

### The Nature of the Household

In this chapter we look inside of the household sector and investigate how the universal force of scarcity encourages rational intra-household decisions, starting with household formation, the allocation of resources within households, and sometimes the destruction of households. We join the story already in progress: People are born into households, which have **endowments** of land, capital, labor, and entrepreneurial skills. They are nurtured through their formative years, encouraged to develop altruistic attitudes, and somehow make it through their teenage years, when egoism and hedonism rebel against parental authority. Households perform two functions: they jointly consume commodities purchased with income and refined through household production. Household consumption is enhanced when household members have similar tastes and preferences; a major goal of dating and courtship is learning whether one is compatible with potential life mates. Often overlooked is how differences between spouses contribute to comparative advantage in household production. As will all issues economic, there is a tension between positive sorting traits that enhance household consumption and negatively sorting traits that enhance household production.

### The Rational Consumer

Economists typically assume that rational consumers maximize their personal satisfaction by reconciling what they want with opportunity cost. A methodical consumer would first pick that commodity that generated the maximum additional satisfaction (marginal utility) per dollar spent. As more of that good was purchased, its marginal utility would decline, leading to the purchase of a second commodity. As the satisfaction from those commodities declined, the consumer would purchase three goods, until, she ran out of money to spend. At that point, the marginal utility from the last dollar spent on each commodity purchased would be the same, and that common marginal utility to price ratio would exceed the satisfaction generated from spending the first dollar on any additional commodity. If this were not the case, they could improve their satisfaction by cutting back on the consumption of commodities with small additions to satisfaction per dollar spent and consume more commodities that provided the most satisfaction per dollar spent. They decide whether to save or borrow by comparing the satisfaction from consumption today with the satisfaction from delayed gratification. Rational people allocate their time between market work, household work, personal maintenance, and leisure so that the last hour spent on each activity provides the same satisfaction either directly (leisure) or indirectly (e.g., the amount of satisfaction an hour's income can buy). When authorities such as governments or employers want to modify behavior, they must understand how incentives affect behavior or rue the consequences.

### Intra-Household Choice: Interpersonal Comparisons of Utility

One of the most important features of a market economy is that markets work when people are selfish. What we tend to forget is that markets also work when people care about the welfare of others. While it simplifies the analysis to assume that economic agents are **egoists**, who are indifferent to the welfare of others, the typical family contains altruistic people who care very much about each other. Consider a mother who allocates her family budget. She considers how each dollar spent affects the welfare of each family member. If one child is sick, that child receives medicine before other children gets

candy or the mother herself buys a romance novel. The principle is the same; the family welfare is maximized when the last dollar spent on each commodity generates the same marginal utility for the person in charge of the family budget.

What constitutes an altruist is her willingness to incur personal costs to improve the (perceived) satisfaction of another. Altruism may be as simple as allowing a person with a few groceries to proceed you in the supermarket checkout line, or it may be as profound as sacrificing one's life for another. A person could be altruistic towards some people (the members of my family), indifferent to the welfare of some (rich people whom I believe to have enough), and malevolent towards others (child molesters). Indeed, the American culture wars are fought over disagreements over altruism (should we help the poor?) and malevolence (are they *undocumented workers* or *illegal aliens*?)

So, within a household we expect parents to allocate resources among family members so that the last dollar spent on each person provides the same level of satisfaction for the altruist. This typically does not result in equal distribution of resources: Adults require more food than children do. Parents who work outside the home require more expensive clothing than do infants. Those who are sick require more medical care than those who are well, and so forth. In my opinion, the functional family personifies Karl Marx's ideal "from each according to ability, to each according to need."

### Household Formation

According to Nobel laureate economist Gary Becker,<sup>1</sup> households are formed to facilitate joint production and consumption, particularly the production and rearing of children. There are uncounted romantic novels, poems, movies, and television scripts about the chaotic process of mating. Partly this is because what makes mating interesting is the apparent unpredictability of *romance* or *love*. But do people really *fall* in love, or do they plan their plunge? Individuals must choose *where* to search for a mate: One can imagine very different futures for those who search out mates in church and those who search out mates in brothels. Regina and I met in the meat-cutters' union hall in Dayton, Ohio, in 1968. What brought us together was not our love of meat, but our service as volunteer campaign workers for a Democratic candidate to the United States Senate.<sup>2</sup>

Becker calls the process of household formation the **marriage market**. Potential spouses<sup>3</sup> are scarce, and so we invest resources (time and money) to find the person who is right for us. Typically a courtship (dating) allows people to compare likes and dislikes. A **positively sorting trait** is a characteristic that couples tend to have in common, which typically allows them to enjoy **joint consumption**. One of the most obvious positively sorting traits is age: Most couples meet when they are young and, if they are lucky, grow old together. When couples divorce, they tend to subsequently marry people of approxi-

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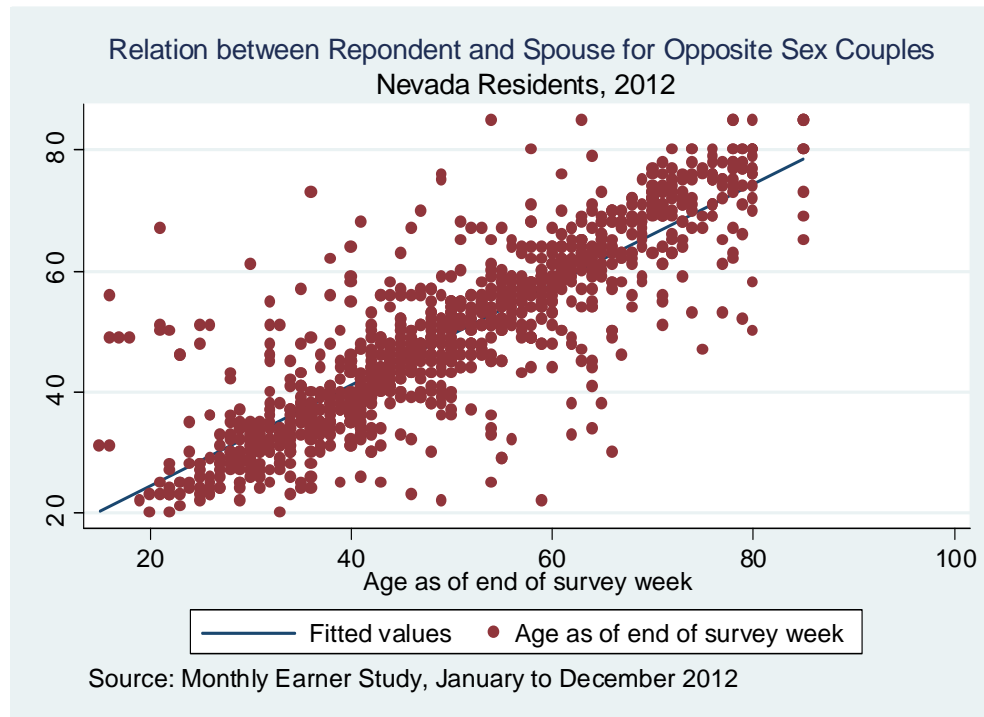
<sup>1</sup> Much of this chapter is taken from Gary S. Becker, *A Treatise on the Family*, Harvard University Press, 1981, and his more recent book, Gary S. Becker and Kevin M. Murphy, *Social Economics: Market Behavior in a Social Environment*, Belnap/Harvard, 2000.

<sup>2</sup> John Gilligan, Democratic candidate for the U.S. Senate, lost. Regina and I won. John Gilligan was later elected governor of Ohio in 1970. He is the father of Kathleen Sibelius, former Democratic governor of Kansas and current Secretary of the US Department of Health and Human Services.

<sup>3</sup> By spouse I mean life-partner. Spouses could be married or cohabiting in a monogamous relationship. Polygamous unions are beyond the scope of this chapter, although Becker deals with that topic in his *Treatise on the Family*.

mately the same age as themselves. In Figure 7-1, we plot the respondent's age on the horizontal axis, and the spouse's average age on the vertical axis. We can discern a positive relationship in both sets of points: Young men tend to have young wives, while older men tend to have older wives.

Figure 7-1



A useful measure of the strength of an association between two variables is the *correlation coefficient*. The correlation coefficient simply measures how closely two variables – in this case the ages of spouses – change from observation to observation. In theory, if we took the age of one partner, subtracted the average age, and then performed the same calculation for his/her spouse, we would obtain the *covariance* between those

two variables as  $\sigma_{hs} = \frac{\sum_{i=1}^N (a_h - \mu_{a_h})(a_s - \mu_{a_s})}{N}$ , where  $a_h$  is the age of the first person (arbitrarily called the “head” of the household, and  $a_s$  is the corresponding age of his/her spouse. The term  $\mu_{a_h}$  is the average age of all “heads” of household and  $\mu_{a_s}$  is the average age of all spouses. A positive covariance means that  $(a_h - \mu_{a_h})$  and  $(a_s - \mu_{a_s})$  tend to have the same sign; if the “husband’s” age is above average, his wife’s age tends also to be above average.  $N$  is simply the size of the population of all couples, with  $i$  designating specific couples. A negative covariance would occur if older people picked younger spouses and vice versa. A covariance of zero would mean that the two variables were unrelated or *independent* of each other. In order to standardize the covariance, we divide it by the product of the standard deviations:

$$\rho = \frac{\sum_{i=1}^N (a_h - \mu_{a_h})(a_s - \mu_{a_s})}{\sqrt{\sum_{i=1}^N (a_h - \mu_{a_h})^2} \sqrt{\sum_{i=1}^N (a_s - \mu_{a_s})^2}} = \frac{\sigma_{hs}}{\sigma_h \sigma_s}$$

The population correlation,  $\rho$ , ranges from -1 (perfectly inversely related) to +1 (perfectly positively related), with 0 indicating no relation. In order to estimate the population correlation we take a random sample from the population of interest. I use the *Current Population Survey*, which the US Bureau of the Census uses to estimate the monthly unemployment rate. Using the household identifier, I sorted the monthly sample from January 1979 through December 2012 (336 months). The sample of 3,087,901 heterosexual couples generated a sample correlation of 0.9210, which shows a high degree of positive association between the ages of spouses.<sup>4</sup>

Another **positive sorting trait** is education: Most people pick a spouse with approximately their level of schooling. One reason is universal preference: The higher one's schooling, the greater is one's expected earnings. Therefore, other factors constant, everyone would pursue a well-educated mate. Another reason is opportunity: People often meet and fall in love in school. High school dropouts become pregnant together; high school graduates both leave school for work; college students marry soon after graduation and graduate students meet while in doctoral or professional schools. Checking the same source, I find that the correlation between the educational attainment of spouses is 0.6393, which is not as high as for age, but still strongly positive.<sup>5</sup>

Ethnicity tends to reflect common experiences, both positive and negative, and people usually feel closer to others with shared experiences. Because of housing and school segregation, one is more likely to meet someone of the same ethnicity than a person with different racial or ethnic characteristics. And, alas, there are few stigmas that generate more active hatred than marrying someone of different ethnicity. Marrying someone "different" can cost people their friends, their family, and sometimes, their lives. So, for good or ill, most people go with the flow and settle down with spouses who look like them.

