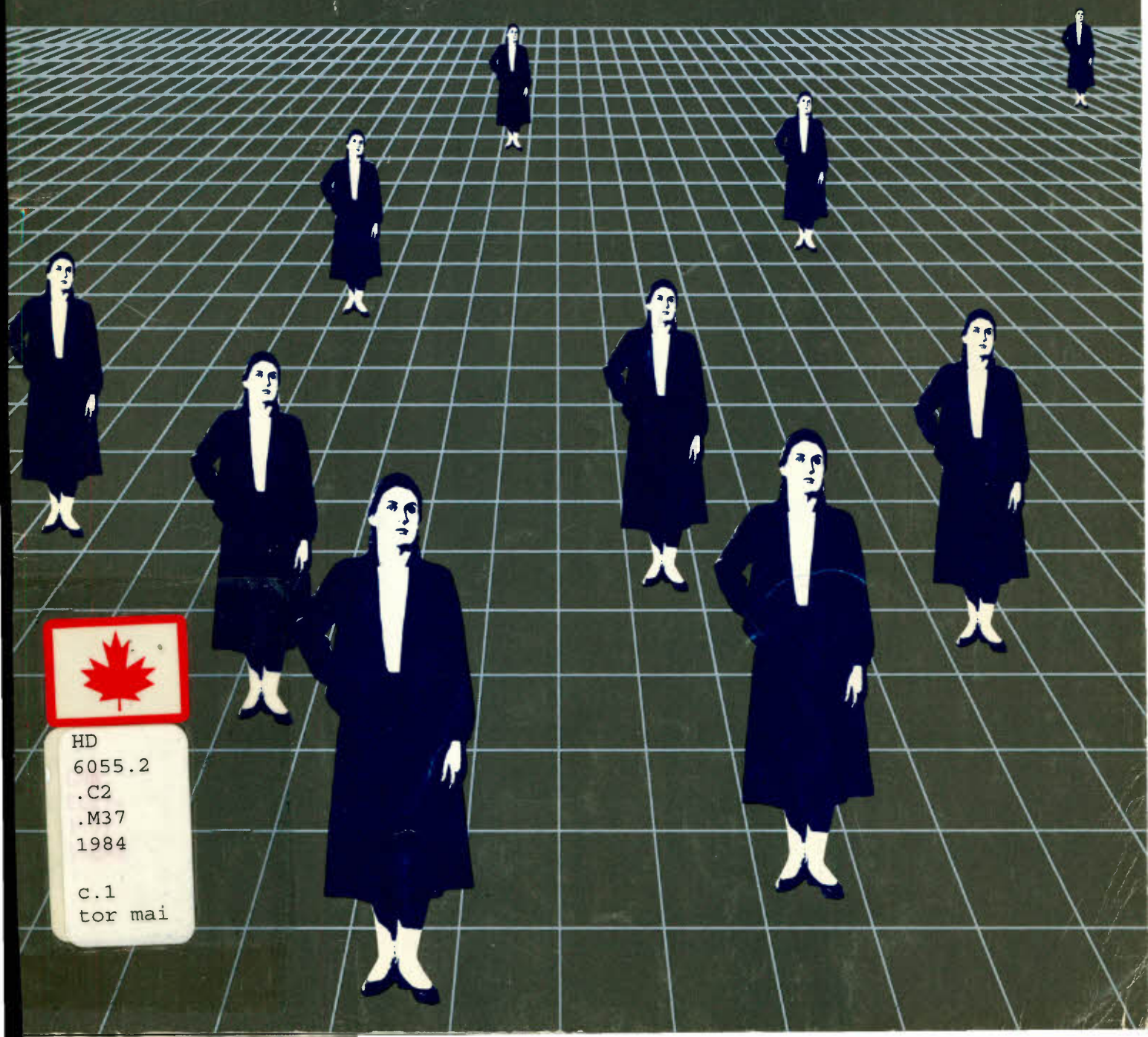
Marriage, Population, and the Labour Force Participation of Women

An essay prepared for the Economic Council of Canada

Albert Breton



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The findings of this essay are the personal responsibility of the author and, as such, have not been endorsed by the Members of the Economic Council of Canada.

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Contents

Foreword

Perhaps the most remarkable change affecting Canadian labour markets over the last three decades has been the steady increase in the number of women in the workforce. A larger proportion of women with both preschool and school-age children are now in the labour force, either part-time or full-time. A virtual revolution has taken place in the proportion of those who undertake careers requiring postsecondary education. Particularly notable has been the growth in the number of women in the fields of medicine, law, business, public administration, and computer programming.

Despite these advances, barriers still exist for women in the economy, placing them at a disadvantage in labour markets. It is an open question, too, whether, in a future where there will likely be less economic expansion than in recent decades, women will be able to maintain steady growth in labour force participation and in the development of new career paths outside traditional fields.

Unlike some other disciplines, the Canadian economic profession has paid little attention to the issues raised by the increased participation of women in the economy. In venturing into this uncharted area, the Economic Council of Canada has set itself objectives that are designed to establish a basis for further research in this field, outside or within the Council. These objectives are:

- to outline the major changes that are occurring in female labour force participation;

- to identify the occupations where women have registered losses or gains;

- to analyse the conditions that have resulted in such advances or losses; and

- to suggest policies and measures, based on its research, that are aimed at fostering conditions that will promote the equal advancement of women in the economy.

It is with these objectives in mind that a modest research program on the role of women in the economy was developed at the Council, of which this essay is part. Needless to say, the Council does not expect to find solutions for all the special problems facing women. Nevertheless, we do hope that studies such as this will provide some small contribution to the understanding of, and knowledge about, the activity of women in labour markets.

In conclusion, it should be stressed that this essay, like the other authored studies in our work program, does not reflect the consensus views of the Members of the Economic Council of Canada. It is published under the authority of the Chairman of the Council as a professionally competent and useful contribution to discussions about an important public policy issue. The content of this monograph is strictly the personal responsibility of the author.

DAVID W. SLATER

CHAIRMAN

Preface

If the reader sees this text through, he or she will eventually arrive at a chapter dealing with policy matters. Though placed at the end because it is based on the descriptive analytical model that is developed in the preceding chapters, that section should logically introduce the whole exercise. Indeed, the question that the Economic Council invited me to consider was a policy question: Is the *economic* status of women, as briefly outlined in the first pages of this essay, the outcome of the working of "natural" forces or the product of "market failure," as that term is understood in the tradition of modern welfare economics.

The standard way for an economist to proceed in seeking to answer such a question is to examine how markets fail. The market I chose to analyse – for reasons given in the text – is the marriage market. In what way could failure occur in that market? And if failure occurred, would it be of a type that could explain the differences in economic status between women and men?

There are essentially five channels through which failure in a market can manifest itself – namely, through 1) neighbourhood or interaction effects; 2) nonconvexities originating in indivisibilities and/or setting-up costs; 3) public goods; 4) information asymmetries, leading to adverse selection; and 5) market imperfections of various sorts.

The view underlying this essay is that the most important element of failure in the marriage market is that related to the structure of that market. Undoubtedly, one could point to other types of failure originating through any of the other four channels, but these would be either weak or inconsistent with an analysis that pertains to individual welfare.

To illustrate what I mean let me cite a few examples. There are growth and depression (stagnation) theories that rest in a significant way on what happens to the growth (positive or negative) of a population. In these theories there are scale effects associated with changes in the size of the population: if growth is too slow, one could have stagnation. This is a type of market failure related to population scale. But if we look at it closely, it is a strange type of failure, since it can be associated with the number of offspring that parents desire. What are we to do with a decision that leads to macroeconomic failure in the presence of microeconomic optimality?

