A_1^{sf}(s_f)$.

4.1.4. Young Single Men

The problem of young men who remain single after the first period matching is similar and given by

$$B_1(s_m) = \max_{\{a,n\}}\{[u(c)+v(1-n)]+ \beta \sum_{s'_m, s'_f, \gamma} \max\left\{I_2\left(s'_m, s'_f, \gamma\right) H_2\left(s'_m, s'_f, \gamma\right), B_2\left(s'_m\right)\right\} \Pr\left(s'_f\right) \Pr\left(s'_m | a; s_m\right) \Gamma(\gamma) \tag{P1sm}$$

subject to

$$c = zn - a,$$

with optimal decisions denoted by $N_1^s(s_m)$ and $A_1^{sm}(s_m)$.

4.1.5. The Young Married Couple

A couple's state variable in the first period is $s = (s_f, s_m, \gamma) = (x, 0, z, 0, \gamma)$. This transits to s' next period with a probability distribution that depends on the current state as well as their saving decision. Their only source of current income is from labor, and they decide the market time of each spouse as well the level of savings.

Given $s = (s_f, s_m, \gamma) = (x, 0, z, 0, \gamma)$ let W_1^c and H_1^c be the expected value of entering second period marriage market as married. These values depend on the current state s and on the savings decision of the household a and given by:

$$H_1^c(a; s) = \sum_{s'} \max\left(I_2^d(s') H_2(s'), H_2^d(s'_m)\right) \Pr(s' | a; s),$$

and

$$W_1^c(a; s) = \sum_{s'} \max\left(I_2^d(s') W_2(s'), W_2^d(s'_f)\right) \Pr(s' | a; s),$$

where $s' = (s'_f, s'_m, \gamma') = (x', \alpha w', z', (1-\alpha)w', \gamma')$ and the transition function is given by

$$\Pr(s'|a;s) = \Delta^x(x'|x)\,\Delta^z(z'|z)\,\Lambda(\gamma'|\gamma)\,\Theta(w'|a).$$

A young couple's decisions are then determined by

$$\begin{aligned}&\max_{\{l,n,a\}}\{(1-\rho)\left[(u(c)+v(1-l)-\gamma)+\beta W_1^c(a;s)\right]\\&+\rho\left[(u(c)+v(1-n)-\gamma)+\beta H_1^c(a;s)\right]\}\end{aligned} \tag{P1m}$$

subject to

$$c = \phi\left[(xl+zn)-a\right].$$

Let $H_1(s)$ and $W_1(s)$ be the values of being married in the first period for the husband and wife. The indicator function for a state s first-period match is then given by

$$I_1(s) = \begin{cases} 1, \text{ if } W_1(s) \geq G_1(s_f) \text{ and } H_1(s) \geq B_1(s_m) \\ 0, \text{ otherwise} \end{cases}. \tag{I1}$$

Finally, let the decisions for a married young couple be $L_1^m(s)$, $N_1^m(s)$ and $A_1^m(s)$.

4.2. The Aggregate Economy

Now that the decision rules of a given household have been defined, we can define the probabilities of transitions across states, which depend also on both the marital and the household decisions of all other agents in the economy.

4.2.1. Matching Probabilities

Given the distribution of young single males, $\Omega_1(z)$, and young single females, $\Phi_1(x)$, the number of single agents who are in the marriage market next period will consist of people who remained single in the first period and people who had a divorce. Let $\Phi_{21}(x_i, w_f)$ be the number of old single females who were single last period, and $\Phi_{22}(x_i, w_f)$ be the number of old single females who had a divorce. Then,

$$\Phi_{21}(x_i, w_f) = \sum_x \Theta(w_f | A_1^{sf}(x,0))\Delta^x(x_i, x)\Phi_1(x)\,[1 - \sum_z \sum_\gamma \Omega_1(z)\Gamma(\gamma)I_1(x,0,z,0,\gamma)],$$

and

$$\begin{aligned}\Phi_{22}(x_i, w_f) \;=\; & \sum_x (\sum_z \sum_\gamma \Phi_1(x)\,\Omega_1(z)\Gamma(\gamma)I_1(x,0,z,0,\gamma))((\sum_{z'}\sum_{\gamma'}\sum_{w_m}(1 - I_2^d(x_i, w_f, z', w_m, \gamma') \\ & \Delta^x(x_i, x, L_1^m(x,0,z,0))\Delta^z(z', z)\Lambda(\gamma'|\gamma)\Theta(w|A_1^m(x,0,z,0,\gamma))\end{aligned}$$

with $w_f = \alpha w$ and $w_m = (1-\alpha)w$. Then $\Phi_2(x_i, w_f)$ will be

$$\Phi_2(x_i, w_f) = \frac{\Phi_{21}(x_i, w_f) + \Phi_{22}(x_i, w_f)}{\sum_{x_i}(\Phi_{21}(x_i, w_f) + \Phi_{22}(x_i, w_f))}. \tag{C1}$$

The probability of meeting an old male of type-z_i with w_m units of assets in the second period marriage market can be determined similarly. Note that in order to be able to solve for the matching probabilities we need to know agents decisions. These decisions, however, depend on the matching probabilities. Therefore, in equilibrium matching probabilities and decisions must be consistent.

4.3. Steady State Equilibrium

Given $\Omega_1(z)$ and $\Phi_1(x)$, a steady state equilibrium for this economy consists of a set of value functions, $W_3(s)$, $H(s)$, $G_3(s_f)$, $H_3(s_f)$, $W_2(s)$, $H_2(s)$, $G_2(s_f)$, $B_2(s_f)$, $W_1(s)$, $H_1(s)$, $G_1(s_f)$, and $B_1(s_m)$; a set of decision rules $L_2^m(s)$, $N_2^m(s)$, $A_2^m(s)$, $L_2^s(s_f)$, $N_2^s(s_m)$, $A_2^{sf}(s_f)$ $A_2^{sm}(s_m)$, $L_1^s(s_f)$, $A_1^{sf}(s_f)$, $N_1^s(s_m)$, $A_1^{sm}(s_m)$, $L_1^m(s)$, $N_1^m(s)$, and $A_1^m(s)$; and a set of distribution functions $\Phi_2(x, w_f)$ and $\Omega_2(z, w_m)$ such that:

- Given $\Phi_2(x, w_f)$ and $\Omega_2(z, w_m)$, the value functions and decisions rules solve problems P3, P2m, P2sf, P2sm, P1sf, P1sm, and P1m with associated indicator functions given by I2, I2d, and I1.

- The indicator functions, I2, I2d, and I1, and the distributions $\Phi_2(x, w_f)$ and $\Omega_2(z, w_m)$, satisfy C1 (as well as similar conditions for males).

5. Benchmark Economy

In this section we describe our benchmark economy obtained by choosing functional forms and parameterization so as to match U.S. demographic and economic features. Our basic strategy is to fix the parameters that can be mapped directly to published estimates, and then choose the remaining free parameters so that the steady-state of the model matches an equal number of statistics from the U.S. data.

