Custodial Rights and the Rise in Out-of-Wedlock Fertility *

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Abstract

Non-marital fertility and cohabitation have risen dramatically in Europe and North America. This paper focuses on the legal role of marriage in assigning custodial rights to children. The proposed mechanism is that women are vested with custodial rights to their children while men acquire such rights through marriage. I present a marriage model in which men and women decide jointly whom to parent a child with and whether to marry the partner. Marriage transfers parental rights from the mother to the father. The model predicts that i) men pay to marry; ii) non-marital fertility increases in female relative to male earnings; iii) men with high earnings marry if anyone does, while female selection into marriage depends on the income distribution; iv) marriage increases men's labor supply, while it decreases women's labor supply; and v) men prefer economically weak women, while women prefer economically strong men.

Key words: Out-of-wedlock childbearing; custodial rights; marriage contract; cohabitation.
JEL article classification: D10, J12, J22, K39.

1 Introduction

Out-of-wedlock childbearing has risen steadily since the mid-1960s. In the period 1980-94 the percentage of births to unmarried mothers tripled in Norway, France and the UK. In 1994, more than half of all births were to unwed mothers on Iceland and in Sweden, a quarter of births among White Americans and

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more than 70 percent among Black Americans (Table 1 in Appendix). Out-of-wedlock fertility is positively correlated with the percentage of single parent and female headed households (Figure 1 in Appendix); and associated with social ills such as child poverty (e.g. Carlson and Danziger [11]; Lerman [28]), father absenteeism, and male delinquency (e.g. Akerlof [2]). Better educated men still marry; and they do so increasingly to women with similar educational attainments (e.g. Mare [31]; Qian and Preston [37]). Concurrent with the rise in non-marital fertilty, non-marital cohabitation has increased. Still, unmarried (but cohabiting) parents are less likely to stay together until the child reaches majority (for Sweden BO [8]).

To understand non-marital fertility and cohabitation, we need to understand marriage. Becker [4] proposed that marriage serves to realize gains from trade, with one partner specializing in market work and the other in household work. However, while the Beckerian framework addresses household formation, it does not distinguish between formally married couples and informal unions (cohabitation). Although division of labor may be important, it cannot address the recent substitution of cohabitation for marriage, nor can it explain the prevalence of marriage among very wealthy men whose wives are both expensive and do little household work.[1]

The key observation of this paper is that marriage establishes paternity and transfers custodial rights from the mother to the father. To use the wording of the Code Napoleon: the mother is the woman giving birth to the child, the father is the husband of the mother.[2] This aspect of marriage is true irrespective of the number of wives and husbands thus united, or the duration of the marriage. For instance, under polyandry, several men are married to one woman, and all husbands are considered fathers of children borne by the wife. Moreover, there are Muslim marriages that instead of being open ended last a fixed couple of hours, and any resulting children belong to the husband. The transfer of custodial rights is a potentially important role of marriage since private contracting in this realm is highly restricted (Posner [36]). It is an aspect of marriage that, to my knowledge, is universal but ignored by the existing Economics literature on the role of marriage (e.g. Becker [5]; Bergstrom [7]; Pollak [35]; for an exception see Edlund and Korn [16]). This paper will argue that it may further our understanding of the rise in non-marital fertility and cohabitation.

While social recognition of parenthood may be non-rivalry, not all parental rights have this public good nature. Custodial rights is a case in point. By default, a woman has custodial rights to her children, which means that she alone is the custodian. However, if married she shares these rights with her husband and presumed father. The degree to which she transfers rights differs from culture to culture. Fathers used to have sole custody of their children born in-wedlock in the Western world (e.g. Mason [32]), and this is still the case in some Muslim countries.[3]

[1] For instance, Financial Times [13].

[2] Surrogate motherhood and other non standard reproduction technologies are not further discussed.

[3] Naming conventions essentially mirror this description. A child takes the mother's family

This paper focuses on marriage as a contract that provides the husband with custodial rights to children borne by the wife. To model the marriage decision, I assume a marriage market with two men and two women who face the joint decision of whom to produce a child with, and whether to marry the partner. Men only obtains custodial rights if he marries his partner. Men and women are of either high or low type. High types are more productive than low types, they face higher wages and may produce children of higher quality. I will first consider a benchmark case in which child quality does not depend on parental type. This simple case suffices to yield predictions consistent with several labor and marriage market findings: why marriage can be a source of income for women, and women only (e.g. Wright [53]; Goldin [20]); why women (in particular married women) work less than men (in particular married men) (e.g. Killingsworth and Heckman [25]; Eurostat [17]); why married men earn more than unmarried men (e.g. Korenman and Neumark [26]); why men are primary earners among married couples (e.g. Becker [5]); why family migration raises husband's and lowers wives' employment (Mincer [33]; Jacobsen and Levine [22]); why wives move to live with husbands, and not the other way around (e.g. Rosenzweig and Stark [40]); why women prefer financially strong men, while men do not (e.g. Wiederman and Allgeier [51]; Buss [10]; Gray [21]); and last but not least, why higher female relative to male earnings is positively related to the rate of out-of-wedlock fertility (e.g. Figure 2 in Appendix).

Allowing for child quality to differ, sorting will depend on the wage distribution and quality differences. Positive sorting is more likely if the high type male has a relatively high wage. The intuition is that with a higher wage, his willingness to pay for high quality children increases, and this promotes marriage with the high type woman. The effect of the female high type's wage is ambiguous. Her valuation of quality increases in her wage, but so does her taste for custody. While the high type male provides the former, he may also want custody. This can induce her to turn to the male low type, since he will agree to mating without marriage.

Generally speaking, negative sorting with everybody married will be unlikely, i.e. the high type woman may mate with the low type man, but she does not marry him. As in the case of homogenous child quality, higher female/male wages work against marriage.

This may shed some light on why increasing income dispersion in the US (e.g. Juhn, Murphy and Pierce [24]), and a narrowing of the earnings gender gap, in particular among low skill workers, have coincided with on the one hand rising rates of out-of-wedlock fertility and on the other hand increasing educational and earnings homogamy among married couples (e.g. Mare [31]; Qian and Preston [37]; Juhn and Murphy [23]).

The remainder of this section gives a brief account of the legal framework and other related literature. Section 2 develops the model. Section 3 concludes by discussing further implications.

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name by default. If the mother is married, the child takes the father's family name.

1.1 Custodial rights

The laws treating custodial rights differ across countries. Common to all is that an unmarried mother has sole custody of her children, while a married mother shares these rights with her husband (e.g. Glendon [19]; SOU [45]).[4] Most Western countries allow for the possibility of non-married parents to share custodial rights. Germany and Iceland are exceptions. Germany, until December 1997, did not allow unmarried fathers custodial rights, a fact that may have contributed to the to date relatively low rate of out-of-wedlock fertility. Iceland is the only country (to my knowledge) where unmarried but co-residing parents share custodial rights by default. This may go some way towards explaining why unmarried mothers account for almost 60 % of births on Iceland.

Sweden is a more typical case. In Sweden there are three forms of custody, mother, father or joint custody. Married spouses have joint custody of children born in-wedlock. Paternity is presumed and cannot be challenged by a third party (e.g. Saldeen [41]; Agell [1]). In the case of a divorce, custody is joint by default.