Consider a second example. Suppose that there are beneficial neighbourhood effects associated with family size, at least up to a point – that, for example, children "educate" each other. If family size is small, should one conclude that market failure has occurred? Should one, in other words, conclude that social product is larger than private product? I think not. I am inclined towards the view that these interaction effects are internal to the family, while failure would require them to be external.

A final illustration will, I hope, justify my efforts at seeking an explanation in market structures rather than in any of the other four possible sources of market failure. Many of those who seek to explain the differential economic status of men and women turn to the concept of discrimination against women by men. As I stress in this text, some types of discrimination do play a role of one kind or another. But one type, associated in the literature with the notion of a discrimination coefficient, though it explains some discrimination, cannot be related to market failure, since the coefficient is derived from utility functions and therefore reflects people's tastes. In an analysis based on a "taste for discrimination," removal of the discrimination would lead to market failure!

This essay seeks out market failure in market organization. To put it differently, it is with certain structures of the marriage market that I associate failure. But I wish to emphasize anew that such an exercise does not deny a role to the other sources, although I myself do not put much weight on them.

In parts of the essay, I appeal to historical facts to shed light on certain propositions or on the nature of the model that is proposed. This is an old tradition in economics. It has its drawbacks and its advantages. The drawbacks come from straining the historical facts, thus sometimes depriving them of their full richness; the advantages reside in the new light that facts may acquire. At all times, the reader should bear in mind that I am not writing a historical monograph and consequently do not contrast the various interpretations given to most facts by different historians; rather, I choose them for the possible light that they may shed on the model.

* * *

I am grateful to Jac-André Boulet of the Economic Council of Canada for insisting that I undertake this essay. I wish to thank him also for his help in providing direction, comments, and innumerable references.

I have also benefited greatly from the sometimes very elaborate written comments of Judith Alexander, Raymond Breton, Barbara Campbell, Kathy Cannings, Jeannine David-McNeil, Tanis Day, Cécile Dumas, Janet Ferguson, Linda Gaboriau, Hélène Goulet, Robert Jenness, Laval Lavallée, Claire McCaughey, Nancy Olewiler, Lucile Sarault, Neil Swan, François Vaillancourt, Ronald Wintrobe, and three anonymous referees. Since I chose to use only a fraction of the comments offered, I need not insist that the usual caveat about responsibility for ideas expressed holds here with special force.

I wish to thank in a special way my daughters Catherine and Natalie who, for months, collected papers and books for me and abstracted a large quantity of literature.

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1 Introduction

The preparation by women to participate in the labour force, their mode and level of participation, as well as the earnings received from that participation, differ from those of men. In searching for an explanation for these differences, economists and others have usually focused on labour markets and on how these markets function. This has produced a large volume of useful research. A major finding of that research is that the differences mentioned above are to a significant degree the result of discrimination, which may in turn originate in attitudes (the so-called "taste for discrimination"),[1] in lack of information (labelled "statistical discrimination"),[2] or in the structure of organizations (sometimes called "institutional discrimination").[3]

To put it in different words, the evidence would seem to indicate that with respect to a variety of behaviours pertaining directly or indirectly to labour force participation, men and women differ significantly. For example, it would seem that in their schooling, women do not select the same subjects for study; that they do not pursue the selected subjects as long; that their rate of participation in the labour force is lower; that they do not choose the same occupations; that they earn less, though the differences in earnings vary considerably between occupations; and, finally, that the life cycle of their earnings is flatter and peaks later than that of men. Empirical research, focusing on one or the other of these dimensions, has identified discrimination (usually as a statistical residual, which in logical terms is equivalent to proving a proposition by a negative) as one explanation for the differences.

In addition, other factors, such as oppression (possibly just another name or ideological label for discrimination), submissiveness, and lack of motivation, have received attention as explanations for the differences in the labour force participation of men and women. These, however, have not been given the same attention as discrimination.

As already noted, the significance of discrimination – and of oppression, submissiveness, or motivation – is established as a statistical residual,[4] which is not very powerful. (Comments received on an earlier draft force me to spell out the obvious: lack of statistical power is lack of statistical power, not a proof that discrimination does not exist.) There are other problems with the discrimination model. The evidence, for what it is worth, would seem to indicate that although women earn less than men in all occupations, the difference is close to zero in some cases, while it approaches 40 per cent in others, with considerable variation in between. If one wanted to rely on discrimination (or on oppression or motivation, for that matter) to explain these differences, one would not only have to conclude that men are capable of more discrimination, and do discriminate more, in some occupations than in others, but one would have to provide an explanation of why that is so. I am not arguing that it would be impossible to generate such a model of discrimination, but only that that would be a requirement of any analysis based on discrimination.[5] That should be obvious, especially if one keeps in mind that such a model must also explain the other facts about women's labour force participation.

In addition, as Fuchs[6] has observed, explanations of the earnings differential between men and women, based on the notion of discrimination, have to account for the fact that self-employed women earn less than self-employed men. Along similar lines, as Malkiel and Malkiel[7] have documented, when the job level is held constant, professional men and women earn equal incomes though women are more often at lower levels than men.

The burden of this essay is *not* to argue that labour markets should not be examined with care in searching for an understanding of the different labour force participation experiences of men and women, *nor* to argue that discrimination is not a factor in explaining these differences. The purpose of the essay is to seek to demonstrate that, in addition to the variables conventionally attached to labour markets, other factors, which I associate with the workings of marriage markets, play a significant role in producing the observed differences between the labour force

experiences of men and women. In a word, this essay suggests that more than one variable, or more than one class of variables, is at work in generating the differences that appear to be real. For reasons of space and of time, and because labour markets have already received much attention, I restrict myself to an analysis of marriage markets. The inevitable resulting bias may act as a corrective in an area that, in my view, is much too focused on a single set of variables.

To allow for two (or more) markets poses a question that many have raised in comments or private discussions. Which comes first or which rules the other? If the differences between men and women in labour force participation change through time, should one impute that change to forces in the labour market, in the marriage market, or in some other market? This is the fascination for single-variable models all over again! To be blunt, I must acknowledge that I have no answer to that question. I could, of course, reach for the usual cop-out and say that equilibria are simultaneously determined in all markets, as in Walrasian analysis. But empirically relevant hypotheses cannot resort to that fiction. I could, probably by approximating real processes more closely, appeal to some dialectical process of interaction; but beyond this formal statement I would be stuck, since I am not able to specify the dialectic. Consequently, I will not address the question. I will simply point out that it seems to me virtually certain that one market does not at all times drive the other; there is a complex interaction between the two, as there is between all ordinary commodity markets. This, by the way, does *not* mean that markets cannot be modeled separately and independently of each other. Partial equilibrium analysis can be consistent with general equilibrium analysis; and, as the work of social scientists testifies, they can be done side by side.

2 Marriage Markets

I borrow the expression "marriage market" from Becker,[1] although I suggest a different analysis of its workings than the one he provides. It is in the marriage market that men and women come together to form units, which (again, following Becker) I shall call families or households. These are of all types and varieties: they include contractual and consensual (concubinal) associations, whether heterosexual or homosexual; polygamous, as well as monogamous, arrangements; and also communal unions of men and women, as well as of men, or of women, such as religious or lay orders.[2] Any one of these units, I call a family or a household; and describe the formation of the units as marriages. This is a slightly unconventional use of the terms "family" and "marriage," but it is one that will simplify the exposition, without, it is hoped, blurring the differences that exist between the various kinds of families and marriages.