Table 7-1 relates the ethnicity of respondents<sup>6</sup> and their spouses. First, we find that white, non-Hispanic respondents constitute 66.4 percent of the sample of husbands, and marriages between two white, non-Hispanics constitute 63.1 percent of all marriages. Hence, the **conditional probability** that a white, non-Hispanic man is married to a white, non-Hispanic wife is  $63.1/66.4 = 95.08$  percent. The probability that a white, non-Hispanic wife has a white, non-Hispanic husband is 93.7 percent. Black men have a 90.48 percent probability of marrying a black woman; however, the probability that a black woman has a black husband is 95.38 percent. Other non-whites (Asians, Native

<sup>4</sup> The ages of same-sex couples are slightly negatively correlated: -0.1740 for gay men and -0.1464 for lesbians.

<sup>5</sup> The correlation is 0.3431 for gay men and 0.3213 for lesbians; positive sorting traits may be lower for same-sex couples because there are fewer prospects. In 2012, 1.03% of couples were gay and 1.23% of couples were lesbians.

<sup>6</sup> Households that agree to participate in the *Current Population Survey* designate one member of the household as the respondent, and his or her spouse is designated as "spouse of the respondent."

Americans, and mixed ethnicity) have the lowest propensities for marrying someone of their same ethnicity. The probability that a Hispanic man is married to a Hispanic woman is 84.55, which is slightly lower than the 86.7 percent probability that a Hispanic woman is married to a Hispanic man. The point is that the concentration of “same-ethnicity couples” is much greater than what we would expect from chance.<sup>7</sup>

**Table 7-1**  
**Ethnicity of Spouses**

Table 7-1					
Ethnicity of Heterosexual Couples					
Respondent's	Spouse's Ethnicity				
Ethnicity	white	black	other nonwhite	Hispanic	Total
white	2,480,295	5,475	31,714	36,174	2,553,658
black	7,599	175,488	1,710	2,006	186,803
other nonwhite	23,781	1,110	105,468	2,430	132,789
Hispanic	31,171	1,588	2,453	179,439	214,651
Total	2,542,846	183,661	141,345	220,049	3,087,901

According to this table, 80% of respondents were white and 83% of their spouses were white. If ethnicity were uncorrelated, we would expect  $(.8)(.83) = 0.664 = 66.4\%$  of couples to have a white husband paired with a white wife. In fact, 80.3% of couples were both white. So, while ethnicity is not a quantitative variable like age or years of school completed, we can nevertheless conclude that ethnicity is also a positively sorting trait.<sup>8</sup>

There are some other important positively sorting traits that are not recorded in my data base. Religion is a set of shared beliefs; it is rare to fall in love with someone one believes to be damned; even if you do marry, that marriage is not likely to last. My wife and I have common political philosophies; we both cheer Rachel Maddow and Jon Stewart and jeer Glenn Beck and Ann Coulter. What about beauty; beauty would seem to be a positively sorting trait? Two beautiful people are more likely to be married, as are two ugly people, than we would predict from chance. Is beauty truly in the eye of the beholder or is there a positive association? Popular media would have us believe that everyone desires a beautiful partner, and the hours squandered preening seem to confirm this. If beauty is a universally desired trait, then we have an excess demand for beautiful people (like Regina) and an excess supply of ugly people (like me). Perusal of fan magazines and web sites confirms that beautiful people win the competition for beautiful partners, unless some beautiful people are willing to settle for other universally desirable traits like wealth or charisma.

<sup>7</sup> For both men and women, the probability of obtaining such ethnic concentrations among couples if pairing were random is less than 1 in  $10^{99}$ , based on a chi-square statistic of 6,573,566 with nine degrees of freedom.

<sup>8</sup> The chi-square ( $\chi^2$ ) statistic is 5,224,323; with 9 degrees of freedom, the probability of obtaining the pattern in Table 7-1 is less than  $1 \times 10^{-300}$ . The proportion of marriages involving both white (non-Hispanic) husbands and wives declined from 84.7% in 1984 to 73.1% in 2011.

There are many other positively sorting traits that we could mention: desire for children, city or country of residence, and the preference for sports teams. The evidence presented here should suffice to show that positively sorting traits fundamentally reflect the tendency of people to share consumption activities with those who like the same thing they do. Whereas marital competition resolves the inequality between supply and demand in favor of those ranking highest in the universally desired trait.

**Negatively sorting traits** are characteristics that are likely to differ between a wife and her husband. The most obvious negatively sorting trait is gender: Most men pick women for their life partner and most women pick men. Table 7-2 shows the relation between the gender of the respondent and the gender of his/her spouse from the Monthly Earner Study. Each household respondent reports whether the respondent is male or female. Here we find 80.19% of households report that the respondent is male, and 19.15% percent report that the respondent is female. Slightly less than 0.5% of couples were both male, 1.08% were both female; men tend to marry women and women tend to marry men, but not always. Clearly gender (as opposed to sexual preference<sup>9</sup>), is a negatively sorting trait.

**Table 7-2**

Distribution of Respondents and Spouses by Gender

responden	spouse		Total
	male	female	
male	0.42%	79.77%	80.19%
female	18.73%	1.08%	19.81%
Total	19.15%	80.85%	3,134,778

Aptitude for household services and opportunity cost of household production are major negatively sorting traits in household formation. If both husband and wife detest housework, the housework does not get done, and families wallow in less than optimal environment. If both love housework, their relationship degenerates into obsessive-compulsive nesting. If one person detests cleaning less than the other person does,<sup>10</sup> there is mutual gain if they pair.

Since market earnings are the opportunity cost of household production, they are also negatively sorting traits. Consider two couples that each have the potential to earn \$100,000 per year. Mr. and Mrs. Brown each earn \$25 per hour, while Mr. Smith earns \$10 per hour and Mrs. Smith earns \$40 per hour. The opportunity cost of household production is \$25 per hour in the Brown household, regardless of whether Mr. or Mrs. Brown takes time away from work for household production.<sup>11</sup> In the Smith household

<sup>9</sup> We can infer sexual preference from the composition of couples; we infer that 98.5% of couples are heterosexuals and 1.5% of couples are homosexual. However, there may be some mismatches – closeted homosexuals who marry opposite sex partners in pursuit of conformity.

<sup>10</sup> A recent article on the Internet suggests that men’s minds are wired differently so that they just “don’t see the dust.”

<sup>11</sup> Remember that the opportunity cost of leisure is the market wage; so even if Mr. or Mrs. Brown sacrifice leisure to clean the house, the opportunity cost is still \$25 per hour for each of them.

however, the opportunity cost of household production differs substantially, depending upon who chooses to perform the work. Every hour that Mr. Smith spends in household production, he could have been earning \$10 per hour; every hour that Mrs. Smith spends in household production, she could have been earning \$40 per hour. Mr. Smith has a comparative advantage in household production, and Mrs. Smith has a comparative advantage in market production. Mr. Smith might insist that Mrs. Smith mind the kids while he brings home the bacon, but their low standard of living will likely strain the marriage beyond the divorce point. In 1961, each additional dollar a husband earned reduced his wife's earnings by \$0.02. In 2011, however, the relation between husbands' and wives' labor earnings had turned positive, since most households require multiple earners, and since education and age, which are both positively correlated with earnings, are positively sorting traits.

How do we explain the apparent failure of Becker's theory to predict that wage rates are actually a (weak) positively sorting trait? First, recall that economic theory is based on the premise that people maximize satisfaction, given their constraints. Since selecting a mate requires balancing negatively and positively sorting traits, it is likely that positively sorting traits are more important during courtship. People find mates based on important considerations like age, ethnicity, and education, and then work out the details of negatively sorting traits (other than gender) later on. One interesting statistic, however, is that the probability of divorce increases as a woman's earnings increase,<sup>12</sup> while the probability of divorce decreases as a man's income increases.<sup>13</sup>

The second reason why we fail to find an inverse relation between the earnings of husbands and wives is explained by the distinction between absolute advantage and comparative advantage. For a college educated couple, if he earns \$20 per hour and she earns \$40 per hour, he has a comparative advantage for household production and she has a comparative advantage for market work. If we compare to a high-school educated couple, she earns \$15 per hour and he earns \$7.50 per hour, again we find that he has a comparative advantage in household production. However, when we compare across couples, we find a positive correlation; the wife with the higher wage rate has the husband with the higher wage rate.

### Intra-Household Decisions

Now we have established that a household is begun with the pairing of adults, who select mates partly to be complementary—find a mate who can share consumption—and partly to be substitutes—decide who will work inside the home and who will work outside the home. Figure 7-2 shows a production possibility curve for the Smith family. On the horizontal axis is “market income,” which shows the potential income that the husband and wife can earn if they work between 0 and 3120 hours per year. Assume that Adam Smith earns \$20 per hour at his primary job (40 hours per week) and \$15 per hour at his part-time job (up to 20 hours per week) and that Eve Smith earns \$30 per hour at her primary job and \$10 per hour at her part-time job. The vertical axis shows “standard

<sup>12</sup> If a woman's wage rate (average \$13.78) increased by \$1, the probability of divorce increases by 0.03%. While not large, the relation is statistically significant.

<sup>13</sup> For a man with an average wage of \$17.04, an extra \$1 per hour (in 2012 dollars) reduces the probability that he is divorced by 0.02 percent, again, small, but statistically significant nonetheless.

of living,” which includes the combined effect of market income (purchase raw materials like food, clothing, and entertainment), household durables (the house, the car(s), and appliances), household production time (cooking food, cutting the grass, driving to the movies), and leisure time (eating meals, cuddling). Note that income increases at a decreasing rate; for the first 2000 hours, Mrs. Smith can earn \$30 per hour—the slope is \$30/hour. Between 2001 and 4000 hours, Mr. Smith can earn \$20 per hour—the slope decreases to \$20 per hour after the best earning opportunity is exhausted. Note that it would be inefficient (place the family inside its production possibility frontier) for Mr. Smith to work and for Mrs. Smith not to work; they would give up \$10 per hour in income potential. Eventually the slope decreases to \$15 per hour (Mr. Smith’s part-time job), and finally to \$10 per hour (Mrs. Smith’s part-time job).

