Marriage and Fertility in a Catholic Society: Eighteenth-Century Quebec

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Abstract

There are similarities and differences in marriage and fertility behavior between early North American societies and their modern counterparts. This paper investigates the quantitative importance of differential fecundity, assortative matching, and marriage market search frictions in affecting marriage and fertility behavior in a Catholic society, 18th century Quebec. The model may provide an explanation for both the historic and current experience.

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In most modern societies there are more never married men than women.[1] The average age at first marriage is lower for women than men.[2] The remarriage rate for divorced and widowed men is higher than that for women.[3] In cross-section data, men with higher labor earnings have a higher marriage and remarriage rate than men with lower labor earnings.[4] A marriage model with differential fecundity, where women are fecund for a shorter period of their lives than men, can potentially explain the above behavior (Siow, 1998).

The above features were also relevant in historical marriage markets. Table 1 provides some statistics for eighteen century Quebec.[5] Fifteen percent of women never married compared with twenty-one percent of men. The average age at first marriage was 20.6 for women and 27.9 for men. The remarriage rate for widowers was 0.47 compared with 0.27 for widows. Although the remarriage rate for wealthier widowers (0.56) was higher than that of all widowers, the marriage rate of wealthier males (0.57) was lower than that of all males.[6]

The objective of this paper is to investigate the quantitative importance of differential fecundity, assortative matching, and marriage market search frictions in affecting marriage and fertility behavior in a Catholic society, 18th century Quebec. Since the effects of differential fecundity hinge on remarriage, it may be inappropriate to study such a model in a society without divorce. Remarriage was not uncommon, though, in part because people were often widowed at young ages. The high death rate of women associated with childbirth (0.09) contributed to this

[1] In 89 out of 138 countries, there are more never married 45-49 year old men than women (United Nations 1992).
[2] In 91 countries, the mean age at first marriage is higher for men than for women (Bergstrom and Bagnoli 1993).
[3] In 47 countries, Chamie and Nsuly (1981) showed that divorced and widowed men were more likely to remarry than divorced and widowed women respectively.
[4] For 11 countries, Schoeni (1995) found that married men have higher wages than single men. Becker, Landes and Michael (1977), Wolf and MacDonald (1979) provide contemporary evidence for the remarriage rate of US men.
[5] A full description of the data can be found in Section II.
[6] These rates are not historically unusual. Hurwich (1998) studies German noble families (counts) and finds marriage rates of 60 percent for men and 73 percent for women between 1400 and 1699 (among people that lived to

phenomenon. In general, the average ages of remarriage, 42.9 for men and 37.0 for women, were lower than the average ages at widowhood, 51.2 for men and 49.8 for women.

Our study makes use of reconstituted family data from the Quebec region of seventeenth and eighteenth century New France gathered painstakingly by demographers at the University of Montreal.[7] The data set consists of linked information from all of the birth, marriage, and death parish registers in the Quebec region. It provides the vital life histories of everyone known to have been born in the colony.

Apart from an intrinsic interest, there are two other reasons for studying these data. First, these data are the richest vital record data set available for exploring the demographic experiences of seventeenth and eighteenth century North Americans.[8] This is the case for both the general populous and the wealthy class.[9] Second, even by today's standard, these data have relatively complete marriage and fertility records for both men and women. For example, there is no estimate of the completed fertility distribution for modern North American men.

While the paper is focused on 18th century Quebec, the framework sheds light on current marital experiences. While most behaviors that existed then are practiced today, there is an important difference. Currently, high skilled men have a higher marriage rate than low skilled

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at least age 15). Citing Cooper (1976) she reports that marriage rates were similarly low in eighteenth century Italy and France.

[7] The project, *Registre de la Population du Québec Ancien*, operates under the auspices of the *Programme de Recherche en Démographie Historique*—PRDH. It is ongoing. A number of papers describe aspects of this program: Desjardins (1993), Desjardins, Beauchamp, and Légaré (1977), Landry and Légaré (1987), Légaré (1988), Légaré and Desjardins (1980), Légaré, LaRose, and Roy (1975), Légaré, Lavoie, and Charbonneau (1972), Nault, Desjardins, and Légaré (1990), Nault and Desjardins (1988, 1989).

[8] Little work has been done on 17th or early 18th American demographic behavior, principally because of poor data sources. Some localized reconstitution projects have been undertaken, but they are small in comparison to the New France project. See Wells (1992) and Haines (1996) for a description of the state of research on colonial American demography. There is a considerable literature on New France's demographic experiences. See the citations in footnote 7 and also: Bates (1986), Bouchard and dePourbaix (1987), Choquette (1997), Cliché (1988), Henripin (1954), Henripin and Peron (1972), Paquette and Bates (1986), Pelletier et al. (1997).

men, whereas high skilled women have a lower marriage rate than low skilled women.[10] Our model may provide an explanation for both the historical and current experience.

The rest of the paper is organized as follows. Section I presents the model. Section II describes the data set, Sections III and IV contain the empirical investigation of the model.

I. The Model

The main ingredients of the model are differential fecundity, costly search, and assortative matching in marriage.[11] While we provide new insights on the relationship between costly search in marriage and differential fecundity, the objective of the theory is to guide the empirical investigation.

Consider a society where every adult may potentially live for two periods. *d* is the probability that a young (*y*) adult will survive into the second period and become old (*o*). Men are fecund for both periods of their lives. Women are fecund only in the first period of their lives. A primary purpose of marriage is to have children. Thus we assume that single older women (in the second period of their lives) will be indifferent between marrying or not. Older single men will prefer to marry if they can find a spouse.

In the first period of any marriage, the couple will have a boy and a girl. In the next period, these children become adults and make their own decisions. In addition to gender, adults

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[9] Considerable work has been done on the marriage and fertility behavior of elite groups in Europe. For example, see Hollingsworth (1964, 1977) and Hurwich (1998). Much less has been done for the United States (for example, Kantrow, 1980, studies family limitation among 15 'gentry' families from Philadelphia).

[10] Goldin (1997), Moorman (1987), Moorman et. al. (1987), Qian and Preston (1993), Statistics Sweden (1994).

[11] This class of marriage market models began with Becker (summarized in Becker (1991)). Weiss (1997) is a survey of the literature. Also see Aiyagari, et al. (1998), Akerlof, et al. (1996), Allen (1992), Bergstrom (1994), Bergstrom and Bagnoli (1993), Betzig (1997), Botticini (1999), Burdett and Cole (1997), Chiappori et al. (1998), Edlund (1996), Grossbard-Shechtman (1993), Hamilton (1999), Lundberg and Pollak (1996), Mortensen (1985), Siow (1998), Siow and Zhu (1998), Shimer and Smith (1998), Trivers (1972), Willis (1996).

are also differentiated by skills. There are two types of skilled adults, high skilled (h) and low skilled (l). The per period income of an adult with skill h (l) is h (l).

Marriage markets are differentiated by skills and ages of participants. Every adult decides in which marriage market he or she wants to participate. In a market with type S women, a man of age a and skill s has to pay $T(S,s,a)$ to meet a woman. We interpret $T(S,s,a)$ as a courting cost.[12] A type S women who enters a market with men of age a and skill s receives $T(S,s,a)$. $T(S,s,a)$ adjusts to equate the number of men and women in a particular market.

In a marriage market, an eligible man meets one eligible woman per period. When a man meets a woman, he pays her $T(S,s,a)$. After T is paid, they observe v, the value of the match. Aside from the transfer T, an individual's return from the first period of marriage is v. If both spouses are alive in the second period, they will obtain bv each when old, $0 < b < 1$. The probability that the couple will have high skilled children is $p(v)$, $p' > 0$. v is drawn from a distribution $F(v|g(S,s))$.

The difference across marriage markets is characterized by $g(S,s)$. $g(S,s)$ is increasing and symmetric in male and female skills. Let an increase in g generate a mean preserving spread in F. This means that there is more heterogeneity in the match value distribution as the skill levels in the marriage market increase. This increased heterogeneity induces a higher expected return to search in more highly skilled marriage markets. Since the data shows that high skilled individuals were less likely to marry than low skilled individuals, our parameterization of $g(S,s)$ allows the model to generate a similar prediction. We will also assume that $g_{Ss} > 0$, which is the standard condition for assortative matching in marriage.

[12] The significance of T will be discussed later.

If a man and a woman meet, observe v and decide not to marry, they will not meet another potential partner in the same period. They will just consume their own income for the period. If a young man marries and his spouse dies at the end of the first period, he may re-enter another marriage market when he is old. If a young man does not marry, he may also re-enter another marriage market when he is old. Older widows or single women will not remarry or marry respectively in order to have more children. There is no divorce.

Older eligible men and the women who marry them

Since men and women obtain their skilled income in every period independent of whether they marry or not, their skilled income does not affect their marital decisions. Thus we will ignore income from skills in what follows. An adult is interested in the skill of his or her potential spouse because the transfer and match value distribution depends on the couples' skills.

Consider a marriage market with S skilled young women and s skilled older men. There is no difference between widowers and never married men.[13] Let an eligible man and a woman draw v in the marriage market. If she marries, she obtains v in the first period. She receives no return from marriage in the second period because her spouse will be dead. She will marry as long as:

(1) $v > 0$

Since the man has only one period to go, he will marry as long as:

(2) $v > 0$

[13] There will be a difference if widowers have to support children from their earlier marriage.