Men and women enter the marriage market, search for mates,[3] and found families because they expect net positive benefits from these activities. These benefits are related to certain "basic" services that marriages (families) can produce (in a Becker-Lancaster sense).[4] There is a long tradition in economics that dispenses its practitioners from giving a specific name to the services entering, say, utility functions. This has been a fruitful tradition because, on the whole, the "big" problems of economics – the allocation of resources, the distribution of the product, and the level of economic activity – can be solved tolerably well by making simple assumptions about substitution, complementarity, competition, returns to scale, and so on, which are not related in an essential way to differences between, or attributes of, economic objects and units.

I depart from that tradition in this essay because, as I hope to demonstrate below, the technical restrictions on choice and on participation in the marriage market are different for men and women. Consequently, well aware that I must be incomplete and without concern for relative merit, I suggest, as much for illustration as for anything else, a list of "basic" services derivable from marriage and family: sex, children, and security. I could easily make that list longer. Surely love, companionship, reputation, shelter, laundry, and so on, could be added. I restrict myself to three, however, to economize on space and to hide my ignorance, since I do not know how to model the production of love,[5] companionship, or reputation.[6] (Those of my readers who do know can formulate the constraints on maximization themselves and extend the analysis.) Although adding such variables as shelter and laundry, would make the analysis richer, and therefore more interesting, it would not alter the basic structure of the hypothesis suggested.

Two points must be made. The first is the obvious one that if the constraints facing men and women are different, it is necessary to distinguish between their respective utility functions. The economic, but also the sociological, literature on marriage and family has had a tendency to postulate a single function for the whole family. That focuses attention immediately on the founded unit, but it is awkward as an assumption when the trades and exchanges that surely must characterize the marriage market (if it is a market) are the objects of investigation.

In the last analysis, the assumption of a unique utility function for households or families robs the very notion of a marriage market of any real meaning, since it presupposes, on the part of the analyst, a prior decision about who "owns" the family utility function and who maximizes it.[7] This is not a view that is easily reconcilable with free and voluntary market exchange. The same strictures can be levied at the theory of clubs, to which reference has already been made.

The second point is simply that substitutes for the services that families can produce, can be "purchased" outside marriages in markets related to the marriage market. The most cursory inspection of the short or longer list of services given above will confirm that fact. Indeed, in the course of a lifetime, many individuals, though married, enter one or more of these related markets to obtain sex (prostitution, extramarital affairs), children (adoption), and security

(insurance, social security).[8] Exogenous changes in any one of the related markets will cause adjustments in the marriage market. To illustrate, if children are demanded because parents (father, mother, or both) want income protection in their old age, the introduction of a public social insurance system will reduce fertility by shifting the demand curve for children to the left.

No market can be meaningfully studied in isolation, and the marriage market is no exception to that rule. But, as I intend to show later, the nature and the degree of market interrelatedness tend to differ between men and women. As a result, exogenous changes in related markets will generally affect men differently than they affect women. In the above example, the reduction in fertility could induce greater participation by women in the labour force, if women had been taking the prime responsibility for rearing children, while the same reduction could leave the situation of men unchanged.

Constraints on Decision Making

In the following discussion, I assume that the utility functions of men and of women are defined over five terms only: a vector of "nonfamily" services and four "basic" marriage (or family) services, namely sex, number and quality of children, and security.[9, 10] For children, I have distinguished between quantity and quality, as has become customary. That distinction goes part of the way in dealing with the multidimensionality of that variable. Problems related to the timing and spacing of births are dealt with as questions of numbers, since these dimensions are closely related. For the security variable – one that can include freedom from fear, physical harm, and anxiety, as well as freedom from want, and guarantees of on-going material and emotional support, old-age protection, and so on – I assume that all dimensions are positively correlated.

I analyse separately three constraints (one for each variable) under which the utility functions with respect to family variables are maximized: 1) birthing constraints; 2) rearing constraints; and 3) security constraints. The first pertain to the relationship between the incidence of coition and the expected number (and therefore the timing and the spacing) of children; the second, to the relationship between the quality and number of children; and the third, to the relationship between security and the number and quality of children. Although I examine these separately, they are closely interrelated as a simple reading of their make-up will immediately reveal.

To ensure that the discussion will be as orderly as possible, I begin by analysing the constraints that govern decision making by women; I then contrast these with those which bind men's choices. I stress the asymmetry between them.

Birthing Constraints

Suppose, to begin, that only imperfect birth control methods[11] exist. Under such circumstances, the expected number of pregnancies and births and, therefore, the expected number of children would be positively related to the incidence of coition,[12] with control over pregnancies related to the efficiency of birth control devices and to such factors as age and fecundability which affect the expected productivity of sexual intercourse. Such a relationship could be called a "birthing function" or "constraint".[13] For women, the only way to ensure that the expected number of children will be zero is to make the incidence of intercourse equal to zero, at least if we restrict ourselves to heterosexual relationships,[14] if we continue to assume imperfect birth control devices, and if age, fecundability and so on permit pregnancies. An implication of this is that neither abstinence (including the delaying of marriages, unless it is absolute) nor infrequent intercourse are contraceptive devices, though both may be fairly efficient in controlling fertility.

There is no need to engage in what would essentially be a repetition of the foregoing discussion, for the timing and spacing of births. In the case of timing, it is evident that improvements in the efficiency of contraception would make its regulation easier, because control of timing is, *ceteris paribus*, related to frequency of coition. Since spacing – the average number of months between births – is given as the ratio of the child-bearing life of a woman to the number of children she delivers, the control over spacing is intimately related to that over numbers and, hence, to intercourse.

Economists, and others working on problems related to marriage (the marriage market), family (the division of labour in that unit) and fertility (the demand and supply of children), have sometimes rejected relations like the birthing function described above.[15] This rejection has been defended on two grounds: 1) that "more effective birth control methods are not *sufficient* to reduce fertility," as indicated by the fact that the ruling families of Europe, from the beginning of the sixteenth to the end of the eighteenth century, as well as poor Indian families, have maintained higher fertility levels than available (birth control) methods made possible; and 2) that reductions in fertility levels can be achieved, as they were by the ancient Greeks and Romans, "through delayed marriage, infanticide, reduced coition during marriage, abortion, primitive contraceptives, and

nonproductive modes of sex" and, as by the Jews of Florence and Leghorn between 1670 and 1840, through delayed marriage and other (unspecified) methods.[16]

The question is not principally one of sufficiency – which is easily granted – but one of necessity, especially if the division of labour in families is the issue being considered. Two points need to be emphasized. The first pertains to a difference between contraception and birth control on the one hand and fertility control on the other. To be meaningful, the former must relate not only to the control of unwanted births (i.e. birth of a child when none is wanted) but also to that of unplanned births (i.e. birth of a child at a time other than the one desired). Contraception and birth control, in other words, must confer the capacity to regulate not only the number of children but also the timing of pregnancies and births (and therefore the spacing of children), and even the timing of marriages. Control over fertility is important, but surely no more so than that over timing and spacing in the process of maximizing the utility function of women.

The second point, which is related, is that some methods of birth control (like breast-feeding or lactation amenorrhea) and of fertility control (such as infanticide),[17] which have variable efficiency in controlling fertility,[18] are very inefficient in regulating the timing, spacing, and even the birthing of children and may have, when used, a controlling role to play in the division of labour that families adopt and in the labour force participation of women.