The green curve, labeled “standard of living,” places a money value on the total satisfaction the Smiths “share” resulting from each allocation of time.<sup>14</sup> Note that if income is zero, the Smiths’ standard of living will also be zero—it’s hard for even a loving couple to survive without food or shelter. As money income increases, standard of living initially increases faster, because even with an austere income, the Smiths have free time to enjoy their lives. As money income increases, their standard of living increases as they qualify for automobile loans and mortgages, and can even plan for children. Eventually, at some quantity of market time,  $t^*$ , the Smiths’ standard of living is maximized. While their money income would increase if they worked more hours, their standard of living would decrease, as their time together became scarcer and their market-working fatigue caused friction between them.

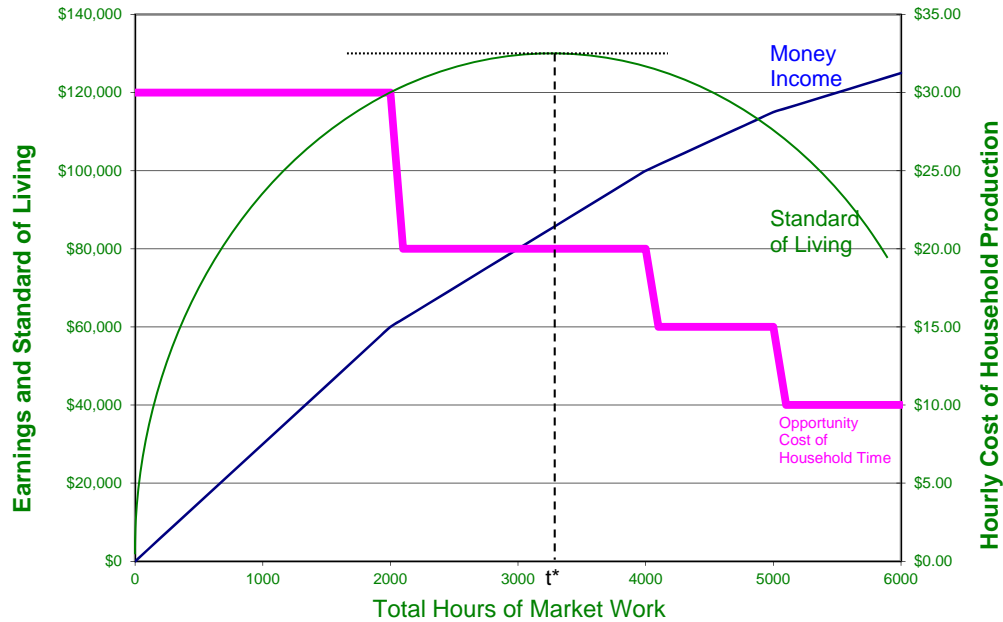
If this couple allocated 6,000 hours to market work, their combined income would be \$125,000, but the opportunity cost of household production time would be only \$10.00 per hour. If Eve Smith quit her part-time job and spent that time in household production, their market income would fall, but their standard of living would rise. At 5,000 hours of market work and 1,000 hours of housework, household income would be \$115,000, and the opportunity cost of household time would be \$15.00 per hour—the wage rate for Adam’s part-time job. If Adam and Eve are equally skilled and have the same like (or dislike) for household production, it would be inefficient for Eve to work two jobs while Adam worked only one job. If Adam quit his part-time job, money income would again fall, while standard of living would rise. Note, at  $t^*$ , Eve is working full time, while Adam is working part-time at his primary job. Their income is about \$85,000 and their standard of living is maximized.

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<sup>14</sup> The diagram shows the earnings from each amount of market time; we assume that non-market time is allocated efficiently between household production and leisure time.



**Figure 7-2**  
**Market Work and Standard of Living**



### The Demand and Supply of Children

Probably the most important decision that members of a household will make is when to have children and how many children to have. For much of human history, children were a *joint product* of sex. In primitive societies that did not understand the biology of human reproduction, children were seen as a gift from God. Henry VIII of England blamed his first wife, Catherine of Aragon, for her inability to produce a son, although we now know that it is the father who contributes either the X chromosome (producing a girl) or the Y chromosome (producing a boy) to the mother's X chromosome. Since many children died in infancy, and since children would work on the farm from an early age, the idea of birth control was rarely considered, even for the first 150 years of the American republic. The Comstock Act of 1873 outlawed interstate commerce for all obscene material and commodities used to commit immoral acts, which included the use of birth control, even by married couples.<sup>15</sup> Under this act, authorities arrested and imprisoned Margaret Sanger in the early decades of the twentieth century.<sup>16</sup> Indeed, it wasn't until 1965 that the US Supreme Court finally ruled the Comstock Act unconstitutional.

State and federal governments were *anti-choice de facto* from 1787 to 1873, and *anti-choice de jure* from 1873 to 1965. Only in 1965 did the United States Supreme Court rule that state laws that interfered with the practice of birth control were an unconstitutional violation of the Fourteenth Amendment to the Constitution. It was only eight years later that a divided Supreme Court extended the ban on state interference with re-

<sup>15</sup> See <http://www.britannica.com/EBchecked/topic/130734/Comstock-Act>.

<sup>16</sup> <http://www.time.com/time/time100/leaders/profile/sanger.html>

productive decisions to the more controversial issue of abortion. In *Roe v. Wade*, the Court ruled (1) that a woman has a constitutional right to an abortion during the first six months of pregnancy, and (2) that state regulation of abortion was limited to the last three months of pregnancy when the fetus was considered viable outside the mother's womb. In 1968 Pope Paul VI wrote his encyclical<sup>17</sup> *Humanae Vitae*, which proclaimed that all forms of birth control, save abstinence, violated Catholic canons. The Catholic Church greeted the *Roe v. Wade* decision with dismay and condemnation. Sometime later conservative Protestant groups embraced the "pro-life" cause, and many opponents of abortion parrot the Catholic Church's opposition to all forms of birth control.

While the issue of reproductive rights is likely to remain controversial for a long time,<sup>18</sup> since it is probably the major wedge issue between Democratic and Republican voters, it is nevertheless a major discrimination issue. Those who are pro-choice are willing to discriminate in favor of the pregnant woman and against the potential or actual fetus; those who are pro-life are willing to discriminate against the pregnant woman in favor of the fetus. Even the nomenclature is loaded; pro-life people always refer to the "baby," never the "fetus"; pro-choice people generally refer to the fetus until he or she is born. Probably the most controversial economics discussion of abortion is Chapter 4 of *Freakonomics* by Steven Levitt and Stephen Dubner, which attributes much of the decline of the crime rate in the 1990s to legalized abortion 20 years earlier.

Despite one's attitudes toward the desirability of abortion, economists and economic students should agree that government interference with reproductive choices does have economic costs. Like any crime, prohibiting abortion would require allocating scarce resources to the detection, apprehension, conviction, and punishment of abortionists. One curious statistic is that the incidence of abortion is fairly high among young Catholic girls, who seem to reason that since birth control (and indeed, pre-marital sex) are "mortal sins," which would send her to hell if she fails to confess than sin, an abortion is just another mortal sin. This is an interesting example of **moral hazard**.

Economist Gary Becker devoted several chapters to his *Treatise on the Family* to the economics of reproductive choice. According to Becker, the demand for children is like the demand for any other good:  $Q_d = D(p_c, I, t)$ , where  $Q_d$  is the number of children demanded,  $p_c$  is the price of children (most importantly, the opportunity cost of time for the mother),  $I$  is household income, and  $t$  is "tastes." He predicts that children are normal goods,<sup>19</sup> which follow the law of demand.<sup>20</sup> Some important "taste" proxies are really supply variables. For instance, younger women are more fertile than older women are,

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<sup>17</sup> "A Papal Encyclical is the name typically given to a letter written by a Pope to a particular audience of Bishops. This audience of Bishops may be all of the Bishops in a specific country or all of the Bishops in all countries throughout the world." <http://www.papalencyclicals.net/encyclical.ht>

<sup>18</sup> Those who romanticize the era when theocratic government outlawed birth control information should read Ann Fessler's *The Girls Who Went Away: The Hidden History of Women Who Surrendered Children for Adoption in the Decades Before Roe v. Wade*.

<sup>19</sup>  $\frac{\partial Q_d}{\partial I} > 0$

<sup>20</sup>  $\frac{\partial Q_d}{\partial p_c} < 0$

and women with more education are more likely to practice birth control than are women with less education.

Table 7-3 shows a multiple regression printout that tests Becker's theory of the demand for children. The dependent variable, children, is the number of children under the age of 18. The results predict that, as the parents age, the number of children decreases at a decreasing rate. The coefficient on xfrwage (the mother's predicted wage<sup>21</sup>) is positive, implying that the number of children in the household increases as the mother's wage rate increases. The father's wage also has a positive, but smaller effect. Finally, as the schooling of the mother (fschool) or father (mschool) increases, the number of children decreases; schooling may be a proxy for knowledge of birth control. This variable could directly proxy the mother's access to birth control information, or it could also proxy the potential earnings of a stay-at-home mom. Either way, the results in Table 7-3 contradict Becker's theory that the number of children will decrease as the opportunity cost of time increases.

**Table 7-3**  
Estimated Demand Equation for Children

Source	SS	df	MS	Number of obs = 2542151		
Model	458330.425	9	50925.6028	F( 9,2542141)	=	97002.8
Residual	1334601.3	2542141	.524991084	Prob > F	=	0.0000
				R-squared	=	0.2556
				Adj R-squared	=	0.2556
Total	1792931.782542150		.705281665	Root MSE	=	.72456

children	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
xfrwage	.0221084	.0003431	64.45	0.000	.021436	.0227808
xmrwage	.0010528	.000315	3.34	0.001	.0004355	.0016701
fage	-.0146334	.0003426	-42.71	0.000	-.0153049	-.013962
fagesq	.0000174	3.52e-06	4.95	0.000	.0000105	.0000243
mage	.0023419	.0004427	5.29	0.000	.0014742	.0032095
magesq	-.0000572	4.50e-06	-12.71	0.000	-.0000666	-.0000484
fschool	-.0347501	.0005043	-68.90	0.000	-.0357385	-.0337616
mschool	-.0060877	.0004171	-14.60	0.000	-.0069051	-.0052703
time	.0452107	.0000573	788.74	0.000	.0450984	.0453231
_cons	.3564806	.0082674	43.12	0.000	.3402768	.3726845

Another interesting aspect of Becker's theory is that he explicitly considers the trade-off between the quantity of children and the *quality* of children. For instance, certain religions (Church of Latter Day Saints) place a premium on family size while others (Roman Catholics) prohibit birth control, and so some households prefer many children. However, the more children one has, the less one can spend on each child. For parents, children are often forms of **conspicuous consumption**. Instead of having eight children and sending them all to the community college, the family may opt to have one child and send her to Stanford. This substitution of quality for quantity may help explain the gen-

<sup>21</sup> We observe the mother or father's wage rate only if they have accepted a job offer; if their reservation wage exceeds the wage offer, they will specialize in household production. The variables xfrwage is the wife's predicted wage, based on her age and education; the variable xmrwage is the equivalent wage rate for her husband.

eral failure of Malthusian population theory, which predicted that as income grows, population grows unchecked, until, a generation later, the increase in the labor force reduces the wage rate to near subsistence levels. If families generally prefer to have a few “high-quality” children, they can reduce the total time input of the mother, at the same time allowing the parents to show off among similarly situated couples.