If the woman giving birth is not married, she has sole custody of the child and paternity is not presumed. An unmarried father wishing to establish paternity cannot impose a test against the will of the mother.[5] Once established, paternity entails visitation but not custodial rights. If the mother and father so wish, they can re-allocate the custodial rights. The options are joint custody and father custody. While a mother can unilaterally decide to retain custody, both parents acquiescence is required for joint and father custody. In case of a separation, custody is not joint by default.[6] Hence, an unmarried mother retains full custody by default, and can pre-empt future custody claims by reporting the father to be unknown.[7]

1.2 Redistribution in marriage

Since marriage is a voluntary contract entailing a transfer of custodial rights from the woman to the man, it may also feature a mechanism for transfer of resources in the other direction, i.e. from the man to the woman. Contemporary family law in Western countries typically falls short of explicitly mandating such a transfer. Instead, the magnitude (and direction) of the transfer is implied by the relevant sharing rule. Default sharing rules tend to stipulate a de facto 50/50

[4] Historically, this has also been largely true. There are, however, exceptions. For instance, in North America, children of slaves belonged to the mother's owner, and in the early colonial period, children born out-of-wedlock were expropriated by the State and put out to work for 'masters' (Mason [32]). Unmarried fathers have invariably had few legal rights.

[5] Other countries may put parents on more equal footing, however, until the arrival of paternity test, a woman could be presumed to know more about possible fathers, than a man, and hence there may have been little use in allowing men to bring positive paternity cases to court.

[6] Default joint custody to unmarried parents has been proposed to the Parliament but defeated, partly on the grounds that such legislation may encourage unmarried women to not acknowledge the father.

[7] In practice, only about 0.5% of children have unknown fathers.

split of incomes during marriage (e.g. Glendon [19]; Agell [1]). For instance, the law may prescribe that spouses enjoy the same standard of living. It is straightforward to see that such rules in effect transfer resources to the party who contributes less. Of course, this alone does not imply that married women are paid, but in equilibrium that may very well be the case: women may choose to marry financially stronger men (or reduce labor supply) and in the absence of such an option, choose to not marry at all.[8]

1.3 Other related literature

Akerlof et al. [3] argued that the arrival of more effective birth control methods in the early 1970s moved the equilibrium from a situation in which pre-marital sex was conditional on a male commitment to marriage in case of pregnancy, to one in which men demand and obtain non-committal sex. In their model, women always want to marry, and men acquiesce either to obtain sex or because they empathize with their pregnant partner. Willis [52] drew on unbalanced sex ratios to produce non-marital fertility. However, non-marital fertility has risen rapidly long after the introduction of more effective birth control methods, in many countries and social groups not readily characterized by a shortage of men, and not entirely at the expense of women.

In the US, the role of Aid to Families with Dependent Children (AFDC) in encouraging out-of-wedlock fertility has been widely discussed (e.g. Rosenzweig [39]). Any program that is more generous to unmarried than married mothers is likely to have this effect. Still, non-marital fertility (and cohabitation) remains high in for instance Sweden, a country that does not condition neither taxation nor transfers on marital status.[9] Moreover, women not likely to be affected by income support have chosen to have children without marriage.[10]

Findings from recent empirical studies of non-marital cohabitation (e.g. Waite [47]; Smock and Manning [44]; Manning and Smock [43]) are consistent with this paper's distinction between legal marriage and consensual unions.

2 Model

I analyze the marriage and partner decisions within the framework of a marriage model with Cobb-Douglas utilities. There are two men, m_H, m_L, and two women, f_H, f_L, where subscripts H and L stand for high and low, who decide jointly whom to produce a child with, and whether to marry the partner. If a man and a woman jointly produce a child, they mate. If they deviate from the default outcome of mother only custody, they marry. I will refer to mating without marriage as non-marriage or mating.

[8] Anecdotal evidence from the US points to women being more keen on covering their assets by a pre-nuptial agreements than men (Financial Times [13])

[9] For tax purposes, registered parents who share the same address are treated as married.

[10] Epitomized by the TV character Murphy Brown.

A matching is a set of pairs where everybody is mated or married to one member of the opposite sex: $\{(m_i, f_j)^n, (m_{-i}, f_{-j})^n\}$, where $\{i, -i\}, \{j, -j\} = \{H, L\}$; ; and superscript $n = 0, 1$ ($n$uptial) indicates marital status, with 1 for married. It is called stable if no two individuals of opposite sex not matched with each other would be better off mated or married to each other.

If m_i mates with f_j where $i, j = H, L$ the resulting child is of quality

$$q_{ij} = \begin{cases} q_i & \text{if } i = j, \\ q_M & \text{otherwise,} \end{cases} \tag{1}$$

where $q_H \geq q_M \geq q_L > 0$. To simplify the discussion, I abstract from issues regarding the rearing of the child. [11]

In order to focus on the effect of wages on sorting, I restrict quality differences.

Assumption 1 $\frac{q_H}{q_M}, \frac{q_M}{q_L} < \frac{1+\pi}{1+\pi-\bar{\theta}}$.

If Assumption 1 did not hold, at $p = 0$, women would always prefer marriage to m_H to mating with m_L (the corresponding male condition is implied by Assumption 1).

2.1 Marriage, budget constraints, and utilities

Custodial rights to children are assumed to be a private good that unmarried women keep and married women share with their husbands. Hence, marriage is modeled as a trade in custodial rights from the mother to the father. In keeping with family law, the transfer is restricted to an exogenously determined fraction $\bar{\theta} \in (0, 1]$. Trade between adults who are not biological parents (adoption) is not allowed. In addition to the private and tradeable good aspect of children, there may be a public good aspect. For instance, the knowledge of having reproduced may raise utility. I model this by allowing a fraction $\pi \in (0, 1)$ of child quality to accrue to both parents irrespective of the division of custodial rights.[12]

There is one unit of time and labor supply is $l \in [0, 1]$. On the labor market, men and women face wages w_i^m and w_j^f respectively, where $w_H^m > w_L^m > 0$ and $w_H^f > w_L^f > 0$. People derive utility from child quality q, leisure $1 - l$, and consumption c.[13] The female utility function is Cobb-Douglas as follows

$$U = ((1 - \theta + \pi)q)^\alpha (1 - l)^\beta c^\gamma \tag{2}$$

where $\alpha, \beta, \gamma \in (0, 1)$, and

[11] This notion of child quality differs from what is standard in the literature. However, type may shorthand for expected parental post-natal investment in the child.

[12] Thus providing men with an incentive to mate in the face of no marriage, or women to marry in case $\bar{\theta} = 1$.

[13] Child quality in the utility function may justified by assuming that people care about the well-being and opportunities of their children. To the extent that they are influenced by the child's parents, this may have a bearing on partner choice. In particular, high types would be preferred to low types.

$$\theta = \begin{cases} \bar{\theta} & \text{if married ,} \\ 0 & \text{otherwise.} \end{cases} \tag{3}$$

If unmarried, a woman keeps the custodial right to the child, and her consumption is determined by her own labor earnings. On the other hand, if married, she has traded a share of these rights against a compensation p from the man. $p = 0$ unless she marries, hence the budget constraint is

$$c = wl + p. \tag{4}$$

For men, utility is given by

$$V = ((\theta + \pi)q)^{\alpha}(1 - l)^{\beta}c^{\gamma}. \tag{5}$$

In the absence of marriage he only enjoys the public good aspect of the child. The male budget constraint is the mirror image of the female. If unmarried, the man has purchased no custodial rights, and consequently can spend all his labor earnings on consumption. If married, he pays p. Hence, the male budget constraint is

$$c = wl - p. \tag{6}$$

2.2 Labor supply

Maximizing (2) s.t. (4) yields female labor supply as

$$l^f = \max\{\tfrac{\gamma w^f - \beta p}{(\beta+\gamma)w^f}, 0\} \quad \text{for} \quad p \geq 0. \tag{7}$$

Maximizing (5) s.t. (6) yields male labor supply as

$$l^m = \tfrac{\gamma w^m + \beta p}{(\beta+\gamma)w^m} \quad \text{for} \quad p \in [0, w^m], \tag{8}$$

since $p > w^m$ is not possible.