So women and men have the same reservation match value, 0, in this market. Let $\mathbf{E}_{Ss}$ be the expectations operator when a woman of type *S* is matched with a man of type *s*. The woman's expected utility from entering the marriage market, $U(S,s,o)$, is:

(3) $U(S,s,o) = T(S,s,o) + [1-F(0|S,s)]\ \mathbf{E}_{Ss}(v|\ v > 0)$

The man's expected utility from entering the marriage market, $u(S,s,o)$, is:

(4) $u(S,s,o) = -\ T(S,s,o) + [1-F(0|S,s)]\ \mathbf{E}_{Ss}(v|\ v > 0)$

Young men and young women

Ignoring skilled income, let $u(s,o)$, which is greater or equal to zero, be the maximum utility attained by older eligible men of type *s*. A young man of type *s* who enters the marriage market with women *S* and draws *v* will enjoy in marriage:

(5) $-\ T(S,s,y)\ + v + d\ (dbv + (1-d)u(s,o))$

$(dbv + (1-d)u(s,o))$ is his expected payoff from marriage if he survives into the second period. If he does not marry, he will enjoy:

(6) $-\ T(S,s,y)\ + du(s,o)$

So he will marry if:

(7) $v + d\ (dbv + (1-d)u(s,o)) > du(s,o)$

$v > \ d^2u(s,o)(\ 1 + d^2b\ )^{-1}$

His reservation match value is:

(8) $\underline{v}(S,s,y) = \ d^2\ u(s,o)(\ 1 + d^2b\ )^{-1}$

When $u(s,o)$ is greater than zero, that is when the old eligible man decides to reenter the marriage market, $\underline{v}(S,s,y)$ will be greater than zero. Given v, the woman will enjoy in marriage:

(9) $T(S,s,y) + (1+d^2b)\, v$

If she does not marry, she will enjoy $T(S,s,y)$. She will marry as long as:

(10) $v > 0$

Her reservation match value is lower or equal to the man's. So his reservation match value is sufficient to determine whether they marry or not. His expected utility from entering the marriage market is:

(11) $u(S,s,y) = - T(S,s,y) + (1-F(\underline{v}(S,s,y)|S,s))\{ (1+d^2b)\mathbf{E}(v| v > \underline{v}(S,s,y)) + d(1-d)\, u(s,o)\}$

$+ F(\underline{v}(S,s,y)|S,s)d\, u(s,o)$

A woman's expected utility from entering the marriage market is:

(12) $U(S,s,y) = T(S,s,y) + (1-F(\underline{v}(S,s,y)|S,s))(1+d^2b)\, \mathbf{E}(v| v > \underline{v}(S,s,y))$

Marriage market equilibrium

With this framework a marriage market equilibrium is one in which, given endogenously determined transfers, an equal number of men and women enter each sub-marriage market so that every individual in a sub-market finds a potential mate.

Depending on parameter values, there is potentially more than one marriage market equilibrium. We will consider an equilibrium in which young skilled men marry young skilled women. Young unskilled women marry old skilled men and young unskilled men. Some young unskilled men will choose not to participate in a marriage market. We study this equilibrium because it fits the data at hand. The appendix shows that such a market equilibrium exists.

Young high skilled men expect to reenter the marriage market if they are not successful in their initial search. Their reservation match value when young is greater than zero. Young low skilled men do not expect to reenter the marriage market if they are unsuccessful in their initial search. Their reservation match value is zero.

Formally, older eligible women do not derive any additional utility from marriage nor do any low skilled men who marry them. But there is also no utility loss from such marriages. Thus we may assume that a suitably small fraction of older eligible women may marry or remarry older eligible low skilled men. Since there is no gain to these "companionship" marriages, no transfer takes place.

We discuss various propositions below which have empirical counterparts.[14]

In equilibrium, most women marry when they are young. Young skilled men who chose not to marry will reenter the marriage market when they are old. So:

Proposition 1: *The average age of first marriage is lower for women than men.*

Since older men who marry for the first time are primarily high skilled, we have:

Proposition 2: *The average age of first marriage for high skilled men is higher than the average age of first marriage for low skilled men.*

Since most women, both high and low skilled, marry when young,

Proposition 3: *The average age of first marriage for women is independent of their skills.*

Young high skilled men who chose not to marry and high skilled widowers will systematically enter the marriage market for low skilled women. Since the total supply of young

[14] All propositions are derived by ignoring companionship marriages. Thus we are assuming that there are too few companionship marriages to overturn the propositions.

low skilled women is equal to the total supply of young low skilled men, some young unskilled men choose not to participate in a marriage market. The transfer, $T(l,l,y)$ will adjust to make young unskilled men indifferent to participating in the marriage market or not. Abstracting from "companionship marriages", remarriage ensures that some men have two wives over their lives whereas women have at most one husband. Thus:

Proposition 4: *There are more never married men than women.*

Moreover,

Proposition 5: *Widowers have a higher remarriage rate than widows.*

High skilled widowers are systematically more likely to remarry. They also marry less skilled women because they have less to offer high skilled women relative to high skilled young men. Thus:

Proposition 6: *The propensity of widowers to remarry is correlated with their skills. The skill level of the second wife is lower than the skill level of the first wife.*

Formally, we assume that young women discriminate against widowers because they have a shorter time horizon than young men. Empirically, widowers have children from previous marriages. These children compete with the new wife for resources and demand resources from her. Thus previous children add to the disadvantage of widowers in the marriage market.

Since women in "companionship" marriages are assumed to be infertile,

Proposition 7: *In their respective new marriages, widows who remarry will have less children than widowers who remarry.*

Proposition 5 and 7 imply:

Corollary 1: *The average number of children for married men is higher than for married women.*

The derivation of the above propositions using differential fecundity and costly search is new. However, the above propositions may be derived in a marriage market model with differential fecundity without search frictions using other mechanisms (e.g., Siow, 1998).

The propositions discussed below have not been obtained in marriage market models without search frictions. They show that, under some circumstances, high skilled individuals may have lower marital rates than low skilled individuals.[15] Young high skilled women will enter the marriage market for young high skilled men. Marriage occurs only if the match value is higher than the young high skilled men's reservation match value which is strictly above zero. Young low skilled men and their potential spouses have zero reservation match values. So,

Proposition 8: *High skilled women may have a lower marriage rate than low skilled women.*

High skilled women enter the marriage market for high skilled men in spite of a lower marriage rate because of the gains from assortative matching (due to higher expected match values and transfers).

Young high skilled men who postpone marriage will reenter the marriage market when old. Now they will have a zero reservation match value. Since they draw from a match value distribution that has a higher variance than that of low skilled men and there are also some low skilled men who do not enter any marriage market,

Proposition 9: *In the finite horizon model, high skilled men will have a higher marital rate than low skilled men.*

[15] These propositions need not hold if g increases the mean of F rather than the variance. We do not take a stand as to whether g increases the mean of F.

The propositions related to matching rates by skill also obtain if we assume that there are few high skilled men and women who are available to match with each other and that the arrival rate of potential matches for high skilled matches are smaller than that for low skilled matches.[16] While we believe the differential arrival rate of potential matches is empirically relevant, we ignore it in this section because the implications are straightforward.

The model also yields testable implications concerning transfer values across individuals. These can be explored separately without loss of continuity. For expositional ease, they are discussed after the empirical examination of propositions 1 to 9.

The time horizon

Proposition 3 is valid because, aside from companionship marriages, all women are in the marriage market for only one period. If women can be in the marriage market for multiple periods, high skilled women may have a higher average age of first marriage than low skilled women because the high skilled women may start off in the market with high skilled men who have a lower marital acceptance rate. Such women may move to less discriminating markets if they are unsuccessful early. As the age of first marriage increases, these high skilled women are likely to marry less well off spouses.

Proposition 9 also depends on the finite horizon. In an infinite horizon model, the high skilled man will have a lower per period marital rate than a low skilled man who is in the marriage market. If the fraction of low skilled men who do not search at all is small, there may be a lower lifetime marital rate for a high skilled man.

[16] Bourgeois and noble families constitute 6 percent of the population, and literacy was a skill enjoyed by a minority of the population.

In an infinite horizon model, the remarriage rate of widowers will still depend on their skills if widowers are less desirable than never married males in the marriage market.

II. Data Set

The French began settling New France early in the seventeenth century. There were around 7,000 people in the colony in the 1660s, and over 20,000 by 1720.[17] Similar to other North American settlements, farming was the principal occupation. Most people lived along the St. Lawrence River, close to Quebec City and Montreal.

The data set includes all individuals born in New France before 1700 and consists of information on all known vital events over peoples' lifetime. Reconstituting New France's native-born population has been particularly successful, in part because parishes were established early in the colony's history and few records have been lost through neglect or disaster. In some cases, the parish records have been supplemented by census and notary records. These sources provide extra information on family composition, literacy (ability to sign their name), and occupation or status. There are omissions, but because of extensive cross-checking the gaps are believed to represent a small minority of the native-born population.[18] Charbonneau et al. (1993)

[17] Dickinson and Young (1993: 67-70).

[18] Charbonneau et al. (1993) describes the parish registers covering the period up to 1730. Most of the registers pertaining to the native Indian population (mission registers) have not survived. For the non-Indian population, there were 80 parishes in the current Quebec territory. The registers for 48 of the parishes are 'intact', and 16 out of the remaining 32 have information gaps that total less than five years. They write: "as a whole, annual losses affect 11.4 percent of the registers from the 80 parishes" (Charbonneau et al. (1993): 43). The losses are most frequent in the earliest years of the colony's history. They estimated that the loss rate was likely in the neighborhood of one out of every 10 years between 1680 and 1700, and worse before 1680. Note that the population was quite small before 1680, hence comparatively few entries were missed when a parish book from 1640, versus 1740, was lost.

There are other potential sources of omissions apart from parish books. Individual entry sheets may have been misplaced and the priests may have missed some vital events. It is unlikely that all illegitimate births and abandoned babies were baptised (and registered). When the parish registers were incomplete, information was garnered from other sources, two of which are mentioned here. First, the nominal censuses from 1666, 1667, and 1681, which listed an individual's name, age, and often their occupation (if male). Second, marriage contracts, which most couples signed shortly before marrying. Hence if the parish marriage register was lost, a record of the couple's intent to marry was recovered from the notarial archives. Overall, Charbonneau et al. (1993: 62) estimate that marriage and death information is known in about 85 percent of cases. The sample they are concerned with (French emigrants who settled in Quebec) does not assess Quebec birth records, but there is little reason to believe

estimate that 20,680 non-native people were born in the Quebec area before 1700, 19,580 of which are documented in this data set.[19]

While parish data can capture most of the native-born population, the records on immigrants are naturally much spottier and systematically over-represent immigrants who married or died in the province. This is of some consequence before 1680, but less important afterwards, when the flow of immigrants slowed and the population grew primarily through natural increase.[20] Compared to America, New France was a relatively closed society. Nonetheless, these data are better than most reconstituted family data sets because the information is linked across all of the colony's parishes.[21] Hence there is no loss of information on individuals that moved from one parish to another, which is a source of censuring bias in English reconstitution data sets.[22] Certainly it is the richest vital record data set available for exploring seventeenth and eighteenth century North American experiences.

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that they are less complete than other records. Of the remaining 15 percent, missing information often can be inferred from other sources (for example, for an individual with no death record, an upper bound on life span can be established in some cases from the date their spouse remarried). See also Légaré (1988: 5).