### **Allocating Time: Market Work, Housework, Leisure, and Personal Maintenance**

It should be obvious that the allocation of time between market work, household work, and leisure is likely to change if the Smiths produce (or adopt) children. Biology requires that the mother actually bear the children, which typically requires a break from the labor market while she undergoes a different form of labor. In this case, with Eve working 40 hours per week, and Adam working about 12.5 hours per week, the opportunity cost of Adam rearing the children is lower than if Eve became a full-time mom. But, although economists are reluctant to admit it, economic considerations are not the only considerations. Eve may have a nesting urge to stay home and watch little Abel, and keep his brother Cain out of mischief. Adam may be incompetent at changing diapers (or attempt to convince Eve that he is incompetent if he fears being a stay-at-home dad). They may opt for day care, or a full-time nanny. All that economics can say is that as the opportunity cost of time increases, the time spent raising children is *likely* to decrease.

Before one can perform market work, one must **participate in the labor force**, meaning that he or she actively looks for a job, or is employed. Table 6-8 relates the probability of labor-force participation of both husbands and wives to their own past earnings as well as those of their mates.

To find the general tendencies, we return to market data. Table 7-4 relates the hours worked in 2010 by the husbands and wives.<sup>22</sup> We find that the higher one’s own wage rate, the more hours one is likely to work. We find that the hours men work start at 33.06 hours, then increase with their age, their own years of schooling, the number of children in the household, their own wage, and the potential wage of their spouse.<sup>23</sup> Note that the probability that the results are due to chance is remote. For the wives, the negative constant term implies that if we compare a husband and wife with similar characteristics, the wife tends to work fewer hours. The number of hours a woman works in the market decreases as the number of children in the household increases. The higher her husband’s potential wage rate, the fewer hours a wife is likely to work. In fact, her wage rate has virtually no impact on her hours of work.<sup>24</sup>

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<sup>22</sup> I use *seemingly unrelated regressions* to estimate the model. First, I estimated the potential wage rate for men and women, based on their age and education, then I used this potential wage to predict earnings, using similarities in unmeasured variables between husbands and wives to improve the estimation precision.

<sup>23</sup> Does this imply that men, having “won” a wife with high potential earnings, must work harder to keep her?

<sup>24</sup> The wife’s working hours typically reflect “need” (a low wage from her husband) rather than “desire” (a high potential wage for herself).

**Table 7-4**

Seemingly unrelated regression

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
mhours	38700	8	12.52832	0.0248	985.39	0.0000
fhours	38700	8	12.32642	0.0345	1378.49	0.0000

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
<b>mhours</b>						
fage	.2096026	.0507053	4.13	0.000	.1102221 .3089832	
fagesq	-.0027002	.0005844	-4.62	0.000	-.0038456 -.0015548	
fage65	1.280847	.5692352	2.25	0.024	.165167 2.396528	
mage65	-4.510968	.393022	-11.48	0.000	-5.281277 -3.740659	
mschool	-.0478594	.0505007	-0.95	0.343	-.1468389 .05112	
xfwage	-.0006614	.015764	-0.04	0.967	-.0315582 .0302354	
xmwave	.3089223	.0314415	9.83	0.000	.247298 .3705466	
mchldnm	.1751646	.0656167	2.67	0.008	.0465582 .303771	
_cons	33.06728	1.079076	30.64	0.000	30.95233 35.18223	
<b>fhours</b>						
fage	.6250498	.0518562	12.05	0.000	.5234135 .7266862	
fagesq	-.0076969	.0005897	-13.05	0.000	-.0088526 -.0065412	
fage65	-.5119314	.5590338	-0.92	0.360	-1.607618 .5837548	
mage65	-2.225751	.3768218	-5.91	0.000	-2.964308 -1.487194	
fschool	.1637763	.0700934	2.34	0.019	.0263957 .301157	
xmwave	-.2321095	.0170425	-13.62	0.000	-.2655122 -.1987068	
xfwage	.2017585	.037311	5.41	0.000	.1286303 .2748868	
fchldnm	-1.6322	.0652974	-25.00	0.000	-1.76018 -1.504219	
_cons	24.76278	1.289895	19.20	0.000	22.23463 27.29093	

Table 7-5 presents the evidence that my graduate intern, Aruna Abeyakoon, and I learned about hours of household work by husbands and wives, based on information gained from the Panel Study on Income Dynamics. According to the table, the number of hours men spend in household work increases to age 58, then declines. The husband reduces his household work by 0.06 hours for each hour spent working outside the household. A man's household work increases until there are three children in the household, then decrease. Note that years of schooling increase a man's household work; is it possible that education sensitizes husbands to empathize with their wives? His own and his wife's potential wage each has a negative effect on a man's household hours, although her wage has a stronger effect.

Note that women's work also increases until age 54, then declines. Each additional child increases a mother's household work by 114 hours per year; there are no "diminishing returns to children" as far as women are concerned. As with men, her spouse's wage actually has a stronger effect on hours worked than her own wage does.

**Table 7-5**

	Derivative	Probability of Chance	Optimal Number
husband's household hours			
Age	8.452	2.00%	58.14
Age Squared	-0.073	3.70%	
Meals as Family	5.529	6.70%	
Own Home	47.938	1.20%	
Husband's job hours	-0.059	0.00%	
Wife's job hours	0.026	0.10%	
Years of Schooling	12.715	2.70%	
Number of Children	51.247	0.10%	3.16
Number of Children Squared	-8.098	3.60%	
Husband's Potential Wage	-4.690	12.80%	
Wife's Potential Wage	-5.245	4.80%	
Constant Term	-71.330	65.50%	
wife's household hours			
Age	45.170	0.00%	53.76
Age Squared	-0.420	0.00%	
Meals as Family	24.490	0.00%	
Own Home	36.941	11.40%	
Husband's job hours	0.076	0.00%	
Wife's job hours	-0.229	0.00%	
Years of Schooling	-2.617	68.00%	
Number of Children	113.917	0.00%	
Husband's Potential Wage	-19.833	0.20%	
Wife's Potential Wage	-9.666	0.00%	
Constant Term	-335.352	0.80%	

Table 7-6 breaks down the activities for male and female respondent from the American Time Use Survey, reported between January 2003 and December 2010. Except for a few insomniacs, nearly everyone spends personal time – sleeping, preening and having sex;<sup>25</sup> on average, women spent about 25 more minutes per day on personal activities than men did. Women spent nearly an hour more per day on household services (cooking, cleaning, repairing, lawn maintenance) than men did. Women spent 20 more minutes per day caring for household members (spouse, children, elderly relatives) than men did. Men spent more time in market work, travel, and eating. Note that the sum of all activities was slightly less than 24 hours per day, implying either that respondents failed to record some activities,<sup>26</sup> or there were activities for which no category existed in the survey.

<sup>25</sup> Men (age 16 and above) reported average sexual activity of 0.96 *minutes* per day, while women reported sex activity equal to 0.52 minutes per day; I'll let the reader decide why these two average amounts of time are significantly different from each other.

<sup>26</sup> For instance, 98.8% of respondents reported zero sexual activity. Since respondents reported their activities for only one 24-hour period, it is possible they transferred their time from personal pleasure to filling out the forms for the American Time Use Survey.

Women: Average Daily Activities					
Activity	variable	Minutes	Hours	Range (minutes)	
				minimum	maximum
Personal Care	act_pcare	583.03	9.72	0	1440
Household Services	act_hhact	144.13	2.40	0	1310
Care of Household Members	act_carehh	42.46	0.71	0	1151
Care of non-relatives	act_carenhh	10.64	0.18	0	1129
Market Work	act_work	131.54	2.19	0	1395
Education	act_educ	16.72	0.28	0	1090
Purchasing goods or services	act_purch	31.30	0.52	0	875
Purchasing professional services	act_profserv	5.71	0.10	0	1060
Overseeing household help	act_hhserv	0.89	0.01	0	620
Receiving government services	act_govserv	0.31	0.01	0	470
Eating	act_food	65.82	1.10	0	735
Social activities	act_social	276.49	4.61	0	1434
Sports activities	act_sports	13.68	0.23	0	900
Volunteer activities	act_vol	10.23	0.17	0	1315
Telephoning	act_phone	10.00	0.17	0	870
Travel (including commuting)	act_travel	70.86	1.18	0	1420
Total			23.56		
Men: Average Daily Activities					
Activity	Variable	Mean	Hours	Range (minutes)	
				minimum	maximum
Personal Care	act_pcare	558.05	9.30	0	1440
Household Services	act_hhact	92.11	1.54	0	1190
Care of Household Members	act_carehh	22.83	0.38	0	1065
Care of non-relatives	act_carenhh	9.19	0.15	0	980
Market Work	act_work	200.09	3.33	0	1430
Education	act_educ	16.63	0.28	0	1051
Purchasing goods or services	act_purch	20.87	0.35	0	700
Purchasing professional services	act_profserv	3.37	0.06	0	780
Overseeing household help	act_hhserv	0.99	0.02	0	630
Receiving government services	act_govserv	0.31	0.01	0	380
Eating	act_food	70.34	1.17	0	895
Social activities	act_social	307.24	5.12	0	1395
Sports activities	act_sports	27.39	0.46	0	1073
Volunteer activities	act_vol	9.00	0.15	0	1095
Telephoning	act_phone	4.23	0.07	0	635
Travel (including commuting)	act_travel	76.52	1.28	0	1440
Total			23.65		

### Recent Trends in Marriage

Figure 7-4 shows the historical trend in marriage for men and women over 18 between 1962 and 2012. In 1962, nearly 78 percent of men, and nearly 70 percent of women were married (because women live longer than men do, a smaller proportion of women are married compared to men). By 2011, the marriage rate for men had declined to 59.3 percent for men and 53.8 percent for women. Over this period, the marriage rate declined by 0.39 percent per year for men and by 0.33 percent per year for women.