5.1. Parameterization

A model period is assumed to be 20 years, and three model periods correspond to ages 25-44, 45-64, and 65-84, respectively. In mapping our model's statistics to the data we use results from our empirical analysis of HRS and PSID data sets. As explained in the empirical section HRS sample was between 51 and 61 and the corresponding PSID sample was between 45 and 65 years old in 1992. Hence, people in our sample were in their 40s during 1980s, in their 30s during 1970s and in their 20s in 1960s.

The first step in the simulations is to create a grid of productivity and asset levels. In the simulations we set

$$x \in \mathcal{X} \equiv \{x_1 .... x_{25}\} \text{ and } z \in \mathcal{Z} \equiv \{z_1 .... z_{25}\},$$

and choose these grid points as a finite approximation to a log-normal wage distribution. The mean and the standard deviation of wages are chosen to match those for 25-45 years old in our PSID sample as shown in Table 7. We assume current labor supply decisions do not affect future wages and hence abstract from the human capital accumulation decision. On average the second period productivity level of an agent is assumed to be the same as his/her first period productivity, but is subject to uncertainty. Transition functions $\Delta^x(x_i, x_j)$ and $\Delta^z(z_i, z_j)$ are discrete approximations to $\log(x') = \alpha_x + \theta_x \log(x) + \varepsilon_x$ for females, and to $\log(z') = \alpha_z + \theta_z \log(z) + \varepsilon_z$ for males.

There are two functional forms we have to specify: utility function and stochastic structure for match qualities. The momentary utility functions are assumed to take the following form

$$F(c, \ell, \gamma) = M(c, \ell, \gamma) = \frac{c^{1-\sigma}}{1-\sigma} + \delta \frac{\ell^{1-\sigma}}{1-\sigma} - \gamma,$$

for young and

$$M(c) = F(c) = u^c(c) + u^\ell(1) = \frac{c^{1-\sigma}}{1-\sigma} + \delta \frac{(1)^{1-\sigma}}{1-\sigma},$$

for old. We assume that the match quality takes two values and has the following stochastic structure:

$$\begin{aligned} \gamma &\in \mathcal{G} \equiv \{\gamma_1, \gamma_2\} \\ \text{with } \Pr[\gamma = \gamma_1] &= \pi, \text{ and} \\ \Pr[\gamma' = \gamma_1 \mid \gamma = \gamma_1] &= \Pr[\gamma' = \gamma_2 \mid \gamma = \gamma_2] = \pi_d. \end{aligned}$$

These choices leaves us with eleven parameters that have to be determined: $\{\phi, \sigma, \delta, \gamma_1, \gamma_2, \pi, \pi_d, \rho, \alpha, r, \beta\}$.

Few parameters can be determined on the basis of a priori information. We set $\phi = 0.7$, which implies that in a household with two adults each adult enjoys 0.7 of total resources. This is a value that Cutler and Katz (1992) call an intermediate estimate.[6] Each spouse has an equal weight in the household joint maximization problem, i.e. $\rho = 0.5$, and that the financial wealth of married couples is split evenly between the two spouses upon divorce, i.e. $\alpha = 0.5$. We do not have any available estimates for these parameters and choose these two values as reasonable starting points. Finally, we set $r = 2.1911$, which corresponds to a 4% annual interest rate compounded over one model period.

[6] Cutler and Katz (1992) report estimates for the parameter θ in the household equivalence scale $E = \frac{1}{2^\theta}$. Our measure $\phi = 0.7$ corresponds to $\theta = 0.5$.

As a standard calibration strategy, we choose the remaining seven parameters to match exactly seven statistics from our model economy with those from the data. Table 10 shows our calibrated parameters and the statistics that are targeted. There are obviously several ways that these seven parameters can be chosen, and some justification of our choices are in order. Our strategy is to choose four parameters that determine the level and the stochastic structure of the match quality so that the model generates marital histories that are consistent with the data. Since our ultimate aim is to investigate model's implications for the distribution of wealth by marital status and marital histories, these targets are quite natural.

The four parameters of match quality were chosen to get the marital histories of the model to match those of the U.S. population. In particular we want to match the following statistics: fraction of agents who are single in the first period, fraction of agents who are in an intact marriage in the second period, fraction of agents who are remarried in the second period and fraction of agents who are never married in the second period. These four targets determine both first and second period fraction of married agents and well as the turnover in second period the marriage market. According to CPS data the fraction of 24 to 44 years old females who are married in the data was about 83% in 1970s. As documented in Table 2, in the HRS about 56% of males and about 62% of females were in an intact marriage, and about 17% of males and 14% of females had a divorce and got remarried, while 4% of males and 3% of females never married. The four parameters that determine the match quality and stochastic structure of marriages were chosen so as to match these four statistics. Marital status of the population in benchmark economy is shown in Table 11.

There are still 3 parameters to be determined: $\{\sigma, \delta, \beta\}$. Our strategy is to choose these three parameters so that three factors that determine wealth distribution among the old are consistent with the data: labor supply, income distribution among young adults, and savings behavior. To this end we set $\sigma = 1.5$. This value is chosen so that first period income of a single female is about 35% of the income of a married couple, which is consistent with our results from the PSID sample. This is a measure of income inequality that we are particularly interested, since wealth levels in the old age differs more among females by marital status than they do among males. We then choose $\delta = 1.1$ so that an average person in the model spends about 33% of his/her total available time in the market (as documented by Juster and Stafford (1991)). Finally, we set the discount factor β to 0.73. This value, which is a free parameter in the current setup, was chosen to match the wealth accumulation of married couples in the HRS. In particular, in the benchmark economy second period wealth of a married men is about 61% of their first period incomes. This number is what Levine, Mitchell, and Phillips (1999) found when they compare the net wealth levels of married couple in the HRS with their lifetime potential earnings. Tables 12 and 13 shows labor supply and savings behavior by marital status and age in the benchmark economy.

Given these functional forms and parameter choices, we are able to simulate our model economy and investigate its implications for wealth and marriage.

5.2. Results

In this section we first describe how the wealth distribution in the benchmark model matches the US wealth distribution by marital status, and note the pertinent features of the model economy that seem most closely related to interaction between marital status and wealth. We then present the results of several experiments designed to uncover the quantitative importance of the channels connecting wealth and marital outcomes.

Before proceeding, it is important to note that our model abstracts from important features that are thought to explain wealth dispersion more generally. Thus we do not consider savings motives arising from income and employment uncertainty at annual frequencies, nor do we consider liquidity constraints or limited market participation, or even differences in discount factors. It is therefore unlikely that our model will generate the amount of wealth dispersion or skewness we see in the data, as papers that do this seem to require one or more of the preceding features. For this reason, we focus in this section on behavior at the medians, as this statistic is less sensitive to the shape of the tails of the wealth distribution. Since we know from our earlier tables the ratios of median wealth of single men and women to that of married couples, we will take these as our measure of how well the model does matching the US data.

First consider wealth by current marital status. Table 14 shows the median wealth levels by marital status for the second model period. Non-married females, single or divorced, have median wealth levels are about 30% of married ones, while the same figure for males is about 52%. These numbers are close to ones we observe in HRS (see Table 3a), where median wealth of non-married females is about 40% of married ones (about \$24,000-\$25,000 vs. \$61,000) and median wealth of single males is about 50% of married ones (about 32,000-\$34,000 vs. \$61,000). Hence, the model does a good job delivering the wealth distribution by marital status.

