

## **The Economics of Marriage**

**Introduction to a volume in the International Library of Critical Writings in Economics**

**by Shoshana Grossbard**

**San Diego State University and IZA**

Since it was introduced by Gary Becker in the mid-1970s the economics of marriage has grown to the point that it now warrants an edited volume in the International Library of Critical Writings in Economics. However, most departments of economics still don't offer courses on this topic: economics of marriage and economics of the family typically do not belong in mainstream economics. This volume will hopefully help the economics of marriage move closer to the core of economics. I have chosen these articles based on their influence, how easy they are to read, and how well they bring forth the economic importance of marriage and related institutions. Even though most of the articles included here deal with the formation and dissolution of heterosexual marriages, this collection also includes articles on dating same-sex couples.

The volume is divided into two parts: Part I deals with explaining marriage and related outcomes: cohabitation, matching, explicit prices at marriage (brideprice and dowry), divorce, and polygamy. Part II is about consequences of marriage and marriage markets for labor supply, household production, wages, consumption, household finance, education, and fertility. The subject matter of the articles in the various sections often overlap. Many of the sections contain an article dating from the first decade of economics of marriage--a "classic"--and materials published in the last fifteen years based on state-of-the arts models.

### **PART I. Explaining Marriage and Related Outcomes**

Outcomes considered here are: marriage, cohabitation, divorce, and how people match. To the extent that marriage markets operate and establish explicit prices, what explains these prices? The section on divorce also examines law and economics questions.

#### **I.A. Marriage and Cohabitation: "Who Marries?" and "Who Cohabits?"**

The first section of a volume on the economics of marriage naturally starts with studies aimed at explaining why people marry or live together in unmarried couples (cohabitation) or domestic partnerships. The first two articles are by Nobel laureate Gary Becker who pioneered the economics of marriage. Originally published in the *Journal of Political Economy* in 1973 and 1974 these articles have also appeared as chapters in T.W. Schultz's (1974) *Economics of the Family*, Becker's (1976) *Economics of Human Behavior*, and in the volume on economics of the family that Nancy Folbre (1996) prepared for this series. Most materials in these two articles were integrated in Becker's (1981) *Treatise on the Family*, one of the most cited publications by economists, but some were not, including a marriage market model that could be relabeled a hedonic market model and that Becker considered important (Grossbard 2010).

Becker's theory of marriage is part of *The New Home Economics* that he started with Jacob Mincer a decade before he published the theory of marriage (Becker 1960, Mincer 1962) and that introduced the idea that households are small non-profit firms. In light of this analogy Becker assumes in his

theory of formation of firms called 'marriages' that when two individuals form such firm it is like a business merger.

Becker assumes that production in marriage is at the household level and that once married, individuals pool all their resources and form a firm together, the firm being like a collective. At the same time, Becker's economic models of marriage assume individual decision-making. Each individual compares what he or she can produce and consume on their own and the portion of the firm that they would gain access to if they marry a particular partner. More specifically, in this essay Becker assumes that (1) what they would get if married is a portion of the marital household income that they would produce and (2) this portion is determined by a distribution rule influenced by market forces.

Becker's two articles on marriage contain a few models, including two marriage market models in the essay included here. Both involve Demand and Supply (D&S) models, market equilibria and transferable utility. Both lead to the derivation of optimal implicit prices and quantities and to allocative efficiency. Becker emphasizes how these models can also help analyze intra-marriage distribution problems by placing them in a section entitled 'Division of Output between Mates'.<sup>1</sup> These models lead to the first derivation of a sex ratio effect on personal consumption of wives and husbands, where sex ratios are defined as the ratio of men to women. The second D&S model, a micro partial equilibrium model, is presented graphically for one particular type of man and one type of woman, with multiple types of men and women participating in separate but inter-related markets. In each market there are many homogeneous women and homogeneous men. In more recent terminology, this model can be labeled as "hedonic".<sup>2</sup> Here demand and supply are reminiscent of the ones found in standard labor economics models, which makes it easier to grasp that the individuals in those markets have an implicit price in marriage that is influenced by marriage market conditions. The sequel to this article, Becker (1974), includes an economic analysis of polygamy and introduces love and caring into economic models of marriage.

The next essay is by Michael Keeley, a student of Becker at the University of Chicago in the 1970s. It is the first application of search theory to marriage and the dissertation on which it is based is the first econometric study of marriage analyzing individual data. Keeley introduces the concept of 'marital wage', defined as an individual's share of potential marital output. As in Becker's articles this wage does not depend on how much an individual contributes to the household's production. Keeley models the decision to continue to search for a mate, and age at marriage, as functions of the asking marital wage and the offers received from potential mates. His marriage markets are similar to those in Becker's micro-level marriage markets, and the search theory he uses was inspired by the search-theoretical models of the labor market pioneered by another one of his professors at Chicago, George Stigler(1962). Wages, education, urbanization and more variables enter the model by influencing the costs and benefits of search and most results are in line with theoretical predictions. Around the same time Keeley also published another article based on his dissertation: an analysis of age at first marriage using state data and a then novel technique: a two-stage estimation procedure (Keeley 1979). Soon after publishing these important articles Keeley dropped out of the field of economics of marriage.

The last three articles on the determinants of marriage and cohabitation that appear in Section I.A were first published about thirty years after Becker's and Keeley's. By then economic analyses of marriage had followed a trend also found in other applications of labor and household economics: a stronger emphasis on data and econometrics. These three recent articles are mostly of an empirical

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<sup>1</sup> More on Becker's theories of marriage in a comparative perspective can be found in Grossbard (2010).

<sup>2</sup>Hedonic markets were first introduced by Sherwin Rosen (1974), after Becker published this theory of marriage.

nature and analyze large sets of individual data. The first two essays point to factors that help explain low marriage rates in the United States.

In the USA blacks have experienced lower marriage rates than whites. "Shedding light on marriage" by Darrick Hamilton, Arthur Goldsmith and William Darity reveals that within the black community skin color affects marriage rates. Using the Multi City Study of Urban Inequality, which records three skin shades of black for black respondents (light, medium and dark), the researchers show that relative to young women (29 or younger) with medium and dark shades, light black young women are more likely to be married. This suggests that light skin is a trait valued in the marriage markets in which they participate. This suggests the existence of colorism as a form of discrimination that makes it more difficult for black women to succeed in marriage markets.

Hamilton et al. also examined how type of black is associated with husband characteristics. For that purpose they used the American Community Survey. Comparing women who reported themselves as blacks (and no other race) and mixed blacks (who reported being both black and white) they found that the husbands of mixed women were more educated and had higher earning occupations. Women's advantages from being mixed were only found for groups who were relatively advantaged: those who lived with both parents at age 16, those whose family did not receive welfare, those whose family attended church when they were 16, high school graduates, and those who had been US residents at age 16. The article also presents a search model of marriage.