From (7) and (8) it is clear that p, and by implication marriage, has opposite effects on male and female labor supply.

2.3 Prices

Let the reservation price r_{ij} be the least payment woman j would accept to marry man i, and let the acceptance price a_{ij} be the highest payment man i would accept to pay for marriage to woman j. Marriage is only feasible if $r_{ij} \leq a_{ij}$. Hence, $p_{ij} \in [r_{ij}, a_{ij}]$ if couple ij marries, and zero otherwise. To be able to sign $\partial r_{ij}/\partial w_j^f$ and $\partial a_{ij}/\partial w_i^m$, I assume that the price paid is a weakly increasing function of the reservation price and the acceptance price.

Assumption 2 $\frac{\partial p_{ij}}{\partial r_{ij}}, \frac{\partial p_{ij}}{\partial a_{ij}} \geq 0.$

Since both r_{ij} and a_{ij} increase weakly in the respective wages, a high female to male wage ratio tends to reduce the marriage rate.[14]

The following short hand notation will be useful:

$$A = \frac{q_M}{q_H}, B = \frac{q_L}{q_M}, C = \frac{1+\pi}{1+\pi-\bar{\theta}}, D = \frac{\pi}{\pi+\bar{\theta}}, E = \frac{1-D^\kappa}{C^\kappa - 1}, \text{and } \kappa = \frac{\alpha}{\beta+\gamma}.$$

2.4 Benchmark

I start with the simple case of homogeneous child quality, $q_H = q_M = q_L$. Wages influence marriage patterns, but have no bearing on the aggregate production of child quality. The expressions for acceptance and reservation prices simplify to $a_i = w_i^m(1 - D^\kappa)$ and $r_j = w_j^f(C^\kappa - 1)$. Male valuations are $a_H > a_L > 0$ since $w_H^m > w_L^m > 0$. Analogously, $w_H^f > w_L^f > 0$ implies that $r_H > r_L > 0$. The gains from trade if both couples marry is $a_H + a_L - r_H - r_L$. If only one couple marries the maximum gain is $a_H - r_L$ (the man with the highest valuation marries the woman with the lowest reservation price). In equilibrium the sum of gains is maximized, hence for the high wage woman to marry, it must be that $r_H \leq a_L$. In other words, everybody marries if

$$\frac{w_H^f}{w_L^m} \leq \frac{1-D^\kappa}{C^\kappa - 1} = E, \tag{9}$$

and the sorting is indeterminate.

In case (9) does not hold, at most one couple marries. At least one couple marries if $r_L \leq a_H$, i.e. if

$$\frac{w_L^f}{w_H^m} \leq E. \tag{10}$$

The stable matchings for different values of male and female wages are illustrated in Figure 3 (Appendix). High wage women are more expensive than low wage women, but produce the same quality. Hence, they will not marry if there is non-marital fertility. Allowing for heterogeneous child quality can change that.

2.5 Heterogeneous child quality

Here, $q_H > q_M > q_L$ which implies that prices and qualities will depend on the matching. The high wage woman has a higher reservation price, but unlike the previous section, she also offers higher child quality. Hence, the high wage woman may marry even if the low wage woman does not. There are eight

[14] Higher female (male) wage need not always result in a higher reservation (acceptance) price. A higher wage also means that child quality is more highly valued. Hence, higher female wage means that marriage to the high type male is more valued and this may reduce the reservation price faced by the high type male. Regarding male willingness to pay, higher male wage may reduce his willingness to pay for marriage to the female low type since he is now more interested in quality, see Appendix.

possible matchings. Sorting can be positive or negative. For each sorting, there are four possibilities: both men marry; m_H marries; m_L marries; and finally; neither man marries. However, two are ruled out since no stable matching has m_L married but not m_H. Moreover, in case nobody marries, it is straightforward to show that positive sorting will follow in the absence of side payments.

Remains five matchings, the conditions for which are illustrated in Figure 4. The nodes represents conditions on wages (derived in Appendix), and the end points the resulting stable matching. Going from top to bottom, female relative male wages tend to increase, as do out-of-wedlock fertility. At the top, there are two matchings in which everybody marries. These are stable matchings if female/male wages are so low that the high wage woman would marry the low wage man. The sorting can be negative, but it is unlikely. Below, there are two matchings in which the male low type does not marry. Whether sorting is positive or negative depends on the wages. Lastly, at the very bottom, female/male wages are too high to allow marriage.

2.6 Results

The main results are summarized below.

Proposition 1 *Men pay for marriage.*

Proof: (11) through (14) in Appendix.

Proposition 1 hinges crucially on Assumption 1 (restriction on quality differences). Were quality differences greater, the reservation price for marriage to the male high type could be negative.

Corollary 1 *Marriage lowers female labor supply, and raises male labor supply.*

Marriage depresses female labor supply because custodial rights and labor are alternative sources of income to women. If a woman does not supply any labor, she is married. Men on the other hand work more if married, since they have chosen to pay for custodial rights.

Proposition 2 *The female reservation price for marriage increases in the female wage, if women are held to reservation utility. Male willingness to pay for marriage to the female high type increases in the male wage.*

Proof. (16) and (18) in Appendix.

Corollary 2 *High female/male wage ratios produce out-of-wedlock fertility.*

Corollary 3 *The high wage man marries, if anyone does.*

Proposition 3 *The high type woman is unlikely to marry the low type male. She might, however, mate with him.*

Proof: (23) and (25) in Appendix.

3 Discussion and concluding remarks

Increasingly, people live together, have children, but do not marry. The Beckerian view of marriage does not distinguish between marriage and informal unions and hence cannot address this development. This paper focuses on the legal role of marriage in assigning custodial rights to children. The proposed mechanism is that women are vested with custodial rights to their children while men acquire such rights through marriage. This observation may help explain the rise in non-marital fertility and cohabitation.

3.1 Labor market

This paper points to a reason why marriage typically has opposite effects on male and female labor market behavior. A well established empirical regularity is that married men earn more than unmarried men (e.g. Korenman and Neumark [26]). The interpretation of the marriage premium that this paper proposes is that married men might work more, or expend greater effort at work, simply because marriage means that they have chosen to pay for custodial rights to their children. The paper also offers an alternative interpretation to the observation that among married couples, female and male labor supply tend to be negatively correlated. This pattern has usually been attributed to spouses making joint decisions about labor supply. However, under the sharing rules applicable to most marriages, higher male earnings implies that the non-earned income of the woman increases; and non-earned income is known to reduce labor supply.

Men also tend to earn more than women (only partly accounted for by male marriage premia). Previous explanations of gender earnings gaps have leaned heavily on the assumption that women have an advantage in non-market work (e.g. Lazear and Rosen [27]; Becker [5]). In this paper, however, weaker female labor force attachment stems not so much from women having superior non-market skills, but from women being endowed with the custodial rights to their children. Siow [42] drew on gender differences in fertility: if men can have more children than women, they may have greater incentives to work. In this paper, men work more not because they can have more children than women, but because without money they may have no children at all. However, both views essentially say that men could have greater incentive to amass material resources than women because the reproductive benefits of so doing are greater for men than for women.