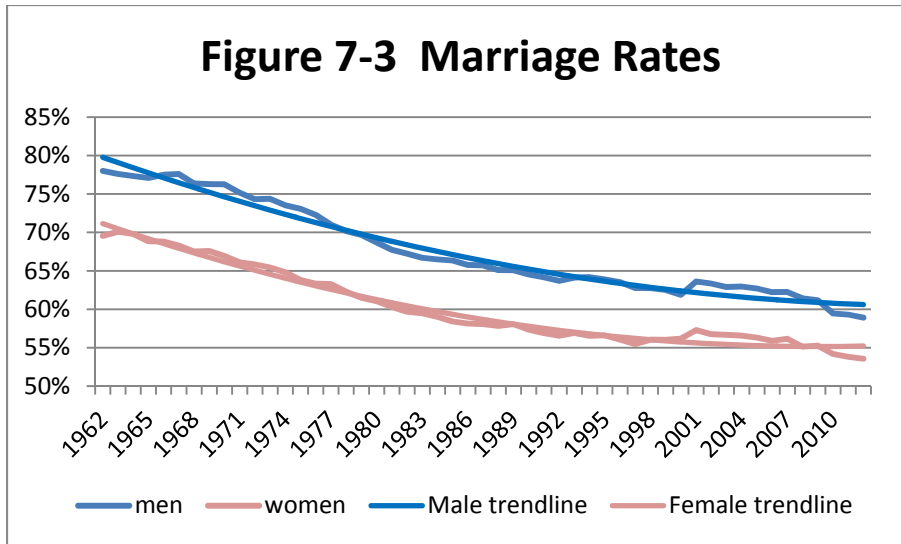


Figure 7-4 shows the marriage rate by age between 1962 and 2010 for both men and women. First, we notice that both men and women delayed marriage in 2012 compared to 1962. In 1962, 47 percent of women and 23 percent of men were married at age 20; in 2012, 53 percent of men and 56 percent of women are married by age 30. Most men remain married well into their 70s, while the probability of marriage for women begins dropping dramatically in the mid-50s. Finally, the probability that men and women over 65 are married is higher in 2012 than in 1962, a tribute to the longer life expectancy for both men and women.

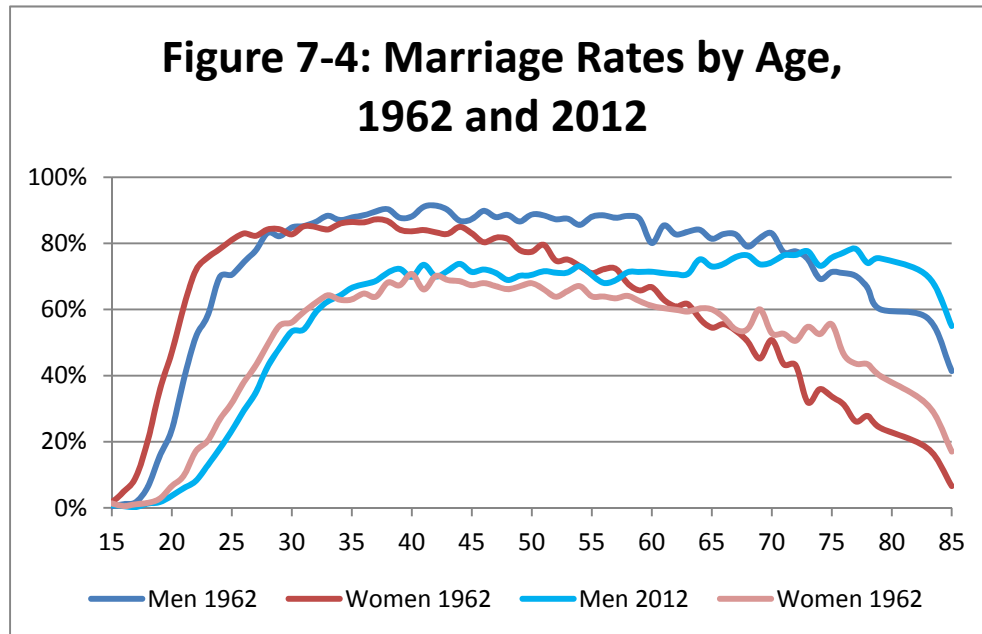
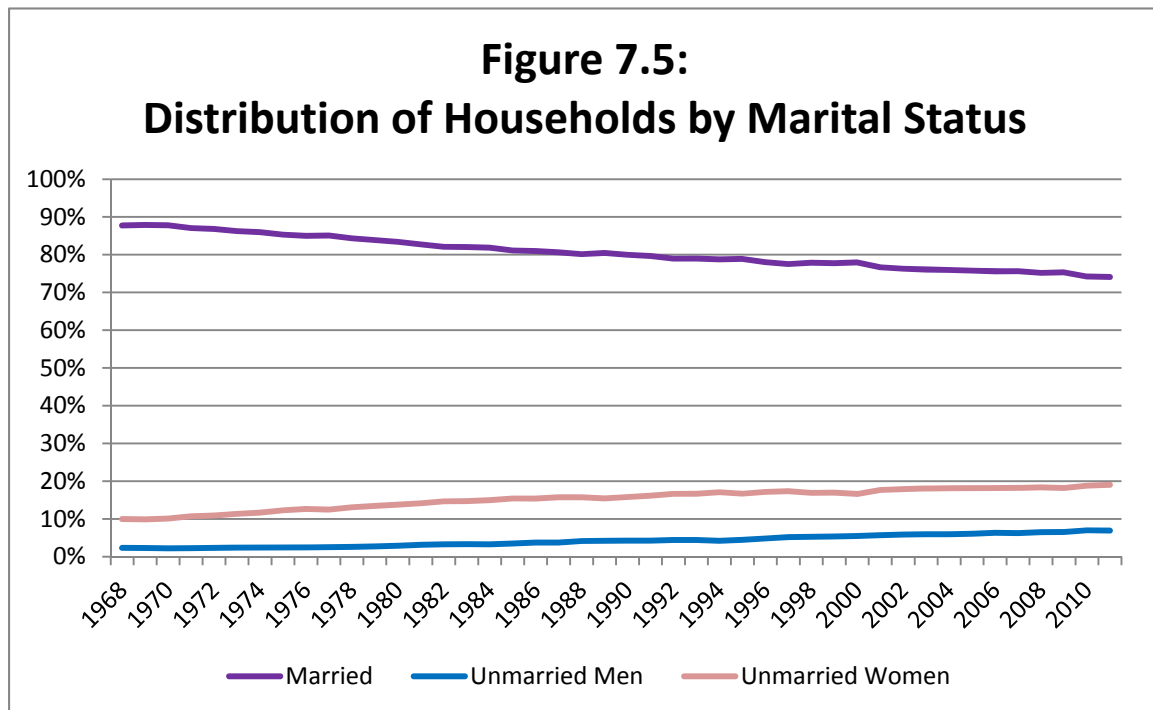


Figure 7-5 shows the female proportion of the population at each age for 1962 and 2012. There is a higher proportion of teenage girls in 1962. The two lines track each other very closely from age 25 until age 75, after which females as a percent of the population dips in 1962, and then increases with age, peaking at slightly more than 60 percent.



In 2011 the proportion of the population who are women remains above 60 percent after age 75, reaching roughly two-thirds of the population beyond age 80.

Finally, in Figure 7-5 we plot the distribution of households by marital status, and the gender of single household heads. In 1968, 88% of multi-person households were headed by married couples; that proportion fell to 74% in 2011. The proportion of households headed by single women increased from 10% in 1962 to 19% in 2011. The greatest percentage increase were households headed by single men, from 2% in 1962 to 7% in 2011.



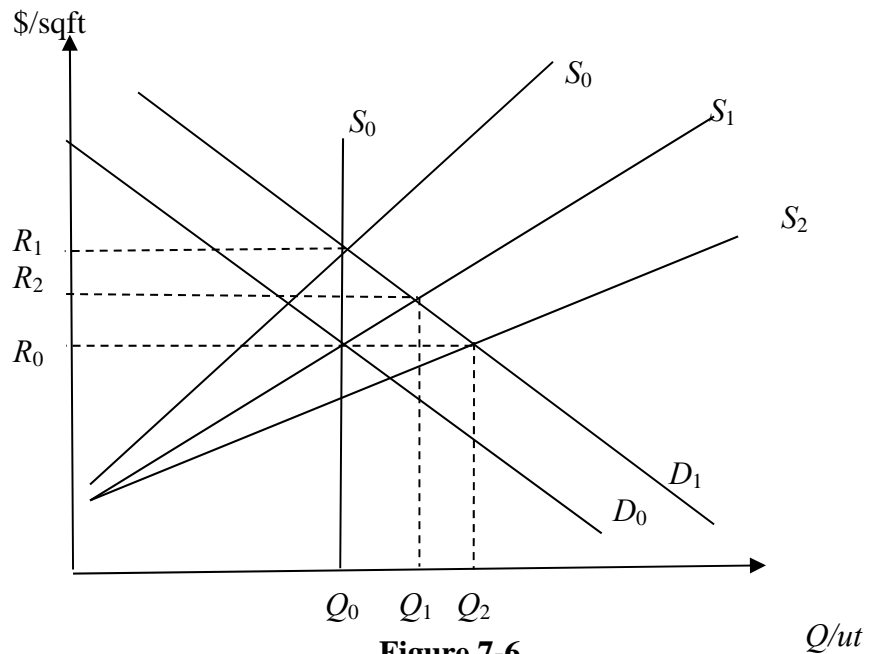
### Investing in a Home

Buying a home is typically the largest single consumption expenditure that a household makes. Home equity is often the most important asset in a household's wealth portfolio. So, given that a family has to live somewhere, what does economic theory tell us about housing choices? Figure 6-8 presents a supply and demand analysis for rental housing. The quantity axis measures the quantity of housing to square feet of living space. There are obviously many other dimensions to housing, such as location, age, amenities, and neighborhood characteristics. We will discuss those issues later.

As usual, we assume a competitive market in long-run equilibrium. The demand for housing is negatively sloped: the higher the rent, the lower the number of square feet households are willing to rent. At any particular time, the quantity of housing available is fixed, here at  $Q_0$ .<sup>27</sup> Now, suppose that an increase in the number of households (or, perhaps, an increase in household income) increases the demand for housing from  $D_0$  to  $D_1$ .