Imbalances between the number of men and women seeking marital partners could also affect marriage rates. Previous studies have shown that marriage rates are positively associated with sex ratios defined as number of men to number of women. However, these associations could be spurious rather than causal. In "Male Incarceration, the marriage markets, and female outcomes" Kerwin Kofi Charles and Ming Ching Luoh set out to prove that low sex ratios cause lower marriage rate, using incarceration of men as an exogenous determinant of sex ratios in marriage markets. They find that lower sex ratios in marriage markets defined by race, age, and location that are due to higher incarceration rates are associated with a lower likelihood that women marry, a higher likelihood that women marry down in terms of their education level, and a lower likelihood of marrying up. These findings confirm the insights from earlier studies that examined how marriage rates vary with exogenous variation in sex ratios due to changes in the size of birth cohorts over time, when differences in men and women's age at marriage remain close to constant (see Heer and Grossbard-Shechtman 1981).

Furthermore, as they expected, Charles and Luoh find that poorer marriage prospects due to higher incarceration rates drive women to participate more in the labor force. This finding also confirms previous research using exogenous variation in sex ratio due to changing cohort size: the larger the size of their birth cohort relative to that of preceding cohorts, the higher women's participation in the labor force (see article by Grossbard and Amuedo-Dorantes in Section II.A of this volume). Charles and Luoh also find that the higher the incarceration rate the higher the fraction of women with any college training. Likewise, when first baby-boomers were ready to start their university studies in the 1960s and 1970s, unprecedented numbers of men were missing due to the small cohort size of the previous birth cohorts. This exogenous variation in sex ratios was also associated with big increases in women's relative college attendance (Heer and Grossbard-Shechtman 1981).

The final article in Section I.A, by Lee Badgett, Gary Gates and Natalya Maisel, applies economic analysis to study the determinants of domestic partnerships among same-sex couples in California in 2003, before same-sex marriage was legalized. The authors compare such partnerships to three alternatives: single status and no partner, a partner without cohabitation, and cohabitation without a domestic partnership agreement. They find that the factors explaining the likelihood that same-sex men are in domestic partnerships differ from those explaining such partnerships among

lesbians, and that when the same factor is statistically significant in regressions of relationship status of same-sex men and women its effects on men and women have opposite signs: college education increases and being black decreases the likelihood that women are in domestic partnerships rather than single, but these variables have no impact on men's relationship status; illness and unemployment decrease men's likelihood of being in domestic partnership but do not affect women's relationship status; income is positively associated with domestic partnership among men but negatively among same-sex women; and the presence of at least one child increases the likelihood that women are in domestic partnerships but reduces men's probability. These results suggest that differences between men and women affect not only heterosexual marriages but also committed same-sex relationships.

### **I.B. Matching Patterns: "Who Marries Whom?"**

While focusing on the question "Who marries?" most of the articles in Section I.A also addressed matching: they also asked "Who marries whom?" However, matching was not their principal focus. In contrast, in this section the questions "Who marries whom?" and "Who dates whom?" take central stage. The section opens with my 1976 article on polygyny developed at the University of Chicago in 1974-76 while I was writing my dissertation under the principal guidance of Becker and Edward Lazear. The article addresses the questions "Who marries whom?" and "How is this matching related to polygamy?". My theoretical framework examines how individual characteristics of both men and women influence the number of wives in a household. In contrast, in his 1974 article included in Section I.A of this volume Becker analyzes how men's characteristics are likely to influence the likelihood of polygamy while assuming that women's characteristics are constant.

While working on my dissertation about polygamy in Maiduguri, Nigeria, I read that among the Kanuris (the main tribe there) women had restricted access to resources and jobs. Their families lived in compounds, with each wife having her own little house (see Cohen 1971). Divorce was common and custody rights over children naturally belonged to fathers, so children were not household public goods. These realities characterizing a polygamous society led me to diverge from Becker's assumptions in another sense. Becker's models of marriage assume that marriages are partnerships between men and women. They are firms without workers. Instead, I assumed that husbands are employers of women working for them in household production. In line with the independence behind decision-making by the workers and firms inhabiting labor economics models, I assumed that cohabiting husbands and wives are independent decision-makers.<sup>3</sup>

This led me to adapt mainstream labor economics models to the male-controlled non-profit firms called 'marriages' in Maiduguri. The marriage markets in Grossbard (1976) are markets for women's work in marital household production benefiting a spouse called 'wife labor' in the article. More recently I have been using the gender-neutral term 'Work-in-Household' (WiHo) to describe any household production benefiting a spouse (Grossbard 2015a). Wife labor is thus one kind of WiHo. "WiHo work has an implicit price, which I called "wife-wage" in the gender-biased context of Maiduguri. Such an equilibrium 'price' is set in each sub-market defined by type of men and women and guides their matching into monogamous or polygynous (multi-wives) marriages. The analysis leads to testable predictions regarding the effects of various characteristics of men and women on the number of wives in the household. Borrowing on traditional analyses of markets for skilled and unskilled labor, assortative mating between a skilled man/employer and a skilled woman/worker is

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<sup>3</sup> If they married very young their parents could represent them in negotiations with potential spouses or their families.

<sup>4</sup> Individuals can also perform WiHo in couples that are egalitarian or female-dominated.

considered as an alternative for multiple marriages between one skilled man/employer and a number of unskilled women/workers.

The empirical implementation consists of regressions of number of wives that simultaneously include characteristics of men and women. In line with Becker (1974) the results indicate that the wealthier and the more educated the men, the higher the number of wives in the household. I predicted that for women education would have the opposite effect: I modeled educated wives as the equivalent of skilled labor in labor markets and expected them to get paid better for their WiHo and thus to earn more monogamous privileges when keeping the characteristics of men and other women's characteristics constant. I found that more educated women had fewer co-wives: a smaller amount (only one wife) of skilled labor seems to be as productive as a larger amount (more than one wife) of unskilled labor. Age also has different effects on the likelihood that men and women are part of a polygynous household. Women aged 21 to 23 are the least likely to have co-wives. This appears to correspond to the age of peak female fertility at that time in Maiduguri, when women often married by age 13 and women in their thirties were considered old. For men peak polygyny was found at ages 43 to 46, which may correspond to peak earnings.

The rest of the articles in Section I.B were originally published at least 30 years later. The first, "Who Marries Whom and Why?", is by Eugene Choo and Aloysius Siow. Like Keeley and I, Siow was a student of Becker at Chicago. The theory part of the article expands on Becker's micro D&S model presented in section I.A that I have relabeled a hedonic marriage market model. Like all D&S models it is a transferable utility model. The model generates a nonparametric marriage matching function with spillover effects (aka substitution effects) that will fit any cross-section marriage distribution. It exploits a property of transferable utility models, namely that they maximize the sum of marital outputs in the society, to specify a just-identified econometric model of the marriage market. However, it is not known how restrictive the substitution effects are on the marriage matching function.

The model is used to estimate U.S. marital behavior at two points in time: in 1971/72 and in 1981/82, with markets for men and women being defined by age. The marriage matching function estimates show that the gains to marriage for young adults fell substantially over the decade, as did actual marriage rates. However, the estimated reduction in marriage rates is substantially smaller than the drastic fall that was observed. The marriage matching function estimates also show that the legalization of abortion had a significant quantitative impact on the fall in the gains to marriage for young men and women. Estimates of the number of marriages affected by this legalization are sensitive to whether the authors use male or female marriage rate regressions. When they extend the benchmark model to include individual state of residence and whether the state allowed abortions, they find that the partial legalization of abortion in some states can explain up to 20% of the drop in the gains from marriage among young adults in the period under study.