3.2 Incomes, outcomes, and marital stability

In a recent paper, Lundberg and Pollak [29]:155 concluded that '...the burden of proof has shifted to those who doubt that children benefit when their mothers control a larger fraction of family resources.' But poverty, not affluence, has been associated with female headship, families in which females presumably control a substantial part of household income. The potential endogeneity of family composition to income shares might be part of such proof. For instance, Weiss

and Willis [49] found that the divorce risk increased in a higher unexpected female income and decreased in a higher unexpected male income. While the unexpected part is consistent with Becker, Landes and Michael [6], this paper suggests a reason for why income shocks are not symmetric: marriage presumes that the man provides more than the woman. Hence, shocks that propel the woman into the role of provider will be more disruptive than shocks that preserve the male's position.

Moreover, this paper suggests an additional reason for marital instability: remarriage. If marriage is a way for men to obtain children, limited fecundity of women implies that older men married to similarly aged wives, may want to divorce in order to remarry a younger, fecund, wife (Siow [42]).

Another empirical regularity is that cohabiting but unmarried parents are more likely to separate. This paper suggests that marriage, as opposed to cohabitation, stabilizes a couple because it entails cross ownership not only of material assets but also of custodial rights to children.

3.3 Gender roles

This paper points to a reason why, division of labor aside, marriage can be a source of income for women (and women only). This may explain why self-help books on marriage are almost exclusively geared towards women (e.g. Fein and Schneider [18]), and why popular culture has stressed marriage as a defining moment in a woman's life, while professional achievements are stressed for males.

Since women sell and men buy, we would expect men to prefer economically weak women, and women to prefer economically strong men. An empirically robust finding as to gender differences in mate selection criteria is that women consistently look for financial security in a partner, while men do not (for a survey see Wiederman and Allgeier [51]). Moreover, women become more demanding with higher own earnings (e.g. Wiederman and Allgeier [50]). Turning to evidence of male preference for female economic dependence, Gray [21] presented evidence of male preference for economic weakness in their partner. He found that married women's labor supply, and hence independent earnings, decreased when their bargaining position weakened. Another example is the institutional restrictions on female earnings. For instance, French wives could not take paid work outside the home without the husband's permission until 1965 (Glendon [19]), and this is still the case in most Muslim countries. A male preference for dependent women may also be gleaned from one of the motive advanced to explain the former Chinese tradition of binding the feet of young girls: to enhance her future value as a wife (Cheung [12]).

The fact that women are endowed with custodial rights, while men have to acquire them may also have a bearing on the prevalence of son preference in intra-family allocations. For instance, historically, family succession law has favored male offspring: sons inherited more than daughters, or at least not less. For a more contemporary application, in a recent US study, Lundberg and Rose [30] found that fathers increased their labor supply substantially on the birth of a son.

A central prediction of the model is that men pay for marriage. The existence of dowry in many cultures seemingly contradicts this (e.g. Rao [38], for a critique see Edlund [15]). However, recent work suggests that dowry may not have this price of marriage interpretation (e.g. Zhang and Chan [54]; Boticcini and Siow [9]), or that the way dowry is calculated systematically overstates the contribution of the bride (Edlund [14]).

3.4 Custody allocation

Weiss and Willis [48] raised the point that to the extent that the father has better earnings potential than the mother, children would be better provided for if custody was awarded the father. However, mothers are given custody in the vast majority of cases. At the same time, child poverty is an issue of considerable public concern. One reason why fathers are not routinely given custody, may be the possible adverse incentive effects such measures would have. For instance, faced with the prospect of losing a custody battle, some women might elect to keep the father of their children at arm's length, by refusing marriage or denying his very involvement. The availability of paternity tests may not change that. The female parental investment exceeds the male (Trivers [46]), a fundamental asymmetry that by itself could be reason enough to favor mothers over fathers.

References

[1] Anders Agell. *Äktenskap,Samboende, Partnerskap*, volume I of *Familjerätt*. Justus Förlag, Uppsala, 1995.

[2] George Akerlof. Men without children. *Economic Journal*, 108(447):287–307, March 1998.

[3] George Akerlof, Janet Yellen, and Michael Katz. An analysis of out-of-wedlock childbearing in the United States. *Quarterly Journal of Economics*, 111(2):277–317, May 1996.

[4] Gary S. Becker. A theory of marriage: Part I. *Journal of Political Economy*, 81(4):813–46, July-August 1973.

[5] Gary S. Becker. *A Treatise on the Family*. Harvard University Press, Cambridge, MA, 1991.

[6] Gary S. Becker, Elizabeth M. Landes, and Robert T. Michael. An economic analysis of marital instability. *Journal of Political Economy*, 85(6):1141–87, December 1977.

[7] Theodore C. Bergstrom. Economics in a family way. *Journal of Economic Literature*, 34(4):1903–34, December 1996.

[8] Barnombudsmannen (BO). *Upp till 18: Fakta om barn och ungdom*. Statistics Sweden, Örebro, 1998.

[9] Maristella Boticcini and Aloysius Siow. Why dowries. Boston University and University of Toronto, 1999.

[10] David M. Buss. *The Evolution of Desire: Strategies of Human Mating*. Basic Books, New York, 1994.

[11] Marcia Carlson and Sheldon Danziger. Cohabitation and the measurement of child poverty. *Reviwe of Income and Wealth*, 45(2):179–91, June 1999.

[12] Steven N.S. Cheung. The enforcement of property rights in children, and the marriage contract. *Economic Journal*, 82(326):641–57, 1972.

[13] Tracy Corrigan. Comment and analysis: Of marriage and multy-millionaires. Financial Times, February 22 1997. p. 7.

[14] Lena Edlund. Dowry to daughters: Theory and evidence. Columbia University, 2000.

[15] Lena Edlund. The marriage squeeze interpretation of dowry inflation: A comment. *Journal of Political Economy*, forthcoming, 2000.

[16] Lena Edlund and Evelyn Korn. An economic theory of prostitution. Columbia University, 2000.

[17] Eurostat. *A Social Portrait of Europe*. Office for Official Publications of the European Community, Luxemburg, 1991.

[18] Ellen Fein and Sherrie Schneider. *The Rules: Time-tested Secrets for Capturing the Heart of Mr. Right*. Warner Books, New York, 1985.

[19] Mary Ann Glendon. *The Transformation of Family Law: State, Law and Family in the United States and Western Europe*. University of Chicago Press, Chicago, 1996.

[20] Claudia Goldin. Exploring the 'present through the past': Career and family across the last century. *American Economic Review*, 87(2):396–9, May 1997.

[21] Jeffrey S. Gray. Divorce-law changes, household bargaining and married women's labor supply. *American Economic Review*, 88(3):628–42, June 1998.

[22] Joyce P. Jacobsen and Laurence M. Levine. Marriage and migration: Comparing gains and losses from migration for couples and singles. *Social Science Quarterly*, 78(3):688–709, 1997.

[23] Chinhui Juhn and Kevin M. Murphy. Wage inequality and family labor supply. *Journal of Labor Economics*, 15(1):72–97, January 1997.

[24] Chinhui Juhn, Kevin M. Murphy, and Brooks Pierce. Wage inequality and the rise in returns to skill. *Journal of Political Economy*, 101(3):410–42, June 1993.

[25] Mark R. Killingsworth and James J. Heckman. Female labor supply: A survey. In Orley Ashenfelter and Richard Layard, editors, *Handbook of Labor Economics*. Elsevier Science Publisher, 1986.