Now consider wealth by marital history. In Tables 3b we saw that the median wealth level of women who were unmarried at age 30 and then got married was about 66% that of the two-period married (\$43,025 vs. \$65,000), while that of those who experienced a divorce but got remarried was about 74% (\$48,250 vs. \$65,000). For men, the figures in the data were 80% (\$51,500 vs. \$65,000) and 72% (\$47,0000 vs. \$65,000). In the model economy, Table 15 shows that married women who were single in the first period have median wealth that is 50% of that of the two-period married couples, while those who were divorced have 80%. For men the same numbers in Table 15 are 68% and 82%, respectively. In Table 3b among people who are not-married in 1992, the levels of wealth differ as well. Men who were unmarried both at age 30 and in 1992 had about 52% of per capita wealth of a men who was married in both periods (\$34,430 vs. \$65,000) while the same number for someone who was married at age 30 but divorced in 1992 is about 48% (\$31,500 vs. \$65,000). The same numbers for females are about 37% (\$24,150 and \$24,240 vs. \$65,000). The model's results are quite close: 47% and 59% for males and 32% and 37% for women.

We now turn to the features of the marital equilibrium that underlie the relationship between marital history and wealth. Overall, married people in the model save more because they have both higher income per person, and higher savings rates. The income difference is almost entirely a selection effect; the effect of marital status on labor supply is second-order. Married people save a higher fraction of their income because economies of scale in consumption lower current marginal utility, and because marital uncertainty decreases their future income, whereas it increases that of the singles.

Figure 1 shows as shaded areas the marital matches that occur in the first period in the benchmark model, conditional on an unfavorable match-quality shock. Note that agents with high productivity levels are more likely to get married and the average productivity levels of single female are lower than those of single males. Hence, married couples enjoy a higher income and can accumulate more wealth. It is also clear that spouse's productivity is closely related, which we take to be analogous to the correlations in education observed in US data. Whereas in the data, the observed education correlations tend to be on the order of 0.5, in our benchmark model the productivity correlation is 0.36. This positive assorting matching on wages because it occurs in the first period, does not affect wealth accumulation incentives, but does increase income and hence wealth inequality among married couples.

Note that since higher productivity people are more likely to get married and stay married, the second period marriage market pool is on average less attractive for those who are divorced and more attractive for those who remain single. In Figure 2, we show the first-period productivity of women in the model, according to their marital outcomes. The diagram for men is identical except for labelling, so we concentrate on the women. It is clear that single women have lower productivity than married women. The second period marriage market is composed of singles and women who divorce, who are themselves an adverse selection of the population of married women. This means that average quality of the second period marriage market is lower than the first-period wives; husbands contemplating divorce therefore anticipate lower income in the second period, even if they re-marry, which contributes to first period savings of married people. Also single people save less when divorce rates are high because the divorced people raise the quality of the marriage pool, increasing the anticipated income of the singles should they marry in the second period.

In the second period marriage market, people with more wealth are more likely to stay married or to form a new marriage. Since marriage makes people in the model (weakly) better off, this increases the rate of return on savings for singles. Furthermore, the quality of the spouse is also increasing in wealth. In Figure 3 we show the second period matches with a bad shock. In contrast to Figure 1, here the productivity levels are fixed, while the wealth levels change. It is clear that for a given productivity levels more wealth implies a higher probability of getting married in the second period marriage market. Therefore there is positive assortment on wealth in the second period, which further increases the rate of return to savings in the first period, particularly for singles, but also for married people, who face a risk of having to re-enter the marriage market.

5.2.1. Experiment 1: No Economies of Scale

In order to separate these effects we next run the following experiments. In Experiment 1, we set $\phi = 0.5$. Since $\phi = 0.5$, married people do not enjoy any economies of scale. Then we force people to get married and divorce as they did in our benchmark economy. Every couple who decided to get married in the first period of our benchmark economy is again married here (even if in they prefer not be). Of course since $\phi = 0.5$, they now make different savings decisions. Table 14 shows that now the gap between the wealth levels of married and singles shrink. Single females have about 55% and single males have about 63% of per capita wealth of married people.

5.2.2. Experiment 2: No Second Period Marriage Market

In Experiment 2, we set $\phi = 0.5$ and also shut down the second period marriage market. If you are married in the first period you remain married in the second, and if you were single you remain single. Since $\phi = 0.5$, married people do not enjoy any economies of scale. Then we force people to get married as they did in our benchmark economy. Every couple who decided to get married in the first period of our benchmark economy is again married here (even if in they prefer not be). Of course since $\phi = 0.5$ and the second period marriage market is shut down, they now make different savings decisions. Table 14 shows that now the gap between the wealth levels of married and singles shrink. Single females have about 72% of per capita wealth of married people and single males have about the same per capita median wealth.

5.2.3. Experiment 3: No First-Period Selectivity

In Experiment 3 we also make the first-period marriages random. That is, each match between a young female and a young male has the same probability of turning into a marriage. Now there is no selection effect coming from the first period marriage market. Married couples and singles should behave exactly the same, and the wealth differences should simply reflect the gender gap in wages. The results, also shown in Table 14, indicate that while per capita wealth of single females is about 82% of married ones, single males have more per capita wealth than the married ones. Hence about 20% of the wealth differences between married and single females comes from the first period selection on income.

5.2.4. Experiment 4: Exogenous Marriage Process

What role does endogenous formation and dissolution of marriages play in our results? In order to understand this we next compare our results with an environment where people still meet randomly, but whether a marriage takes place or not is determined exogenously.

In the benchmark economy the marriage market equilibrium is characterized by indicator functions defined in equations (I2), (I2d) and (I1). These indicator functions report whether each possible match is desirable for the parties involved. When marriage/divorce decisions are exogenous, we do not use any indicator functions. There is also no match quality variable. We use three parameters to characterize the marriages: p_{m1} (the probability that a first period match results in a marriage), p_d (the probability that a first period marriage ends in divorce), and p_{m2} (the probability that a second period match results in a marriage).

The matching is still random. Hence, given Φ_1 and Ω_1, and p_{m1} we know the distribution of first period marriages and single agents. Given p_d, we know the distribution of those who have a divorce. Hence, p_{m1} and p_d determines Φ_2 and Ω_2.Given Φ_2 and Ω_2 , p_{m2} determine the marriages in the second period.

Suppose now we look at a model economy where we set p_{m1}, p_d, and p_{m2} to generate exactly the same first and second period marriage rates and divorce rate as in our benchmark economy, and keep all other parameters the same. In this economy marriage and divorce decisions are exogenous . Furthermore, since the first period matching is random and any match has the same probability of turning into a marriage, the singles and married people are identical for each gender.

Table 16 shows the savings decisions of young adults when marriages are determined exogenously. People now save less. When marriages are determined endogenously, there are certain marriages that will definitely do not take place. Now every marriage is possible with some positive probability, hence marriage prospects look better for these people, reducing the need for savings. Also when marriage decisions are endogenous people save to improve their marriage prospects in the second period. With exogenous marriages, such a motive is absent reducing savings as well. While married people save about 2% point less, the effect on single are more dramatic: single males save about 4% point less and single females save about 14% points less. Second-period wealth declines by about 12% compared to our benchmark economy. Thus both aggregate savings and wealth inequality depend significantly on the endogeneity of marriages.