[19] These data includes illegitimate births and individuals known to have left the province. The data sources for the 19,580 are as follows: baptism (17,445); death record before baptism (251); marriage record, census list, or other document (1,890). The PRDH calculated that 1,094 people were born in the province but did not appear on any surviving records. This estimate is based on two factors: an assumption that the ratio of marriages arising from baptisms that survived is the same as the marriage-baptism ratio for missing baptisms records and an estimate of the undercounting of births due to infant mortality (individuals who died before baptism without a surviving death record). (Bertrand Desjardins, letter, June 1997 and e-mail communication, October 10, 1997).

[20] Nault, Desjardins, and Légaré (1990: 274) report that (principally male) immigration "became more and more marginal relative to the native white population [after 1673]. Out migration, although significant at some moments, was negligible in total."

[21] Wrigley and Schofield's work on family reconstitution for England (1541-1871) is well known. See Wrigley and Schofield (1989, 1983); and Wrigley, Davies, Oeppen, and Schofield (1997).

[22] There is a considerable literature on the sources of bias in data sets based on family reconstitution. Most of the literature focuses on biases that might arise because immigrants are excluded from the data sets. This sample selection has been shown to bias estimates of mean age-at-marriage and life expectancy in the English reconstitutions. See, for example, Levine (1976). Ruggles (1992) argues that biases will arise even if the age-specific demographic behavior of migrants and non-migrants was identical, because the probability of a demographic event occurring (and being recorded) in a parish rises the longer an individual remains in the parish. Hence life span will be biased downward because long-lived people have a greater chance of migrating than short-lived people. Age-at-marriage also will be understated because people that delay marriage have more opportunities to migrate. In contrast, Desjardin (1993) illustrates that the data employed here (the PRDH data set) do not suffer from inter-parish-migration censuring. He estimates mean age-at-marriage for men and women born between 1680

For each individual born in the colony before 1700, the data set includes information on gender, birth date, place of birth, whether they are known to have married, date and place of death (if known). For those that married, there is information on their marriage (each of their marriages if they married more than once). This includes the date and place of the union, whether they signed their marriage record, and the number of children produced from the marriage. The same variables are recorded for the spouse (birth date and place, death date and place, social status, and whether they signed their marriage record), but if they were born outside the colony sometimes less is known about their birth date and place (and hence their life span). For each child of these marriages, we have information on their gender, and life span (where known).[23]

Individuals that were likely wealthy have also been identified. Members and offspring of the nobility have been identified (Gadoury, 1991), as have the 'bourgeois' class (Noguera, 1994). Noble title was conferred by the King of France, or his representative in New France, and was inherited through the male line. In New France a substantial portion of those that did not inherit the title were army officers.[24] The nobility did not have the same stature as their French counterparts, but they were afforded privileges not enjoyed by the typical *habitant*.[25] A bourgeois is essentially a man with a professional affiliation. Women were bourgeois only if they married a bourgeois.[26]

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and 1740, and shows that the marriage age of those who moved between parishes was not very different from those who remained in their birth parish.

[23] The data linkage project is progressing chronologically. At this point, the coding and linkages becomes less complete around 1800. Hence many death dates for individuals tend (as yet) to be unknown if they lived past or around 1800. Because information on life span and lifetime fertility are necessary for our analysis, our sample includes only those people born before 1700.

[24] Gadoury (1991) identified the nobility either through the use of a noble title in civil documents (*ecuyer* or *chevalier*) or service to the King (for those that did not work with their hands). After 1680 the title could be 'purchased' if the person brought sufficient capital to the colony.

[25] See Gadoury (1991), Dechêne (1991), or Greer (1997).

[26] Noguera (1994) assigned bourgeois status to any male that married before 1760, identified himself as having one of a set of trades or bourgeois status on any notarial or vital record document at any time during his life, and was not a noble. A bourgeois occupation included *bourgeois*, *négociant* [merchant/trader], *armateur* [ship owner], *marchand bourgeois*, *bourgeois marchant*, *marchand* [merchant], *greffier au Conseil Supérieur* [court clerk—judge,

In what follows, we characterize high skilled individuals as those people that were either offspring of a noble or bourgeois, or were able to sign their names on their marriage register (we interchangeably characterize this group as 'wealthy' or 'high-status').[27] We restrict our analysis to those with known life span. Summary statistics on marriage and fertility behavior for the entire population and the high-status population are found in Table 1.

In addition to the discussion in the introduction, three features in Table 1 are noteworthy. First, mortality rates were high. Twenty-five percent of boys and 20 percent of girls died before they reached the age of 10. Average life span for those who lived past age 10 was 56. As discussed earlier, women had a 9 percent mortality rate associated with childbirth. Second, families were large. Adults in their first marriage had an average of 8.2 children.[28] Third, mortality rates were higher for the wealthy class. They had higher infant and childhood mortality rates. Their average life span, conditional on living past age 10, was also lower than that found in the general population. Today, in contrast, life expectancy is inversely related to wealth. Thus wealth had different effects on 18th century Quebeckers compared with their current descendents.

III. Results:

A. Importance of Differential Fecundity

We present two kinds of evidence on the importance of differential fecundity in the marriage market. Figure 1 plots the distribution of fathers and mothers' ages at the time their children were born. The age distribution for men clearly exhibits a higher mean than women's

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Crown's notary, Crown's lawyer], *conseiller du Roi* [Crown's counsel], *délégué de l'intendant et subdélégué de l'intendant* [Intendant's delegate. The Intendant was the Crown's representative or top official in the colony], *grand voyer* [overseer], *contrôleur de la marine*, *directeur du Domaine*, *lieutenant général civil et criminel procureur du Roi, grand prévôt, directeur de la ferme*, *receveur*, *visiteur et contrôleur du Domaine*, or *garde magasin*.

[27] When examining marriage rates, high-status is defined as individuals from a noble or bourgeois family. It is also defined more broadly to include those individuals with a parent that could sign his or her name. In this case, the sample is restricted to those individuals whose parents were married in the province (at least one of whom was born in the colony).

[28] See Nault, Desjardins, and Légaré (1990) for a study of the relationship between infant mortality and family size.

age distribution. More importantly, men were continuing to have children when women in the same birth cohort could no longer have children. That is, at an age when women could not have children, men of the same age still demanded children. Only men marrying younger women satisfied this demand.

Table 2 presents probit estimates of remarriage probabilities. In all our probit regressions, the coefficients reported are estimates of the change in the probability of the event occurring due a marginal change in each of the continuous variables (evaluated at the means) and a discrete change in the dummy variables. The sample consists of individuals known to have been widowed from their first marriage (subsequent remarriage behavior is ignored).[29] Since we predict that men will behave differently from women, columns (2) and (3) analyze the data separately for men and women. In column (2), a widow without a child from her first marriage has a 0.15 lower probability of remarriage. This infertility penalty fell as the age of widowhood increased (it disappears by age 30). Potential spouses did not, however, value children from the first marriage per se — the remarriage rate fell as the number of (previous) children increased.

On the other hand, an absence of children from the first marriage did not affect the remarriage probability of widowers (column (3)). These results provide further evidence on the importance of differential fecundity in the marriage market.[30]

[29] This sample includes non-native Quebeckers who married a Quebecker in their first marriage.

[30] Research on historic remarriage behavior argues fertility as well as other factors were important deterrents to female remarriage. For example, Hufton (1995: 218-22) states that post-menopausal women did not tend to remarry. She goes on to argue that women faced more social pressure than men to remain in their widowed state. The minimum acceptable mourning period was much longer for women (at least a year, compared to 3-6 months for men) and men's honor required them to replace their wives quickly because engaging in menial tasks like cooking, cleaning, and child rearing was degrading. Hufton also cites contemporary correspondence that illustrates various Church's views on widowhood. In short, they tended to believe that because widows had acquired 'carnal knowledge' the best antidote to this unfortunate situation was chastity.

B. Age at First Marriage

Propositions 1, 2, and 3 predict that the average age of first marriage is lower for women than men, the average age of first marriage for high skilled men is higher than for low skilled men, and the average age of first marriage for women is independent of their skills.

Tables 3 report ordinary-least-squares regression results for the determinants of log age at first marriage. The sample consists of marriages where both spouses are marrying for the first time.[31] In all regressions, we have controlled for the age of marriage of the spouse. Thus a delay in marriage does not imply that the person is marrying somebody older. Columns 1 and 2 illustrate that men were older than women when they married, independent of the year of the marriage, whether it took place in a city, own status, and (in column 2) spouse status.[32]

The rest of Table 3 reports age-at-first-marriage determinants for men and women separately. Without controlling for spouse status, high-status men tended to marry later (column 3: men with noble and bourgeois parents). With spouse status controls (column 4), men's status becomes insignificant but their wives' status becomes significant. Men who married high status women tended to be older than other men. An interpretation of these results is as follows. High status women marry older men. High status men tend to marry high status women and thus

[31] We also used a sample which excludes marriages that occurred after 1715, because these marriages are highly correlated with marriage age (since people born in the province—a high proportion of the sample—were born before 1700). Excluding these people does not appreciably affect the results (except for the marriage year coefficient) and markedly reduces the sample size. Hence the results for 'all years' are discussed here.

[32] Hajnal's (1965) influential work on marriage patterns attributes the low marriage rates and high age-at-marriage observed in western Europe to general economic conditions. Economic conditions affected marriage behavior, he argues, because it was a society where newlyweds were expected to establish separate, self-sufficient households. Guinnane (1991) argues that marriage patterns are better explained by recognizing one of the primary motives for (and result of) marriage—children. If the return to children was primarily in the form of old-age security, the decision to marry will reflect the costs of child rearing and availability of alternative sources of old-age security.

marry at an older age. Those high status men who marry low status women do not marry at an older age. In other words, the status of women determines the age of marriage of men.[33]

There is some evidence that women's marriage age is positively correlated with status, although the results are not unambiguous (columns 5-6). Women in noble families and those who signed their marriage record were older than low status women at the time of marriage. The exception is bourgeois women, who tended to marry earlier than low-status women. Although proposition 3 implies that a woman's status should not affect her age of first marriage, this results depends on the two period structure of adult life. If women enter the marriage market at the same time for multiple periods, high status women will have a higher mean age of first marriage because high status men have a lower marital hazard.

