Incomplete

Economic theories of union formation

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The objective of this paper is to survey analytic constructs that economists have used to study union, marital and cohabitating, formation.[1] It is easier to first discuss marital behavior in a society without cohabitation. After that, I will expand the discussion to include a society with both marriage and cohabitation.

Although this paper is primarily focused on theoretical contributions, I will note along the way that economists have shown that pecuniary and non-pecuniary public policies have significant quantitative effects on union formation.

In a marriage market, there are many different individuals with different attributes. How does the marriage market clear?[2] Or who marries whom and who remains unmarried? Becker 1973; 1974 proposed the first analytic model of the marriage market.[3]

Every marriage includes many activities such as having and raising children, producing and consuming household income, shared family activities and so on. These activities may be aggregated into an index, marital output of that marriage.[4] An individual who is married to two different types of spouse will produce different amounts of marital output. A productive marriage has more marital output than an unproductive marriage. How many types of individuals there are in a marriage market depends on what the analyst is interested in studying. For example, a division of each gender in two types, college graduate and non-college graduate may be sufficient to study positive assortative matching in marriage by education.

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[1] Related surveys include Bergstrom 1997; Casper and Bianchi 2002; Waite 2000; Weiss 1997.
[2] The marriage market is the market for adult living arrangements. It includes being single, married, divorced, cohabitation, and so on.
[3] His work is summarized in his 1991 book. The discussion here is based on Choo Siow 2006.
[4] Measures of marital output used in the policy literature include equivalence scales, measures that compare the welfare of a single parent family with a two parent family, and poverty indices. This paper does not associate marital output with a particular measure.

In addition to producing marital output, the two spouses will have to divide it between them.[5] Marriage market models in which marital output is divisible are known as transferable utilities models.[6] How is a wife's or husband's share of marital output realized in a real marriage? Marriage produces many outputs such as children, a family house, etc., which are not easily divisible. A proponent of the transferable utility assumption may argue that there are enough divisible outputs in a marriage such as individual spousal leisure, decision making authority such as where to go on vacation, which house to buy, how much religious education should the children have and so on, so that potential spouses can divide up the divisible outputs to give one spouse a larger or smaller share of marital output.

Assume for the moment, that the marriage market determines the shares of marital output that each spouse obtains. In this case, each individual will know his or her share of marital output for any marital choice that the individual makes. Given marital shares for every marital choice, each individual chooses the martial choice which maximizes his or her marital output.[7] Consider a marriage match between type *i* men and type *j* women. In general, the number of type *i* men who want to enter these marriages need not equal the number of type *j* women who want to enter these marriages. In this case, there is an imbalance in the *i,j* sub-marriage market. When there are imbalances in the sub-marriage markets, spousal shares adjust to clear the imbalances. In any sub-market, the increase in a woman's share is equal to the decrease in her husband's share. For example, if there are

[5] There is a large empirical literature on intra-household allocations. E.g. Chiappori, et. al. 2002; Lundberg, et. al. Pollak and Wales 1997.
[6] Transferable utilities models of the marriage market are similar to models for academic co-authors and business partnerships.
[7] The rational choice assumption is particularly apt for modern marriage markets where most individuals make their own marital choices.

more type *i* man who want to marry type *j* women than type *j* women who want to marry type *i* men, the woman's share has to rise to attract more type *j* women and deter some type *i* men from entering the *i,j* sub-market. The marriage market clears when the spousal shares in all sub-markets are such that there is no imbalance in any sub-marriage market. So when the marriage market clears, for each sub-market, the number of husbands is equal the number of wives. Some men and women will choose to remain unmarried. The number of unmarried men in general will not be equal to the number of unmarried women.

It is now convenient to summarize the model that we have introduced. First, we introduced marital output, the output from a marriage between two different types of individuals. Second, different types of marital matches will generate different amounts of marital output. Third, marital output can be shared between the spouses, the shares being determined by marriage market clearing. Fourth, the model predicts that there will be marital matching, that is different types of individuals are likely to marry different types of spouses.