The next paper in this section, "Matching and Sorting in Online Dating" by Gunter Hitsch, Ali Hortacsu and Dan Ariely, studies the economics of match formation using data for Boston and San Diego obtained in 2003 from a major online dating service. First the authors measure preferences based only on data for the users and the persons they first contact. These preferences regard age, height, BMI, income, education, and ethnicity. They also construct an index of physical attractiveness based on ratings for the photos posted by the site users. This measure is based on the evaluations (on a scale from 1 to 10) provided by 100 students, each photo having been evaluated by 11 students on average. They then use the observed mate preferences to estimate a matching model based on Gale and Shapley (1962) to predict the observed matching outcomes obtained on the Web site, where an online match is defined as an exchange of information leading to an offline meeting. The observed correlations in age largely agree with the correlations in the

predicted matches. However, the model under-predicts the average male/female differences in BMI, income, and education.

Hitsch and his co-authors also attempt to use the preferences based on first contacts on the dating internet site to explain sorting patterns among dating and married couples. Here they assume that the users of their dating site in 2003 do not differ in their mate preferences from the respondents to a national survey interviewed around the same time. Their model predicts matching by age but it under-predicts matching by most other attributes they included in their model—height, weight, looks, race and education—and over-predicts matching by income and imputed income. They offer some explanations for the under-predictions, including the existence of meeting opportunities for people with same attributes to meet (they call that ‘search frictions’) and the fact that the Gale-Shapley model is a nontransferable utility framework. Marriages may be better described by a transferable utility framework. More specifically, a transferable utility model that includes possible exchanges between income and Work-in-Household benefiting a spouse could simultaneously explain why people with similar levels of education marry each other (their WiHo productivities are complementary) and why marriages often include two spouses who are not well-matched in terms of their actual or imputed income (the lower-earning spouse may supply WiHo to the higher-earning spouse).

In "Fatter Attraction: Anthropometric and Socioeconomic Matching on the Marriage Market" Pierre-André Chiappori, Sonia Oreffice and Climent Quintana-Domeque analyze data from the Panel Study of Income Dynamics (PSID) on body mass index (BMI) and socioeconomic characteristics of married men and women. Previous studies such as Mukhopadhyay (2008) showed that BMI was associated with a lower likelihood of being in a relationship, but did not control for partner or spouse’s attributes. Likewise, Hamermesh and Biddle (1994) showed that physically unattractive women are matched with less educated husbands, but they did not fully control for all the relevant characteristics of both husband and wife.

Chiappori, Oreffice and Quintana-Domeque consider a multidimensional matching framework, where all individuals have the same preferences regarding the opposite sex, which implies the existence of one “attractiveness index” for men and one for women. They also assume separability of observable characteristics and conditional independence. As a result, when two individuals of the same sex differ in their observable characteristics but they have the same attractiveness index and the same unobservables, they will be perfect substitutes on the marriage market, while if two individuals have the same index their unobservable characteristics are drawn from the same distribution. In addition, male and female trade-offs between their partners' characteristics are overidentified. One model satisfying these assumptions is the additively separable one. In this case, the male and female index are each a sum of their characteristics. Linear regressions estimated by the authors include one characteristic of men or women as the dependent variable and other characteristics of the spouse and own age on the Right-Hand-Side.

Chiappori et al. regress the various characteristics of male  $i$  over the characteristics of  $i$ 's wife, say  $j$ , on the sample of married couples. They estimate simultaneously for all characteristics of men using seemingly unrelated regressions (SUR), and also estimate similar regressions for women. Their results are summarized in Table 2, including two SUR regressions for wife’s BMI and education, controlling for husband’s wage, husband’s BMI, own age and state fixed effects. Regardless of whether number of children and a number of other variables are included or not, the authors find that wife’s BMI is negatively related to the husband’s log wage and positively to his BMI, whereas her education exhibits the opposite patterns. His wage thus seems to add to a man’s attractiveness while excess weight seems to reduce it. Table 3 presents corresponding regressions for husband’s BMI and wage. The husband’s BMI is negatively related to wife’s education and positively to her BMI, whereas husband’s log wage exhibits correlations of opposite signs. The assumptions made by

Chiappori, Oreffice and Quintana-Domeque allow them to overidentify the trade-offs between individual characteristics for each spouse. For instance, on average an additional year of women's education may compensate up to two BMI units, and men may compensate a 1.3-unit increase in BMI with a 1 percent increase in wages. Linear regressions of one individual characteristic (number of wives or co-wives) and multiple observable characteristics of husband and wife on the Right-Hand-Side were first introduced in Grossbard (1976). Among the improvements over this earlier methodology offered by Chiappori, Oreffice and Quintana-Domeque is the ability to identify trade-offs between the various characteristics of a spouse.

### **I.C Who Pays at Marriage?**

This section starts with a note containing the oldest economic analysis of marriage: Martin Bronfenbrenner's "Note on the Economics of the Marriage Market", published in the *Journal of Political Economy* in 1971, two years before Becker's first article. Even though it is barely a page long it is an important article due to its pioneering nature and the thought-provoking ideas it contains. Bronfenbrenner had a distinguished career that started with a Ph.D. in economics from the University of Chicago and spanned more than half of the twentieth century. He was intrigued by his observation that in India in some castes monogamy and dowries prevailed whereas in other castes there was polygamy and bride prices were paid. In other words, sometimes the bride or her parents paid (dowry) and sometimes the groom or his parents (bride price). He suggested that the probability of a positive bride price will be greater when (1) there is more polygamy; (2) the wife is expected to work harder for the benefit of the husband (in household production or in his business); (3) there are few substitutes for wives as sexual partners; (4) the sex ratio is higher; and (5) men have more of a demand for healthy sons willing to provide for them in old age. He does not expand on most of these hypotheses, but mentions that in Calcutta the laundrymen seem to marry their labor force, thereby generating a relatively high demand for wives. In line with prediction 2, this helps explain why these laundrymen tend to pay to get married whereas in most of India married women don't work as hard in their husbands' business and typically they and their relatives have to pay a dowry to get married.

Bronfenbrenner also briefly identifies a price dimension in marriages in industrialized societies when he mentions some of the fringe burdens and benefits that come with marriage. Contracts are typically not drawn up, leaving room for misunderstanding between husbands and wives regarding the specific performances associated with certain privileges. (On the subject of marriage contracts also see the next section on divorce )

Again, a relatively old article is followed by a recent one: "The Economics of Dowry and Brideprice" by Siwan Anderson. She starts by surveying the prevalence of brideprice in contemporary less developed countries. Dowries paid by women or their families are less than bride price systems. Anderson lists social and family characteristics associated with each type of marriage payment.

Anderson discusses economic explanations, focusing on three topics: dowry versus brideprice, rising prices at marriage, and the effect of property rights on marriage payments. She associates the increasing emergence of dowry payments with rising quality differentiation amongst grooms when brides remain relatively homogeneous. Among the factors associated with dowry inflation are marriage squeezes for women. As also discussed in Heer and Grossbard-Shechtman (1981) baby booms cause marriage squeezes for women, given that men tend to be older than women when they marry. As for the welfare implications of marital payments, Anderson observes that bride prices are linked to violence against women and thinks such prices are unlikely to benefit women. She sees African women's rights campaigns for the abolishment of the practice as evidence that women don't

benefit from bride price systems. Dowry systems are also associated with violence against women in current-day South Asia. Perhaps further research will establish which of these systems is less conducive to domestic violence.