6. Conclusion

Since wealth accumulation is potentially a life-long process, and since the association between household wealth and marital status is very strong, it is natural to ask how events when young, such as marriage and divorce, influence economic status when old. Our empirical analysis suggests that early marital outcomes affect wealth by influencing later marital status and by influencing income in middle ages. We find that wealth differences by marital status are driven partly by selectivity; high income people are more likely to have stable marriages, but more by differences in savings rates. However to date there has been no quantitative model of the interaction between marriage matching and wealth inequality, so it is difficult to analyze the incentive effects that give rise to these savings rate differences. An important question in this regard is to what extent the dependence of marital prospects on wealth is responsible for higher savings rates.

This paper therefore presents a simple model that relates the wealth of older households to their earlier decisions regarding work, saving, marriage and divorce. Rather than ignoring these dimensions or take them as exogenous, we model these as the outcomes of rational decisions. Furthermore, we model the interaction of agents across households via the effects of these decisions on equilibrium distributions of income and wealth for each age group. These distributions in turn affect, via the marriage market, the optimal decisions of the agents, so the model provides an appropriate framework for understanding life-cycle and demographic interactions.

We illustrate with a numerical example the ability of this model to generate wealth levels by marital status that are close to ones that we observed in the empirical analysis. The model reproduces, approximately, the relative median wealth by marital history, and generates strong positive assortative matching on both wealth and productivity.

The results of our computational experiments allow us to make rough statements about the relative importance for savings of various aspects of the marriage equilibrium. Differences in savings behavior (that originate from the economies of scale in consumption and incentives that the second period marriage market generates) explained about 80% of the married differential in median wealth, while the selection on productivity in the first-period marriage market explains about 20%. However the marriage market also provides strong incentives for single people to save, both because wealth increases the chances of marriage, and also because wealthier people end up with wealthier (or more productive) partners. When we shut down this effect by making marriage events exogenous, aggregate wealth decline by about 12%.

We believe this model can be useful to future researchers interested in exploring different hypotheses of the change in marital patterns in the US, or for simulating the effects of policies such as social security on long-run wealth inequality. We also discuss why it is important to model marriage decisions explicitly in order to understand the connection between marital decisions and wealth accumulation.

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Table 1: Description of HRS Sample by Marital Status at Age 30

	Marital Status at Age 30	Statistic	Number of Marriages	Protestant	Catholic	Religious	Black	White	Asian	Hispanic	Years of Education	High-School Graduate	Bachelor's Degree	Master's Degree
Men	Single (Never-Married)	mean	1.04	0.53	0.30	0.33	0.20	0.72	0.04	0.12	12.17	0.69	0.27	0.13
		std.	(0.792)	(0.499)	(0.459)	(0.470)	(0.404)	(0.448)	(0.190)	(0.324)	(3.938)	(0.464)	(0.443)	(0.337)
		medi	1	1	0	0	0	1	0	0	12	1	0	0
		nobs	723	723	723	723	723	723	723	723	723	723	723	723
	Married	mean	1.20	0.61	0.27	0.32	0.14	0.83	0.01	0.08	12.13	0.72	0.20	0.09
		std.	(0.485)	(0.487)	(0.446)	(0.466)	(0.345)	(0.373)	(0.091)	(0.278)	(3.442)	(0.448)	(0.400)	(0.283)
		medi	1	1	0	0	0	1	0	0	12	1	0	0
		nobs	4079	4080	4080	4080	4080	4080	4080	4080	4080	4080	4080	4080
	Divorced	mean	2.13	0.70	0.18	0.22	0.17	0.79	0.00	0.07	11.70	0.67	0.12	0.05
		std.	(0.337)	(0.458)	(0.383)	(0.413)	(0.375)	(0.408)	(0.069)	(0.251)	(3.313)	(0.472)	(0.328)	(0.224)
		medi	2	1	0	0	0	1	0	0	12	1	0	0
		nobs	623	623	623	623	623	623	623	623	623	623	623	623
Women	Single (Never-Married)	mean	0.69	0.56	0.35	0.46	0.30	0.64	0.03	0.15	11.98	0.71	0.24	0.12
		std.	(0.699)	(0.497)	(0.479)	(0.499)	(0.461)	(0.481)	(0.166)	(0.353)	(4.089)	(0.456)	(0.427)	(0.320)
		medi	1	1	0	0	0	1	0	0	12	1	0	0
		nobs	460	460	460	460	460	460	460	460	460	460	460	460
	Married	mean	1.13	0.62	0.28	0.43	0.17	0.79	0.01	0.09	12.06	0.74	0.14	0.05
		std.	(0.401)	(0.484)	(0.450)	(0.495)	(0.375)	(0.407)	(0.120)	(0.291)	(2.950)	(0.438)	(0.343)	(0.221)
		medi	1	1	0	0	0	1	0	0	12	1	0	0
		nobs	4912	4912	4912	4912	4912	4912	4912	4912	4912	4912	4912	4912
	Divorced	mean	2.08	0.71	0.19	0.36	0.18	0.78	0.00	0.07	11.94	0.68	0.11	0.04
		std.	(0.270)	(0.453)	(0.394)	(0.481)	(0.387)	(0.415)	(0.033)	(0.256)	(2.686)	(0.466)	(0.313)	(0.206)
		medi	2	1	0	0	0	1	0	0	12	1	0	0
		nobs	920	920	920	920	920	920	920	920	920	920	920	920

Table 2: Marital Status and History in HRS

Marital Status		Percent of Population	
Age 30	1992	Men	Women
Single	Single	4.419	3.347
	Married	2.220	1.179
Married	Married	62.267	55.736
	Divorced	7.958	11.275
	Widowed	1.700	7.410
Divorced	Married	17.172	13.917
	Divorced	3.966	4.434
	Widowed	0.239	2.314

Table 3a: Wealth by Marital Status in 1992*

Sex	Marital Status in 1992	Statistic	Wealth in 1992: Home Equity	Wealth in 1992: Financial Assets	Wealth in 1992: Tangible Assets	Wealth in 1992: Net Worth	Income in 1992: Total Household Income	Income in 1992: Earnings of Head and Spouse	Income in 1992: Household Capital Income
Male	Single	mean	$34,180	$59,295	$83,615	$190,055	$30,999	$16,845	$8,152
		std.	(84713)	(210902)	(457945)	(706650)	(48680)	(18302)	(45005)
		medi	$0	$3,250	$3,000	$34,430	$21,200	$12,700	$0
		nobs	168	168	168	168	168	168	168
	Married	mean	$34,753	$33,450	$57,659	$134,673	$56,362	$40,548	$6,586
		std.	(47324)	(93929)	(207534)	(270600)	(49508)	(41588)	(24813)
		medi	$25,500	$7,500	$7,500	$61,500	$46,651	$34,000	$26
		nobs	4721	4721	4721	4721	4721	4721	4721
	Divorced	mean	$27,341	$34,471	$59,628	$129,239	$33,251	$23,994	$2,922
		std.	(54482)	(100956)	(302895)	(366307)	(45891)	(41017)	(12852)
		medi	$0	$1,000	$5,000	$30,311	$24,180	$16,000	$0
		nobs	463	463	463	463	463	463	463
Female	Single	mean	$25,309	$24,652	$13,355	$65,425	$25,682	$17,033	$1,679
		std.	(41418)	(78433)	(37544)	(127456)	(23746)	(19798)	(7248)
		medi	$0	$400	$2,000	$24,150	$20,040	$12,000	$0
		nobs	194	194	194	194	194	194	194
	Married	mean	$34,753	$33,450	$57,659	$134,673	$56,362	$40,548	$6,586
		std.	(47324)	(93929)	(207534)	(270600)	(49508)	(41588)	(24813)
		medi	$25,500	$7,500	$7,500	$61,500	$46,651	$34,000	$26
		nobs	4721	4721	4721	4721	4721	4721	4721
	Divorced	mean	$31,728	$18,434	$26,988	$84,005	$24,978	$15,288	$1,416
		std.	(64540)	(109365)	(145061)	(213192)	(22736)	(15603)	(11569)
		medi	$1,000	$100	$2,000	$23,500	$20,000	$12,000	$0
		nobs	857	857	857	857	857	857	857