[26] Sanders Korenman and David Neumark. Does marriage really make men more productive? *Journal of Human Resources*, 26(2):282–307, Spring 1991.

[27] Edward P. Lazear and Sherwin Rosen. Male-female wage differentials in job ladders. *Journal of Labor Economics*, 8(1):S106–23, January 1990.

[28] Robert I. Lerman. The impact of the changing US family structure on child poverty and income inequality. *Economica*, 63(250):S119–39, 1996.

[29] Shelly Lundberg and Robert A. Pollak. Bargaining and distribution in marriage. *Journal of Economic Perspectives*, 10(4):139–58, Fall 1996.

[30] Shelly Lundberg and Elaina Rose. The effects of sons and daughters on men's labor supply and wages. University of Washington, 1999.

[31] Robert D. Mare. Five decades of educational assortative mating. *American Sociological Review*, 56(1):15–32, February 1991.

[32] Mary Ann Mason. *From Father's Property to Children's Rights: The History of Child Custody in the United States*. Columbia University Press, New York, 1994.

[33] Jacob Mincer. Family migration decisions. *Journal of Political Economy*, 86(5):749–73, October 1978.

[34] Council of Europe. *Recent Demographic Developments in Europe 1996*. Council of Europe, Strasbourg, 1996.

[35] Robert A. Pollak. A transacton cost approach to families and households. *Journal of Economic Perspectives*, 23(2):581–608, June 1985.

[36] Richard Posner. *Sex and Reason*. Harvard University Press, Cambridge, MA, 1992.

[37] Zhenchao Qian and Samuel H. Preston. Changes in American marriage, 1972 to 1987: Availability and forces of attraction by age and education. *American Sociological Review*, 58:482–95, August 1993.

[38] Vijayendra Rao. The rising price of husbands: A hedonic analysis of dowry increases in rural india. *Journal of Political Economy*, 101(4):666–77, September 1993.

[39] Mark R. Rosenzweig. Welfare, marital prospects, and nonmarital childbearing. *Journal of Political Economy*, 107(6):S3–32, December 1999.

[40] Mark R. Rosenzweig and Oded Stark. Consumption smoothing, migration and marriage: Evidence from india. *Journal of Political Economy*, 97(4):905–26, August 1989.

[41] Åke Saldeen. *Barn och Föräldrar*. Justus Förlag, Uppsala, 1995.

[42] Aloysius Siow. Differential fecundity, markets, and gender roles. *Journal of Political Economy*, 106(2):334–54, April 1998.

[43] Pamela J. Smock and Wendy D. Manning. Why marry? race and the transition to marriage among cohabitors. *Demography*, 32(4):509–20, November 1995.

[44] Pamela J. Smock and Wendy D. Manning. Cohabiting partners' economic circumstances and marriage. *Demography*, 34(3):331–41, 1997.

[45] Statens Offentliga Utredningar (SOU). *Vårdnad, Boende, Umgänge: Vårdnadstvistutredningen 1995:79*. Norstedts, Stockholm, 1995.

[46] Robert L. Trivers. Parental investment and sexual selection. In Bernard Campell, editor, *Sexual Selection and the Descent of Man*, pages 136–179. Aldine de Gruyter, Chicago, 1972.

[47] Linda J. Waite. Does marriage matter? *Demography*, 32(4):483–507, November 1995.

[48] Yoram Weiss and Robert J. Willis. Children as collective goods and divorce settlements. *Journal of Labor Economics*, 3(3):268–92, July 1985.

[49] Yoram Weiss and Robert J. Willis. Match quality, new information and marital dissolution. *Journal of Labor Economics*, 15(1):S293–329, January 1997. part 2.

[50] Michael W. Wiederman and Elizabeth Rice Allgeier. Gender differences in mate selection criteria - sociobiological or socioeconomic explanation. *Ethology and Sociobiology*, 13(2):115–24, March 1992.

[51] Michael W. Wiederman and Elizabeth Rice Allgeier. Male economic status and gender differences in mate selection preferences. In Lee Ellis, editor, *Social Stratification and Socioeconomic Inequality: Reproductive and Interpersonal Aspects of Dominance and Status*. Praeger, Westport, CT, 1994.

[52] Robert J. Willis. A theory of out-of-wedlock childbearing. *Journal of Political Economy*, 107(6):S33–64, December 1999.

[53] Robert Wright. *The Moral Animal: The New Science of Evolutionary Psychology*. Pantheon, New York, 1994.

[54] Junsen Zhang and William Chan. Dowry and wife's welfare: A theoretical and empirical analysis. *Journal of Political Economy*, 107(4):786–807, August 1999.

A Appendix

Recall that $A, B < 1, C > 1, D < 1$ and $\kappa > 0$, and that Assumption 1 implies that $AC, BC > 1$ and $A, B > D$. $F \overset{x}{\sim} G$, indicates that x is indifferent between F and G, and $F \overset{x}{\succ} G$ that x weakly prefers F to G. Moreover, let $Q_{ij} = p_{ij} - r_{ij}$, where $p_{ij} \in [r_{ij}, a_{ij}]$.

If m_i mates with f_j, his indirect utility is

$$v_{ij}(0) = (\pi q_{ij})^{\alpha}(\frac{\beta}{\beta+\gamma})^{\beta}(\frac{\gamma}{\beta+\gamma}w_i^m)^{\gamma}.$$

If he marries, he obtains custodial rights $\bar{\theta}$ but pays p_{ij}. His indirect utility is

$$v_{ij}(\bar{\theta}) = ((\pi+\bar{\theta})q_{ij})^{\alpha}(\frac{\beta}{(\beta+\gamma)}\frac{(w_i^m - p_{ij})}{w_i^m})^{\beta}(\frac{\gamma}{(\beta+\gamma)}(w_i^m - p_{ij}))^{\gamma}.$$

If f_j mates with (but does not marry) m_i, her indirect utility is

$$u_{ij}(0) = ((1+\pi)q_{ij})^{\alpha}(\frac{\beta}{\beta+\gamma})^{\beta}(\frac{\gamma}{\beta+\gamma}w_j^f)^{\gamma}.$$

If she marries, she gives up custodial rights $\bar{\theta}$ against p_{ij} and her indirect utility is

$$u_{ij}(\bar{\theta}) = ((1+\pi-\bar{\theta})q_{ij})^{\alpha}(\frac{\beta}{(\beta+\gamma)}\frac{(w_j^f + p_{ij})}{w_j^f})^{\beta}(\frac{\gamma}{(\beta+\gamma)}(w_j^f + p_{ij}))^{\gamma}.$$

A.1 Reservation prices

A.1.1 Female low type

Consider the female low type. The lowest payment f_L would accept for marriage to m_L is an r_{LL} such that $(m_L, f_L)^1 \overset{f_L}{\sim} (m_L, f_L)^0$, which implies that

$$r_{LL} = w_L^f(C^{\kappa} - 1) > 0. \tag{11}$$

The reservation price increase in the female wage, $\partial r_{LL}/\partial w_L^f > 0$. Now consider the least payment m_H could offer f_L against marriage. Her reservation price depends on her option: $(m_H, f_L)^0$, $(m_L, f_L)^0$, or $(m_L, f_L)^1$.

$$r_{HL} = \begin{cases} w_L^f(C^{\kappa} - 1) & \text{if} \quad (m_H, f_L)^0, \\ w_L^f((BC)^{\kappa} - 1) & \text{if} \quad (m_L, f_L)^0, \\ -w_L^f(1 - B^{\kappa}) + p_{LL}B^{\kappa} & \text{if} \quad (m_L, f_L)^1. \end{cases} \tag{12}$$

$\partial r_{HL}/\partial w_L^f \geq B^{\kappa} - 1$, since $\partial p_{LL}/\partial w_L^f \geq 0$ from (12) and Assumption 2. If females are held to reservation utility, the reservation price increases in the female wage.