C. Marriage Rates

Propositions 4, 8, and 9 predict that there are more never married men than women. High skilled women may have a lower marriage rate than low skilled women. In the finite horizon model, high skilled men will have a higher marital rate than low skilled men.

Table 4 reports probit regressions on the probability of marriage. The sample includes all people born in the colony before 1700 whose life span is known and who lived for at least 10 years. The first column examines men and women together. Consistent with proposition 4, males were significantly less likely to marry than females.

Another explanation for the lower marriage rate of men is that immigration to New France was predominantly male and therefore the low marriage rate of males reflected an uneven

[33] Another possibility is that migration biases (discussed in footnote 21) vary across status. We would expect this bias to have been larger for high-status people (especially males) because they were likely more mobile than others. If so, this would accentuate the downward bias in their age-at-marriage. Hence we expect that the 'delay' in marriage among high-status men is underestimated.

sex ratio.[34] While the uneven sex ratio hypothesis is valid especially in the early part of the sample, it cannot explain entirely the gender differences in marriage rates because the remarriage rate of widowers is higher than that of widows.[35]

Men's later age-at-marriage also affects the relative marriage rates of men and women because they face a higher probability of dying before marrying. This effect is compounded by the fact that single men are more likely to die between ages 20 and 40 than single women. Table 4b (column 1, row 6) illustrates that if we examine marriage incidence for a sample of married people and single people that live at least until age 30, men and women exhibit statistically indistinct marriage rates.[36] This selection by age suggests that the second wives of widowers were primarily women whose "alternatives" were single men who died young.

Returning to column 1 of Table 4, children of noble or bourgeois parents reduced their marital probabilities by 0.27 and 0.16 respectively. The qualitative effect for women is consistent with proposition 8. The qualitative effect for men is not consistent with proposition 9, the finite horizon version of the model. As discussed in the model section, it may be consistent with the infinite horizon version of the model. The magnitudes of the noble and bourgeois effects are much smaller, but always remain negative and statistically significant, if we broaden the

[34] At least part of this effect is picked up with the birth-year variable. The coefficient on birth year indicates that marriage rates fell over time (especially for women), which likely reflects the fact that women were exceedingly scarce in the colony's early years (before 1680). Prior to that, the immigrant composition was almost entirely male. This changed in the 1660s when the French Crown undertook a migration policy specifically designed to correct the gender imbalance. For an examination of this episode see Landry (1992). The male-to-female ratio is estimated to have fallen from 6.7 in 1666 to 1.4 in 1681 (Charbonneau et al., 1993: 81). See also Roy and Charbonneau (1978).

[35] Native-born men's marriage rate is significantly lower than native-born women's marriage rate even when the sample is restricted to those born after 1680. Recall that for this period, Desjardins (1993) finds no bias in mean age-at-marriage.

[36] Table 4b reports the gender (and high status) coefficients of marriage rate probit regressions across different samples. The samples vary principally in the restrictions placed on unmarried individuals' minimum life span.

definition of high-status and attempt to take account of the impact of the later age-at-marriage found among the high-status on their opportunity to marry (Table 4b).[37]

The second and third column of Table 4 documents the effects for men and women separately. Again both high-status males and females were significantly less likely to marry than their more pedestrian counterparts. A test that the high-status variables (bourgeois and noble family) are jointly zero is consistently rejected at the one-percent level.

If high status individuals are valued as spouses, the lower marriage probability of high status individuals cannot be explained without search frictions. In our model with assortative matching and search frictions, this behavior suggests that the value of search rose with status and/or the arrival rate of potential mates in the high-status market was low compared to that in the low-status marriage market.[38]

It is also noteworthy that marriage probabilities are consistently estimated to have been lower for people born in urban areas. The urban variable may be capturing differences in

[37] First we broaden the definition of high-status to include individuals with a parent that signed his or her marriage register (see Table 4b). In this case the sample is restricted to those individuals whose parents were married in the province (and at least one parent was born in the province). For men (column 2), the marital probabilities are 0.17, 0.14, and 0.07 lower for men from noble, bourgeois, and parent-signing families respectively (row 3). These effects tend to be smaller as we take increasingly strict account of the compounding effects of later age-at-marriage and higher age-specific risk of death for young single men, both of which were larger for high-status (compared to low-status) males. To see this compare rows 5 to 7, which restrict the sample of singles to those who lived until at least age 20 (row 5), 30 (row 6), and 40 (row 7).

[38] In Europe low marriage rates among the aristocracy often are attributed to families desire to retain their elite status (see Hurwich, 1998). These societies practiced primogeniture, hence subsequent sons were less attractive than first-born sons, and dowries were prohibitively large. Birth order effects are typically evident. In most of New France, all children (male and female) claimed an equal share of their parent's estate and dowries were rare (on dowries, see Dechêne, 1991, and Hamilton, 1999). We find little evidence of birth order effects. The only exception appears to be among the nobility, where second sons were less likely to marry than other sons. Gadoury (1991) argues that noble families responsibility to supply priests (and nuns) to the Church, as well as the nomadic quality of military life contributed to the low marriage rates among the nobility. Priests typically were second sons. In addition, it was legal for people who owned *seigneuries*, often members of the nobility, to practice a form of primogeniture (the French King initially offered some of the nobility and the church large land grants, called *seigneuries*, in order to encourage settlement). Half of the estate, including the house, passed to the first son, the remainder was divided equally among the other children. The objective was to discourage partition of the *seigneuries* (see, for example, Greer (1997) for more information on *seigneuries*). These factors do not explain why the bourgeois (mainly merchants) or, controlling for noble and bourgeois status, individuals with literate parents, had low marriage rates.

expected life span (and hence mate quality) that are not picked up with realized life span (life span was lower in the cities, in part because of higher infant mortality rates).[39]

Additional evidence on the higher reservation match values for high status individuals comes from examining the marital rates of families. Table 4c presents OLS estimates for within-family marriage rates. In this sample, each observation is a family, and regressors consist of attributes of the parents and average attributes of the parents' children. The dependent variable is the proportion of the couples' (adult) children that married (i.e., the marital rate of the family).

Column 1 shows that high status families have lower marital rates. In column 2, we also include the average status of the in-laws of the children who marry. Controlling for own family status, families whose children married other nobles had statistically significant lower marital rates. The bourgeois and signing coefficients are also negative but not significant. The number of children had a negative effect on a family's marriage rate, which suggests that resources affected marital prospects.[40]

D. Remarriage

Proposition 5 and 6 predict that widowers are more likely to remarry than widows and the propensity of widowers to remarry is correlated with their skills.

Returning to Table 2, column 1 studies the remarriage behavior of men and women together. With controls, men were significantly more likely to remarry. The difference in the

[39] Pelletier, Légaré, and Bourbeau (1997) discuss urban mortality in mid-19th century Quebec. Note that the smaller positive effect of life span on the marriage probability for women (compared to men) reflects the non-trivial incidence of maternal mortality. Omitting life span from the regressions does not appreciably alter any of the coefficients.

[40] Guinnane's (1991) work suggests an alternate explanation for lower marriage rates among large families. Individuals with numerous siblings may have been less reliant on children for old-age security if some siblings preferred to live, and grow old, together.

probability of remarriage by gender after controls, 0.314, is larger than the difference without controls (0.2 = 0.47 - 0.27, see Table 1 row 18).[41]

In column 3, consistent with proposition 6, the remarriage probability of men who could sign their first marriage registers were 0.11 higher than those who could not. The remarriage probabilities of men with noble and bourgeois parents are not significantly different from zero. While the model has no prediction on status and the remarriage rates of women, women with bourgeois parents experienced a significantly lower probability of remarrying (column 2).

The model also predicts that men who remarry are likely to remarry women of lower status than their first wives (proposition 6). In Table 2a, we present probit estimates of wives' status. The sample consists of all of the marriages of men who remarried. High status, for both men and women, is defined as individuals who could sign or had noble or bourgeois parents. In column 1, conditioning on the status of the husband and his age of marriage, husbands in subsequent (not their first) marriages had a statistically significant 0.043 lower probability of marrying a high status wife. In other words, the status of first wives was (on average) higher than the status of subsequent wives. This lower probability becomes statistically insignificant once we also include the number of children from the first marriage in the regression (column 2). Instead, number of first-marriage children is negatively correlated with wife's status.[42] The results show that widowers remarried lower status women, largely because new spouses found children from the first marriage undesirable.

[41] An alternative explanation for the lower remarriage rate of widows is the fact that wives outlived their husbands and therefore widows had a lower remarriage rate if widows and widowers marry each other. However, widowers largely remarried younger women. The average age gap between widowers and their wives were 12.9 years which was much larger than the age gap between the same men and their first wives (4.9 years). In other words, widowers did not remarry women from the same age cohort as their first wives.

[42] The number of children from the first marriage is zero if the husband is in the first marriage.

E. Remarriage Fertility

Proposition 7 predicts that widowers have more children in their second marriage than widows.

Table 5 studies the fertility of men and women after their first marriage. Columns 2 and 3 report quantile regressions of post-first-marriage fertility. OLS results are presented for comparison (columns 4 and 5).[43] The sample includes all individuals that remarried at least once (those that married a third or fourth time are observed more than once). Sample means are shown in column 1. The dependent variable is the difference between lifetime fertility—across all of an individual's marriages—and fertility in the first marriage.[44] Column 2 shows that after their first marriage, without other controls, widowers who remarry have a median of 3 more children compared with widows who remarry. As shown in column 4, the mean number of additional children of widowers is 2.1. In column 3, we control for gender, age at remarriage, spouse's age, as well as year and location effects (an urban dummy variable). Holding the spouse's age constant, fertility declined with age at remarriage. Predictably, it declined at a faster rate for widows. If the second wife is older when she married the widower, she will bear less children. The fertility of the second husband is unaffected by the age at which he married the widow.

Since widowers are more likely to remarry and they have more children when they remarry, it is not surprising that the mean completed (lifetime) fertility for married men was significantly higher than married women's average completed fertility (Corollary 1). The average

[43] We also estimated remarriage fertility with poisson regressions (a count data model). The results had no sensible interpretation which suggests that the functional form imposed by the poisson model is inappropriate.