*Wealth is reported in per-spouse units for married couples.

Table 3b: Wealth and Income by Marital History in HRS

		Marital Status at age 30		Marital Status in 1992: Married	Unmarried	Divorced
Net Worth Per Person	Male	Married	mean	$138,167		$133,248
			median	$65,000		$31,500
		Unmarried	mean	$139,417	$190,055	$137,332
			median	$51,500	$34,430	$28,462
		Divorced	mean	$107,257		$102,858
			median	$47,000		$29,656
	Female	Married	mean	$139,807		$80,244
			median	$65,500		$24,450
		Unmarried	mean	$116,803	$65,425	$81,818
			median	$43,025	$24,150	$33,400
		Divorced	mean	$114,578		$102,511
			median	$48,250		$14,500
Income Per Person	Male	Married	mean	$57,513		$32,750
			median	$47,400		$24,000
		Unmarried	mean	$54,206	$30,999	$30,210
			median	$43,612	$21,200	$22,250
		Divorced	mean	$50,590		$37,652
			median	$43,700		$26,250
	Female	Married	mean	$56,794		$25,679
			median	$47,000		$20,458
		Unmarried	mean	$56,844	$25,682	$33,718
			median	$45,116	$20,040	$31,600
		Divorced	mean	$54,085		$20,894
			median	$45,500		$13,834

Table 4: Household Wealth Regression Estimates For HRS 1992*

Variable		Statistic	Men Model 1	Men Model 2	Men Model 3	Women Model 1	Women Model 2	Women Model 3
Marital Status at Age 30	Single	Parameter Estimate	-0.289	-0.229	-0.263	-0.246	-0.141	-0.249
		Standard Error	(0.066)	(0.074)	(0.070)	(0.085)	(0.105)	(0.100)
		Pr > |t|	<.001	0.002	0.000	0.004	0.181	0.013
		t Value	-4.405	-3.074	-3.765	-2.891	-1.340	-2.500
	Divorced	Parameter Estimate	-0.170	-0.159	-0.120	-0.342	-0.326	-0.245
		Standard Error	(0.071)	(0.070)	(0.066)	(0.061)	(0.060)	(0.058)
		Pr > |t|	0.016	0.024	0.070	<.001	<.001	<.001
		t Value	-2.401	-2.262	-1.811	-5.617	-5.415	-4.224
Marital Status in 1992	Single	Parameter Estimate	.	-0.316	0.472	.	-0.462	0.099
		Standard Error	.	(0.140)	(0.141)	.	(0.169)	(0.167)
		Pr > |t|	.	0.024	0.001	.	0.006	0.554
		t Value	.	-2.255	3.346	.	-2.740	0.592
	Divorced	Parameter Estimate	.	-0.545	-0.158	.	-0.797	-0.473
		Standard Error	.	(0.077)	(0.077)	.	(0.066)	(0.066)
		Pr > |t|	.	<.001	0.040	.	<.001	<.001
		t Value	.	-7.061	-2.052	.	-12.101	-7.172
Log of Earnings in 1992		Parameter Estimate	.	.	0.500	.	.	0.451
		Standard Error	.	.	(0.022)	.	.	(0.021)
		Pr > |t|	.	.	<.001	.	.	<.001
		t Value	.	.	22.334	.	.	21.582
R-Squared			0.024	0.034	0.126	0.011	0.038	0.115

**Wealth is reported in log of per-spouse units for married couples. Top and bottom 1% of wealth distribution excluded. Age controls included in regressions,*

Table 5: Household Wealth Regression Estimates With Race and Education

Variable		Statistic	Men Model 1	Men Model 2	Women Model 1	Women Model 2
Marital Status at Age 30	Single	Parameter Estimate	.	-0.2765	.	-0.2697
		Standard Error	.	(0.07)	.	(0.10)
		Pr > |t|	.	0	.	0.0046
		t Value	.	-4.1549	.	-2.8369
	Divorced	Parameter Estimate	.	-0.0408	.	-0.1972
		Standard Error	.	(0.06)	.	(0.06)
		Pr > |t|	.	0.5149	.	0.0004
		t Value	.	-0.6513	.	-3.5769
Marital Status in 1992	Single	Parameter Estimate	.	0.3201	.	-0.0026
		Standard Error	.	(0.13)	.	(0.16)
		Pr > |t|	.	0.0168	.	0.987
		t Value	.	2.3926	.	-0.0163
	Divorced	Parameter Estimate	.	-0.1849	.	-0.5363
		Standard Error	.	(0.07)	.	(0.06)
		Pr > |t|	.	0.0116	.	0
		t Value	.	-2.5266	.	-8.4503
Log of Earnings in 1992		Parameter Estimate	0.3405	0.3366	0.3359	0.2974
		Standard Error	(0.02)	(0.02)	(0.02)	(0.02)
		Pr > |t|	0	0	0	0
		t Value	15.3045	14.8984	16.2711	14.159
Years of Education		Parameter Estimate	0.0828	0.0845	0.1109	0.1201
		Standard Error	(0.01)	(0.01)	(0.01)	(0.01)
		Pr > |t|	0	0	0	0
		t Value	5.9961	6.1187	7.5405	8.2188
High-School Graduate		Parameter Estimate	0.2748	0.2687	0.3193	0.2957
		Standard Error	(0.08)	(0.08)	(0.07)	(0.07)
		Pr > |t|	0.0004	0.0005	0	0
		t Value	3.5518	3.4767	4.3834	4.0869
Bachelor's Degree		Parameter Estimate	0.0996	0.0994	-0.0443	-0.0471
		Standard Error	(0.08)	(0.08)	(0.08)	(0.08)
		Pr > |t|	0.1933	0.1938	0.5933	0.5684
		t Value	1.3012	1.2995	-0.5341	-0.5705
Master's Degree		Parameter Estimate	0.1543	0.1703	0.1826	0.2202
		Standard Error	(0.08)	(0.08)	(0.10)	(0.10)
		Pr > |t|	0.054	0.0331	0.0574	0.0214
		t Value	1.9276	2.1311	1.9005	2.301
Black		Parameter Estimate	-0.0212	-0.0347	-0.4368	-0.3647
		Standard Error	(0.13)	(0.13)	(0.12)	(0.12)
		Pr > |t|	0.8734	0.7944	0.0003	0.0025
		t Value	-0.1593	-0.2606	-3.6027	-3.027
White		Parameter Estimate	0.6735	0.6361	0.387	0.3806
		Standard Error	(0.11)	(0.11)	(0.10)	(0.10)
		Pr > |t|	0	0	0.0002	0.0002
		t Value	5.9311	5.5895	3.7384	3.705