A.1.2 Female high type

The female high type's price for marriage to the male low type, must at least be such that $(m_L, f_H)^1 \overset{f_H}{\sim} (m_L, f_H)^0$, which implies that

$$r_{LH} = w_H^f(C^\kappa - 1) > 0, \tag{13}$$

and $\partial r_{LH}/\partial w_H^f > 0$.

r_{HH} depends on whether the outside option is $(m_H, f_H)^0$, $(m_L, f_H)^0$, or $(m_L, f_H)^1$.

$$r_{HH} = \begin{cases} w_H^f(C^\kappa - 1) & \text{if} \quad (m_H, f_H)^0, \\ w_H^f((AC)^\kappa - 1) & \text{if} \quad (m_L, f_H)^0, \\ -w_H^f(1 - A^\kappa) + p_{LH}A^\kappa & \text{if} \quad (m_L, f_H)^1. \end{cases} \tag{14}$$

In the first two cases $\partial r_{HH}/\partial w_H^f > 0$, while in the last case $\partial r_{HH}/\partial w_H^f \geq A^\kappa - 1$, since $\partial p_{LH}/\partial w_H^f \geq 0$ from (14) and Assumption 2. A sufficient condition for the the reservation price to increase in the female wage is that females are held to reservation utility.

A.2 Acceptance prices

A.2.1 Male low type

The low type man's willingness to pay for marriage to the low type woman depends on the option.

$$a_{LL} = \begin{cases} w_L^m(1 - D^\kappa) & \text{if} \quad (m_L, f_L)^0, \\ w_L^m(1 - (D/B)^\kappa) & \text{if} \quad (m_L, f_H)^0, \\ -w_L^m(B^{-\kappa} - 1) + p_{LH}B^{-\kappa} & \text{if} \quad (m_L, f_H)^1. \end{cases} \tag{15}$$

The acceptance price for marriage to the low type woman does not necessarily increase in his wage if the alternative is marriage or mating with the high type woman. The intuition is that as his income increases, so does his willingness to pay for high child quality, which is provided by the high type woman.

His willingness to pay for marriage to the high type woman depends on the option.

$$a_{LH} = \begin{cases} w_L^m(1 - D^\kappa) & \text{if} \quad (m_L, f_H)^0, \\ w_L^m(1 - (BD)^\kappa) & \text{if} \quad (m_L, f_L)^0, \\ w_L^m(1 - B^\kappa) + p_{LL}B^\kappa & \text{if} \quad (m_L, f_L)^1. \end{cases} \tag{16}$$

Clearly $\partial a_{LH}/\partial w_L^m > 0$ in all three cases.

A.2.2 Male high type

Now consider the male high type. a_{HL} depends on whether$(m_H, f_H)^0$ or $(m_H, f_H)^1$ is the outside option (he would never mate with the low type, because that implies that the low male type would mate with the female high type, but in case nobody marries, sorting is positive).

$$a_{HL} = \begin{cases} w_H^m(1-(D/A)^\kappa) & \text{if} \quad (m_H, f_H)^0, \\ -w_H^m(A^{-\kappa}-1) + p_{HH}A^{-\kappa} & \text{if} \quad (m_H, f_H)^1. \end{cases} \tag{17}$$

Willingness to pay can decrease in wage.

Lastly, a_{HH} depends on whether $(m_H, f_H)^0$, $(m_H, f_L)^0$ or $(m_H, f_L)^1$ is the relevant alternative.

$$a_{HH} = \begin{cases} w_H^m(1-D^\kappa) & \text{if} \quad (m_H, f_H)^0, \\ w_H^m(1-(AD)^\kappa) & \text{if} \quad (m_H, f_L)^0, \\ w_H^m(1-A^\kappa) + p_{HL}A^\kappa & \text{if} \quad (m_H, f_L)^1. \end{cases} \tag{18}$$

$\partial a_{HH}/\partial w_H^m > 0$ in all three cases.

A.3 Node conditions

This section spells out the node conditions in Figure 4:

C is the condition for m_L and f_L to marry were $(m_L, f_L)^0$ the only option. Using (11) and (15), $r_{LL} \leq a_{LL}$ implies

$$\frac{w_L^f}{w_L^m} \leq \frac{1-D^\kappa}{C^\kappa - 1} = E. \tag{19}$$

C.1 is the condition that m_L and f_H would marry were $(m_L, f_H)^0$ the only option. Using (13) and (16), $r_{LH} \leq a_{LH}$ implies

$$\frac{w_H^f}{w_L^m} \leq E. \tag{20}$$

C.1.1 is the condition for negative sorting if everybody marries. This occurs when both m_H and f_L are better off married to each other than to partners of their own type.

Consider m_H. His best price for marriage to f_L is

$$p_{HL} = r_{HL} = -w_L^f(1-B^\kappa) + w_L^m(1-D^\kappa)B^\kappa, \tag{21}$$

since $p_{LL} = a_{LL}|(m_L, f_L)^0 = w_L^m(1-D^\kappa)$. His best price for marriage to f_H is

$$p_{HH} = r_{HH}|(m_L, f_H)^1 = -w_H^f(1-A^\kappa) + w_L^m(1-D^\kappa)A^\kappa \tag{22}$$

since $p_{LH} = a_{LH}|(m_L, f_H)^0 = w_L^m(1-D^\kappa)$. He marries f_L if $(m_H, f_L)^1 \overset{m_H}{\succ} (m_H, f_H)^1$, which implies that negative sorting results if

$$w_H^f(1-A^\kappa) - w_L^f(1-B^\kappa)A^\kappa \leq w_L^m(1-D^\kappa)(1-B^\kappa)A^\kappa - w_H^m(1-A^\kappa). \tag{23}$$

First, negative sorting is unlikely, since the left hand side is likely to be positive and the right hand side negative. Second, negative sorting is helped by higher wages of the low types and lower wages of the high types. The intuition is that demand for higher child quality increase in the wage, and higher quality children are achieved through marriage to the high types.

C.1.2 is the condition for positive sorting $\{(m_H, f_H)^1, (m_L, f_L)^1\}$ to dominate negative sorting $\{m_H, f_L)^1, m_L, f_H)^0\}$. It must be that $r_{HH} \leq a_{HH}$, using (14) and (18) this corresponds to

$$w_H^f((AC)^\kappa - 1) \leq w_H^m(1 - A^\kappa) + p_{HL}A^\kappa. \tag{24}$$

$p_{HL} = r_{HL} + Q_{HL}$, and $r_{HL}|(m_L, f_L)^1 = w_L^f(B^\kappa - 1) + P_{LL}B^\kappa$ from (12). Moreover, $p_{LL} = a_{LL}|(m_L, f_H)^0 = w_L^m(1 - (D/B)^\kappa)$ from (15). Hence, (24) can be rewritten as

$$w_H^f((AC)^\kappa - 1) + w_L^f(1 - B^\kappa)A^\kappa \leq w_H^m(1 - A^\kappa) + w_L^m(B^\kappa - D^\kappa)A^\kappa + Q_{HL}A^\kappa \tag{25}$$

Positive sorting is more likely to occur when women are poor relative to men. Moreover, negative sorting is characterized by (m_L, f_H) mating but not marrying.