## **I. D Divorce and Divorce-related Laws**

A relatively high proportion of all articles on the economics of marriage deal with the economics of divorce. The law and economics of divorce was pioneered by Becker, Elizabeth Landes and Robert Michael (1977). I chose Anne Laferrère's "Marriage Settlements" as the first article in this section because it presents a careful study of initial choice of marriage contract with implications for divorce settlements. The article exploits a unique feature of legal marriage in France: when getting married, couples can choose between a common or separate property marriage. The default is common property and implies that in case of divorce or death all the assets accumulated during the marriage are the couple's joint property. Couples who choose to marry with a "marriage contract" opt for separate property: there is no common property in case of dissolution. Laferrère offers a theoretical model leading to predictions as to who will opt for separate property instead of common property. The model is then tested using French data from the early 1990s.

To the extent that the choice of a property regime is motivated by considerations regarding widowhood it is predicted that the higher the risk that the wife survives the husband and the lower her expected earnings, the more a common property regime is likely to be chosen. Separate property is more likely to be chosen if the husband has children from a previous union. The higher the risk of divorce and the higher the individual wealth or human capital of one of the spouses, the more a separate property regime is likely to be chosen. All predictions are supported. For instance separate property contracts are more likely if the husband has a child from a previous union, but whether the wife has her own child does not make a difference. The more women work outside the home, the more educated the spouses, the more difference between them, the more separate property contracts are likely to be observed.

Given that choice of property regime, wife's labor force participation and number of children are all endogeneous, Laferrère also estimates a two-stage least squares model of wife's career, number of children, and choice of contract. It is found that the choice of contract influences future career decisions but does not influence fertility. The second article in this section offers a useful and practical summary of many of the major findings from the economic literature on the determinants of divorce. Evelyn Lehrer's "Economics of Divorce" starts with a brief overview of the negative consequences of divorce for women's financial well-being and for children's overall well-being that have been documented in the literature. Her focus is on individual characteristics of spouses and children. The evidence indicates that men with higher earning potential have more stable unions, but an increase in women's earning capacity seems to have a destabilizing effect. The role of education is stabilizing regardless of whether it is her education or his; if both are more educated the marriage has an even better chance to last. Divorce is less likely if husband and wife are similar in age; in contrast, large differences in age are destabilizing, especially if the wife is older than the husband. As for religion, if both spouses are of the same religion their union is more stable. The destabilizing effect of religious intermarriage is especially large if the two religions are more dissimilar and if one or both partners belong to exclusivist religions. What also contributes to higher divorce rates are non-intact family background and childlessness. The presence of young children and boys seems to stabilize marriages more than that of children six years old or older and girls. Presence of a child who is ill or disabled or was born in a previous marriage reduces marital stability. In addition, Lehrer reviews some of the literature on women's labor force activities and divorce and on whether marital instability is related to cohabitation prior to marriage. Finally she reviews the literature on the

differences in the expected stability of first marriages and remarriages. For example, she reports that first marriages that are entered at early ages are more unstable, but the opposite is the case for remarriages.

The last paper in this section, Justin Wolfers' authoritative analysis of the effect of unilateral divorce laws on divorce rates, is one of the latest in the large literature on effects of unilateral and no-fault divorce laws. Becker (1981) first investigated such effects: based on the Coase theorem he expected that the introduction of unilateral divorce would not affect divorce rates in the long run. Wolfers first reviews the literature, especially the difference-in-difference analysis of Leora Friedberg who had concluded that the introduction of new divorce laws led to an increase in divorce. Her analysis was based on data from 1968 to 1988, and the first unilateral divorce laws were introduced in 1970. Wolfers is concerned that Friedberg's state-specific trends picked up not just preexisting trends but also the effects of policy. To better separate between preexisting trends and effects of legal change he lengthens the time series and adds dummy variables for specific years after policy change. He finds small positive effects of unilateral divorce laws on the divorce rate over the decade following the adoption and even smaller and sometimes negative effects more than ten years later. Wolfers brings up the possibility that these findings may reflect a shift to earlier divorce or a convergence in divorce norms across the various states, leading divorce rates to rise faster in control states than in the states that experienced legal change. Alternatively, it could be that in those states that introduced unilateral divorce and where divorce rates first increased, there was a learning process leading later generations in those states to be more careful about whom they marry in order to minimize the likelihood of divorce. One of Wolfers' major conclusions is that changed divorce laws contributed very little to overall trends in divorce in the United States. This is consistent with Becker's interpretation of the Coase theorem. Bargaining between spouses appears to be widespread and in the long run whether the law empowers those who want to quit or those who want to stay makes little difference.

### **I.E. Polygamy**

The institution of polygamy provides interesting applications of economic analysis since in societies allowing polygamy one of the restrictions imposed on marriage markets is removed. It is particularly interesting to compare societies with and without polygamy. Becker (1973) was the first to provide an economic analysis of this institution, one of the highlights of his analysis being the prediction that women are better off in polygamous (polygynous) societies due to the larger market demand for the available women. Barbara Bergmann, who passed away in 2015 while I was writing this introduction, disagrees with Becker's analysis of the value of polygyny to women in her essay on "Becker's theory of the family", the first essay in this section originally published in 1995.

Bergmann starts by criticizing Becker's conclusion based on a market analysis assuming that all men are the same and all women are the same. If there are more women than men Becker had concluded that the entire gain from marriage will go to men: women who are overabundant will compete with each other and end with a welfare level that is the same regardless of whether they marry or not, while the relatively scarce men capture the entire gain from marriage. If polygyny is legal, men will consider taking a second wife. Their demand increases and the new market equilibrium will be at a point where women, who are now relatively scarce, capture the entire gain from marriage. Bergmann writes that Becker's "analysis must be grossly incomplete because it appears to prove propositions which we know to be false" in light of the low status of women in societies allowing polygyny. She wonders why men, "who have historically controlled governmental processes, would ever opt for polygamy if it damages them so gravely." Bergmann then throws the baby with the water, concluding that demand and supply analyses of marriage markets are useless.

She rules out possible economic analyses of polygamy that include political economy considerations such as male dominance of the political process as well as demand and supply analysis, of the kind sketched out in Grossbard (2015b). Bergmann's article also includes a critique of Becker's analysis of altruism.

The second item included in this section is "The Mystery of Monogamy" by Gould, Moav and Simhon, first published in 2008. It examines why developed societies are monogamous even though rich men may be expected to prefer polygyny and often practice it even when it is illegal (by having a wife and one or more mistresses or concubines). As stated in Becker (1974) income inequality among men (but not among women) is likely to produce a polygynous system. However, higher inequality among women is expected to reduce the likelihood of polygyny (also see Grossbard 1980).

According to Gould et al. the process of economic development is intrinsically related to the advantages of polygyny. In less developed economies men prefer quantity over quality of children, leading them to prefer multiple wives. Women in these economies are mostly valued for their ability to produce large families. In more advanced economies human capital plays a more central role among men and among women as producers of both quantity and quality of children. High quality women who can invest better in their children's human capital are scarce and obtain high prices in marriage markets. Consequently, rich men who want high quality children no longer can afford multiple wives.