**Wealth is reported in log of per-spouse units for married couples. Top and bottom 1% of wealth distribution excluded. Age controls included in regressions, but coefficients not reported.*

Table 6: Ages at Marriage and Divorce in PSID Sample, by Marital Status When Young

Marital Status at Age 30	Statistic	Men: Age at First Marriage	Men: Age at End of First Marriage	Men: Age at Second Marriage	Women: Age at First Marriage	Women: Age at End of First Marriage	Women: Age at Second Marriage
Single	Mean	31.89	37.30	38.70	34.06	37.34	38.15
	Std. Dev.	(7.65)	(10.79)	(6.75)	(8.44)	(10.86)	(9.72)
	Median	33	36	39	34	37	40
	N	260	179	67	223	234	39
Married	Mean	22.92	44.27	45.33	21.01	46.97	44.41
	Std. Dev.	(2.88)	(10.46)	(9.26)	(3.16)	(11.09)	(8.50)
	Median	23	41	43	21	43	43
	N	1757	478	247	2139	865	172
Remarried	Mean	20.31	23.26	26.04	19.08	23.25	25.55
	Std. Dev.	(2.27)	(3.19)	(3.13)	(2.23)	(3.31)	(3.11)
	Median	20	24	27	19	22	26
	N	89	104	104	91	98	94
Divorced	Mean	21.66	28.11	34.13	19.87	27.81	33.65
	Std. Dev.	(2.72)	(5.88)	(7.39)	(3.26)	(6.82)	(8.98)
	Median	21	27	34	19	27	33
	N	309	322	262	634	646	439

Table 7: Wages and Hours by Age and Marital Status at Age 30*

SEX	Marital Status at Age 30	Statistic	Age 25-45			Age 46-65		
			Wage	Hours	Earnings	Wage	Hours	Earnings
Men	Never Married	mean	$23.95	2271.83	$53,605	$24.56	2109.45	$49,358
		std.	(14.610)	(611.040)	(36532.610)	(19.890)	(606.620)	(37423.190)
		median	$17.66	2070	$37,410	$17.66	2010	$36,727
		nobs	734	734	734	2561	2561	2561
	Married	mean	$20.95	2339.74	$47,680	$21.73	2158.75	$46,051
		std.	(12.760)	(605.800)	(28877.470)	(17.100)	(704.880)	(37312.210)
		median	$16.67	2205	$37,484	$16.24	2060.5	$33,874
		nobs	1950	1950	1950	6128	6128	6128
	Remarried	mean	$16.11	2265.44	$36,533	$13.11	2076.36	$27,100
		std.	(2.070)	(135.700)	(5313.840)	(2.830)	(368.340)	(5809.290)
		median	$18.89	2155	$42,427	$13.55	1960	$28,416
		nobs	11	11	11	49	49	49
	Divorced	mean	$17.02	2478.61	$39,925	$17.91	2196.65	$38,325
		std.	(7.810)	(628.650)	(16452.960)	(8.340)	(629.400)	(19228.830)
		median	$15.21	2247	$33,697	$16.56	2069	$33,581
		nobs	232	232	232	756	756	756
Women	Never Married	mean	$14.54	1414.33	$21,415	$12.47	1547.29	$19,625
		std.	(8.370)	(666.240)	(16333.770)	(8.180)	(640.740)	(13868.650)
		median	$7.91	1651	$11,526	$9.04	1785	$14,743
		nobs	326	326	326	1389	1389	1389
	Married	mean	$10.68	1316.9	$13,395	$11.92	1458.7	$17,106
		std.	(8.370)	(730.880)	(9787.060)	(9.910)	(709.020)	(14232.070)
		median	$8.08	1440	$10,809	$8.67	1600	$12,713
		nobs	1673	1673	1673	5947	5947	5947
	Remarried	mean	$9.28	1541.38	$13,596	$10.08	1443.76	$12,853
		std.	(3.120)	(545.650)	(5819.880)	(11.840)	(528.190)	(6564.050)
		median	$7.93	1825	$13,117	$7.25	1613	$11,269
		nobs	39	39	39	91	91	91
	Divorced	mean	$10.72	1786.14	$19,298	$11.06	1663.91	$18,553
		std.	(4.790)	(777.220)	(12324.180)	(6.920)	(562.000)	(11013.310)
		median	$8.07	1906.5	$13,448	$8.47	1821	$14,058
		nobs	422	422	422	1401	1401	1401

**Based on PSID sample aged between 45 and 65 in 1992*

Table 8: PSID Wage Level Regression Estimates*

Variable		Statistic	Men Model 1	Men Model 2	Men Model 3	Women Model 1	Women Model 2	Women Model 3
Marital Status at Age 30	Single	Parameter Estimate	-0.14634	-0.14745	-0.17997	0.00362	-0.0479	-0.05074
		Standard Error	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
		t Value	-3.72978	-3.73559	-4.67892	0.08068	-1.07617	-1.20637
		Pr > |t|	0.0002	0.0002	0	0.93571	0.2821	0.22794
	Divorced	Parameter Estimate	-0.09002	-0.09045	-0.08425	-0.16144	-0.183	-0.10846
		Standard Error	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
		t Value	-2.97009	-2.97867	-2.8606	-4.96552	-5.72312	-3.50767
		Pr > |t|	0.00305	0.00296	0.00432	0	0	0.00047
Log of Average Annual Hours, Age 25-30		Parameter Estimate	.	-0.01118	-0.01319	.	0.10856	0.0842
		Standard Error	.	(0.04)	(0.04)	.	(0.02)	(0.02)
		t Value	.	-0.26186	-0.31708	.	6.87259	5.56768
		Pr > |t|	.	0.79349	0.75125	.	0	0
High-School Graduate		Parameter Estimate	.	.	0.11837	.	.	0.10488
		Standard Error	.	.	(0.03)	.	.	(0.03)
		t Value	.	.	3.64449	.	.	3.00099
		Pr > |t|	.	.	0.00028	.	.	0.00275
Attended College		Parameter Estimate	.	.	0.12839	.	.	0.27046
		Standard Error	.	.	(0.03)	.	.	(0.03)
		t Value	.	.	4.71123	.	.	9.13666
		Pr > |t|	.	.	0	.	.	0
R-Squared			0.0192	0.0193	0.0812	0.0274	0.0692	0.1717

**Wage is reported in log units; non-working sample excluded. Intercept and age controls included in regressions, but coefficients not reported.*