[44] It ranges from zero to 22 (more than 600 observations, or about 30 percent, equal zero; and only 21 observations, or about 1 percent, are for individuals that had more than 15 children after their first marriage. The quantile regression estimates the median post-first-marriage fertility (conditional on the values of the independent variables), which may be a better measure of the central tendency of these data.

married man born in New France fathered 8.67 children over his lifetime, compared to 8.01 children produced by the typical native-born (ever-married) woman.[45]

IV: Transfers: Theoretic and Empirical Examination

Recall that the reservation match value for the young high skilled man is higher than that of the young low skilled man. The young high skilled man draws from a match value distribution with a higher variance than that of the young low skilled man. These two properties imply:

Proposition 10: *The average match value in marriage, which is reflected in the skills of their children, is higher for young high skilled couples than young low skilled couples.*

Young low skilled women draw match values from a preferable distribution if they enter a marriage market with young high skilled rather than low skilled men. In equilibrium, these women are deterred from entering this marriage market because the transfer they will receive from the young high skilled men will be lower than what is needed to compensate them for not matching with young low skilled men. An equivalent argument holds for why in equilibrium young low skilled men do not match with young high skilled women. Put another way:

Proposition 11: *Controlling for age, individuals who want to marry higher skilled spouses will receive lower transfers.*

[45] The t-test performed to test whether the means are equal is rejected at the 1 percent level. The variances are treated as unequal, and the t-statistic is 7.39 (with more than 10,000 degrees of freedom). The result is sensitive to the sample employed—including non-native individuals that married (but whose life span is known because of an age declaration) tends to reduce the average number of children fathered by men. This is likely a result of missing (first) marriages that occurred outside New France. It is not surprising that this bias would affect men more than women, since immigrants tend to have been male. The variance of men's fertility distribution was also significantly higher than women's fertility distribution in this sample (the null hypothesis of equal standard deviations is rejected at the one percent level). The variance comparison test was performed on a sample that included never married people, with similar result. The test rejects the null of equal variances at (better than) the one percent level. In this case mean fertility should be equal for men and women (because all children have one male and female parent). A check that this held true cannot be rejected at the 10 percent level.

In the appendix, (equation A.12), we show that high skilled men pay lower courting cost than low skilled men to match with low skilled women:

Proposition 12: *Holding constant the skilled level of women, high skilled men will pay lower courting costs than low skilled men.*

Since low skilled women have to be indifferent between high skilled men and low skilled men, Proposition 12 also says that the benefit to a low skilled woman from marrying a high skilled man is through the public good in marriage, i.e. *v* or children.

Corollary 2: *Low skilled women who marry high skilled men will receive less own consumption than those who marry low skilled men.*

F. Life spans and marital transfers

For analytic convenience, we assume that the transfer, *T*, is paid before the match value is observed. Empirically, we expect that much of the transfer is paid after the couple married.[46] We hypothesize that an individual who transfers more resources to their spouse during marriage reduces his or her own resources, which results in a shorter life. Because the model hypothesizes that higher transfers are required for individuals that marry 'up,' we predict a negative correlation between life span and spouse status.

Table 6 reports ordinary-least-squares estimates for the determinants of life span. The sample consists of marriages where both spouses are marrying for the first time. Men and women are examined separately. The first column for each sex (1 and 4) excludes spouse

[46] An alternative theoretical formulation is to assume that *T* is an ex-ante agreed upon transfer that is paid only if the marriage occurs. In this alternative case, men may choose not to pay *T* by refusing to marry. If so, there is no reason for any low skilled young male not to enter a marriage market. Hence there will be an excess of low skilled males in the market for young low skilled males and females. While analytically more complicated, we can follow Moen (1997), Peters (1991) and Shi (1998) and use congestion costs and anticipated transfers to clear the various sub-marriage markets.

attributes, the second (2 and 5) includes them. The last columns (3 and 6) restrict the sample to those who were born in the colony. Apart from status, we control for the year of marriage, whether the couple married in a city, and age at marriage.

The estimates show that, consistent with proposition 11, controlling for own status and age at marriage, men and women's life span was significantly shorter if they married a high status spouse (see columns 2-3 and 5-6). For both men and women, this effect is picked up by the spouse-signing variable.

Controlling for spouse attributes, the results also illustrate that high-status men tended to live longer (those that signed their marriage document).[47] While this may have been a pure wealth effect, it is also consistent with the hypothesis that high status males had to give up (transfer) less than low status males, holding their spouse's status constant (proposition 12). Contrary to corollary 2, the results are more mixed for the life span of women. In fact, controlling for spouse attributes married bourgeois women tended to live shorter lives.[48]

The results also reveal that those men who married in the city tended to experience shorter lives, which suggests that the harm of city life was not confined to infants. Finally, life span is decreasing with year of marriage for women, but increasing for men. This may reflect rising maternal mortality rates over this time period.[49]

G. Match Value

Proposition 10 stated that match value in marriage will vary positively with the skill level of the parents—hence the average high-status marriage will entail a higher match value than the

[47] Since there is assortative matching, this result does not contradict the evidence that high status individuals have lower life spans.
[48] The bourgeois coefficient is significant at the 10 percent level. This understates the true relationship between women's life span and high-status, since these women had less exposure to the dangers of childbirth (due to smaller family size).
[49] Restricting the sample to those born in New France (the base sample) does not appreciably alter the results.

average low-status coupling. If match value is reflected in the quality of children, higher quality children may have lower mortality rates. The link between match value and child survival rates may be somewhat tenuous in the historic context, but given the nature of our data it is worth investigation and of interest in its own right.[50]

Table 7 presents probit estimates with family random-effects of the probability of surviving for at least two years. Apart from high-status, city, and birth year variables, we also control for gender, birth rank (equal to 1 if first born, 2 if second born, *et cetera*), life span and marriage age of the parents. The family random effects take account of possible differences in lifestyle (for example) across families, which may not be picked up by the family status or parental life span variables.[51] To make use of parental life span information, the sample consists of those individuals born in the province before 1700 with parents that were also born in the province (where parent and child life span are known).

Column (1) reports results without parental life span controls and does not restrict the sample to observations with known life span. Column (2) is different from column (1) in so far as it restricts the sample to those with known parental life span. Column (3) includes parental life span as regressors. In all three specifications, the survival rate for individuals from families in which at least one parent signed their marriage record was lower than the survival rate for individuals from non-signing families. Reading across columns, part of this correlation arises because low-status families tended to live longer. Parental life span is positively correlated with child survival rates, and once it is included in the regression (column 3), the signing coefficient

[50] The positive association between wealth and certain measures of standard of living—such as infant mortality rates and life span—was not established in Europe until the 19th century. Before this, the negative impact of urban centers on well being (with their poor water supplies and open sewers), given the disproportionate location of the rich in urban centers, overwhelmed any positive effects of wealth on living standards.

[51] We have also estimated infant survival rates without family random effects. The results are not appreciably different, although the standard errors tend to be somewhat larger in the random-effects results. This suggests the random-effects model is more appropriate.

becomes less negative. The coefficients on noble and bourgeois parents are statistically insignificant. When we control for parental life span, the positive coefficient on nobility becomes more positive and the negative coefficient on bourgeois becomes less negative. Thus there is weak evidence that, holding their lifestyle constant, high status parents increased their children survival rates.

On the whole, high status individuals in New France appear to have lived unhealthy lives. Apart from the fact that they tended to live in urban areas (which were associated with higher child mortality rates), they tended to wet nurse their children, which was ultimately detrimental to their health. The weak support for our hypothesized link between match values and child survival rates may be partially due to ignorance about healthy child rearing practices.[52]

Conclusions

Eighteenth century men and women followed different marital and fertility behavior. The low marriage but high remarriage rates of the high status individuals are also distinctive. We employ an economic model of marriage that combines differential fecundity, assortative matching, and search frictions in marriage markets to rationalize the behavior of these individuals. All three assumptions have already been discussed separately in the literature. Our contribution is to integrate them into a single model and to use it to account for some of the marital and fertility patterns observed in this society.

Many of the findings remain to this day. For example, men are more likely than women to remain unmarried; women marry at a younger age than men; and the remarriage rate for men exceeds that for women. In addition, there is a positive correlation between the age of first

[52] The results in Table 7 also document the low survival rates among male children, a result that is consistent with other findings, both historic and contemporary. The table also documents strong birth order effects. Principally,

marriage and resources of men, which suggests that the gain to delaying marriage as resources rise remains.[53] As with the historical data, Goldin Moorman, Moorman et. al. and Statistics Sweden show that better educated women from the U.S. and Sweden are less likely to marry than less educated women. In contrast with the 18th century, though, married men have higher earnings compared with single men (which suggests that high-income men are more likely to marry than low-income men). Hence the behavior of 18th century adults appears to fit the infinite horizon model, whereas modern individuals act as if their time frame is finite. While the longer marital horizon of 18th century adults may seem paradoxical given their lower life expectancy, the absence of divorce may have made them more cautious in the marriage market. It is also not surprising that men's behavior has been more responsive to the availability of divorce than women's, because women's marital time horizon continues to be affected by their shorter fecund interval. Thus our model potentially provides an explanation for both the historical and current experience.

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first born children were more likely to die than children born subsequently. Different specifications using birth rank and numbers of children show similar, but less precisely estimated, results.

[53] The evidence largely shows a positive correlation between wages and age of marriage (Bergstrom and Schoeni (1992), Keeley (1977), Vella and Collins (1990), Zhang (1995)). For direct evidence on education and marital rates, see Qian and Preston, and Statistics Sweden.

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Table 1: Select Summary Statistics

		(1)	(2)	(3)	(4)
				High-status[A]	
Row		**Males**	**Females**	**Males**	**Females**
I. Base sample (individuals born in New France before 1700)					
1	Birth year	1683.08	1682.97	1680.79	1682.23
2	Life span from birth	42.72	45.83	35.78	41.31
3	Life span (if greater than 10 years)	56.31	56.63	51.19	53.25
4.1	Incidence of marriage[B]	0.79	0.85	0.57	0.62
4.2	Incidence of marriage[C]	0.81	0.85	0.66	0.71
5.1	Incidence of life span < 2 years	0.19	0.15	0.25	0.18
5.2	Incidence of life span ≤ 10 years	0.25	0.20	0.31	0.23
6	Noble parents	0.03	0.02	0.41	0.36
7	Bourgeois parents	0.04	0.04	0.59	0.64
8	Urban births	0.38	0.39	0.81	0.77
II. First marriages (for both spouses)					
9	Age at first marriage (years)	27.87	20.63	28.58	21.16
10	Number of children (if > 0)	8.15	8.15	7.64	7.58
11	Age at widowhood (years)	51.22	49.79	48.03	46.48
12	Age at second marriage (years)	42.89	36.98	42.37	35.60
13	Number of children (after first marriage)[D]	5.45	3.20	5.63	3.34
14	Incidence of signing their marriage record	0.22	0.17	0.95	0.89
15	Incidence of no children	0.05	0.05	0.07	0.07
16	Incidence of maternal mortality [E]		0.09		0.11
17	Incidence of outliving spouse	0.42	0.58	0.49	0.57
18	Incidence of remarriage	0.47	0.27	0.56	0.30

Standard deviations in parentheses. The base sample consists of 7,350 males and 7,877 females, 453 high-status males and 501 high-status females; the marriage sample (section II) consists of 4,772 observations where both spouses are in their first marriage, 1088 high-status males and 949 high-status females. All samples include only those cases where life span is known (life span of both spouses in the marriage sample).