C.2 is the condition that if the low type man prefers to not marry the low type woman, the same goes for the high type woman. I will assume that C.2 holds.

C.2.1 is the condition that $r_{HL} \leq a_{HL}$ were $(m_H, f_L)^0$ the only option.

$$\frac{w_L^f}{w_H^m} \leq E. \tag{26}$$

If (26) does not hold, nobody marries and sorting is positive. To see this, note that marriage only happens if the high type man can marry the high type woman. The condition for this is that

$$\frac{w_H^f}{w_H^m} \leq E. \tag{27}$$

Since $w_H^f/w_H^m > w_L^f/w_H^m$ and $w_L^f/w_H^m > E$, (27) cannot hold.

C.2.1.1 is the condition that $r_{HH} \leq a_{HH}$ given that $r_{HL} \leq a_{HL}$ (cf. C.1.2). The relevant outside option for f_H is $(m_L, f_H)^0$ and for m_H it is $(m_H, f_L)^1$. Using (14) and (18), $r_{HH} \leq a_{HH}$ implies

$$w_H^f((AC)^\kappa - 1) - w_L^f((BC)^\kappa - 1)A^\kappa \leq w_H^m(1 - A^\kappa) + Q_{HL}A^\kappa. \tag{28}$$

Positive sorting is helped by a relatively high w_H^m, and a small female wage differential. The intuition is that if the high type woman is only marginally more expensive than the low type, the high type man will prefer to marry the high type.

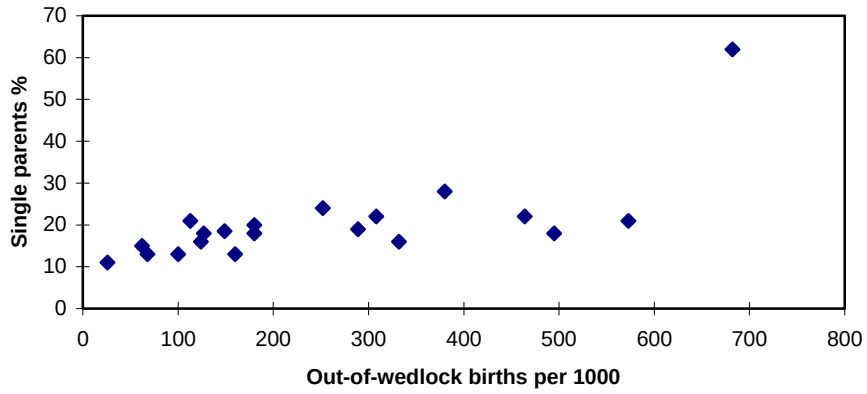
Table 1: Births to unwed mothers in some European countries and the United States (per 1000 births).

Country		1980	1994/95
Iceland		397	596
Sweden		397	529
Norway		145	476
Denmark		332	469
Finland		131	313
France		114	349
UK		115	336
Germany	Former West	76	124
	Former East	228	414
US	All	184	326
	White	110	254
	Black	552	704

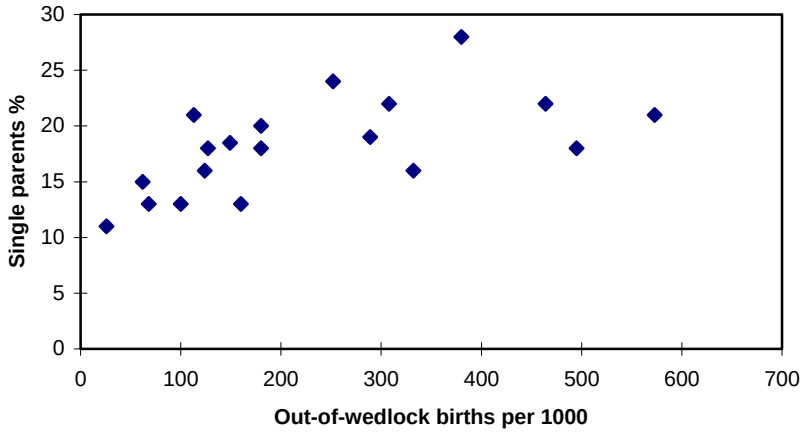
Sources: Council of Europe [34]. Statistical Abstract of the United States, 1985 and 1997.

Figures

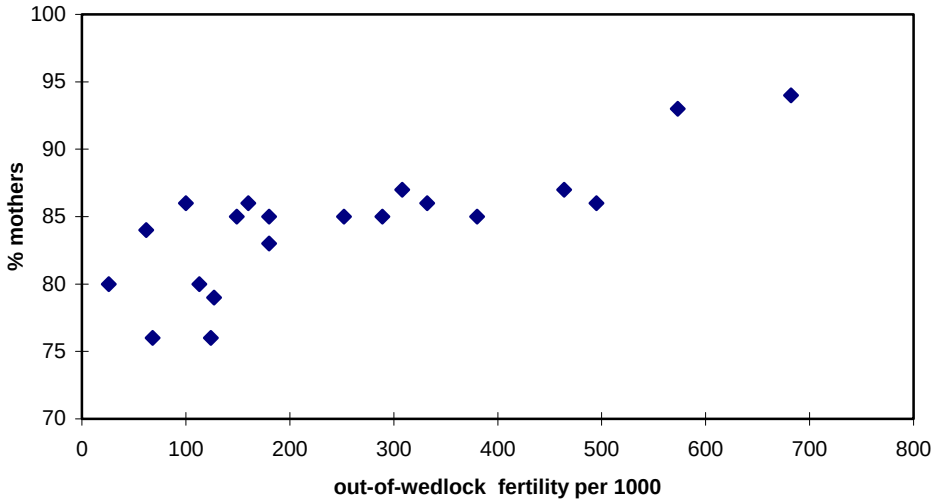
Figure 1.
Panel a.
Single parents by out-of-wedlock fertility, Western Europe and US Black and Whites 1990-92



Panel b.
Single parents by out-of-wedlock fertility, excluding US-Blacks



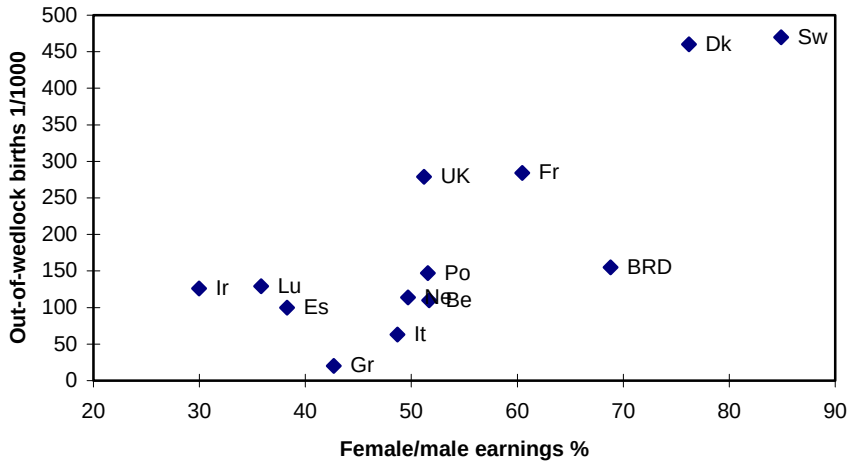
Panel c.
Female headed single parent households



Source: Eurostat, *A Social Portrait of Europe*, 1996; and US Bureau of the Census, various years.

Notes: The countries are Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal, the UK, Sweden, Finland, Norway, Iceland, Austria, Switzerland, and the US. Data for US Blacks and Whites are reported separately.