We will discuss implications of this model. First, individuals choose who they want to marry. Second, intra-household allocations will depend who the partners are. Third, changes in marriage matching patterns are due to either changes in the technology of producing marital output and or changes in the supplies of the different types of individuals to the marriage market. So individuals are flexible in their choice of spouses. They will choose different spouses as marriage market conditions change. Similarly, changes in a wife's and or husband's share of marital output are due to either changes in

the technology of producing marital output and or changes in the supplies of the different types of individuals to the marriage market.

Changes in the technology of producing marital output can increase or decrease the amount of output for each spouse and make both of them better or worse off respectively. These changes can be due to changes in laws and other social norms. Or they can be due to technological change such as the invention of the birth control pill.

Changes in population supplies will redistribute marital output between the spouses. Because marital output of a marriage is unchanged, for any given type of marital match, a wife's share will increase if her type becomes relatively scarce in the society. Similarly, a husband's share will decrease if his type becomes relatively plentiful. This model will predict that the recent increase in the supply of college educated women relative to men will decrease their share of marital output in marriage. If the division of marital output for a particular type of marriage is substantially affected by changes in population supplies, affected parties may change who they will marry. That is, changes in population supplies affect the division of marital output in a society as well as who marries whom.

I will now demonstrate how the structure of marital output can be used to understand positive assortative matching by spousal characteristics (Becker 1991). A standard explanation for positive assortative matching is that individuals want spouses with the same tastes. This explanation works well for matching by religion, ethnicity and attributes where individuals disagree about ranking of potential spouses by those attributes. But consider attributes where all individuals agree on the same ranking of potential spouses. For example, all individuals may prefer a spouse with more education.

Consider two types of women, *j* and *k*, where *j* has more education than *k*. For any type of man, marital output will increase if he is married to the type *j* woman rather than the type *k* woman. If the increase in marital output is higher when the man's education is higher, Becker shows that the marriage market will result in positive assortative matching. Compared with less educated men, more educated men will be willing to give a larger share of marital output to more educated women. So educated men will out bid less educated men for educated wives. The less educated are left to marry each other. This explanation for positive assortative matching is important because it provides us with a mechanism to understand the degree of positive assortative matching. As discussed by Guner, et. al. 2005, the degree of positive assortative matching by education is an important determinant of intergenerational income inequality.[8]

While we are able to explain positive assortative matching of spouses, the phenomena of positive assortative matching is less significant than it appears. The reason is that for most characteristics, the sex ratio, ratio of available men to available women, is close to one. So it is easy for individuals to match with a spouse with the same characteristics. For example, it is easy to marry within educational, ethnic and religious groups when the sex ratios by attributes are close to one. The observed degree of positive assortative sorting for spouses by education, ethnic and religious is not informative on how substitutable college graduates and non-graduates are as spouses.

Evidence of substitutability of different types of spouses are provided by Ni Bhrolchain 2001; Bergstrom and Lam 1989. They show that marriage rates adjust minimally to significant changes in sex ratios. Instead, who marries whom changes. Put another way, marriage is a compelling experience for most individuals.

[8] Also see Bisin, et. al. 2004; Fogli, et. al. 2004; Qian and Preston 1993.

Some studies, such as Angrist 2002, South and Lloyd 1992, show that marriage rates of young adults are affected by the sex ratio (the ratio of young men to young women in the marriage market). These studies confound delay with ever marrying. We will discuss the issue of delay later.

Another use of marital output is to consider how it changes as socioeconomic circumstance changes. For example, legalized abortion and effective birth control for young adults reduced the value of marriage relative to remaining unmarried. Angrist and Evans; Choo and Siow 2006 showed that the legalization of abortion significantly reduced the marriage rates of young adults between 1970 and 1980. Goldin and Katz 2002, and Bailey 2006 showed that college educated women delayed marriage after they obtained access to the birth control pill.

Non-transferable utilities

The transferable utilities model of the marriage market assumes that marital output is divisible and also that the division is not subject to renegotiation after marriage. What happens if a spouse reneges on a promise to bring the children up in a particular religion or drive the children to after school activities? Can one spouse exclude another from use of part of the family house? If a pre-marital commitment to a division of marital output is not feasible after the marriage, potential spouses will anticipate this lack of commitment. For example, a current issue in many jurisdictions is the obligation of a higher education graduate to support his or her ex-spouse who supported them financially through school. If an ex-spouse can effectively renege on providing support after graduation, one spouse may be unwilling to support the other through school. Without

transferable utilities, marriages between individuals with widely different characteristics are less likely to take place.