## **PART II. Consequences of Marriage and Marriage Market Conditions**

This part contains selected articles that analyze the following outcomes: labor supply, household production, wages, consumption, wellbeing, household finances, savings, education, and fertility.

### **II. A Marriage and Labor Supply**

This section starts with one of the oldest article on this topic: my own 1988 article co-authored with Shoshana Neuman: "Women's Labor Supply and Marital Choice." Even though Becker's (1973) article featured at the beginning of this collection first brought prices established in marriage markets into economic models, in all his subsequent models he continued to consider an individual's value of time as their wage in the labor force or a value of time established in a 'unitary household', not a value established in marriage markets. My theory of allocation of time in markets for labor and marriage (Grossbard-Shechtman 1984) was the first model to formulate reservation wages as a function of marriage market conditions. The essay included here is the first publication that empirically estimated some of the implications of that model.

In this econometric analysis Shoshana Neuman and I used a sample of Israeli Jewish women with a high school education or less, as we wanted to focus on women unlikely to go to work because their job is interesting. We found that for each year of husband/wife age difference beyond 3 or 5 years (depending on the cultural norm prevalent for European/American Jews and Asian/African Jews) there was a lower probability that the wife participated in the labor force. This is consistent with the existence of an age-gap premium in the price for women's time in marital household production benefiting a spouse (WiHo). More recently, using French data from 1990 to 2002 Bloemen and Stancanelli (2015) found that an age gap of five or more years in either direction was associated with lower labor force participation of both partners. The finding of lower labor supply by relatively young wives and husbands possibly reflects a premium for youth in marriage markets.

We also find that women from a higher status ethnicity (European/American) were less likely to be in the labor force if their husband belonged to a lower status ethnicity ('born in Asia or Africa')

than if they were both European/American. This possibly indicates that individuals belonging to groups that are discriminated against in marriage markets experience lower demand for their WiHo and therefore the equilibrium price of their time in marital household production will be lower. Likewise, using Hawaiian data, Xuanning Fu and I found that Caucasian women married to Hawaiian men were less likely to be in the labor force than endogamous Caucasian women and that Hawaiian women married to Caucasian men were more likely to be in the labor force than endogamous Hawaiian women. We found similar results for Caucasian-Black and Caucasian-Filipino intermarriages, two other groups who have lower than Caucasians in Hawaii.

This section also includes two articles by economists of marriage who have adopted Samuelson's (1956) consensual approach and assume that households have a social welfare function: Patricia Apps and Ray Rees, and Pierre-Andre Chiappori and his co-authors. The principal aim of Apps and Rees' "Labour supply, household production, and intra-family welfare distribution" is to demonstrate the importance of incorporating household production in models of labor supply. In their exchange model a family member can exchange domestic output for market goods within the household. This is also the case in my WiHo model mentioned earlier in this introduction, but in addition I assume that the terms for such exchange are partially determined in marriage markets.

Apps and Rees contrast their exchange model with a transfer model according to which the only reason why an individual's consumption exceeds their income is that there was a lump-sum transfer from the other individual, with no economic explanation as to why this transfer took place. They present estimations of household production and demand, (in Table 1) and of individual expenditures on leisure and consumption, hours of leisure and domestic work, intra-household trade and the distribution of full and equivalent incomes (Table 2). For all these outcomes they compare their exchange model (including household production) to a transfer model omitting such production. They analyze two Australian sub-samples of families in which the male is employed at least 500 hours a year and aged from 20 to 54 years, and the family has at least one child under age 15: a traditional subsample in which the wife works less than 500 hours a year, and a non-traditional sample with wives working more than 500 hours.

Apps and Rees find that according to the exchange model the female share of the household's cost of time allocated to household production increases with the presence of young children and declines with partner's age, education and training. Presence of young children also reduces leisure of both men and women. In contrast, according to the transfer model ignoring exchanges of household production for income, the presence of young children does not have a significant effect on female share of cost of time allocated to household production or on leisure of either partner. The transfer model leads to significant overestimates of the income elasticities of labor supply. Accordingly, when ignoring household production economists would be inclined to recommend excessive reductions in tax rates.

Defining full income a la Becker (including the value of household production as well as monetary income) the authors then consider both the traditional and the non-traditional sample. They find that according to the exchange model specialization between the male and female partner involves an exchange of domestic output for market goods with a value of about 6000 Australian dollars but does not affect individual full incomes. In contrast, according to the transfer model ignoring household production the same transfer is interpreted as an increase in women's full income and a corresponding decrease in men's individual full income. Household production and exchanges of work in household production for income earned outside the home thus matter when estimating labor supply, elasticities of labor supply and full incomes. The same implications follow from the WiHo market analysis presented earlier in this section (see Grossbard-Shechtman (1984) and Grossbard (2015a)). Despite the problems with transfer models pointed out by Apps and Rees in 1996 such models ignoring exchanges of money for work in marriage have since been published

by top economics journals (e.g. Blundell, Chiappori and Meghir 2005). The next essay, "Marriage markets, divorce legislation, and household labor supply", by Chiappori, Bernard Fortin and Guy Lacroix appeared originally in 2002. Their model leads to an insight found in Grossbard-Shechtman (1984): the higher the sex ratio (the ratio of men to women in a marriage market) the less women are likely to be active in the labor market. They also predict that at higher sex ratios men are more likely to be active in the labor market. Another prediction from their model is that the more divorce laws favor women in marriage markets, the less women are likely to be in the labor force. To the extent that sex ratios and divorce laws affect equilibrium conditions in marriage markets it is expected that these factors will influence the labor supply of married as well as single individuals (a prediction that also follows from Grossbard-Shechtman 1984).

This paper's empirical work is based on an analysis of the 1989 wave of the PSID. In line with an earlier cross-sectional analysis by Grossbard-Shechtman and Neideffer (1997) the authors find that women's labor supply is inversely related to the sex ratio. They also find that men's labor supply is positively related to that ratio and that passage of a divorce law considered favorable to women induces men to transfer an additional \$4310 to their wives. This last finding implies that the passage of a divorce law considered favorable to women leads men to pay more for women's time in household production (in terms of the Apps and Rees exchange model) or women's WiHo time (in terms of my 1984 and 2015 models).

The disadvantage of cross-sectional studies is that they make it difficult to distinguish between two alternative causalities: did sex ratios respond to differences in employment opportunities via migration, or are sex ratios causing differences in employment? Cities with higher sex ratios may have attracted men by offering better jobs for men; cities with lower sex ratios may have better jobs for women. Luckily for researchers, this migration-related reverse causality does not apply to cohort comparisons: people don't choose when to be born; they are stuck in their birth cohorts. Sex ratios vary across cohorts because (1) on average, women marry men who are generally somewhat older and the age difference does not fluctuate much, and (2) the number of births fluctuates from one birth cohort to the next.