Table 9: PSID Wage Growth from Ages 25-30 to 30-35

Variable		Statistic	Men				Women			
			Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Marital Status in 1992	Single	Parameter Estimate	-0.13362	-0.19632	-0.20882	-0.20616	0.00354	-0.0123	-0.02369	-0.02474
		Standard Error	(0.05)	(0.07)	(0.07)	(0.07)	(0.05)	(0.07)	(0.07)	(0.07)
		t Value	-2.561	-2.969	-3.150	-3.168	0.075	-0.186	-0.364	-0.380
		Pr > |t|	0.011	0.003	0.002	0.002	0.940	0.852	0.716	0.704
	Divorced	Parameter Estimate	-0.05708	-0.08032	-0.07822	-0.07434	-0.01017	-0.01221	-0.02826	-0.02956
		Standard Error	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
		t Value	-2.572	-2.799	-2.725	-2.643	-0.389	-0.343	-0.805	-0.841
		Pr > |t|	0.010	0.005	0.007	0.008	0.698	0.732	0.421	0.401
Marital Status at Age 30	Single	Parameter Estimate	.	0.06731	0.05782	0.02192	.	0.01803	0.05075	0.04958
		Standard Error	.	(0.04)	(0.04)	(0.04)	.	(0.05)	(0.05)	(0.05)
		t Value	.	1.54179	1.32101	0.50557	.	0.34465	0.97735	0.95489
		Pr > |t|	.	0.12353	0.18689	0.6133	.	0.73046	0.32872	0.33995
	Divorced	Parameter Estimate	.	0.04151	0.03172	0.02548	.	0.00513	0.00137	0.00625
		Standard Error	.	(0.04)	(0.04)	(0.03)	.	(0.04)	(0.04)	(0.04)
		t Value	.	1.179	0.897	0.734	.	0.136	0.036	0.165
		Pr > |t|	.	0.239	0.370	0.463	.	0.892	0.971	0.869
Work History Ages 25-30	Log of Labor Income	Parameter Estimate	.	.	-0.06174	-0.11195	.	.	-0.09948	-0.11576
		Standard Error	.	.	(0.03)	(0.03)	.	.	(0.03)	(0.03)
		t Value	.	.	-1.990	-3.533	.	.	-3.263	-3.506
		Pr > |t|	.	.	0.047	0.000	.	.	0.001	0.000
	Log of Hours Worked	Parameter Estimate	.	.	-0.06287	-0.05482	.	.	-0.11063	-0.11051
		Standard Error	.	.	(0.05)	(0.05)	.	.	(0.03)	(0.03)
		t Value	.	.	-1.277	-1.134	.	.	-3.415	-3.412
		Pr > |t|	.	.	0.202	0.257	.	.	0.001	0.001
High-School Graduate		Parameter Estimate	.	.	.	0.03936	.	.	.	-0.01133
		Standard Error	.	.	.	(0.03)	.	.	.	(0.03)
		t Value	.	.	.	1.340	.	.	.	-0.327
		Pr > |t|	.	.	.	0.181	.	.	.	0.743
Attended College		Parameter Estimate	.	.	.	0.1128	.	.	.	0.04268
		Standard Error	.	.	.	(0.02)	.	.	.	(0.03)
		t Value	.	.	.	4.625	.	.	.	1.476
		Pr > |t|	.	.	.	0.000	.	.	.	0.140
R-Squared			0.0161	0.02	0.0277	0.0687	0.0122	0.0123	0.0496	0.0525

Table 10: Calibration of Benchmark Model

Statistics	Parameter	Benchmark	Data
First Period Income of Single Females as a Fraction of Married Couples	$\sigma = -0.5$	0.34	0.35
Per Person Hours of Work	$\delta = 1.1$	0.34	0.33
Fraction Married in First Period	$\gamma_1 = 0$	0.83	0.83
Fraction Never Married in Second Period	$\gamma_1 = -0.8$	0.055 -0.07	0.03-0.04
Fraction of Intact Marriages in Second Period	$\pi_d = 0.75$	0.62	0.56-0.63
Fraction Remarried in Second Peirod	$\pi = 0.5$	0.15 - 0.17	0.14-0.17
Second Period Wealth/First Period Income	$\beta = 0.73$	0.62	0.61

Table 11: Marital Status and History in Benchmark Economy

Marital Status		Percent of Population	
Period 1	Period 2	Men	Women
Single	Single	5.50	7.00
	Married	11.40	9.90
Married	Married	62.20	62.20
	Divorced	5.50	4.00
	Remarried	15.30	16.90

Table 12: Marital Status and Labor Supply in Benchmark Economy

Marital Status		Males		Females	
Period 1	Period 2	Period 1	Period 2	Period 1	Period 2
Single	Never Married	0.37	0.19	0.34	0.36
	Divorced		0.22		0.23
Married	Intact Marriages	0.42	0.26	0.27	0.11
	Newly Married		0.30		0.11

Table 13: Marital Status and Savings Rates in Benchmark Economy

Marital Status		Males		Females	
Period 1	Period 2	Period 1	Period 2	Period 1	Period 2
Single	Never Married	0.27	0.38	0.18	0.38
	Divorced		0.38		0.38
Married	Intact Marriages	0.36	0.38	0.36	0.38
	Newly Married		0.38		0.38

Table 14: Second Period Median Wealth Per Capita in Benchmark Model*

Marital Status in the Second Period	Data	Model	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Males						
Married	1.00	1.00	1.00	1.00	1.00	1.00
Unmarried	0.50	0.52	0.63	0.96	1.20	1.00
Females						
Married	1.00	1.00	1.00	1.00	1.00	1.00
Unmarried	0.40	0.30	0.55	0.72	0.82	0.65

In Experiment 1, there are no economies of scale and the marriage decisions are same as the benchmark economy. In Experiment 2, there are no economies of scale, first period marriage decisions are as in the benchmark economy and first-period marital outcomes are permanent. In Experiment 3, there are no economies of scale, the first-period marital outcomes are permanent, and first period matching is random. In Experiment 4, all marriage decisions are exogenous

Table 15: Second Period Median Wealth Per Capita*

Marital History in the Second Period	Data	Model
Males		
Old Marriage	1.00	1.00
Newly-Married	0.79	0.68
Remarried	0.72	0.80
Never Married	0.52	0.47
Divorced	0.48	0.59
Females		
Old Marriage	1.00	1.00
Newly-Married	0.67	0.52
Remarried	0.74	0.81
Never Married	0.37	0.32
Divorced	0.37	0.37

Table 16: First Period Savings Rates by Marital Status*

Marital Status in First Period	Benchmark		Experiment 4	
	Men	Women	Men	Women
Single	0.27	0.18	0.24	0.04
Married	0.36	0.36	0.34	0.34

**in Experiment 4, marital outcomes are given by exogenous stochastic process with conditional probabilities set to match benchmark economy.*