[A] For the base sample (section I), high-status is defined as those individuals with either a noble or bourgeois family, except in row 4.2 (see C). In the marriage sample (section II), high-status is defined as men or women that are either from a noble or bourgeois family or signed his or her marriage record.

[B] If lived to age 10.

[C] If lived to age 15 and parents married in the province (at least one parent born in the province, 3084 males and 3489 females). High status definition is broadened to include individuals with a parent that signed their marriage register.

[D] For men and women that remarried from marriages where both were marrying for the first time.

[E] Woman died within a year of her child's birth.

Table 2: Incidence of Remarriage: probit estimates.

	(1)	(2)	(3)
Dependent variable: remarried = 1, 0 otherwise	ALL	Females	Males
Male widowed from first marriage (MW)	**0.314**		
	(0.018)		
No children in first marriage ('no children')	**- 0.159**	**- 0.148**	- 0.141
	(0.058)	(0.029)	(0.169)
Number of children in first marriage	**- 0.006**	**- 0.012**	0.009
	(0.002)	(0.003)	(0.004)
Age at first spouse's death	**- 0.024**	**- 0.018**	**- 0.029**
	(0.0007)	(0.0008)	(0.001)
First married in a city	**- 0.038**	- 0.020	**- 0.072**
	(0.017)	(0.017)	(0.035)
Year of first marriage	**- 0.004**	**- 0.004**	**- 0.004**
	(0.0004)	(0.0004)	(0.001)
(No children) * (age at first spouse's death)	**0.004**	**0.005**	0.004
	(0.002)	(0.002)	(0.004)
Signed first marriage record	0.031	- 0.015	**0.112**
	(0.020)	(0.020)	(0.036)
Noble parents	- 0.090	- 0.099	0.001
	(0.050)	(0.037)	(0.118)
Bourgeois parents	**- 0.089**	**- 0.073**	- 0.076
	(0.035)	(0.030)	(0.089)
F–test on high status variables	0.040	0.039	0.021
N	4609	2923	1686
Pseudo R-squared	0.409	0.425	0.361

Values reported are maximum likelihood probit estimates of the change in probability of a one-unity change in the independent variable, evaluated at the means of the independent variables. Bold type indicates significance at the five percent level. White corrected standard errors are in parentheses. The F-test tests that the high-status coefficients (noble parents, bourgeois parents, and signing) are jointly zero.
Source: The sample consists of individuals known to have been widowed from their first marriage, subsequent remarriages are ignored.

Table 2a: The determinants of wife's status, among men who remarried: probit estimates.

	(1)		(2)	
Dep var: high status wife = 1, 0 otherwise	Coefficient	S.E.	Coefficient	S.E.
Subsequent marriage (H)*	**- 0.043**	(0.0185)	- 0.0177	(0.0202)
High status (H)	**0.298**	(0.0166)	**0.289**	(0.0171)
Age of marriage (H)	0.00057	(0.00084)	0.00113	(0.00097)
Number of children from first marriage (H)			**- 0.00764**	(0.00267)
N	3260		3091	
Pseudo R-squared	0.127		0.124	

See Table 2 for information on values reported. Bold type indicates significance at the five percent level. White corrected standard errors are in parentheses. Unreported regressors: year of marriage. H = husband.
* Dummy variable equal to 1 if not husband's first marriage, 0 otherwise.
Source: The sample consists of all marriages of males who remarried.

Table 3: Age at First Marriage

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Men		Women	
Dependent variable: log(age at first marriage)						
Log (spouse's marriage age)	**0.011**	0.010	**0.088**	**0.086**	**0.076**	**0.075**
	(0.010)	(0.010)	(0.015)	(0.015)	(0.014)	(0.014)
Married in a city	**0.027**	**0.024**	**0.028**	**0.021**	**0.023**	**0.022**
	(0.004)	(0.004)	(0.006)	(0.006)	(0.005)	(0.005)
Marriage year	**0.004**	**0.004**	**0.001**	**0.001**	**0.007**	**0.007**
	(0.000)	(0.000)	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Signed marriage record	**0.019**	**0.015**	0.008	0.003	**0.022**	**0.018**
	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Noble parents	**0.093**	**0.060**	**0.091**	0.037	**0.078**	**0.067**
	(0.016)	(0.017)	(0.023)	(0.024)	(0.023)	(0.025)
Bourgeois parents	-0.003	-0.021	**0.049**	0.024	**- 0.026**	**- 0.033**
	(0.011)	(0.011)	(0.018)	(0.018)	(0.013)	(0.013)
Spouse signed		0.005		0.008		0.009
		(0.005)		(0.007)		(0.006)
Spouse noble parents		**0.077**		**0.128**		0.027
		(0.017)		(0.025)		(0.022)
Spouse bourgeois parents		**0.066**		**0.078**		0.019
		(0.012)		(0.014)		(0.019)
Male	**0.309**	**0.308**				
	(0.004)	(0.004)				
Constant	**-4.361**	**-4.350**	**1.495**	**1.475**	**- 9.189**	**-9.191**
	(0.192)	(0.191)	(0.290)	(0.289)	(0.240)	(0.240)
R squared	0.4624	0.4649	0.036	0.045	0.332	0.333

Notes: Coefficients reported are ordinary-least-squares estimates. White corrected standard errors are in parentheses. The dependent variable is the log of marriage age. Bold type indicates significance at the five percent level.
Source: The sample consists of marriages where both spouses are marrying for the first time (N = 6268; 12536 for columns 1 and 2).

Table 4: Incidence of Marriage: probit estimates.

	(1)	(2)	(3)
	All	Male	Female
Dependent variable: married = 1, 0 otherwise			
Life span	**0.007**	**0.010**	**0.005**
	(0.0001)	(0.0002)	(0.0002)
Born in a city	**- 0.038**	**- 0.041**	**- 0.034**
	(0.007)	(0.012)	(0.009)
Birth year	**- 0.001**	- 0.0008	**- 0.002**
	(0.0003)	(0.0004)	(0.0004)
Noble parents	**- 0.272**	**- 0.208**	**- 0.318**
	(0.034)	(0.048)	(0.047)
Bourgeois parents	**- 0.158**	**- 0.174**	**- 0.150**
	(0.264)	(0.043)	(0.032)
Male	**- 0.052**		
	(0.006)		
N	11865	5532	6333
Pseudo R squared	0.251	0.372	0.160
F-test (parents noble & bourgeois parents)	0.000	0.000	0.000

Notes: See Table 2 for information on values reported. Bold type indicates significant at the five percent level. White corrected standard errors are in parentheses. F-test tests that the high-status coefficients (noble and bourgeois parents) are jointly zero.
Source: Sample includes everyone born in the province before 1700 with known life span of more than 10 years.

Table 4b: The incidence of marriage: gender and status effects (probit estimates)
Dependent variable: Married = 1, 0 otherwise.

	(1)	(2)					(3)				
	All	Men					Women				
Sam-ple	Male	Noble parents	Bourg. parents	Parent signed	N	Pseudo R^2	Noble parents	Bourg. Parents	Parent signed	N	Pseudo R^2
1		**- 0.208**	**- 0.174**		5532	0.372	**- 0.318**	**- 0.150**		6333	0.160
		(0.048)	(0.043)				(0.047)	(0.032)			
2	**-0.037**	**-0.204**	**-0.165**		3084	0.337	**-0.310**	**-0.120**		3489	0.128
	(0.008)	(0.060)	(0.051)				(0.061)	(0.037)			
3	**-0.038**	**-0.172**	**-0.139**	**-0.068**	3084	0.340	**-0.258**	**-0.102**	**-0.089**	3489	0.134
	(0.008)	(0.059)	(0.050)	(0.027)			(0.060)	(0.036)	(0.023)		
4	**-0.034**	**-0.236**	**-0.130**	**-0.068**	3001	0.337	**-0.264**	**-0.100**	**-0.088**	3472	0.134
	(0.008)	(0.074)	(0.049)	(0.028)			(0.062)	(0.036)	(0.023)		
5	**-0.033**	**-0.186**	**-0.142**	**-0.075**	2954	0.036	**-0.277**	**-0.109**	**-0.085**	3377	0.047
	(0.009)	(0.057)	(0.045)	(0.027)			(0.057)	(0.034)	(0.022)		
6	0.002	**-0.148**	**-0.142**	**-0.056**	2728	0.085	**-0.238**	**-0.106**	**-0.080**	3251	0.063
	(0.007)	(0.053)	(0.042)	(0.022)			(0.057)	(0.032)	(0.020)		
7	**0.014**	**-0.128**	**-0.122**	**-0.040**	2663	0.047	**-0.222**	**-0.097**	**-0.077**	3207	0.078
	(0.006)	(0.053)	(0.042)	(0.020)			(0.056)	(0.031)	(0.020)		

Three types of regressions are reported in the table: (1) includes both genders (all); (2) include males; and (3) includes females. Each regression includes life span, born in a city, and birth year as regressors. See Table 2 for information on probit estimated values reported. Bold type indicates significant at the five percent level. White corrected standard errors are in parentheses. All samples are restricted to individuals with known life span, and all but sample 1 are restricted to individuals whose parents were born in the province:
Sample 1: base sample, if life span > 10 years.
Sample 2 & 3: parents were born in the province, if life span > 15.
Sample 4: parents were born in the province, if life span > 15 & died in the province.
Sample 5: married people and singles that lived until at least age 20.
Sample 6: married people and singles that lived until at least age 30.
Sample 7: married people and singles that lived until at least age 40.