To put it differently, and to be emphasized again later, planned births will help to determine a household's division of labour and the labour force participation of its members, but unwanted and unplanned births (meaning more children than the number desired – that is, the number that maximizes utility – and/or different timing and spacing than those wanted) must also have a significant influence. When birth and contraception controls are inefficient, every fertile woman who plans to engage in heterosexual activity must expect a different number of children than the one she desires and/or a different timing and spacing of pregnancies than the ones she would prefer unless she is totally indifferent about these. Improvements in the efficiency of contraception are *necessary* for a change in these expectations and in the conditions under which women enter the marriage market and the labour market.

The evidence, I suggest, supports the view that improvements in the efficiency and use of contraceptive and birth control devices play a significant role in fertility decisions and planning. For example, the fact that the number of unplanned pregnancies among married women declines as their level of schooling increases; that, even though the ideal (or desired) family size is the same for Catholics and non-Catholics, the actual family size of the former is larger; that illegitimate births vary inversely with schooling and directly with military occupations; that the proportion of couples using contraception (defined as pill, diaphragm, condom, withdrawal, foam, rythm, and douche) before the first pregnancy has been increasing throughout the twentieth century in the United States; and that the incidence of surgical sterilization for women declines with increased schooling, all support that view.[19]

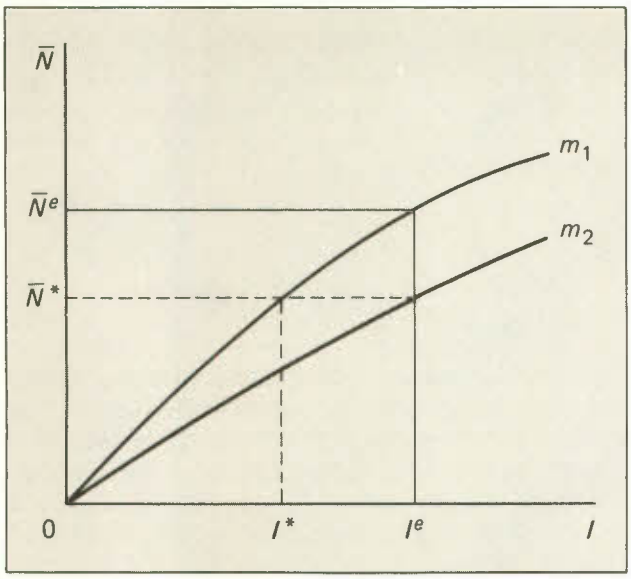
I therefore assume that birthing functions act as technical restrictions on utility maximization by women and therefore that contraceptive and birth control technologies help determine the number, timing, and spacing of children desired by women. It is interesting that, armed only with birthing constraints, one can already shed light on the structure and behaviour of phenomena that are otherwise difficult to interpret.

Consider a simplified utility function – that is, one that is defined over intercourse (I) and the expected number of children ($\bar{N}$) only. This function is to be maximized subject to the birthing constraint. Because women, as distinguished from men, are in general restricted by the birthing relationship, regardless of whether sex is produced in the marriage or obtained in the market, the constrained maximization of the simplified utility function must consist in choosing a level of I (call it I^*) that is consistent with the desired expected number of children ($\bar{N}^*$). Suppose that a woman of a given age and fecundability expects the incidence of intercourse for her to be $I^e > I^*$, for reasons that will be examined later, then, given a birth control technology (m_1), she could expect $\bar{N}^e$ ($>\bar{N}^*$) children, as shown in Figure 1.

Given such a situation, she would decide not to engage in heterosexual activity if she had that choice. Instead, she could choose to remain single; she could join a religious order; or she could join a lay order, such as the beguines and other such lay orders which were widespread in Germany and Flanders during medieval times;[20] or depending on the conditions prevailing in the marriage market (as will be examined in the following section), she could "negotiate" a reduction in coital encounters, to I^*. The outcome would be determined by the state of the marriage market, that of related markets, and the weights that she assigned to the other arguments in her utility function.[21]

Note that an improvement in birth control technology that shifted the birthing constraint from m_1 to

Figure 1



m_2 in Figure 1, would lead to an increase in the incidence of intercourse from l^* to l^e,[22] and to an increase in expected fertility if the outcome of her decision when m_1 ruled had been to choose $N = 0$.

It is of interest to note that in many societies, over centuries[23] when birth control technology would have resembled m_1 more than m_2, women (and sometimes babies or girls who were barely nubile) did not have the freedom to decide whether to get married or not; that decision was made for them by their parents. It is easy to assume that if they had been free agents, they would not necessarily have married.[24] Indeed, the evidence suggests[25] that in medieval Europe, among the women who were widowed (and many were at a fairly young age, because of incessant wars and poor health conditions) there were many who never remarried, but, instead, joined lay or religious orders or remained single. I return to this question again in the next section. Note here, however, that the reason why the marriage market did not reflect exchanges between the involved mates, but between their parents, is that otherwise the probable number of offspring would have been smaller than the number that the parents wanted for their own purposes.

The discussion surrounding Figure 1 leads to the conclusion that improvements in the efficiency of birth control techniques could either increase or reduce births and fertility. It would lead to a reduction for women already married, but it could lead to an increase for unmarried women who might be induced to marry because of improved control over pregnancies.

But the fact that the efficiency of contraceptive techniques has an influence on how the marriage market is organized (more on this later) leads to the conclusion that, in general, improved contraception will lower fertility and therefore the demand for children.

The maximization of utility functions by men is carried out under two sets of constraints. One set is like the birthing constraints for women; the other reflects the fact that sex can be "purchased" on the marketplace (prostitution, extramarital affairs) at a price, so that men face a second constraint, which is, in effect, a budget constraint.[26] If the maximization of men's utility functions subject to the birthing constraints yield a value for sexual intercourse (conditioned, of course, by the desired number, timing, spacing and quality of children) which is deemed to be too low, that value can be increased by having recourse to the market.[27] For men then, the birthing constraints need not be binding or as binding as it is for women. In addition, the existence of the new market or budget constraint implies that when contraception is very inefficient – and as a consequence the budget constraint likely to be the binding one – the properties of equilibrium in the marriage market will be importantly affected by the price[28] ruling in the sex market. Let me illustrate by assuming that wives have a preference for faithfulness in their husbands; that is, their marginal rate of substitution between faithful husbands and some numéraire is large. Then, given some level of efficiency in contraception, the lower the price of market sex, the higher the price (or *quid pro quo*) that wives will have to pay for the faithfulness of their husbands.

Conversely, given the price of market sex, the more efficient the birth control devices, the lower the price that would have to be paid for faithfulness. Indeed, it is even possible to imagine that as contraception improves, the situation would reverse itself, so that men would be observed paying for the faithfulness of their wives. This analysis is presented to underline the fact that, when contraception is inefficient, the terms of trade ruling in the marriage market for the various services traded in that market are likely to be unfavourable to women and likely to improve, *ceteris paribus*, with improvements in birth control technology.

Rearing Constraints

While birthing is strongly rooted in biology, the biological ties of rearing are much more tenuous.[29] To be sure, some aspects of rearing – like breast-feeding – have a strong biological base, but the innumerable dimensions of nurturing and parenting that produce quality in children are largely cultural.[30]

Quality is a complex, multidimensional variable. It includes physical strength and endurance, health, eyesight, emotional stability, civility, politeness, schooling, education, training, and so on. Some of these are in the nature of a biological inheritance, but very few of them cannot be improved by a systematic investment of resources, time, and market goods. It is because of this fact that it is possible to talk of rearing functions or constraints.