Figure 1: First Period Matches with a Bad Shock

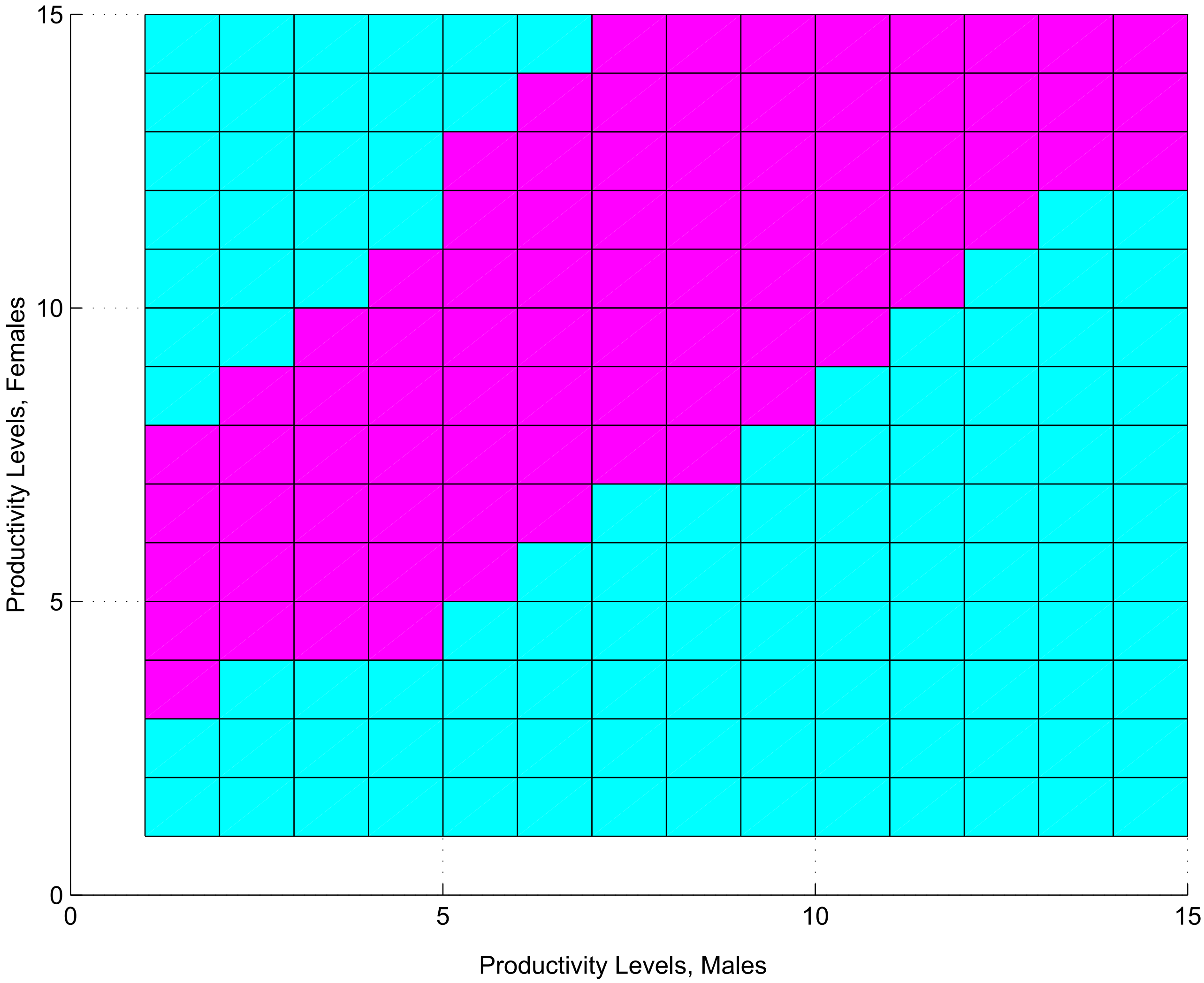

Figure 2: Distribution of Females

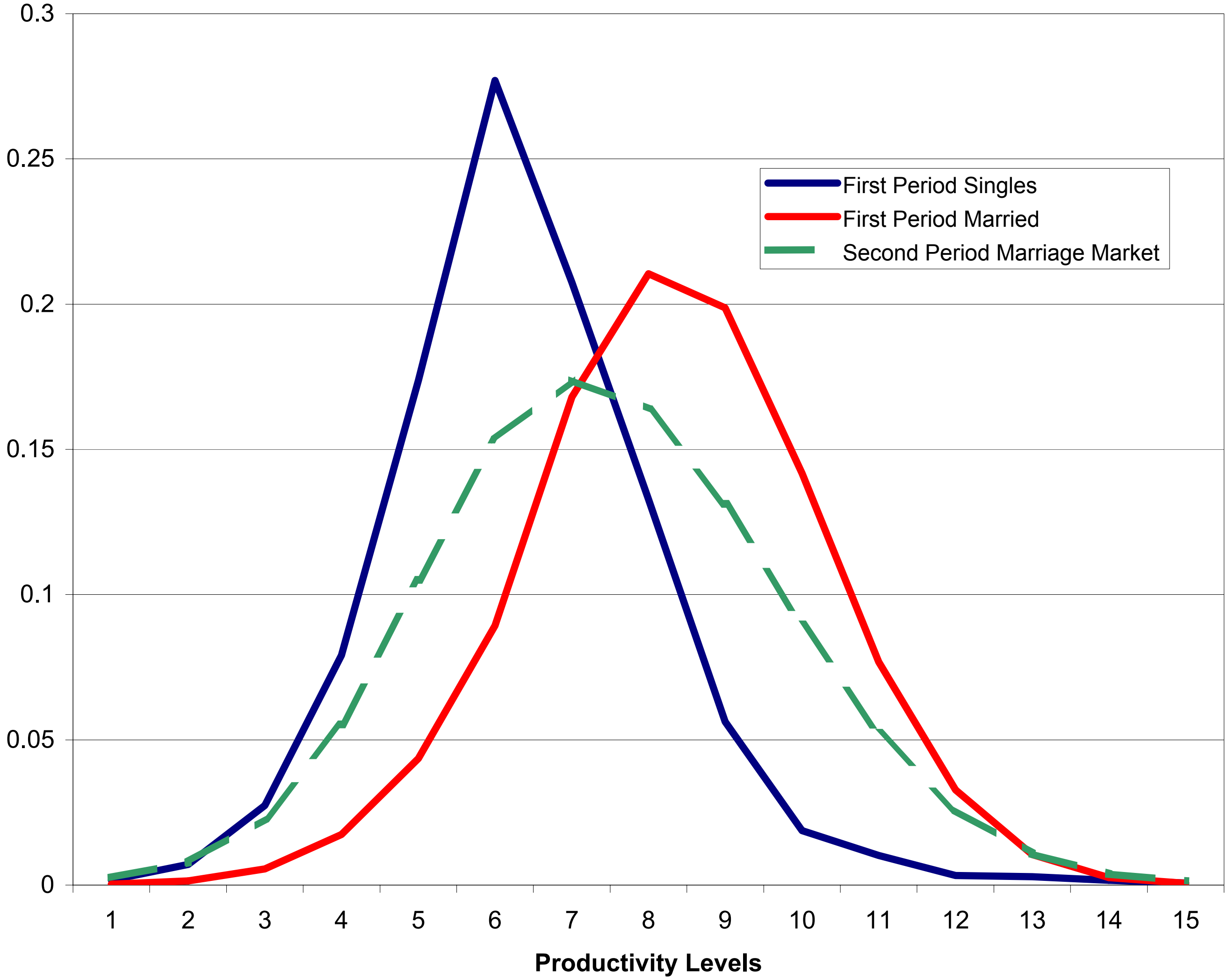

Figure 3: Second Period Matches by Wealth with a Bad Shock
fixed levels of productivity