How does the marriage market clear in societies without pre-marital divisions of marital output? Peters and Siow 2004 considered a society in which marital output is the sum of the wealth of the spouses but spouse cannot commitment to a division of marital output. When individuals can make irreversible pre-marital investments, these irreversible pre-marital investments act to clear the marriage market. For example, an individual may marry only after he or she finishes medical school. The individual's potential spouse is not worried that he or she will renege on becoming a doctor. Boulier and Rosenzweig provide empirical evidence to show how the marriage market affects schooling decisions.

Another way to deter spouses from reneging on their pre-marital commitments is to use social norms. For example, consider a traditional marriage in which the husband works and the wife stays at home. In such a marriage, the wife expects the husband to financially provide for her and the family. If the husband reneges on his commitment after the marriage, their community may impose social sanctions on him to get him to honor his commitment. Similarly, if the wife does not take care of the household according to the community standards, the community may also ostracize her. In societies where community enforcement of social norms is effective, mainstream couples may be able to depend on community enforcement of spousal shares of marital output. This social enforcement works if the marital matches are common. If the marital match is uncommon, it is unclear how social enforcement should proceed. For example, if a Catholic marries a Muslim, it is unclear to the community, either Catholic or Muslim,

what faith the children should adopt. Thus a community may not enforce a pre-marital bargain to bring the children up in a specific faith when a disagreement arises. The potential spouses will have to decide whether such a marriage should proceed. Without social enforcement, "unusual" matches may not occur. Put another way, if social enforcement of marital shares is important, there will be many more standard matches.

An interesting implication of community enforcement of marital shares is that it can rationalize "good" versus "bad" spousal behavior. In general, economic models do not ascribe morality. But if there is community enforcement of norms of behavior, "good" behavior is rewarded and "bad" behavior is punished.

Finally, it may be difficult for some types of individuals to marry another type without transferable utilities. But because the sex ratio is approximately one in the population, most individuals will be able to marry with or without transferable utilities. In other words, the question of transferable utilities is primarily about who marries whom rather than whether to marry or not.

Finally, dynamic considerations provide another way in which non-transferable utilities models of the marriage market can clear.

Dynamic considerations

A marriage is a multi period relationship. Thus when an individual marries, in general, he or she will be unable to divorce and remarry in the next period. If an individual chooses not to marry, he or she can re-enter the marriage market in the next period. Thus an individual has to consider the option of re-entering the marriage market

in the future when he or she decides whether or not to marry the currently available partner.

There are two main reasons to delay marriage. First, individuals may choose to delay entering the marriage market entirely because they have other objectives that they want to satisfy before marriage. They may want to accumulate more human capital, build up their career, enjoy the single life, and so on. Marriage may conflict with these objectives. This reason for delay is systematic in the sense that all individuals with the same characteristics will choose approximately the same amount of delay. For example, individuals who attend college have a higher age of first marriage than individuals who to not attend college.

The second reason for delay is due to search frictions in the marriage market. An individual is in the marriage market but have yet to find an acceptable partner. Individuals who find suitable partners will marry. Individuals who have not found suitable partners will delay marriage. Different individuals with the same characteristics may marry at different times.

Economists use two different ways to model search friction. The first is to use a random search model.[9] In this framework, an individual who is active in the marriage market may or may not meet a potential spouse. When and who they meet is random. When two potential spouses meet, they have to decide whether they want to marry each other. If both parties agree to marry, they will marry and leave the marriage market. If at least one party decides not to marry, the match is broken up and they will return to the marriage market in the subsequent period to search for other potential spouses. In the language of marital output, if marital output is low, the marriage will not occur. If there is

[9] Mortensen 1988. Extensions include Burdett and Coles 1997, Lillard, et. al.; Wong 2003; 2005.

sufficient marital output for both parties, the marriage occurs. An individual may not marry in the current period because he or she did not meet a potential spouse, or they met a potential spouse but did not agree to marry.