Some aspects of those functions have been studied extensively.[31] That analysis, however, has been conducted under the assumption that families as a unit invest in children, not men and women separately. For many purposes, that assumption, which derives from the notion of a single household utility function, is not restrictive, but for others, such as analysing quality formation in the children of separated or divorced parents, or studying the marriage market to derive the equilibrium division of labour and the labour force participation of women, it has to be abandoned.

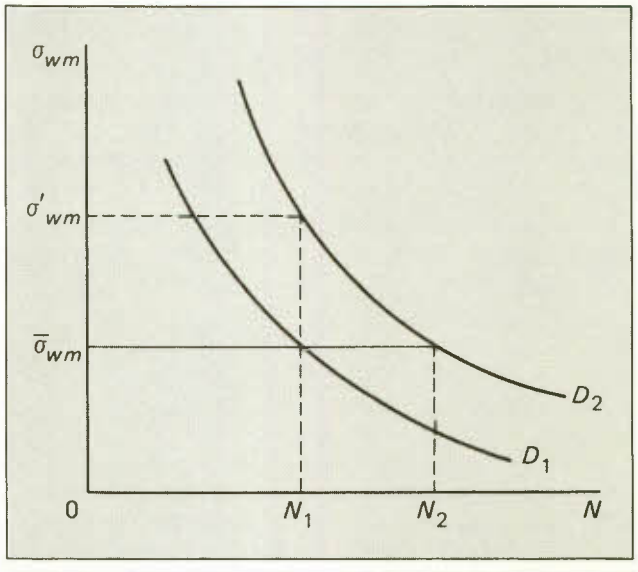
The analysis that follows accepts the model of quantity-quality interaction that supports rearing constraints, but seeks to supplement it with an assumption about the extent to which men and women are substitutes in rearing children. The assumption is simply that, *ceteris paribus*, the degree of substitution between men's and women's time varies inversely with the number of children and directly with the availability of services provided by the market that can replace family production of quality,[32] such as daycare centres, nurseries, nannies, tutors, preceptors, and in earlier times, boarding schools and monasteries.[33]

The justification for the notion that the degree of subtstitution between mothers' time and fathers' time is negatively related to the number of children is that as that number increases and the spacing between children consequently falls, rearing becomes more biologically dependent on birthing, in the sense that repeated pregnancies and births attach mothers to the home and to the care of offspring allowing fathers to undertake other activities. If, in addition, a small reduction in the number of children leads to a large increase in the degree of substitution and therefore to a large increment in the amount of time that fathers devote to the rearing of their children relative to the contribution of mothers, one would be led to conclude that a small reduction in numbers would greatly reduce the extent to which biological differences between men and women influence labour force participation, among other things.

The foregoing implies that an exogenous increase in the market value of the time of women relative to that of men would elicit more nurturing and parenting by men (fathering) in smaller than in larger families. An exogenous increase in the availability of market supplied services (daycare centres, nurseries, and so on which we may call D-services) would raise the degree of substitution between women's and men's time again, weakening and even breaking the link between birthing and rearing.

These assumptions are given graphic representation in Figure 2. On the horizontal axis we measure the number of children (N), and on the vertical axis, the degree of substitution between women's and men's time (σ_{wm}). As the availability of D-services increases, the relationship between N and σ_{wm} shifts from D_1 to D_2. If we force the degree of substitution to remain at $\bar{\sigma}_{wm}$, an increase in the availability of D-services would allow an increase in numbers from N_1 to N_2 through the substitution of family production of quality by market provision. If, on the other hand, the number of children is forced to remain at N_1, an increase in the provision of D-services would reduce the amount of time that women invest in rearing children and increase that of men.

Figure 2



Since the expected number, timing, and spacing of children is, as we saw in the previous section, positively related to the efficiency of contraceptive methods, it follows that the degree of substitution between women's and men's time also is.[34] A testable implication of this is that in populations where birth control technology is more efficient, men will do more nurturing and fathering (including more

housework), irrespective of the market valuation of men's and women's time.

In maximizing their utility functions, women will choose a value for the quantity of children (and for their quality) that, given the availability of D-services, will be consistent, *ceteris paribus*, with the amount of rearing they wish to do. For men, however, the rearing constraints will govern the maximization of their utility functions only if women do not choose to specialize in the production of quality for children, that is, in rearing and caring for children. But if D-services are readily available in the marketplace, men will be able to maximize their utility functions unconstrained by any rearing functions.

Security Constraints

The search for material security as distinguished from emotional security (more related to love and companionship), probably plays a role in most marriages, but there are reasons to believe that it may have been more important in the past, in European and North American societies. Indeed, I would suggest that to understand the evolution of the institutional structures of the marriage market (see the section on "family formation" which follows), the prime focus must be placed on the demand for security, how it is produced in families, and the conditions under which it can be obtained outside families.

I assume that, in families, security is produced by two factor inputs – namely, the number and the quality of children – and that security increases as both quantity and quality are increased.[35] There are probably diminishing returns to increments in each factor taken separately, but perhaps increasing returns to scale over some range when both are increased together. For this reason, where security is produced primarily by families – that is, when little is available through the market, through firms, or collectively through governments – the predominant equilibrium family types generated in the marriage market are either the extended family or systems of family alliances achieved through placing (marrying) sons and daughters in other families that can provide material security, that is, protection against attacks or against the dispersal of inheritance.

There is security in numbers for a variety of reasons: a) the risks attached to specialization of activities are reduced in the case of disaster when the number of children is larger, at least if they are not all specialized in the same activity; b) because trust is often larger in families,[36] intrafamily trade will economize on transaction costs when the security of contracts is small – and the larger the family, the larger such trades;[37] c) when capital markets are inefficient or nonexistent, families act as bankers – and the supply of loans will usually increase with family size; d) families provide insurance against unemployment, sickness, and death that increases with family size; and so on.

Similarly, there is security in quality: strong, healthy, educated, productive, and supportive offspring can only add to the value of a family in dealing with uncertainty, caprice, and vagary of the environment.

Security, in addition to being producible in the family, can be acquired in the market and can be provided collectively by churches and other associations and by public bodies such as governments, as well as by firms. The way to obtain security in the marketplace is to buy insurance against the eventuality of accidents, sickness, and death. But one can also go to the market to purchase detective and police services, bodyguards, safes, and other security boxes, locks, and so on. In addition the marketplace can also sell protection in the form of information that makes it possible to avoid dangerous and harmful products and situations. Private firms also supply security through tenure, through implicit or explicit employment contracts, or through medical plans, mortgage loans, and so on.

If the notion of market is extended to cover all forms of exchange, then markets can supply security in many forms in addition to the above and have done so. Indeed, one of the most important ways to acquire security in feudal Europe between the ninth and fifteenth centuries was through "agreements" between a lord and his vassals whereby the former undertook to supply security in exchange for military and court services by the latter. In Europe, until almost the end of the nineteenth century, and in many other parts of the world, notably Asia, during much of their history, security was obtained through "alliances" based on marriages and family ties.

Sometime around the middle of the nineteenth century, following Bismarck's attempts to salvage the Prussian monarchy through popular consent "acquired" by the implementation of a medicare program, and then, with the extension of the franchise in the latter part of that century and the early years of the present one, governments have become one of the major suppliers of security.[38] To be sure, governments have, for a fairly long time, been supplying protection against external aggression and internal criminal activity, but in the last hundred years or so, they have come to offer protection against unemployment, old age, sickness, natural disasters and accidents. Moreover, in recent years, they have moved to protect their citizens against invasion of

privacy, false advertising, unsafe products, and so on.