In the next entry Catalina Amuedo-Dorantes and I analyze employment data for the period 1965-2005 as a function of major fluctuations in sex ratio due to the sequence of baby-bust, baby-boom, baby-bust that followed the baby-boom. We calculate sex ratios from Census data for 5-year age groups assuming that the male/female age difference at marriage is, on average, equal to 2 years during the entire period. Regressions of women's labor force participation are estimated for the U.S. as a whole and separately for four major US regions, for married women and all women in different age groups. We find that cohorts of women with lower sex ratios (women born at onset of baby-booms) have experienced above-average labor force participation whereas cohorts of women with higher sex ratios (born at the beginning of baby-busts) have experienced below-average labor force participation. This holds for all women and for married women in particular, and results are robust to a number of specifications.

We also find that in the West and the Northeast effects of cohort-based sex ratios on the labor supply of married women are more sizeable for women with less education than for college-educated women. For the Midwest, however, the opposite holds: sex ratio effects on labor supply are more sizeable for educated married women than for their less educated counterparts. Likewise, Emery and Ferrer (2009) found negative sex ratio effects for college-educated women in Canada over the period 1971-91. This suggests that the marriage market premium for the WiHo of educated married women in the Midwest and Canada is higher than in other regions in the U.S. (see Grossbard 2015a, Chapter 6). We used sex ratios defined for all education groups (assuming that educated and less educated people are good substitutes and participate in the same WiHo markets). Negrusa & Oreffice (2010) constructed "quality" sex ratios by education groups and used

variation across metropolitan areas. They found negative sex ratio effects on the labor supply of wives and positive effects on that of husbands. Effects for more educated individuals were more sizeable and effects for high school graduates were insignificant.

## II. B Marriage and Household Production

This section only includes recent articles due to the relatively recent availability of data on household production. Research on household production has benefited substantially from the introduction of time use surveys such as the American Time Use Survey (ATUS) first available for the year 2003.

"Racial Intermarriage and Household Production" is an analysis of ATUS data for the years 2003–2009. Jose Ignacio Gimenez, Jose Alberto Molina and I suspected the existence of discrimination against blacks in marriage markets and predicted that intra-marriage distribution of income would be a function of conditions in marriage markets. More specifically, we predicted that at given incomes and relative to their endogamous counterparts, whites in couple with blacks would perform fewer chores and that blacks in couple with whites would perform more chores. It was also predicted that racial intermarriage differentials in chores or housework would be the largest where household production is more likely to be considered *work* rather than leisure: on weekdays, when couples are married rather than cohabiting, when respondents have low or no participation in the labor force, and when spouses have high levels of labor force participation. We find that white women in couple with black partners devote less time to chores (0.38 fewer hours per day) and housework (0.6 fewer hours per day) than their endogamous counterparts. The racial intermarriage differentials are large in comparison to differentials due to the presence of children or income variation. Racial intermarriage differentials in time spent doing chores appear to be larger for U.S. born blacks and in states that had anti-miscegenation laws until the Supreme Court ruled it illegal in 1967.

White men also seem to spend less time on housework if intermarried with black women than if married to whites, but estimated effects are smaller. Results also suggest that within US marriage markets whites are a preferred group: when in couple with whites, black women seem to devote more time to chores and housework than when endogamous. Results for black men seem to go in the same direction but are less conclusive than those for black women. We also found that the effects of intermarriage seem to be stronger on weekdays than on weekends, for married respondents than for cohabitants, and for respondents with limited labor force participation than for respondents with more hours of work in the labor force. The findings are consistent with the existence of whites' discrimination against blacks in US marriage markets.

The second article included in this section, "The power of love: a subtle driving force for unegalitarian labor division?", is based on data Luise Gorges collected in an experiment that she designed. She arranged for eighty participants—20 real couples and 20 pairs of strangers—to play a two-stage game, paired up either with their partner or a stranger of a different sex. In the first stage, participants make a joint decision on how to play the game: they can both complete a performance-based paid task (task A) or have one of the players perform an unpaid task (task B) that adds to the performance of the A player who then gets a triple pay-rate. After completing their tasks, participants are informed about their pay-offs in private and then asked to make an individual decision about the proportion of their income that they will contribute to a common pool. Whatever goes into the pool earns 20 % and is distributed equally between the two players.

Most strategic games played in economic laboratory experiments are played among strangers. Past research has shown that familiarity with a partner affects outcomes: it reduces the tendency to

exhibit opportunistic behavior while it increases the willingness to cooperate. The author tests two predictions: (1) Couples are more likely than strangers to agree on realizing efficient outcomes based on specialization, and (2) When playing with their real partner, women are more likely than men to give up on their autonomous income and be the B-player. Gorges finds that familiarity with a co-player has a large effect on cooperation towards specialization: all the familiar couples but only 60 % of unfamiliar participants cooperate. Another finding is that women are significantly more likely to be B-players--and depend on the A-player for access to payoffs--when playing with their partner than when playing with an unfamiliar man, but degree of familiarity with their female partner does not affect men's behavior. Those who benefit from the assistance of a B-player typically invest in the common pool. As a result net disposable income of familiar and unfamiliar women is the same. However, men familiar with their partner end up with a higher income after stage 2 than men playing with strange women.

### **II.C Marriage and Wages**

Marriage also seems to affect wages, especially men's wages. In "Does Marriage Really Make Men More Productive?" Sanders Korenman and David Neumark's principal goal is to disentangle causalities: does marriage contribute to men's productivity or are more productive men more likely to be married? Based on a longitudinal analysis they find that (1) there are large wage marriage premiums for married men, even when detailed human capital controls are included in the regressions; (2) marriage premiums seem to arise slowly; and (3) observed correlations between wage and marital status of men are principally a result of effects of marriage on wages. In addition, based on the analysis of a large company's personnel file they report that (1) marriage wage premiums persist even for a single firm and a relatively homogeneous group of professionals; and (2) the marriage premium is in part the result of higher performance ratings by supervisors.

In "Job turnover, wage rates, and marital stability: How are they related?" Avner Ahituv and Robert Lerman examine the interplay between job stability, wage rates, and marital stability. They apply a Dynamic Selection Control model to data from the National Longitudinal Survey of Youth. In analyzing young men's sequential choices about work and family they take account of self-selection and other features of the data. They find that job changes lower wages and the likelihood of getting married and remaining married. At the same time, marriage raises both wage rates and job stability. Feedback effects cause the simulated wage gains from marriage to cumulate over time, indicating that long-run marriage wage premiums exceed conventional short-run estimates.

### **II. D Marriage, Consumption and Wellbeing**

This section includes five selections, the earliest dating to 1990 and the latest to 2013. Marjorie McElroy, the author of the first essay, entered the field of marriage economics at an earlier stage when she co-authored a bargaining theory of marriage assuming that decisions are represented using Nash-bargaining (McElroy and Horney 1981). In this context factors that can shift threat points overlap to a great extent with the factors that are likely to affect a market equilibrium using marriage market analysis. Such factors could affect the likelihood of divorce and therefore a joint analysis of household formation and intra-household allocation of resources (to consumption or to leisure) is recommended. The factors include every variable that affects how well each family member could do in the next best alternative outside the family. These include wages and nonwage incomes of each individual, sex ratios, parental wealth, religion, caste, rules affecting options in case of divorce, taxes affecting individuals and government transfers (level and eligibility criteria).