The random search model accommodates both transferable utilities and non-transferable utilities. Under the transferable utilities assumption, when two potential spouses meet, they can agree on an enforceable division of marital output should they choose to marry. Under the non-transferable utilities assumption, when two potential spouses meet, no one can commit to a particular division of marital output. They have to anticipate their bargaining power after marriage in order to figure out what they will receive in marriage. A marriage will result if both parties are satisfied with what they each expect to receive in marriage. Otherwise the couple will break up and return to the marriage market. From a theoretical perspective, the random search model finesses the question of how the marriage market clears in non-transferable utilities models. Whether there are transferable utilities or not (i.e. individuals can make credible pre-marital commitments to share marital output or not), potential spouses will marry if they agree to do so. Otherwise, they return to the marriage market in the next period.

When there is dynamics, individuals recognize the tradeoff between marrying the current partner who may not be their preferred spouse versus turning down the current partner and searching again tomorrow hoping to find a better spouse.

In terms of predictions, the random search model predicts that different individuals with the same characteristics may marry at different times.

The random search model extends naturally in a theory of cohabitation as a "trial marriage". When two potential spouses meet, they can to choose to marry, return to the

marriage market or an intermediate stage, cohabitation, where they can learn more about what it would be like to marry each other. After some length of cohabitation and learning about each other, the parties may marry or break up and return to the marriage market. Thus the trial marriage model of cohabitation predicts that cohabitation is a transitory state. Most cohabitants will break up or marry. A more subtle prediction from Lillard, O'Brien and Stern is that marriages that are preceded by cohabitation are on average less durable than marriages that are not preceded by cohabitation. They provide empirical support for this prediction. When cohabitation as trial marriage is available, parties that marry without an initial cohabitation period are sure that they are a good match for each other. Parties who are unsure about the value of marrying each other will decide first to cohabitate. During cohabitation, the couples who become satisfied that their value from marriage is larger than remaining in cohabitation will marry. Lilliard, et. al. showed that these marriages have lower average match value than those who marry without initially cohabitating.

A shred of evidence in support of the trial marriage hypothesis is in figure C1. Figure C1 shows that ratio of cohabitating couples to married couples in mixed race unions (blacks and whites) is higher than for own race marriages. Assuming that mixed race unions have more initial uncertainty, individuals contemplating mixed race unions should be more likely to start with cohabitation and also to stay in that state longer.[10]

The arrival rate of meetings is a key parameter in random search models. Some economists have conjectured that this arrival rate is increasing in the number of participants in the marriage market. Communities with larger populations will have

[10] The figure is not conclusive because mixed race marriages are more likely to end in divorce than own race marriages (Felmlee, et. al. 1990).

higher arrival rates of meetings and therefore be more advantageous to participants. Participants can use this higher arrival rate to marry earlier and or wait for better matches. Botticini and Siow provide a preliminary test of this hypothesis. They investigated whether the population size of a city is related to the marriage rate of that city for three disparate societies: (1) Medieval Tuscany, (2) Pre-reform China and (3) Modern United States. Medieval Tuscany and pre-reform China are relevant because mobility was severely limited in these societies. Married sons lived with their parents in medieval Tuscany. In pre-reform China, intercity mobility was essentially non-existent. Finally, there is intercity mobility in the US. For all three cities, Botticini and Siow cannot reject the hypothesis that the marriage rate is not increasing in city size. In fact, there is evidence that the marriage rate is decreasing in city size for China and the US.

Although successful, the random search model in which individuals have no choice over who they meet in the marriage market is too extreme. Individuals care about the characteristics of their spouses and therefore will expend resources to meet potential spouses with these characteristics. These models anticipated the success of internet dating sites and other modern marital matching making mechanisms.

In the last decade, economists have begun to study directed search models. In these models, individuals can direct their search to meet potential spouses with preferred observable characteristics. For example, individuals with particular interests can choose to attend gatherings based on those interests. Internet dating sites where individuals can sort potential partners by characteristics is an extreme example of a directed search mechanism. While individuals can choose to meet potential spouses with preferred observable characteristics, individuals also care about unobservable characteristics of

potential spouses which are not revealed until they meet. Two individual who chose to meet based on observed characteristics may choose not to marry after they meet. Directed search models are able to explain why older adults marry each other. They can limit their search to each other.