The development of what has come to be known as the welfare state, which has accompanied the extension of the franchise, has had, and is continuing to have, profound effects on the equilibrium number of children demanded by both men and women and on the workings of marriage markets.

In addition to the emergence and development of the welfare state, the last century and a half has witnessed the emergence and growth of the private firm, often blossoming into the large modern corporation. Not unlike the welfare state, these bodies have provided increasing security to their employees along the lines indicated above. In recent years, the desire for security on the part of corporate employees who also, in some instances, comprise a significant fraction of the electorate, has led to the emergence of a new form of "cooperation" between the public and private sectors through which, by public loans, tax holidays, and so on, the life of essentially bankrupt corporations is sustained and the security of many corporate employees guaranteed.

These developments have greatly reduced the value of children in providing security and, for some purposes, have eliminated it altogether. Thus the comparative inefficiency of the extended family and of "alliances" based on marriage and family ties has been revealed. Because the efficiency of family "alliances" was greater the larger the number of offspring that could be traded (married) into other families, the demand for children for the purpose of buying security was high, when that was the way to acquire protection, but fell as governments and corporations replaced those "alliances." A fuller discussion of these interactions is given in the section that follows.

Because women live longer than men; because, on the average, they are more defenceless in the face of physical aggression than men; because they survive wars and other similar calamities more than men; and because of other factors of this type, we must expect that the process of utility maximization with respect to security will, *ceteris paribus*, yield a different value for men than for women. It would seem that, in general, women would want to acquire more security than men. Were that the case, the reduction in the demand for children ushered in by the development of the welfare state would have had a greater effect on women's demand for children than on men's. To be able to move ahead, it is necessary that we turn our attention to how marriage markets work.

Family Formation

The structure and operation of marriage markets vary considerably with circumstances. To underscore that fact, I shall conduct the following analysis by distinguishing between three different market structures. The first is characterized by the fact that the parties that enter the market to transact – that is, to found a family – are not the future husband and wife, or the future mates, but their parents. It would seem that this market structure was the dominant form in many societies for long periods of mankind's history and still is today in some parts of the world. For convenience, I shall call this structure, "the old-fashioned marriage market." The second structure is characterized by the fact that the party entering the market in an active role is the man. He searches for a mate; she can accept or reject an offer, but cannot make one herself. This has been the dominant market form, for most of the twentieth century in the western countries, and it now seems fairly widespread in many parts of the world. I shall label this structure "the traditional marriage market." In the real world of history, elements of old-fashioned and traditional markets exist together. The third form of market organization – the one that seems to be emerging among some younger age cohorts in western countries – is characterized by the fact that all parties who wish to found families enter the market themselves searching for mates, making bids, and considering offers. I shall call it "the modern marriage market."

An analysis of the marriage market must therefore address two questions: 1) what are the observable features of equilibrium under each market form; and 2) what are the circumstances that will generate one market structure instead of another. These are exceedingly difficult questions; in addition, they are not questions that have hitherto been asked in an economic framework. As a result, the analysis that follows will point in the direction of future work as much as it will provide more or less definite answers.

Operation of Marriage Markets

The analysis of the workings of each of these organizational forms – old-fashioned, traditional, and modern – will be conducted under the assumption that competitive forces rule at all times. I will not, however, suggest a general assumption about the institution or institutions that support property rights; instead I shall attempt to explain observable features of the real world by specific assumptions about these institutions, be they law, custom, or trust.

As the first part of this chapter made clear, differences in utility functions and, more importantly, in the technical and institutional restrictions or constraints

governing choices, imply that the desired values for most or all of the variables entering the utility functions will be different for men and women. To put it plainly, women will, in general, desire a different incidence of intercourse, a different number of children, a different quality of children, and a different amount of security than men. If other variables – such as love, companionship, reputation – should enter the utility functions, differences would, as a rule, exist for them also. In the case of some variables, these differences may not require any adjustments, because the amounts desired can be consumed in different volume by different members of the family. But for other variables – typically, the incidence of intramarriage coition, the number of children and the quality of children – the difference between men and women must be reconciled.

An important question that the following analysis must answer, therefore, is how the differences between men and women are to be resolved. In other words, are there circumstances under which the outcome of trading in marriage markets is likely to be biased, in that either women or men will have to make all or most of the "concessions?" This is one class of issues which the assumption of a single family utility function suppresses by definition. I intend to show that under certain market forms, the outcome is biased against women, not only in the sense that the maximum utility they derive from family life is less than it could be, but also in the sense that their preparation for, mode of, and rewards from, labour force participation will place them at a disadvantage relative to men. I shall also show that certain structures of the marriage market are more advantageous to women than others.

Old-Fashioned Marriage Markets

In a *pure* old-fashioned marriage market – that is, one in which elements of traditional and modern markets do not play any role – parents enter the market to marry their offspring; we must assume that the selection of mates will be aimed at maximizing their own welfare, not that of their children. To assume the contrary would imply that, for whatever reason – upbringing, altruism (love), and/or genetic transmission – parents and children are alike; that is, that they can be characterized by the same utility function. One's observation and experience deny that, however. But, more importantly, it appears to contradict some significant facts – namely, that in medieval Europe, as was already mentioned, widows (even very young ones) often did not remarry; that in premodern China, the feet of young brides had to be bound to prevent them from running away from their husbands;[39] that the relative number of young people placed in religious and lay orders by their parents appears to exceed the relative number of those entering these or similar orders when choices are made by the candidates themselves[40] and, finally, that the amount of resources invested in children seems to have been minimal and invariant regardless of the fluctuations in the price that boys and girls fetched in the marriage market (as that price can be inferred from variations in the sex ratio).[41]

To describe the operation of an old-fashioned marriage market in a simple way, I shall assume that what parents seek in the marriage market is security. This is a simplification, because parents have sought other things in addition to, or instead of, security in that market – such things as love, companionship, reputation, distinction, business connections, wealth, and so on. But little would be gained that cannot be easily inferred from the hypothesis suggested below, and the complexity of the exposition considerably increased, by taking these various factors into account.

Given this simplification, the analysis of the marriage market will tell us the price at which children will be exchanged for marriage or, alternatively, the price at which security will be bought and sold in that market. What determines the equilibrium is the efficiency of children as producers of security in marriages relative to their efficiency in producing security in alternative undertakings, as well as relative to the efficiency of other sources of security.

It is hard to be certain, but it would appear that one can rationalize the apparent preference of parents for boys over girls in marriage markets that approximate the old-fashioned variety – although that kind of market has never historically existed in pure form[42] – by assuming that boys (men) are deemed to be more efficient providers of security to parents than girls (women) are.

Under such circumstances, assume an exogenous increase in the market price of men. If there is no corresponding increase in the productivity of marriages in producing security for parents, they will refuse to pay the higher price and will seek other, less expensive outlets for their daughters. They may choose to keep them unmarried in their own households, if their value there is not expected to be less than their maintenance cost; but if that cost is expected to be larger, they will seek to place them elsewhere. There is ample evidence that throughout medieval and Renaissance Europe, many parents did place some or all of their daughters in religious and lay orders because the yield on sums paid for such placements was larger than that obtained by marrying them off.