<sup>27</sup> Actually, housing equilibrium is similar to labor-market equilibrium: At any time, there are likely to be some vacant housing units, and there are likely to be some households seeking housing units (e.g., living with parents). Hence, equilibrium exists there are only "frictional vacancies"—when the number of available units equal the number of people willing to rent those units.

As usual, an increase in demand causes a shortage (since quantity demanded increases to  $Q_2$ , while quantity supplied remains at  $Q_0$ ). Allowing rents to increase means that, in the short run, the rental rate increases to  $R_1$  per square foot, which seems unfair<sup>28</sup> since renters end up paying more rent for the same quantity of housing. The temptation is for local governments to freeze (or control) rents at  $R_0$ , so that rents are fair (meaning that more tenants vote than landlords do). Rent controls create a permanent housing shortage of  $Q_2 - Q_0$ , or worse;<sup>29</sup> another name for a housing shortage is *homelessness*.



**Figure 7-6**

Suppose that rents were free to adjust to market conditions. Over time, the supply curve would rotate from  $S_0$  to  $S_1$  as existing landlords expand their operations (build new buildings, turn nonrevenue space like lobbies into apartment units, and so forth). The increase in supply in turn reduces the equilibrium rent from  $R_1$  to  $R_2$ . However, this may not be the end of the story; market entry shifts the supply curve from  $S_1$  to  $S_2$ , and if apartment renting is a constant cost industry, eventually rents return to their former level.

Equilibrium rents reflect the monthly value of housing space to households. Anything that increases the demand for housing (like higher-quality schools, reduced commuting time to work) will tend to increase the short-run rent and the quantity supplied. Anything that increases the supply of housing units (absence of rent controls, efficient wages for construction workers, market-oriented zoning regulations) will tend to reduce the equilibrium rent while increasing the quantity of housing demanded.

So, given this theory of rents, when should households buy houses rather than rent them? The answer is when they find it more efficient to rent from themselves than from a landlord. In equilibrium, the rental payment to the landlord covers the landlord's cost of providing housing services (most importantly, the interest cost of investing wealth in

<sup>28</sup> Unfair to tenants but fair to landlords; since "fair" means "more for me!"

<sup>29</sup> Quantity supplied could eventually fall below  $Q_0$  if landlords fail to maintain apartments (a decrease in quality), or even torch their buildings if insurance coverage exceeds the flow of net rental income.

buildings instead of other financial assets). Suppose a family is paying \$1000 per month in rent. At the end of, say, 30 years, they will have consumed \$360,000 worth of housing services, but their wealth will not have changed because of that rental payment. Suppose they have \$40,000 to put down on a new home and agree to pay off the balance of \$200,000 at the rate of \$1,200 per month for 30 years.<sup>30</sup> At the end of 30 years, they will have a home worth \$200,000 (plus appreciation or minus depreciation). Had they saved the \$40,000, continued to pay \$1,000 rent per month, and deposited an additional \$200 per month at 4% interest, at the end of 30 years they would have \$369,086 in the bank. So, while buying one's own home is considered an investment, it may not be the **best** investment.

Buying a home is an investment in the economic sense of the word—the use of funds to acquire commodities that produce other commodities (in this case, housing services). The reason why so many households purchase their own homes is (1) because everyone else does (so-called **bandwagon effects**); (2) because the appreciation of one's home is typically not taxed, while interest on saving is taxed; (3) owning a home is often (but not always!) a good hedge against inflation; and (4) because home ownership gives tax advantages.

When a household chooses to buy or rent housing, it simultaneously selects a neighborhood. In addition to the quality of the house itself, neighborhood effects are important **amenities** for which households are willing to pay. Typically one must live in a neighborhood to benefit from local parks, local school, and police and fire protection. These services may vary by political jurisdiction or simply because the best teachers, police officers, and fire fighters work in the best neighborhoods. An increase in the quality of service would increase the demand for housing, which would increase the equilibrium rent. So, even if a household had no children, an increase in the quality of schooling would increase their property values because it would increase the amount of money another household would pay to live there. Hence, it is efficient for the local government to use a property tax to pay for schools, parks, and fire or police services. The effect of the tax would be to reduce the quantity of housing services demanded. The optimal level of service would maximize the net value of the property (i.e., increase service until the last dollar increase in value was matched by exactly one dollar of cost).

Finally, consider amenities that are not produced by the government but occurred naturally. For instance, suppose that homeowners prefer to live in a neighborhood with high-income neighbors, as opposed to a neighborhood with low-income neighbors. If this is true for both low-income and high-income households, then high-income households will outbid low-income households, resulting in housing **segregated** by income. This tendency toward income segregation is often reinforced by building codes and home owner association restrictions on property modifications that favor high-income households.

### **The Housing Bubble: Investment vs. Speculation**

I have repeatedly attempted to distinguish between *investment* and *financial speculation*. An investment is a research using activity, wherein the investor incurs costs in

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<sup>30</sup> This assumes a loan of 6 percent and ignores property taxes. Note, since the mortgage interest is tax deductible, the tax advantages of “owning” one's own home can be considerable.

the present with the uncertain hope of being able to produce more in the future. In this sense the purchase of a house is an investment in that the homebuyer purchases a commodity which will generate housing services into the future. However, there is a widespread belief that a home purchase represents a lucrative *financial* move that allows the *speculator to flip* the house – that is, by purchasing and holding the house, the speculator can realize a **capital gain**. This mentality led to the self-fulfilling prophecy. When the demand for housing, driven by speculative fever, outpaced the supply of housing, prices rose dramatically. However, in order to feed the housing frenzy, banks, real estate agents, housing appraisers and the speculators themselves crossed the line separating prudence from herd mentality. In 2007, when my barber told me he had just purchased his fourth house with borrowed money, I knew that the *housing bubble* was about to burst.

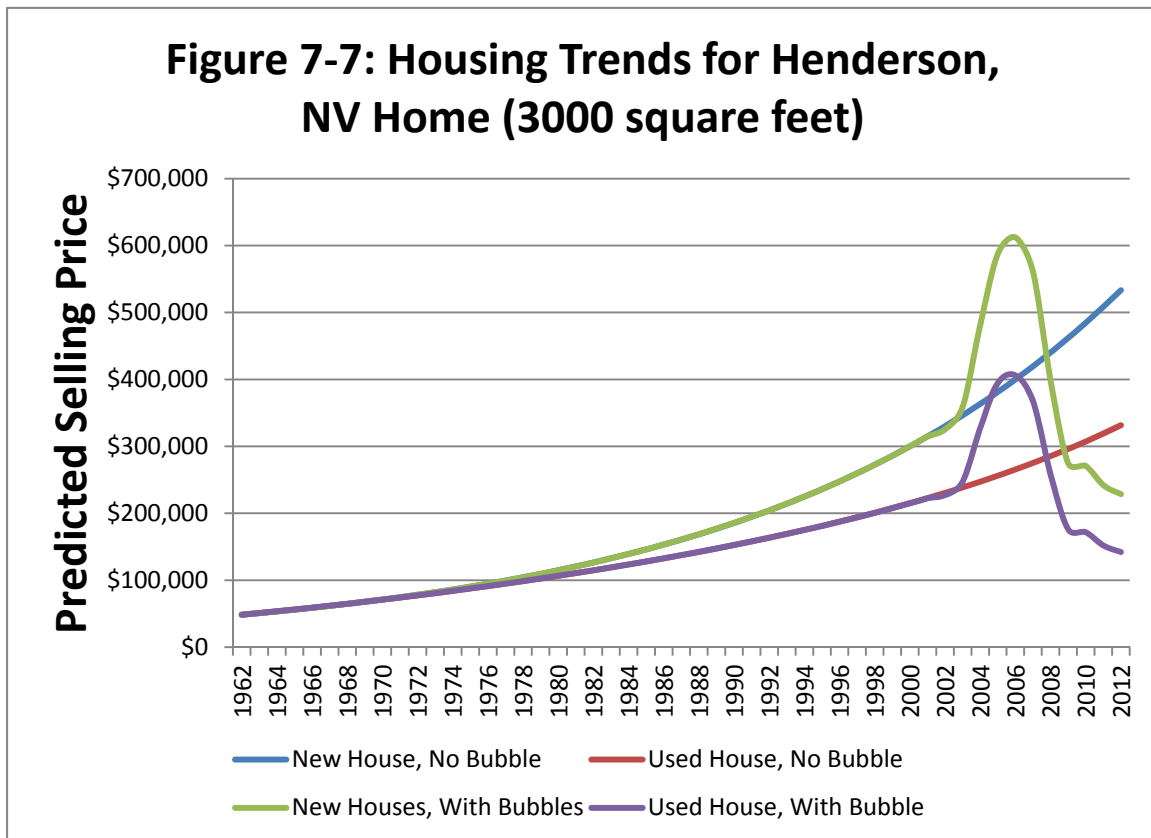


Figure 7-7 shows the **trend lines** for new houses (blue) and a house constructed in 1962 (red). I extracted the data behind this diagram from the Clark County Tax Assessor's data base, which records the sale price of all residential homes sold in Clark County, Nevada. Based on the date of sale, location, and the size (square footage) of single-family homes, I calculate that between 1963 and 2001 the average sale price of a 3000 square-foot house appreciated at a rate of 4.92% per year. Of course the trend in new house prices is only a benchmark for tracking the cost of housing for people who want to move into a home no one else has lived in. If one wishes to consider housing as an investment, we must consider the impact of depreciation – that is the loss of value as a productive asset ages. By tracking the age of homes I compute that a house built in 1963 (that was still occupied in 2002) appreciates at 3.8% per year. Since the data base does not include information about the upkeep costs of a home, a 3.8% *gross* return is less than

half of the return for a random portfolio of stocks, which would have grown at an average annual rate of 9.85%.<sup>31</sup> In 2002, the return on “holding” a used house for a year declined to 2.4%; this reduction might have led people who owned “investment”<sup>32</sup> houses to sell them, perhaps purchasing a 10-year Treasury bond, with a yield of 4.61%. In mid-2003 the price of single-family house increased by 7.61%. During 2004 the average price of a single-family home increased by 37.53%, followed by 60.11% in 2005, and 60.62% in 2006. In 2007 the appreciation of a used house grew by 40.29%. In 2008 “bubble” in housing prices burst; in January 2008 the average price of a new house was 5.95% *lower* than it had been in 2007. The declines continued: -37.56% in 2009, -41.5% in 2010, -50.53% in 2011, and -55.47%. In March 2012, a new house sold for 57.13% *less* than it would sold for had the housing bubble never occurred. Since the trend line ultimately reflected the cost of producing new houses, this meant that developers suffered substantial losses in 2008 to 2012. The house we purchased in Henderson in August 2005 for \$200,500 (the predicted price was \$204,271), now has a market price of \$142,068.