Hitch, et. al. and Fisman, et. al. explore different dimensions of directed search. Hitch, et. al. studied internet dating behavior whereas Fisman, et. al. studied speed dating. In both of these studies, the researchers obtained a lot of data on the participants and their dating search behavior. For example, Fisman, et. al. show that men are less selective about who they are willing to date than women. The implications of this behavior and other behavior in the data remain to be worked out. These new sources of data on dating choices and outcomes promise to increase our knowledge substantially on union formation.

Choo and Siow 2006b use a direct search model to explain positive assortative matching by spousal ages. We show that the accumulation of marriage specific capital, where marital output increases with the duration of the marriage, is quantitatively important for explaining positive assortative matching by spousal ages. When the accumulation of marriage specific capital is important, an individual will prefer to marry someone of the same age or younger so that the duration of the marriage can be long. Older individuals are willing to marry each other because they both do not expect to live very long. Then individuals who are less old choose each other and so on.

Divorce

Per period marital output is not fixed over the lifetime of a marriage. In general, marital output will evolve over the length of a marriage. As two spouses learn to anticipate and accommodate each other, marital output will increase. Sometimes, marital output may fall as spouses become disappointed with each other for various reasons. If marital output falls below what one or both spouses think they can get from dissolving the marriage, the marriage will end. If the spouses have children, they may decide to divorce after the children grow up.

The evolution of marital output is affected by actions of the couple within marriage. Economists think of this as investment in marriage specific capital. Marital output is higher if the stock of marriage specific capital is large and vice versa. If the couple does not invest in marriage specific capital, the stock will be low and the couple will be more likely to end their marriage with the arrival of adverse events. Johnson and Skinner showed that couples invest in marriage specific capital strategically. They founded that wives of couples who divorced increased their hours of work in the years preceding the divorce. Wives who did not divorce did not increase their house of work over the same period.

Economists have studied how marriages evolved with the change in divorce laws. Before the seventies, most states had consent divorce in which both spouses had to agree to a divorce before it was granted by the state. Otherwise one spouse had to show that the other spouse was at fault in the marriage. During the seventies and eighties, some states enacted unilateral divorce in which a divorce was granted when one spouse wanted it. Economists show that there was a significant increase in the divorce rate for a few years after a state enacted unilateral divorce. After ten years, the divorce rate fell but remain at

a higher level than before the change in divorce regimes. The large transitory increase in the divorce rate is rationalized by the fact that many couples who wanted to divorce earlier under consent divorce regime found it too difficult to do so. After the change in the law, they could divorce and did. The subsequent partial drop in the divorce rate is rationalized by the observation that marriages that occurred after the change in the law recognized the new divorce regime. While marriages were more likely to end under unilateral divorce, the marriage rates also increased in states which switched to unilateral divorce. The explanation is that some individuals who were worried about the difficulty of divorce under consent divorce became willing to marry under unilateral divorce.

Gender differences in marital behavior

On average, women marry earlier than men. There are more never married men than never married women. Usually, wives spend more time on household activities and less time on labor market activities than their husband.

Siow 1998 uses gender differences in fecundity and the transferable utilities model of the marriage market to rationalize the above gender differences in behavior.[11] Women have a shorter fertility period than men. Consider a simple model in which all adults live for two periods. Women are fecund in the first period whereas men are fecund for both periods.

Because women are fecund only in the first period, they will marry and have children in the first period. Men can choose to marry or not in the first period. Consider a marriage between a young man and a young woman. When a child is born, the parents have to decide how much time to spend with the child and how much remaining time to

[11] Giolito 2005 provides quantitatively accurate model.

spend in the labor market. Let us assume that both parents derive the same utility from spending an additional hour with the child. In this case, the parents will spend different time with the child if they derive different utility from missing an hour of labor market time. When young adults spend time in the labor market, they earn income which can be spent on the family. They also acquire labor market experience which will increase their earnings in the second period. Thus both parents tradeoff the time spent with their child versus acquiring current and future income.