In his classic study of the beguine lay order,[43] to which reference has already been made, McDonnell attributes the development of the movement, during its first three or four hundred years, to a number of factors, among which he mentions wars, crusades, and the "natural" longevity of women relative to men – all of which increased the price of men and induced an increase in the placement of daughters in nunneries.[44] As these nunneries became crowded and the size of required "dowries" (the prices paid) became larger as a consequence, parents sought other outlets for their daughters. The beguine movement, created in the early years of the eleventh century in northern Europe[45] – Belgium, the Netherlands and Germany – seems to have been a response to that demand.[46]

Data on the relative size of the movement are not easy to come by. The evidence that we have pertains mostly to the thirteenth century and indicates that, in proportion to population, the numbers were fairly large. To deal with these numbers, parishes restricted certain occupations to beguines and ordered guilds to accept them in others. McDonnell estimates that beguines had access to no fewer than 201 occupations.[47] Furthermore, since the beguines did not assemble in large nunneries, large capital sums for the building of convents were not required. There is evidence that the beguines also provided infirmary and hospital services as a source of income, which has led to the mistaken notion that they were a religious order. Others, although apparently few, became prostitutes. As a result of all of this, the cost to parents of placing daughters in beguinages remained low.

Indeed, as the centuries wore on, daughters of the nobility found themselves in nunneries, where no physical work was done[48] (work was an activity unacceptable to nobles), and the daughters of the common found themselves in beguinages.

The very real importance of nunneries and of beguinages over much of Europe – even as far as Russia – during the six to seven hundred years when some approximation to an old-fashioned marriage market was in operation, as well as their ups and downs, provides an indication that, in that type of market, to assume that marriages and the demand for children are closely associated, forces attention away from the relevant issues. The connection between the two that is sometimes encountered in the literature rests on the assumption that what the marriage market generates are heterosexual unions. This assumption, in turn, is based on the presupposition that an equilibrium sorting of people between those who will form such unions and those who will not has already been effected and that only the former kind of people will enter the market to found families. The fraction of the marriageable population that does not enter into heterosexual unions must be an outcome of the workings of the marriage market (and of related markets), not an assumption of its operation.

Security can be acquired by parents by marrying a daughter (son) to a son (daughter) in another family – through the formation of a monogamous union. The question arises, however, whether it might be more efficient for parents to acquire security through the formation of polygamous unions. This is an important question in itself, but it is one whose answer can also shed light on the validity of the analysis so far suggested. In other words, it can tell us whether the simplifications and assumptions made so far are reasonable and empirically valid within their realm of application.

Throughout the Middle Ages and a good part of the Renaissance the incidence of polygamy in Europe appears to have been low. One cannot be certain, because the data are poor and, no less important, because it is difficult to give a tractable definition of polygamy.[49] But if polygynous marriages are defined as unions of reasonable duration, with the husbands' mates recognized by "neighbours" as wives or stable mates,[50] then it appears that polygamy was not very prevalent in Europe during those years. On the other hand, in China, during the years when an approximation to an old-fashioned marriage market was in operation, there appears to have been some polygyny in that a number of men took concubines into their households. These, in addition to having children, had a number of legal rights.[51]

Assuming that the facts are as I have described them, can one provide an explanation for them in terms of the model I am suggesting? I would like to propose that in a pure old-fashioned marriage market, polygamy would not exist for two reasons. First, the additional quantity of security that parents purchase by marrying a second daughter to the same man must be small, while competition will ensure that the price paid for marrying off this second daughter is the same as had to be paid for marrying off the first. It is true that the daughters themselves could be better off if they were placed in polygynous unions, but the welfare of children is not the governing force in that type of market.

Second, the price received by the parents who sell security by marrying off their sons would be low if the sons were to be married to additional wives, because these additional marriages would inflict unpredictable capital losses on the buying parents (those marrying off daughters).

To illustrate, suppose that parents A have purchased security from physical damage by marrying their daughter to a son of parents B; what would happen to the value of that asset should the Bs decide to marry the same son to a daughter of parents C, thus making their son polygynous? Beyond the fact that the Bs' defence capabilities would be more dispersed and thus worth less, the complete answer would depend on who the Cs were. One can easily imagine scenarios in which the value of the asset goes to zero.

I suggest that it is to protect the buying parents against such capital losses that, when the marriage market is of the old-fashioned variety, polygamy is illegal. Because it is recognized that marriages made by parents may be less than the best from the point of view of children in such areas as sexual adjustment, some societies accept the fact that married sons themselves choose to have concubines. Even when polygamy is illegal, concubines can be given legal rights, but these will not pertain to anything related to the terms of the "marriage contract." The assets of buying parents are thus protected. Incidentally, the differential legal status of wives and concubines that ruled in pre-modern China, in ancient Judaism, and in Islam, is powerful evidence that marriages that are the outcome of old-fashioned marriage markets differ radically from those which are the outcome of traditional and modern markets.

Why do husbands in some societies characterized by an old-fashioned marriage market take concubines, while in other societies they do not? I do not wish to devote much space to this question, except to suggest that the answer depends on the conditions ruling in the market for sex services – that is, on the volume, quality, variety and price of these services. This, in turn, will be related to the workings of the marriage market and, in particular, to the opportunities available to parents in placing their daughters. To put it differently, if the market for sex is efficient – that is, for a "low" price, the volume, quality, and variety of services are "large" – the need for concubines will be less. The efficiency of the sex market, in turn, will be related to the operations of the marriage market, to whether the sex market is a black market or not, and to other similar phenomena.

Before moving on, note that when the marriage market is organized along old-fashioned lines, a high incidence of true polygyny would appear to require that what parents seek in marrying their daughters is access to a harem or to a seraglio for themselves. On the whole, the services that would be acquired in this way are probably not specific enough to sustain competition from prostitutes, call girls and courtesans.[52] For that reason, polygamy is not likely to exist in that market structure.

An exogenous increase in the productivity of marriages as suppliers of security will lead to an increase in the price of men and therefore to a decline in the number of daughters married and to an increase in the number placed elsewhere. The consequences of changes in the efficiency of alternative ways of producing security are discussed in the following section.

In concluding the analysis of old-fashioned marriage markets, we must ask two questions. The first pertains to whether such markets reconcile the differences in what men and women desire in terms of the volume and quality of sexual activity, the number and quality of children, and the amount and quality of security. If they do, by what process; and, if they do not, at whose expense? The second question relates to the volume and quality of resources that parents are likely to invest in their children, when they place them in old-fashioned marriage markets. We shall look at these in turn.

The first point is that the differences in what is optimal for men and what is optimal for women play only a negative role in old-fashioned markets. By this I mean that if these differences thwart or frustrate the attainment of the goals sought by parents, the latter will act, either individually as parents or collectively as citizens, to prevent that from happening; otherwise, the differences will remain but will play no observable role. Parents (as individuals) can intervene in a number of ways: Cheung has already documented that the binding of the feet of little girls in pre-modern China was done effectively to prevent differences of any kind from having any effects; parents can buy the acceptance of differences by allowing their offspring to share in the dowry; and, as I shall stress in a moment, parents can undertake particular sorts of capital investments in their children that will reduce the significance of the differences.

In addition, parents (as adult members of society) can support legislation that, as we have just seen, gives differential legal status to wives and concubines, makes sex easily available to men (the medieval "droit de cuissage,"[53]) and makes it difficult for families to dissolve either through divorce or through renunciation of vows.

The ability of parents to enforce the contracts that they have entered into is not in doubt for the reasons just listed. One of these is, however, of particular significance for this essay – namely, that which pertains to the human capital investment that parents undertake by placing their children in old-fashioned marriage markets.