Table 7-7  
Housing Price Trends

Year(s)	New Houses	Vintage House	Inflation Rate	Stock Market	Government Bonds
1962-2001	4.92%	3.87%	5.34%	7.75%	7.43%
2002	3.43%	2.40%	1.46%	-16.56%	4.61%
2003	8.69%	7.61%	2.11%	-1.25%	4.02%
2004	38.91%	37.53%	2.99%	18.05%	4.27%
2005	61.72%	60.11%	3.17%	6.81%	4.29%
2006	60.62%	59.03%	4.15%	8.59%	4.79%
2007	40.29%	38.90%	2.36%	12.81%	4.63%
2008	-5.01%	-5.95%	5.60%	-17.17%	3.67%
2009	-37.56%	-38.18%	-2.10%	-18.84%	3.26%
2010	-41.35%	-41.93%	1.24%	21.86%	3.21%
2011	-50.03%	-50.53%	3.63%	11.63%	2.79%
2012	-55.03%	-55.47%	2.30%	3.12%	2.01%

Table 7-7 shows how Southern Nevada real estate appeared to be a much better “investment” in 2003 than the stock market (-1.25%) or government bonds (4.02%). The longer one delayed jumping into the market, the greater the disparity; by 2007, all qualified buyers had purchased homes, only by expending credit to “sub-prime” borrowers did the financial industry hope to maintain the housing frenzy. By 2008 the housing market turned, and prudent speculators sold their houses; however, the stock market was also tanking. The safe haven was government bonds. By 2010 the stock market had recovered, thanks to the bank bailout. Negative returns to housing mean current owners are

<sup>31</sup> See [http://www.moneychimp.com/features/market\\_cagr.htm](http://www.moneychimp.com/features/market_cagr.htm).

<sup>32</sup> In keeping with my distinction, an *investment* house was purchased as an income earning asset: one could purchase a dilapidated house, fix it up, and sell it for a gain, or one could purchase a house and rent it for income. By contrast, a speculator merely purchases a house (or any other asset) in hopes of a capital gain, never employing resources to improve the value of that asset.

under water – they owe more than their houses are worth, with little help of freeing themselves of their imprudent speculation.

### Explaining Housing Segregation

While income-segregated neighborhoods<sup>33</sup> tend to perpetuate income inequality by segregating education and other public services by income level, racially segregated housing tends to perpetuate racial discrimination and prejudice borne of ignorance. Prior to the 1964 Civil Rights Act, courts enforced restrictive covenants, whereby white homebuyers agreed by contract not to sell their home to an African American buyer. American blacks were crowded into ghettos like European Jews before World War II. Ironically, because of restricted supply of housing, blacks (and Jews) often paid higher prices for housing than white (and gentile) homeowners did.

Economists find it intriguing that housing segregation still persists 40 years after civil rights legislation made discrimination illegal. Of course, just because something is illegal doesn't mean that it will not happen. Based on Gary Becker's path-breaking work,<sup>34</sup> people decide whether or not to commit crimes based on the expected benefits of crime (which depends on whether one is apprehended, prosecuted, and punished) minus the cost (including the opportunity cost of time). For the most part, antidiscrimination laws are enforced by **civil law**, meaning the (alleged) victim must sue the (alleged) perpetrator, and prove that the defendant harmed the plaintiff, and demonstrate measurable damages. Given the cost of litigation, it is unlikely many home buyers could successfully sue homeowners for failure to sell them a house. The defendant could simply argue that someone else made a better offer. Further, damages would be small—probably the difference between the value of the household to the family minus the selling price.

While housing segregation often begins with the failure of whites to sell to blacks, integrated housing often turns out to be an unstable disequilibrium outcome in a housing market. Suppose that neither blacks nor whites wish to live in a predominantly black neighborhood, but whites, having higher average household income, outbid blacks for houses in a new development, resulting in an all-white neighborhood.<sup>35</sup> After the developer sold all the houses available, the resale market takes over. In this case, each homeowner decides whether to continue to reside in their home, and if they choose not to reside in their home, whether to sell the home or to rent the home. From the point of view of neighbors, to whom a homeowner sells a home has **external effects**. That is, part of the cost or benefits of selling one's home will be experienced by neighbors who remain behind. How do the preferences of neighbors determine (1) whether one sells to a white or a black, and (2) whether neighbors themselves sell their home to a white or a black?

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<sup>33</sup> An interesting, if embarrassing, experience occurred when a parishioner at our former church called on God to keep apartment construction out of her neighborhood during a public prayer session.

<sup>34</sup> "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, 76, no. 2 (March-April, 1968), 169–217.

<sup>35</sup> This outcome could also occur if the developer refused to sell houses to blacks, either because the developer had a taste for discrimination (would only sell to a black family if they paid substantially more for a house than a white family would), or because the developer was responding to consumer preference (the developer believed—unfortunately, probably accurately—that selling houses to blacks would reduce the prices that subsequent homebuyers would be willing to bid, be they black or white).

Table 7-8 presents two different scenarios for bid and ask prices by white homeowners in an all-white neighborhood. In Table 7-8a and Figure 7-8a, blacks outbid whites if the neighborhood was less than 20 percent black, and whites would outbid blacks if the neighborhood was more than 20 percent black. These sets of contrived individual preferences would create a stable equilibrium when neighborhoods are 20 percent black. Suppose that a neighborhood of 20 houses were all white and a white family decided to sell its home, say, because of a job change. A black family would offer \$195,000 (since purchasing the home would make the neighborhood 5 percent black), and a white family would offer only \$187,500. An egoistic homeowner would sell to the black bidder, and the neighborhood would indeed become 5 percent black. The next white family to sell would receive a bid of \$187,500 from a white bidder or \$190,000 from a black bidder; again, the black bidder would win the auction. Casual sales would increase the proportion of black homeowners until the equilibrium proportion of 20 percent were reached. At this point, if a black family sold a home, whites and blacks would each bid \$180,000; selling to a black would maintain the proportion, while selling to a white family would reduce the proportion of blacks, causing blacks to again outbid whites at the next sale. If a white family sold to a black family, the proportion of blacks would increase, and a white family would outbid a black family at the next sale; the proportion of 20 percent blacks would tend to prevail in the long run.

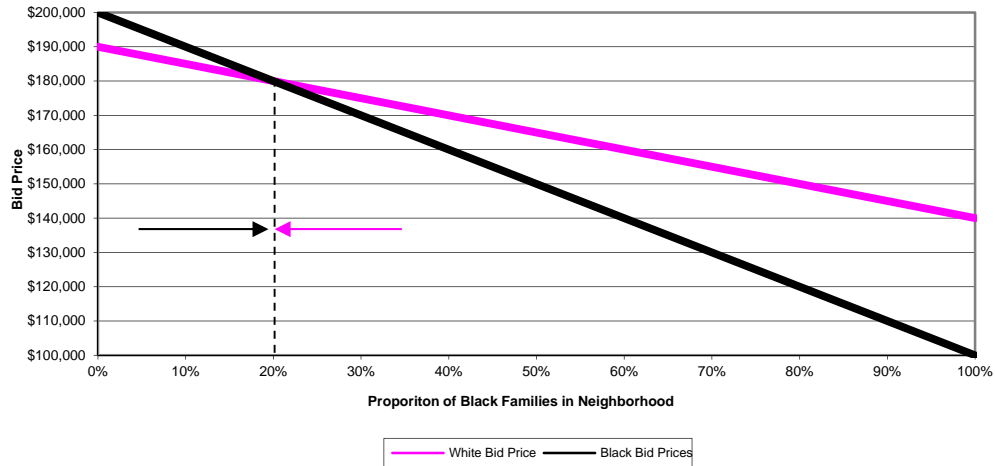
**Table 7-8a**

Percent of Neighborhood Black	Bid Price/Ask Prices	
	Whites	Blacks
0%	\$190,000	\$200,000
10%	185,000	190,000
20%	180,000	180,000
30%	175,000	170,000
40%	170,000	160,000
50%	165,000	150,000
60%	160,000	140,000
70%	155,000	130,000
80%	150,000	120,000
90%	145,000	110,000
100%	140,000	100,000

**Table 7-8b**

Percent of Neighborhood Black	Bid Price/Ask Prices	
	Whites	Blacks
0%	\$200,000	\$190,000
10%	190,000	185,000
20%	180,000	180,000
30%	170,000	175,000
40%	160,000	170,000
50%	150,000	165,000
60%	140,000	160,000
70%	130,000	155,000
80%	120,000	150,000
90%	110,000	145,000
100%	100,000	140,000

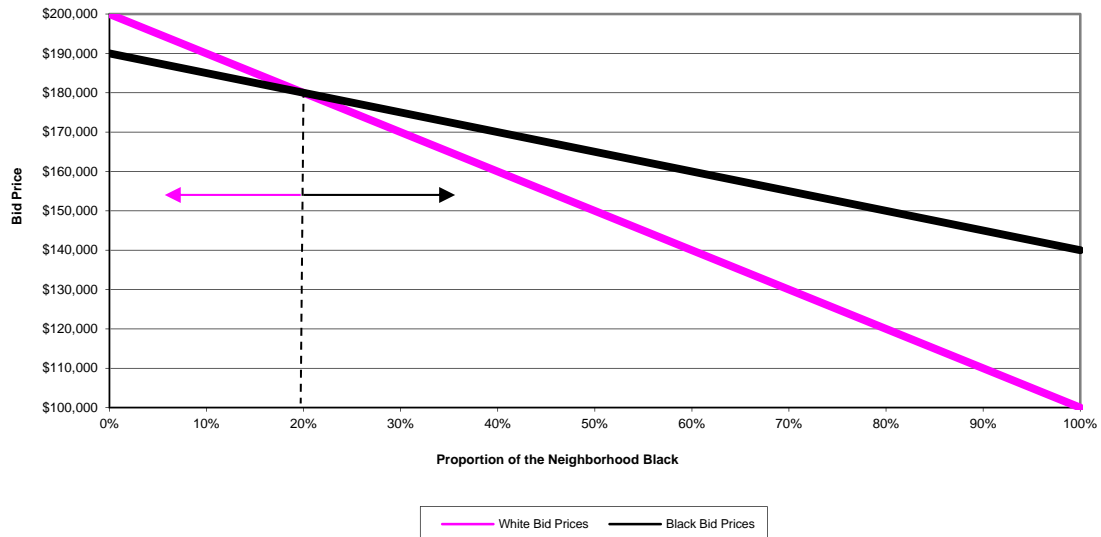
Figure 7-8a  
Stable Equilibrium: Integration



In Table 6-11b and Figure 6-9b are mirror images of Table 6-11a and Figure 6-9a, whereby whites outbid blacks when the proportion of blacks is below 20 percent, and blacks outbid whites when the proportion of blacks is greater than 20 percent. Since whites outnumber blacks, a profit-maximizing developer would sell only to whites, who would outbid blacks to live in a predominantly white neighborhood. Anytime a white family sold, they would sell to whites, and the neighborhood would remain segregated. This, of course, would require a neighborhood for blacks. If land in the black part of town were cheaper than in the white part of town, a developer could earn a profit by selling homes for \$140,000 in the all-black neighborhood. If a neighborhood happened to be 20 percent black, it would *tip* to all black or all white, depending on whether a white or black (each of whom bid \$180,000) actually purchased the property. Selling to a white would encourage whites to outbid blacks when blacks sold their houses; selling to a black would encourage blacks to outbid whites. The only stable equilibria would be 0 percent black with an average price of \$200,000, or 100 percent black with an average price of \$140,000.