What can the spouses do with their future incomes? If they remain married to each other in the second period, they will share the income according to their agreed upon division at the time of marriage. If a divorce occurs, the ex-wife will not want to remarry to have another child. The ex-husband may want to remarry to have another child. Here the transferable utilities income assumption is important because he can use his labor market earnings in the second period to entice another young woman to marry him. The ex-husband has another use for his second period income that his ex-wife does not have. Looking forward from the first period, the young husband has more uses for second period income than his young wife. Consequently, he will want to spend marginally more time in the labor market and less time with his child than his wife. This model rationalizes the observation that wives spend less time in the labor market than their husbands without assuming that women are more productive in child care or are discriminated against in the labor market.

When the second period comes about, some young marriages will end in divorce. Some of these divorce men will be able to remarry by promising their young wives a larger share of marital output than what young men are able to promise. So some young

men will not be able to marry. The young men who will not be able to marry will work and try to marry in the second period. Thus in this model, all women marry when they are young. They marry young men, older single men and older divorced men. Note that divorced men who remarry will have had two wives over their lifetimes. In this case, some men who did not marry when young must also be unlucky in the second period and also not marry when old.

Our simple model has rationalized all the above gender differences in marital behavior. It explains why women marry earlier than men, why there are more never married men than never married women, and why wives usually spend more time on household activities and less time on labor market activities than their husband.

Buckles 2005 shows that differential fecundity affects women ages of marriage. She showed that in states in which invitro fertilization is covered by medical insurance, women delay marriage relative to states in which invitro fertilization is not covered by medical insurance.

Many studies have compared the earnings growth of women who bear children with those who did not to infer the labor market cost of having children. These studies are not conclusive because the women who have children may have lower labor market potential than those who did not have children. To finesse this problem, Miller 2005 relied on "accidents" to create valid comparison groups. She compared the earnings growth of (1) women who had children versus women who miscarried over the same period, and (2) women who had children due to contraceptive failure versus women who did not have children. She found that child bearing substantially reduce the growth rate of labor market earnings of women.

Cohabitation

Cohabitation is a recent phenomenon in North America. Figure C1 shows that cohabitation has grown from an insignificant share of adult unions in 1970 to less than 10% in 2000. Figure C2 shows that cohabitation is most prevalent among adults in their twenties. The average duration of a cohabitating union is significantly shorter than that of a marital union.

There are legal differences between cohabitation and marriage. Due to the rise of child bearing within cohabitation, most jurisdictions have recently changed their laws to make the legal responsibilities of parents the same after a cohabitating or marital dissolution. In general, it is easier for cohabitants to break up and ex-cohabitants have less ability to obtain alimony. Due to increase difficulty of dissolution of marital unions, couples who want to have children together will prefer to have children in wedlock.

An explanation for the recent rise of cohabitation is as follows. Without effective birth control for unmarried women and legalized abortion, sexual activity out of wedlock was very costly. Cohabitation without sexual activity is unrealistic. Thus there was little demand for cohabitation. When adults wanted to engage in sexual activity and or have children, they married. Otherwise they remained single.

When the birth control pill became available to young single women and abortion was legalized in the seventies, the demand for pre-marital sexual activity rose. Cohabitation, either as “trial marriage” or living arrangement without having children became attractive. Thus we can explain the rise in cohabitation in the seventies and also its popularity among adults in their twenties who are actively searching for marital

partners. The decline of cohabitation for older adults is because many cohabitants graduate into marriage and child bearing. These roles of cohabitation also explain the shorter duration of cohabitation versus marriage.

Children under cohabitation occur for two reasons. First, some pregnancies were unplanned and the cohabitants subsequently decided to have the child without marrying. They may not be ready to commit to a long term union. Second, some cohabitants may have decided to bear children without marrying. Marrying is always an option even after the children are born. What the above explanations rule out are adults who enter cohabitation to have children.

The division of labor between partners in marital versus cohabitating households are different. In general, analysts have found that there is less specialization along gender lines in cohabitation compared with marriages. Non-economists have interpreted this evidence as cohabitation being more egalitarian. Another interpretation is that cohabitants expect their living arrangement to break up earlier than marital relationships. In that case, cohabitants will be less willing to specialize compared with married couples. Johnson and Skinner have provided evidence that wives work more when they anticipate divorce.