Table 4c: Marriage rates within Families

Dependent variable: proportion of adult children married

	(1)		(2)	
Family composition	Coefficient	Standard error	Coefficient	Standard error
Proportion male children	**- 0.118**	(0.031)	**- 0.075**	(0.025)
Number of children [a]	- 0.004	(0.002)	**- 0.007**	(0.002)
Mean life span of children	**0.005**	(0.0007)	**0.004**	(0.0006)
Mean birth year of children	0.001	(0.0007)	**0.004**	(0.0006)
Parents married in a city	- 0.008	(0.015)	0.007	(0.013)
A parent signed marriage record	- 0.022	(0.015)	- 0.007	(0.013)
Noble parent or grandparent	**- 0.187**	(0.038)	**- 0.126**	(0.043)
Bourgeois parent or grandparent	**- 0.136**	(0.032)	**- 0.061**	(0.029)
Life span of mother	- 0.0001	(0.0004)	- 0.0001	(0.0003)
Life span of father	0.0002	(0.0005)	0.0004	(0.0004)
Children signing			- 0.031	(0.026)
Spouses life span			0.0006	(0.0006)
Spouses signing			0.023	(0.026)
Spouses from a bourgeois family			- 0.082	(0.057)
Spouses from a noble family			**- 0.179**	(0.073)
Constant	- 1.740	(1.238)	**- 5.288**	(1.075)
Number of families	1555		1445	
R-squared	0.112		0.126	

Notes: The dependent variable is the proportion of children (that survived to adulthood) in a family that married. Coefficients reported are OLS estimates. White corrected standard errors are in parentheses. Bold type indicates significant at the five percent level.

[a] Children that lived to adulthood only (boys that lived to age 18; girls that lived to age 14).

Source: The sample consists of families with information on parental life span and the marriage behavior of children that achieved adulthood.

Table 5: Remarriage fertility

Dep. var.: no. of children after 1st marriage	(1) Means	(2) Quantile Regression	(3) Quantile Regression	(4) OLS	(5) OLS
Male	0.553	**3.00**	**3.396**	**2.144**	**3.919**
	(0.497)	(0.992)	(0.494)	(0.183)	(0.611)
Number of children in first marriage	5.676		- 0.016		- 0.004
	(4.051)		(0.019)		(0.019)
Age at remarriage	37.215[a]		**- 0.237**		**- 0.234**
	(10.721)		(0.011)		(0.012)
Age at remarriage * male	43.202[a]		**0.155**		**0.130**
	(10.667)		(0.015)		(0.017)
Marriage age of spouse	37.152[a]		- 0.009		- 0.005
	(13.059)		(0.009)		(0.007)
Marriage age of spouse * male	30.551[a]		**- 0.213**		**- 0.197**
	(11.667)		(0.013)		(0.013)
First married in a city	0.283		**- 0.415**		**- 0.414**
	(0.451)		(0.139)		(0.156)
Year of first marriage	1704.761		- 0.006		- 0.007
	(15.517)		(0.004)		(0.004)
Constant	4.380[b]	**2.00**	**22.018**	**3.146**	**24.418**
	(4.321)	(0.730)	(7.111)	(0.116)	(7.560)
N	1995	1995	1920	1995	1920
R- squared		0.037	0.369	0.062	0.524

Notes: The dependent variable is the sum of all children born after the first marriage (i.e., lifetime fertility net of the number of children from first marriage). Standard errors are in parentheses (the standard errors are White-corrected for the OLS regressions). Bold type indicates significant at the five percent level.

[a] Conditional means reported.

[b] Mean of the dependent variable (average remarriage fertility)

Sample: The sample consists of all instances where an individual married for the second time (when information of the first marriage exists).

Table 6: Life span

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. var.: Life span		Men			Women	
Sample	All	All	Base	All	All	Base
Year of marriage	0.022	**0.048**	**0.069**	**- 0.063**	**- 0.064**	- 0.034
	(0.013)	(0.015)	(0.020)	(0.018)	(0.019)	(0.024)
Married in a city	- 2.018	**- 1.339**	**- 1.496**	- 0.174	- 0.798	0.918
	(0.500)	(0.509)	(0.667)	(0.601)	(0.618)	(0.657)
Age at marriage	**0.376**	**0.421**	**0.291**	**0.444**	**0.455**	**0.391**
	(0.035)	(0.036)	(0.051)	(0.060)	(0.064)	(0.073)
Signed marriage record	0.185	**1.621**	**2.642**	**- 2.244**	0.144	- 0.295
	(0.527)	(0.557)	(0.672)	(0.724)	(0.774)	(0.846)
Noble parents	- 0.777	+ 0.640	- 0.009	- 2.370	- 1.036	- 2.674
	(1.879)	(1.956)	(2.120)	(2.504)	(2.702)	(3.045)
Bourgeois parents	- 2.581	- 1.420	- 1.796	**- 4.372**	- 3.240	- 3.400
	(1.717)	(1.780)	(1.844)	(1.700)	(1.730)	(1.901)
Spouse's:						
Age at marriage		**- 0.149**	- 0.055		0.017	0.094
		(0.055)	(0.068)		(0.048)	(0.053)
Signed marriage record		**- 4.332**	**- 3.855**		**- 5.345**	**- 5.338**
		(0.652)	(0.769)		(0.740)	(0.800)
Noble parents		- 2.064	- 1.501		- 3.289	- 3.868
		(1.786)	(2.698)		(2.607)	(3.113)
Bourgeois parents		- 1.821	- 1.634		- 0.962	- 0.840
		(1.262)	(1.534)		(2.298)	(2.579)
Constant	+ 14.677	- 27.287	- 60.720	**157.798**	**160.142**	**107.841**
	(21.573)	(24.573)	(34.229)	(30.904)	(31.324)	(39.573)
N	5377	5330	3950	5656	5470	4520
R-squared	0.023	0.036	0.025	0.012	0.022	0.023

Notes: Coefficients reported are OLS estimates. White corrected standard errors are in parentheses. Bold type indicates significant at the five percent level.
Source: The sample consists of marriages where both spouses are marrying for the first time.

Table 7: Infant Survival with Family Random Effects

Dependent variable: survive past age 2 = 1, 0 otherwise

Independent variable	(1)	(2)	(3)
Birth rank	**0.109**	**0.099**	**0.094**
	(0.017)	(0.019)	(0.019)
Birth rank squared	**- 0.008**	**- 0.008**	**- 0.008**
	(0.001)	(0.001)	(0.001)
Born in a city	**- 0.240**	**- 0.205**	**- 0.201**
	(0.040)	(0.045)	(0.045)
Birth year	**- 0.006**	**- 0.005**	- 0.005
	(0.002)	(0.002)	(0.002)
Male	**- 0.208**	**- 0.227**	**- 0.229**
	(0.034)	(0.037)	(0.037)
Noble parents	0.059	0.069	0.089
	(0.106)	(0.113)	(0.113)
Bourgeois	- 0.133	- 0.059	- 0.054
	(0.082)	(0.093)	(0.093)
Either parent signed	**- 0.145**	**- 0.146**	**- 0.138**
	(0.057)	(0.063)	(0.064)
Life span of father			**0.003**
			(0.001)
Life span of mother			**0.003**
			(0.001)
Marriage age of mother	0.003	0.002	0.002
	(0.005)	(0.006)	(0.006)
Marriage age of father	- 0.003	- 0.002	- 0.004
	(0.003)	(0.003)	(0.003)
Constant	**10.888**	**9.544**	**8.301**
	(3.489)	(4.104)	(4.146)
F-test (high status variables)[a]	0.013	0.085	0.110
Number of individuals	8534	6794	6794
Number of families	2144	1637	1637

Notes: The dependent variable is a dummy variable equal to one if the individual's life span exceeded two years of age. White corrected standard errors are in parentheses. Bold type indicates significant at the five percent level. The method of estimation is a random-effects probit regression model using a generalized estimating equations approach.

[a] The F-test tests that the high-status coefficients (noble parents, bourgeois, and parent signing) are jointly zero.

Source: The sample consists of individuals born in the province before 1700, whose parents were also born in the province, and excludes cases where life span is unknown. Column (2 and 3) restricts the sample to those with parents with known life span.

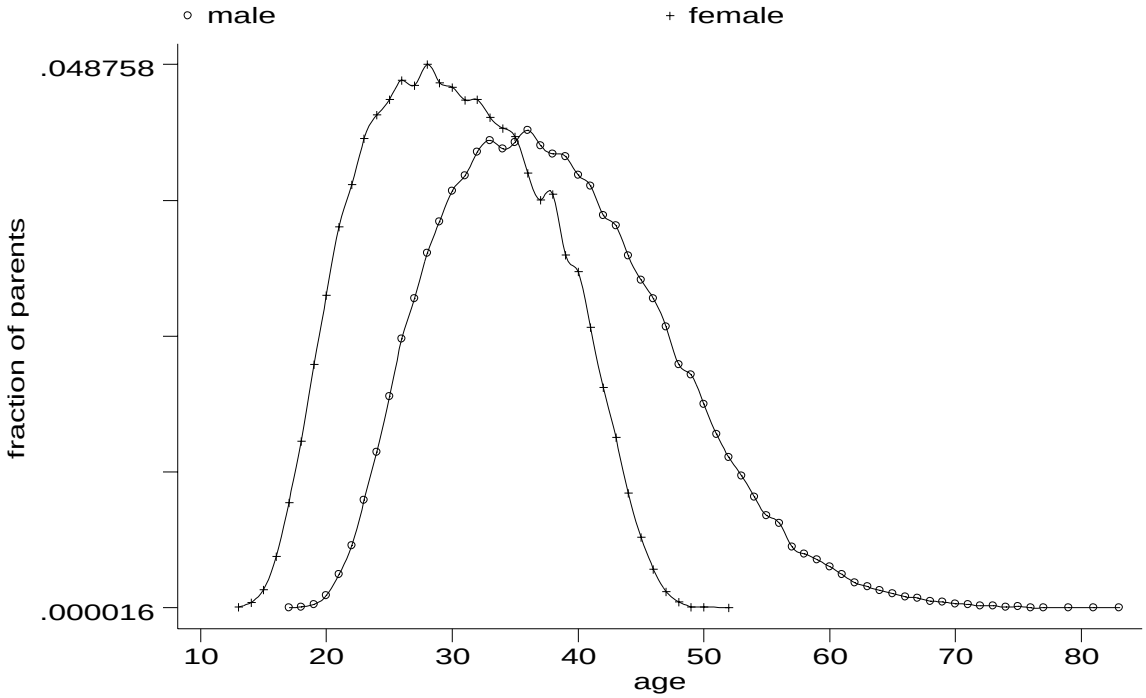

Figure 1: Densities of parent's age at birth of child

Appendix

Appendix A

A Marriage market equilibrium

Each cohort of adults have the same number of similarly skilled men and women. We are looking for an equilibrium in which young high skilled men and women enter the same marriage market. Young high skilled men who do not marry and widowers will enter a marriage market with young low skilled women. Other young low skilled women and some young low skilled men will also participate in a marriage market. Finally, some young low skilled men will not participate in any marriage market. Older women and low skilled men will not participate in any marriage market (aside from companionship marriages). The objective in this appendix is to find the relevant equilibrium transfers and parameter restrictions for such an equilibrium. Anticipating the results, we will need two conditions. First, the expected match value for a low skilled woman to marry a old high skilled man must exceed that of marrying a low skilled young man. Second, there must be complementarity in skills in the production of the matching gains to obtain assortive matching in marriage.