In "Intra-Household Resource Allocation: An Inferential Approach" Duncan Thomas models household allocations as a function of whether income is allocated to mothers or fathers. If household income is completely pooled, whether mothers and fathers control their family's income is not expected to have an impact on demand. However, based on survey data on family health and nutrition in Brazil, Duncan rejects the hypothesis that income is anonymous. He finds that unearned income in the hands of a mother has a bigger effect on her family's health than income under the control of a father; for child survival probabilities the effect is almost twenty times larger. Mothers' income benefits both sons and daughters more than fathers' income, but daughters benefit from their mothers' income even more than sons do. These findings go in the same direction as earlier research published by Glen Cain (1966), T. Paul Schultz (1989), and Grossbard-Shechtman and Keeley (1993): income is not anonymous when it comes to affecting labor supply.

In the Thomas study mother and father's income are not exogeneously determined and that is a problem when comparing the effect of individual incomes on spending. In contrast, in "Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom's Child Benefit" Shelly Lundberg, Robert Pollak and Terence Wales use a natural experiment: a policy change in the United Kingdom that transferred a substantial child allowance from husbands to wives in the late 1970s.

Using Family Expenditure Survey data Lundberg et al. find that this income redistribution coincided with a shift toward greater expenditures on women's and children's clothing relative to men's clothing. When the benefits were sent to men mean values for annual expenditures on men's, women's, and children's clothing were 108 pounds, 145 pounds, and 119 pounds respectively. The policy change led to an increase of approximately 52 pounds in expenditures on children's clothing and of 27 pounds on women's clothing. The reallocation of the Child Benefit was intended to benefit women and children. Based on this study of a single assignable expenditure category--clothing--the policy change seems to have been successful.

There are many ways one could possibly measure individual wellbeing. The next two articles focus on three measures of distress: family violence, suicide, and homicide. In "Bargaining in the Shadow of the Law: Divorce Laws and Family Distress" Betsey Stevenson and Justin Wolfers examine the effect of the introduction of unilateral divorce laws on these three measures of distress. Replacement of fault-based divorce laws with unilateral laws implied that it was no longer necessary for an unhappy spouse to obtain a partner's consent to divorce. The change led to a drop in relationships involving domestic violence. It also led to an increase in the bargaining power of abused spouses, which was associated with roughly a 30% decline in domestic violence for both men and women in extant relationships. In states that introduced unilateral divorce laws Stevenson and Wolfers also found an 8 to 16 percent decline in female suicide and a 10 percent decline in murders of women by their partners. There was no discernable effect on male suicide (even though men are more likely to commit suicide than women) or on murders of men by their partners. These findings suggest that under the old divorce laws women were more likely to feel stuck than men and that the opening of an easy way out did more to improve the lives of women than those of men.

Further evidence that marriage market opportunities affect suicide rates is presented in "The effect of sex ratios on suicide" by Masanori Kuroki. Using data from Japan for five periods starting in 1983 and ending in 2007 and for 47 areas Kuroki finds that higher sex ratios (either earlier in life or at the time of the survey) are associated with higher male suicide rates among men ages 35 to 54. An increase in contemporary or lagged sex ratios from 1 to 1.05 is associated with a 7% increase among men ages 35 to 44 and a 11.7% increase among men ages 45 to 54. In contrast, women ages 35 to 44 had a lower risk of suicide when sex ratios were higher. This last finding is consistent with that of Stevenson and Wolfers for the US: the lifting of divorce laws requiring proof of fault in the US and higher sex ratios in Japan both increase the range of choices available to women and are

likely to raise their bargaining power in marriage (or the value of their WiHo). In both sets of circumstances there are fewer suicides among women than when marriage market and legal factors are less favorable to women. However, in contrast to the Stevenson/Wolfers finding of no significant effects of unilateral divorce on men's suicide rates Kuroki finds higher sex ratios to have a strong positive impact on male suicide rates. Interestingly, Kuroki finds that the coefficients of sex ratios are virtually unchanged when the proportion married is included in the regressions. This indicates that the effect of sex ratios may be operating at the marriage market level and not via an effect on the likelihood of marriage. Given that its population is declining it is expected that Japan's sex ratios will continue to rise in the future and that male suicide rates may increase beyond their already high rates today. Men currently represent 70% of all suicides in Japan. That proportion may rise due to such sex ratio effects.

## **II.E Marriage, Household Finances and Savings**

The basic question addressed by Frances Woolley in "Control over Money in Marriage" is "Who gets what in a marriage?" Is a marriage egalitarian in terms of what its members receive, or are the terms of marriage more favorable to one partner than to the other? Also, what factors influence how spouses share the gains from marriage? Woolley answers this question by using data on who controls the family finances. She analyzes data she collected in a 1995 survey of three hundred couples in the Ottawa-Hull area of Canada. Respondents were asked "How many bank, credit union, trust company or similar accounts do you have?" and "Whose name(s) is the account in?" Linear regressions were estimated for six outcomes: who makes cash withdrawals?, who writes checks?, who records?, who keeps track of balance, and who reconciles? Explanatory variables were individual characteristics of both spouses, such as their age and difference in age, and whether the couple was married or cohabiting (called 'common law' in Canada). Among the findings: men who were married before and women in common law marriages have more control over money. Woolley also ran multinomial logit regressions with the following two dependent variables: likelihood of a male account rather than a shared account being the number 1 account in this couple, and likelihood that a female account rather than a shared account is the number 1 account. The higher the man's income and the lower the woman's income, the less it is likely that the principal account is under the woman's name. Controlling for the man's age, the larger the age differential between them the more it is likely that the main account is under the woman's name. This possibly reflects a 'trophy wife' effect: a relatively young woman may obtain more control over her spouse's money. Contrary to the author's expectation if the woman worked full time she did not have more control over money in this sense. This could reflect the higher value of time of women who work part-time or not at all, possibly due to their higher value in marriage markets due to unobserved characteristics.

Two of the articles in this section deal with savings. The first is Michele Tertilt's "Polygyny, Fertility, and Savings". Sub-Saharan Africa has a high incidence of polygyny and is also the poorest region of the world. Are those two facts related? Tertilt posits that when men are busy buying wives other men will find selling daughters a good investment and that this leads to lower levels of investment in physical assets. Consequently, she hypothesizes that banning polygyny could contribute to economic development by freeing more funds for productive investments. Using a quantitative model of polygyny, she finds that enforcing monogamy increases savings by 70 percent (also seen in the data) and output per capita by 170 percent. Furthermore according to the model banning polygyny appears to lower fertility by 40 percent, which compares well to the 29 percent lower fertility in the data. Finally, polygyny leads to high bride-prices to the extent that high demand for wives is not accompanied by a higher value of women in marriage and more female access to the gain from marriage (possibly due to ceilings on the price of women's WiHo, as argued in Grossbard

2015b). Accordingly, Tertilt shows that banning polygyny leads to a reversal of marriage payments. Another consequence of polygyny is that it leads to a large age gap at marriage. Banning polygyny is expected to shrink the spousal age gap.

As recognized by Tertilt, it may be difficult for countries to pass laws imposing monogamy. An alternative proposed by Tertilt is to give more rights to women, including the right to make their own marriage decisions. This would lead to a significant decrease in the returns men can get on wives and therefore to higher incentives for men to invest in physical assets.