Out of wedlock parenthood

As shown by figure O1, out of wedlock fertility have increased substantially since the seventies. Not surprisingly, economists first investigated changes in financial incentives to have children out of wedlock. They have found empirical support for the hypothesis that the welfare system, AFDC, discriminates against married parenthood in favor of single parenthood (E.g. Grogger and Bronars 2001, Moffitt 1998). Moffitt

provides a particular good summary of the empirical evidence to date and I will not repeat it here. The consensus is that these welfare incentive effects are not sufficient to explain most of the increase in out-of-wedlock fertility.

There is a difficulty in focusing primarily on financial incentives. The reason is that if it is more costly to have children out of wedlock than within marriage, one may predict that women with high incomes will be more likely to be single mothers which is counterfactual. Thus economists have also focused on non-financial effects.

The increase in the fraction of single mothers since the seventies was due to two sources. One source is an increase in unwed teenage pregnancy. These mothers have children at a young age. Prior to the seventies, they married when they had children. After the seventies, they are not marrying before they have children. The rise in the rate of teenage child bearing is modest. What there is, was an increase in unwed teenage pregnancy. In general, these mothers are poorly educated and have low socioeconomic background.

Akerlof, Yellin and Katz provides an explanation for this change.[12] They argue that more men than women want to engage in pre-marital sexual activity. But without effective birth control, women were unwilling to engage in pre-marital activity. In order to engage in sexual activity, many men married before they wanted to do so.

With the availability of effective birth control, many more women were willing to engage pre-marital sexual activity. So men did not have to marry to engage in sexual activity. Young women who wanted to marry to have children found themselves short of potential spouses. Some of these women have children out of wedlock. To date, there is no evidence on the quantitative significance of this explanation.

[12] Also see Siow 2003 and Neal 2004.

The second larger group of single mothers are women who bear children in wedlock or cohabitation but subsequently divorced or left their partner. This is a more heterogenous group of women in terms of socioeconomic background and education. While college educated mothers are more willing to leave the fathers than in the past, it is still the case that non-college educated mothers are more likely to leave the fathers and be single mothers.

When parents separate, mothers predominantly obtain primary custody of the children. We explain this phenomenon using the gender difference model discussed above. Before separation, the model already explained why mothers will choose to spend more time at home with the child compared with the father. After the separation, mothers are already more attached to the children because of the larger time spent with the children. They also want primary custody of the children because they are less likely to have more children in the future.

Another hypothesis on the growth of out of wedlock childbearing is the Wilson hypothesis (Wilson 1980, 19867, 1996; Wilson and Neckerman 1986). He argued that the increase in drug abuse, criminal activity, incarceration rate and unemployment rate among black men lower their desirability and availability as spouses. Black women continued to have children, albeit without spouses. The support for Wilson's hypothesis is mixed.

Black, McKinnish and Sanders 2003 provide support for Wilson's conjecture that higher labor earnings in a society will decrease out of wedlock parenthood. They show that the coal boom in the seventies to the nineties substantially increase the earnings of

miners (low skilled workers) in coal mining counties in Kentucky which also led to increases in the marriage rate and decreases in single parenthood.

Mechoulan tested the incarceration hypothesis by using exogenous increases in incarceration rates. He showed that the incarceration rate increases whenever a new prison is built. The new prison decreases out of wedlock pregnancy among young black women. There are two complimentary explanations for his finding. First, some of the men who would have fathered children out of wedlock were incarcerated when the new prisons were built and therefore did not do so. The marginal inmate, the individual who is incarcerated only after the new prison is built, contributes to out of wedlock pregnancies rather than reducing it. Second, some marginal criminals have switched to legal activities when the new prisons were built. In other words, they were deterred from criminal activity by the additional risk of punishment. They postponed unwed pregnancies and or have children in marriage.

Finally, Figure L1 shows that at all ages, the fraction of adults living alone has increased. In other words, part of the rise in single parenthood is not due to child rearing forces but rather a consequence of the increasing trend of adults living alone.

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