This example assumed that all blacks have the same bid function,  $P_b = \$190,000 - \$500PC_b$ , and all whites have the same bid function,  $P_w = \$200,000 - 1,000PC_b$ . It is more realistic to assume that different black and white households have a different tolerance for living in a neighborhood with blacks or whites. Suppose that one white family will sell its home at a loss when one black family moves into the neighborhood, a second white family sells when the second black family moves in, and so forth. If the whites fleeing their neighborhood (trying to sell before their property depreciates) sell to blacks, a neighborhood would tip from white to black even more rapidly than in our example. Since real estate agents (as explained in *Freakonomics*) gain more from rapid property turnover than for achieving the maximum price for a client, unscrupulous agents or other speculators would profit from a visible tipping phenomenon; they would take a loss on the first few houses sold to blacks, but eventually they would gain considerable profit through buying at the white ask price and selling at the black bid price.



Figure 7-8b  
Unstable Equilibrium

Is this situation unjust or unfair? Obviously, your answer depends on who you empathize with—the white homeowners, the black buyers, or the real estate speculator. White homeowners clearly lose; their **taste for discrimination** may cost them as much as \$200,000 in reduced property values. The blacks who buy before the neighborhood becomes segregated also lose, in this case, as much as \$50,000 (the difference between the value of a nearly all-white neighborhood and the value of an all-black neighborhood). The speculator, of course, makes a handsome profit.

How can such a situation be remedied? For one, fair housing legislation may actually prevent neighborhood tipping, because if blacks have the ability to purchase homes in any neighborhood, whites have no “safe haven.” Second, the greater the income equality between whites and blacks, the less likely neighborhoods will be segregated to start with. Third, the greater the equality of experience between blacks and whites living in the same neighborhood, the more they will learn to tolerate each other.

### Conclusion

In this chapter we looked inside of the household sector, extending our model of one-person consumption decisions developed in Chapter 4 into a model of altruistic behavior. Families function because the parents (and the children) consider the well-being of all family members when deciding how to allocate time and income among competing activities. We found that households are formed through a process of **sorting** whereby individuals look for potential mates with similar characteristics (positive sorting) when it comes to consumption and dissimilar characteristics (negative sorting) when it comes to production. Positively sorting traits seem to be more highly correlated than negatively sorting traits, with the exception of gender. Perhaps a major reason for the culture wars is a profound disagreement whether sex is a consumption activity or a production activity.

### Summary

1. Household formation is a sorting process by which people search and compete for lifetime mates. Economists treat households as institutions that facilitate the joint consumption (sharing) and production (comparative advantage). These two functions of households create some tension in household formation and stability.
2. The most important positively sorting traits are age, education, and ethnicity. Other important positively sorting traits are religion and desire for children. A **positively sorting trait** is one for which individuals seek partners like themselves.
3. The most important negatively sorting traits are gender and wage rates. Negatively sorting traits assist in household production; having complementary genders allows for the production of children. Having different wage rates allows a more clear-cut comparative advantage in allocating time between market production and household production.
4. To maximize a household's standard of living, the time of adults should be allocated so that the marginal utility of the last hour spent, divided by the relevant wage rate is the same for market production, household production, personal maintenance, and leisure.
5. The family allocates its resources according to the Marxist rule: from each according to ability (adults produce more income than children do), and to each according to need (consumption does not depend upon earnings).
6. Marriage, in addition to being a religious rite, is also a legal contract that provides economic protection for the economically vulnerable partner and the children of the marriage.
7. Household decision makers (typically, the parents) do not attempt to maximize household income, but maximize the standard of living by allocating only enough time to market and household production to provide enhanced return to personal maintenance and leisure time.
8. Hours worked at a job are positively related to a person's potential wage rate; hours of household work are inversely related to the market wage, and therefore negatively related to the number of hours on the job.
9. Marital rates have been declining over the last 35 years. Because women typically live longer than men do, the proportion of women who are married peaks when women are in their 40s, then declines. The proportion of men who are married remains at about 80 percent from age 40 on.
10. Typically the most important purchase a family makes is its home. Families purchase houses when the expected present benefits (the savings on rent and the appreciation of the house) exceed the cost (the down payment and present value of mortgage payments).
11. Property values reflect not only the value of the house itself, but also the value of neighborhood amenities. Better-quality schools, parks, and police and fire protection

increase local property values. Using property taxes to finance local government expenditures is an efficient form of benefit taxation.

12. One of the most persistent problems in race relations is **housing segregation**, whereby neighborhoods tend to be all white or all black. Housing segregation can reflect unstable housing-bid functions for blacks and whites, whereby whites outbid blacks when the proportion of blacks in the neighborhood is low, and blacks outbid whites when the proportion of blacks in the neighborhood is high. The fact that whites have higher income and better credit than blacks do, along with white **tastes for discrimination**, contributes to continued housing segregation.

### Glossary

**Endowments:** The resources, advantages, or disadvantages that a person starts with.

Typically, middle- and upper-income children are endowed with loving parents and the opportunity for a quality education. Too often poor children's endowments involved a stressed-out single mom, a crowded school system, and a dearth of positive role models.

**Utility:** Technically, the usefulness of an item, but an economic metaphor for the complex goals of households. Utility is a synonym for satisfaction, and economists assume that consumers wish to maximize utility.

**Egoist:** A person who obtains satisfaction only from his or her own consumption; an egoist is indifferent to the welfare of everyone besides himself or herself.

**Marginal utility:** The satisfaction derived from the last unit of a good or service consumed. Economists believe that as the consumption of one good increases, the consumption of all other goods constant, marginal utility decreases.

**Bad:** A commodity whose marginal utility is negative.

**Rational consumer:** A consumer who allocates income so that the marginal utility of each good consumed is proportional to its price, and that the marginal utility per dollar spent of those goods exceeds the marginal utility of the first dollar spent on each commodity not purchased.

**Impulsive consumer:** An irrational consumer who spends his or her income randomly until it is exhausted.

**Compulsive consumer:** An irrational consumer who attempts always to consume the same commodities, regardless of their relative prices.

**Consumption possibility frontier:** The consumer's budget line divides possible combinations of goods between those that are possible (inside and on the budget line) and those that are impossible (above the line). The rational consumer picks that point on the consumption possibility frontier that maximizes total utility.

**Altruist:** A person who obtains positive satisfaction from the prospect that others (e.g., family members) are better off. An altruist would be willing to reduce her own consumption to increase the consumption of someone else.

**Malevolence:** The opposite of altruism—the increase in satisfaction from the prospect that some other person is worse off. A malevolent person would sacrifice his or her own consumption to harm someone else.

**Sorting process:** A system whereby individuals are divided into larger groups. Marriage is a sorting process, since singles seek out mates, and they, in turn, produce children similar to themselves.

**Positively sorting trait:** A characteristic where one seeks a mate similar to oneself. In marital sorting, positively sorting traits include age, education, ethnicity, religion, and wealth.

**Negatively sorting trait:** A characteristic where one seeks a mate dissimilar to oneself. In marital sorting, negatively sorting traits include gender, the hourly wage rate, and aptitude for household production.

**Regression line:** A statistical estimate of a linear relation between two variables. A regression line is obtained by finding the equation that minimizes the squared difference between the points representing actual data and the line fitted to those points.

**Unconditional probability:** The likelihood of a particular outcome (e.g., having a white, non-Hispanic spouse) that does not account for any of one's own characteristics.

**Conditional probability:** The opposite of unconditional probability. The conditional probability of having a white, non-Hispanic spouse is higher if one is also white and non-Hispanic than if he or she is black, Asian, Native American, or Hispanic.

**Bandwagon effects:** The phenomenon whereby consumers increase the value they place on a good or service because it is popular. Bandwagon effects create fads.

**Amenities:** Things of value in addition to the major purpose of a good or service. For instance, in addition to being the location of one's house, neighborhoods create amenities including local schools, parks, and police and fire protection. Other amenities could include how well neighbors maintain their property, peace and quiet, the amount of vehicular traffic, or the presence or absence of churches.

**Civil law:** A law, such as laws against discrimination, which are enforced when the alleged victim sues the alleged perpetrator for damages. The opposite of civil law is **criminal law**, which is enforced by the state on behalf of citizens, and typically involves state-sanctioned punishment—fines, imprisonment, or execution.

**Segregation:** The legally mandated (**de jure**) or the result of unregulated behavior (**de facto**) separation of a population based on a given characteristic. The two most prevalent forms of segregation are racial segregation (blacks and whites live in neighborhoods and attend school with others of the same race) and income segregation (zoning ordinances and homeowners' associations that discourage homes of different price ranges in close proximity to each other).

**External effects:** When the market transaction between a buyer and a seller affects third parties who are not part of the transaction. External effects could be either beneficial; for instance, the more people who are vaccinated against smallpox there are fewer people to catch smallpox from. Typically, external effects that are negative catch

people's attention, including pollution and deteriorating property values when housing integration causes panic selling.

**Arbitrage:** The practice of making a profit by purchasing a good or service at a low price then reselling it at a higher price.

**Taste for discrimination:** The willingness to incur a higher financial or other cost to avoid associating with someone from another group. The combination of unequal wealth distribution by race gives rise to unstable housing-neighborhood bid functions, which in turn cause neighborhood segregation.