In "What Motivates Single Women to Save? The Case of Japan" Wataru Kureishi and Midori Wakabayashi deal with a situation radically different from that of poor polygynous countries. Japan is a rich industrialized country and its young women often chose to stay single rather than to marry. Kureishi and Wakabayashi use panel data to analyze young women's precautionary savings as a function of their likelihood of staying single. They find that compared with young women who are likely to get married within 3 years, those who are not plan to have 44 percent more savings for precautionary purposes, and 108 percent more for retirement. These results are broadly consistent with (1) a series of previous findings that precautionary motives play an important role in explaining savings in Japan, and (2) a theoretical analysis that recognizes that in marriage WiHo is often exchanged for income, and in the case of a traditional society such as Japan women do most of the WiHo. With both men and women following traditional roles women who plan to marry can typically count on getting a higher disposable income after marriage reflecting the expected compensation their husband will pay them to perform WiHo (see Chapter 11 in Grossbard 2015a).

The last article in this section is by Julie Zissimopoulos, Benjamin Karney and Amy Rauer and it examines "Marriage and Economic Well-being at Older Ages". New evidence on the wealth advantage of marriage is provided based on data from the Health and Retirement Study, a study of a representative sample of individuals over age 50 and their spouses in the U.S. The authors model household wealth near retirement age as a function of marital categories that reflect current status, number and type of past events, and a set of rich covariates of permanent and transitory attributes of the individual and household that are expected to affect wealth according to a lifecycle model of consumption and savings. Zissimopoulos et al. consider type of change whether from divorce, widowhood, remarriage, number and timing of changes, and duration in marriage. They document that lifetime marriage experiences of individuals nearing retirement are very diverse: only about one-half of all individuals experience one continuous marriage throughout their lives. Individuals with more than one marital disruption make up 11% of individuals aged 51–56, and the percentage of the population in this category has been increasing over time.

The impact of marriage on wealth is modeled independent of lifetime earnings, mortality risk, risk aversion and other important confounding factors. Consideration of financial, housing, and public and private pension wealth reveal that unadjusted wealth differences between married, remarried and not married individuals are large.

On average, continuously married individuals have higher wealth than other individuals. In particular individuals in a first marriage are wealthier than unmarried or remarried persons. As duration of marriage increases, so does wealth. Married men are wealthier than unmarried men mostly because they earned more income over their lifetimes but also because of higher future claims on public and private pensions. This is less so for women.

Individuals with more than one marital disruption has the lowest wealth levels of all, even after controlling for a rich set of controls. Divorced women have the least amount of wealth at retirement because of low lifetime earnings and low financial literacy. Even after adjusting for covariates, women remarried after one or more divorce have lower household wealth than women in one continuous marriage and the accumulated wealth of unmarried women remains below 50% of a married couple's household wealth. Future claims to pension and Social Security benefits do not

fully explain the household wealth differences of married and remarried women, although future pension claims do substantially reduce wealth differences between married and unmarried women.

## **II. F Marriage and Education**

Jeanne Lafortune's 'Making Yourself Attractive: Pre-marital Investments and the Returns of Education in the Marriage Market' explores how a gender's scarcity measured by sex ratios may impact educational investments. She uses exogenous variation in the marriage market of second generation Americans in the early 20th century and finds that worse marriage market conditions spur higher pre-marital investments: the effect of worse sex ratios for men is significant while, for women it is only observed in highly endogamous groups. When faced with higher sex ratios men have less stable marriages and their marriages are more likely to involve natives and highly educated spouses while women are less likely to work and, for those in highly endogamous groups, more likely to marry immigrants. Given that a large fraction of second-generation Americans tend to marry within their own ethnicity it follows that more recently arrived immigrants have a disproportionately higher impact on their ethnicity's marriage markets.

Lafortune finds that shifts in sex ratios influence pre-marital human capital investment decisions: where sex ratios increase young men acquire more formal education and select occupations associated with higher levels of education. For men this effect does not depend on the degree of endogamy within one's ethnic group. Women are found to invest less in their education when sex ratios are higher, but this only holds for certain ethnic groups. In addition, when sex ratios are higher men are less likely to marry an immigrant of their own ethnic group and more likely to be matched with a spouse with a high school degree; women are more likely to marry an immigrant of their ethnic group if the group is highly endogamous. Lafortune also presents evidence of effects of sex ratio on women's labor supply that are consistent with those reported in Section II.A of this introduction. Effects of sex ratios on education and labor supply appear to be interrelated.

## **II. G Marriage and Fertility**

This collection concludes with 'An Analysis of Out-of-Wedlock Childbearing in the United States' co-authored by Janet Yellen, the chair of the Federal Reserve as of this writing, her husband George Akerlof and Michael Katz. This paper relates the erosion of the custom of shotgun marriage to the legalization of abortion and the increased availability of contraception to unmarried women in the United States. Single motherhood began its long and steady rise about 1970 and previous research has suggested that these changes have little to do either with increases in welfare eligibility and benefits or the decline in jobs for the less educated.

Starting in the late 1960s the legalization of abortion induced a large fraction of unmarried women to engage in premarital sexual relations while forgoing the promise of marriage in the event of a premarital conception. Around the same time the invention of the pill and its increased availability enhanced the willingness of unmarried women to participate in uncommitted, premarital sex by reducing the odds of a pregnancy in the first place. Women who wanted to bear children were immiserized because their competitive position, and thereby their ability to bargain for the marriage guarantee, deteriorated (a point also made by Heer and Grossbard-Shechtman 1981). Men's willingness to marry in case of pregnancy also declined once it was apparent that the woman herself was unwilling to obtain an abortion. A greater proportion of unmarried women who got pregnant wanted to keep the child (if they did not, they would have used contraception or had an abortion).

The authors present two models of shotgun marriage as the outcome of a sequence of decisions: about premarital sexual activity, abortion, and marriage. First they assume that the promise to marry

is considered enforceable. Later they assume that the man's willingness to marry just prior to the birth of a child depends upon a comparison of his own cost of getting married with his perception of the cost to his partner of becoming a single mother. The first model shows that advances in reproductive technology could lead to the immiseration of women through increased competition. The second model assumes that better contraception and legal abortions lead women to be freer to choose and men to reason "If she is not willing to obtain an abortion or use contraception, why should I sacrifice myself to get married?" This model accurately predicts a decline in shotgun marriage: with abortion readily available, many relationships that previously ended in shotgun marriages now end in abortion. When, instead, the woman carries the baby to term, the man can also rationalize remaining single. The model also realistically predicts a decline in the fertility rate and an increase in the out-of-wedlock birthrate.

Why did the decline in shotgun marriages occur gradually over time and not suddenly? According to the authors this was due to (1) prices in marriage markets and social norms taking time to change; and (2) endogenous decline in stigma associated with out-of-wedlock birth: the norm of premarital sexual abstinence gradually disappeared. Increased acceptance of teen pregnancy led to a rapid increase in the high school completion rate of mothers who became pregnant at seventeen or younger: it stood at 19% in 1955; by 1986 it was 56%.

The "technological" shock explanation regarding both the pill and abortion is consistent with the magnitude and timing of changes in sexual participation, abortion, contraceptive use, shotgun marriage, and the living arrangements of children.

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