A single old man will have utility:

$$u(s,o) = \max\{u(h,s,o), u(l,s,o), 0\} \tag{A.1}$$

From a woman's perspective, aside from the transfer, a young low skilled man is preferable as a husband to an old low skilled man because she may enjoy another period of marital returns with the younger husband. Let $\overline{x} = 1 - x$. Since $u(l,o) \geq 0$, for a young low skilled man, (11) implies:

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$$u(S,l,y) \succeq -T(S,l,y) + \overline{F}_{Sl}(0)(1+d^2b)\mathbf{E}_{Ss}(v|v>0) \tag{A.2}$$

Comparing (A.2) with (4) in the text, a young low skilled man will always outbid an old low skilled man for the same potential spouse. So older low skilled men will not enter any marriage market if some low skilled young men do not enter a marriage market.

If there is an equilibrium with older men entering a marriage market, it has to be older high skilled men. So let us assume that eligible high skilled old men will enter the marriage market for low skilled women.

Then:

$$u(h,o) = u(l,h,o) = -T(l,h,o) + \overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) > 0 \tag{A.3}$$

In the market with high skilled young men and women, since only high skilled young men may postpone marriage, we can write (8) as:

$$\underline{v} = d^2u(h,o)(1+d^2b)^{-1} > 0 \tag{A.4}$$

$$\underline{v} = d^2\frac{-T(l,h,o) + \overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0)}{1+d^2b} \tag{A.5}$$

Low skilled young men must be indifferent between entering a marriage market with low skilled women or not.

$$0 = -T(l,l,y) + \overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0) \tag{A.6}$$

$$T(l,l,y) = \overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0) \tag{A.7}$$

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Low skilled young women must be indifferent between entering a market with low skilled young men or high skilled old men. Thus:

$$T(l,l,y) + \overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0) = T(l,h,o) + \overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) \tag{A.8}$$

Using (A.7), (A.8) becomes:

$$T(l,h,o) = 2\overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0) - \overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) \tag{A.9}$$

Using (A.9) and (A.5)

$$\underline{v} = \frac{2d^2}{1+d^2b}(\overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) - \overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0)) \tag{A.10}$$

Assuming that $\underline{v} > 0$, we need

$$\overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) > \overline{F}_{ll}(0)(1+d^2b)\mathbf{E}_{ll}(v|v>0) \tag{A.11}$$

(A.11), (A.7) and (A.9) imply that:

$$T(l,h,o) < T(l,l,y) \tag{A.12}$$

that high skilled men pay lower courting cost than low skilled men to match with the same skilled women.

In order that high skilled women prefer to match with young high skilled men, they must not prefer to match with young low skilled men:

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$$T(h,h,y)+\overline{F}_{hh}(\underline{v})(1+d^2b)\mathbf{E}_{hh}(v|v>\underline{v})>T(h,l,y)+\overline{F}_{hl}(0)(1+d^2b)\mathbf{E}_{hl}(v|v>0) \quad \text{(A.13)}$$

We also need low skilled men to prefer to match with low skilled women rather than high skilled women:

$$0>-T(h,l,y)+\overline{F}_{hl}(0)(1+d^2b)\mathbf{E}_{hl}(v|v>0) \quad \text{(A.14)}$$

Using (A.13) and (A.14),

$$T(h,h,y)>(1+d^2b)(2\overline{F}_{hl}(0)\mathbf{E}_{hl}(v|v>0)-\overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v>\underline{v})) \quad \text{(A.15)}$$

We also want high skilled women to prefer to match with young high skilled men rather than old high skilled men.

$$T(h,h,y)+\overline{F}_{hh}(\underline{v})(1+d^2b)\mathbf{E}_{hh}(v|v>\underline{v})>T(h,h,o)+\overline{F}_{hl}(0)\mathbf{E}_{hl}(v|v>0) \quad \text{(A.16)}$$

Old high skilled men must also prefer to match with low skilled women rather than high skilled women.

$$-T(h,h,o)+\overline{F}_{hh}(0)\mathbf{E}_{hh}(v|v>0)<-T(l,h,o)+\overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v>0) \quad \text{(A.17)}$$

Using (A.9), (A.16) and (A.17),

$$\begin{aligned} T(h,h,y) &> \overline{F}_{hh}(0)\mathbf{E}_{hh}(v|v>0)-(1+d^2b)\overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v>\underline{v}) \quad \text{(A.18)} \\ -\overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v &> 0)+2(1+d^2b)\overline{F}_{ll}(0)\mathbf{E}_{ll}(v|v>0) \end{aligned}$$

We also want high skilled young men to match with high skilled women instead of low skilled young women:

$$\begin{aligned} -T(h,h,y) + (d\overline{d} + d^2)F_{hh}(\underline{v}))u(h,o) + \overline{F}_{hh}(\underline{v})(1+d^2b)\mathbf{E}_{hh}(v|v &> \underline{v}) > \\ -T(l,h,y) + (d\overline{d} + d^2)F_{lh}(\underline{v}))u(h,o) + (1+d^2b)\overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v &> \underline{v}) \end{aligned} \tag{A.19}$$

$$\begin{aligned} T(l,h,y) + d^2(F_{hh}(\underline{v}) - F_{lh}(\underline{v}))u(h,o) &> \\ T(h,h,y) - (1+d^2b)(\overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v &> \underline{v}) - \overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v > \underline{v})) \end{aligned} \tag{A.20}$$

We also want low skilled young women to match with low skilled young men instead of high skilled young men:

$$T(l,l,y) + (1+d^2b)\overline{F}_{ll}(0)\mathbf{E}_{ll}(v|v>0) > T(l,h,y) + (1+d^2b)\overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v>\underline{v})$$

In other words:

$$T(l,h,y) < (1+d^2b)(2\overline{F}_{ll}(0)\mathbf{E}_{ll}(v|v>0) - \overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v>\underline{v})) \tag{A.21}$$

Using (A.19) and (A.21):

$$\begin{aligned} (1+d^2b)(2\overline{F}_{ll}(0)\mathbf{E}_{ll}(v|v &> 0) + \overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v>\underline{v}) - \\ 2\overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v &> \underline{v})) + d^2(F_{hh}(\underline{v}) - F_{lh}(\underline{v}))u(h,o) > T(h,h,y) \end{aligned} \tag{A.22}$$

Combining (A.15) and (A.22),

$$\begin{aligned}\overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v &> \underline{v}) - \overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v > \underline{v})) - \overline{F}_{hl}(0)\mathbf{E}_{hl}(v|v > 0) \\ +\overline{F}_{ll}(0)\mathbf{E}_{ll}(v|v &> 0) > \frac{d^2(F_{hl}(\underline{v}) - F_{hh}(\underline{v}))u(h,o)}{2(1+d^2b)}\end{aligned} \tag{A.23}$$

Combining (A.18) and (A.22),

$$\begin{aligned}2(1+d^2b)(\overline{F}_{hh}(\underline{v})\mathbf{E}_{hh}(v|v &> \underline{v}) - \overline{F}_{lh}(\underline{v})\mathbf{E}_{lh}(v|v > \underline{v})) > \overline{F}_{hh}(0)\mathbf{E}_{hh}(v|v > 0) \\ -\overline{F}_{lh}(0)\mathbf{E}_{lh}(v|v &> 0) + d^2(F_{hl}(\underline{v}) - F_{hh}(\underline{v}))u(h,o)\end{aligned} \tag{A.24}$$

Taking stock, for the desired equilibrium to obtain, (A.11), (A.23) and (A.24) have to be satisfied.

Let $F_{Ss}(x) = (x+g(S,s))/2g(S,s)$, i.e. the uniform distribution with support $[g(S,s), g(S,s)]$. Since $\underline{v} > 0$ and $g(h,h) > g(l,l)$,

$$F_{hh}(\underline{v}) > F_{ll}(0) \tag{A.25}$$

which implies that high skilled young men have a lower marriage rate than young low skilled men.

In this case, for $\underline{v} > 0$, from (A.11), we need:

$$g(l,h) > (1+d^2b)g(l,l) \tag{A.26}$$

(A.23) becomes:

$$g(h,h) - 2g(h,l) + g(l,l) > 0 \tag{A.27}$$

(A.27) is the standard complementarity assumption impossed on the gains to marriage to obtain assortive matching in marrriage markets (E.g. Becker, Weiss).

(A.24) becomes:

$$1 > \frac{1}{2(1+d^2b)} \tag{A.28}$$

which is automatically satisfied.

In order to have the desired equilibrium, we need (A.26) and (A.27) to be satisfied. (A.26) is needed because the expected match value for a low skilled woman to marry a old high skilled man must exceed that of marrying a low skilled young man. (A.27) is needed to obtain standard assortive matching.

@inproceedings{Hamilton1999MarriageAF, title={Marriage and Fertility in a Catholic Society: Eighteenth-Century Quebec}, author={Gillian Hamilton and Aloysius Siow}, year={1999} }. Gillian Hamilton, Aloysius Siow. There are similarities and differences in marriage and fertility behavior between early North American societies and their modern counterparts. This paper investigates the quantitative importance of differential fecundity, assortative matching, and marriage market search frictions in affecting marriage and fertility behavior in a Catholic society, 18th century Quebec. The model may pr