Figure 2.
Out-of-wedlock childbearing by Female/Male Earnings for EU12 and Sweden, 1990



Notes: The EU12 countries are Belgium, Denmark, BRD-West Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and the UK. Earnings are obtained as average female/male wage in industry adjusted for national rates of female and male labor force participation.
Source: Statistics Sweden, *Om Kvinnor och Man i Sverige och EG: Fakta om Jamstalldheten*, 1992.

Figure 3. Stable matchings under homogeneous child quality

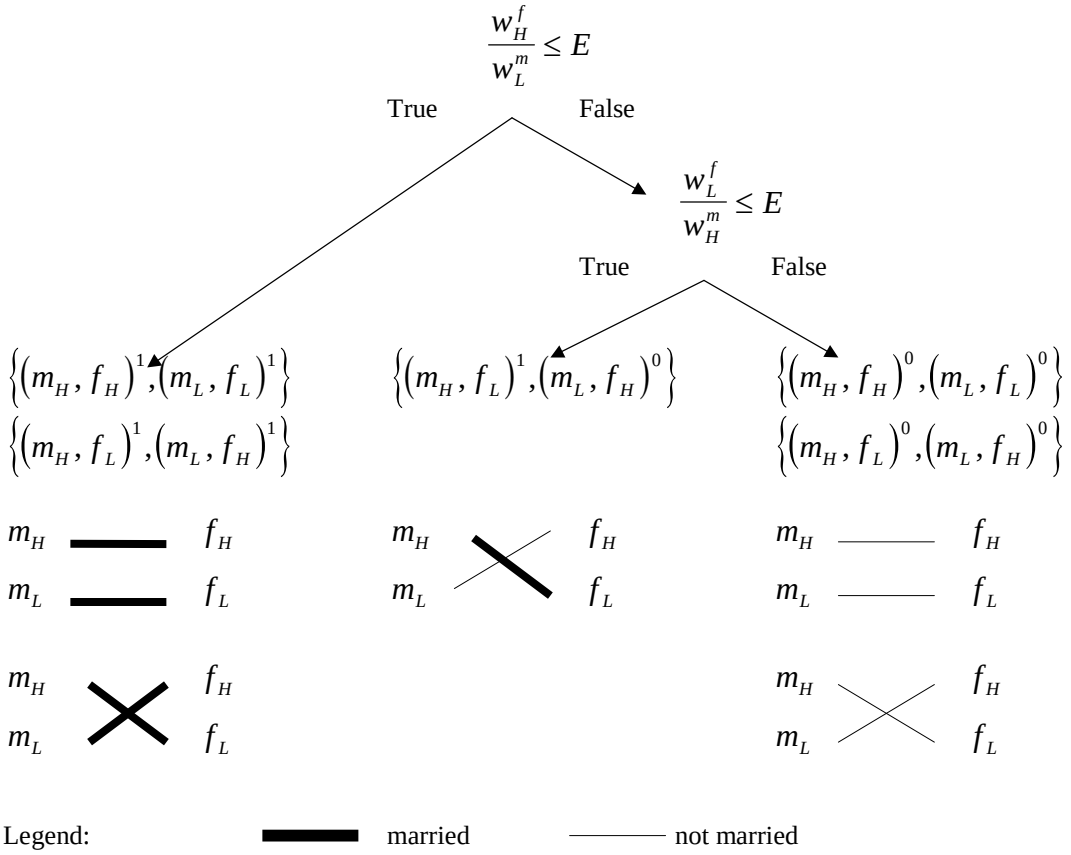
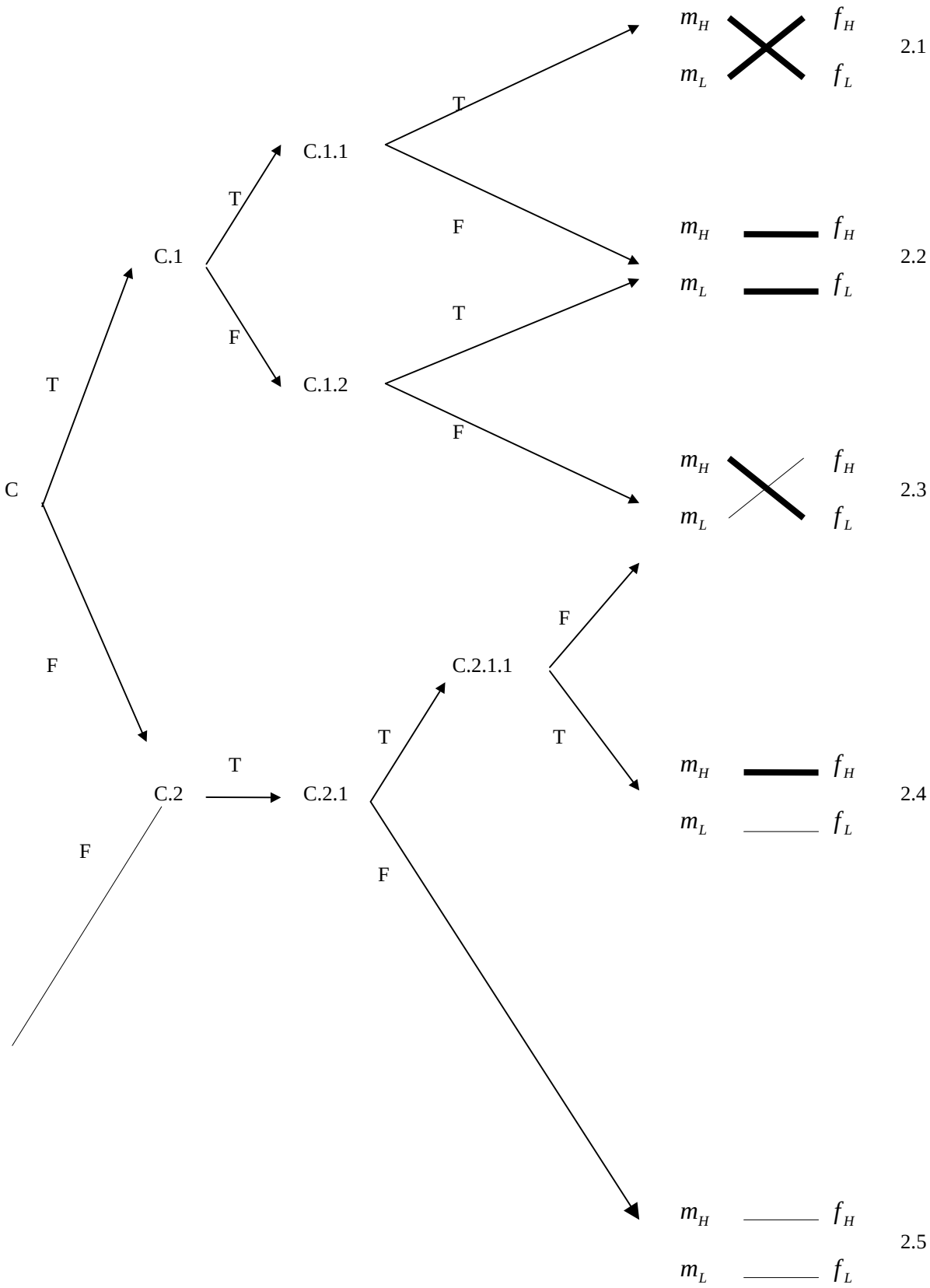


Figure 4. Stable matchings under heterogeneous child quality Case



Legend: T - true, F-false, married not married
Node conditions in Appendix.