At the outset, I note that the type and volume of that capital formation will be very different for men and women. For the first, it will depend on what is being sought by the parents, whether it be security, connections, reputation, esteem, or whatever. For the second, it will depend on what parents expect a prospective husband to want in a mate. To put it differently, the upbringing, schooling, and training of men will be governed by what the parents of sons think the parents of daughters want. The upbringing, schooling, and training of daughters, on the other hand, will be undertaken in accordance with what parents think prospective men mates will desire.

It was therefore no accident that the advice offered to parents regarding the upbringing of their children that was offered in ancient manuals (those used when old-fashioned marriage markets dominated) stressed such traits as courage, strength, dexterity, endurance, cunningness, and ability to make decisions for men, while valuable traits for women were considered to be submissiveness, retiringness, the ability to cook, sew, clean and generally maintain a good household; the capacity to birth and rear a large family (so presumably special attention was paid to the health of girls); and, finally, the skill to deal with the sick and the dead. In medieval Europe, most men were not taught to read or write, even among the nobility except for priests and monks; on the other hand, women were taught to read a bit, because one of the traits they had to possess was the capacity to pray and to read the psalms.

Some men and women were surely "schooled" in things that produced traits other than the above, but, where the marriage market was of the old-fashioned variety, it is reasonable to expect that parents would have cultivated in their sons and daughters, not the traits that would necessarily have maximized the welfare of those children but, rather those which would have maximized the value of the marriage contract for the parents. An old-fashioned marriage market is not one that prepares women to participate in the labour market on an equal basis with men. There need be no discrimination against women on the part of men and no intent on the part of parents to seek for their daughters less "rewarding" occupations. As long as the marriage market is an important source for the purchase of security, and as long as men are assumed to be more efficient in providing it, inequality between men and women will be the "natural" outcome.

Traditional Marriage Markets

In a pure traditional marriage market, parents play virtually no role. What parents seek to acquire in old-fashioned markets, they obtain from alternative sources when traditional markets dominate. Their role is so reduced that the eclipse of old-fashioned marriage markets is often accompanied by the growth of nonfamily programs for the care and development of youth. To put it in extreme form, when traditional marriage markets dominate, parents get so little out of their children, that they are reluctant to invest much in them. For this reason, one observes significant investments in children by churches, charitable foundations, religious orders, firms, and sometimes governments, although, before the latter part of the nineteenth century, the latter acted only very indirectly, when at all. In modern times, governments have largely, though far from completely, eclipsed charitable organizations in caring for children, to the point that we observe public bodies subsidizing schooling at all levels, either through public schools or through grants, interest-free loans, "research programs," or tax incentives; children's clothing, by such devices as exemptions from sales taxes and/or import restrictions; health care, through the provision of free eye, dental, and physical check-ups in schools; and even nutrition, through free or supported school meals, as well as milk and orange juice programs.

This does not deny the existence of altruism and love. But it does not accord it a role in the analysis of marriage markets. I suggest that in seeking to understand the broad sweep of history and the anemic averages of econometricians and statisticians, one need seldom, if ever, appeal to these phenomena. In this way, some of the difficulties of economics with true altruism are avoided,[54] and obstacles to the difficult-to-measure phenomena of wife and child abuse are removed. (I do not address the questions posed by these phenomena in this essay, though they would have to be considered in a more complete treatment.)

A pure traditional marriage market is one that men enter in the search for one or more mates (generally women) who can accept or reject an offer made by those men, but who cannot make any offers themselves. Even if women do not make any offers in these markets, one should not assume that they are completely passive; in fact the opposite is true. In order to elicit an offer that matches as closely as possible their preferences, women will invest the resources at their disposal in such a way as to call forth such an offer.

To say, as has sometimes been said, that in a market structure of this kind, women (and the men who await offers) will spend considerable time and money on clothes, jewellery, hairdos, facials, perfumes, and other adornments to attract an offer from

men of their choice may be correct, but it is very superficial. It is not only the investments in cosmetics and appearance that the organization of the marriage market dictates, it is also investments in all other forms of human capital, including schooling, training, health (fitness), and the readiness to move.

To see this, assume that the decision of men to extend an offer, and that of women to accept or reject it, are made during "dates" – which, in these markets, are initiated only by men. Those decisions are based on the utility that prospective mates expect to derive from making and accepting or rejecting offers. In analysing old-fashioned marriage markets, I assumed that utility was derived from specific services transacted in the marriage market, and I focused on security services. It seemed reasonable to suppose that parents did not derive any satisfaction from the sexual activity of their children and that the pleasure which they would take from their grandchildren would not influence the number of children that their own children would have nor the amount of resources that they would invest in their quality.

In this discussion of traditional marriage markets, I assume that security plays no role, or only a minimal one, so that utility depends only on sexual activity, on the number and quality of children, and on a vector of "nonfamily" services. This is a simplification that can be justified to some extent (see the final subsection of this chapter) but also one that can be eliminated fairly easily; I do not do so here, because it would add little, if anything, to the argument that I am seeking to develop.

The notion of equilibrium in economics (and in the social sciences generally) is a difficult one. Its application to traditional marriage markets requires that two problems be dealt with. The first I shall call the "problem of entrapment;" the second, the "issue of divorce." Suppose that during the "dating period" a woman, sensing that her mate will not make an offer, decides to entrap him by letting herself become pregnant. She could do this because the optimal values that she places on the various arguments of her utility function are imagined to be the same as those placed by her mate, but she could also entrap him that way simply because she wants to leave home, or quit school, for example. Or suppose that a man, sensing that the woman he is dating will not accept the offer he is making, decides to impregnate her, because he knows that she will thus be "forced" to accept his offer.

Should one consider that such events form part of the equilibrium or does the notion of equilibrium require that all transactions be carried out without fraud, deceit, or trickery? The view adopted here is that such events are part of the equilibrium and have a role to play in the process of reaching that equilibrium, just as does the bilking of a client by a serviceman who replaces a perfectly good carburetor in a car, or as does the contracting of syphilis with the purchase of sexual services. I leave to welfare economists the question of whether that equilibrium is Pareto-optimal or not!

The second question pertains to divorces. Should one treat these as "delayed" withdrawals and rejections of offers or as bankruptcies (mortalities) that permanently alter the position of supply and demand curves in the marriage market? This is not at all easy to answer. If one assumes that divorces are "delayed" withdrawals and rejections of offers, one must assume that in the sequential processes to equilibrium, as are encountered in the literature on search,[55] divorced persons return to the marriage market for second and subsequent rounds of transactions. Unless restrictive and unrealistic constraints[56] are imposed on the behaviour of all participants in the marriage markets, such processes will not converge to equilibrium, for the very simple reason that the undoing of one union will, very often, destroy the optimality properties of one or more other existing unions. It is not surprising, therefore, that artists – possibly the most famous being Renoir – have been fascinated by the theme of "La Ronde" or that Becker, in *A Treatise on the Family*, discreetly slipped five full chapters between his discussion of marriage and that of divorce!

But to assume that divorced persons do not return to the marriage market flies in the face of observation and empirical evidence. What is possibly worse, a market that does not converge to equilibrium[57] is one that cannot be analysed. What can we do to deal with this problem? I would like to suggest that traditional marriage markets converge to equilibrium; the basis for that suggestion is that when marriages are entered into in a traditional market, the cost of obtaining divorces is high. The reasons for these high costs, in turn, result from the existence of legal and other barriers that neither men nor women have any great incentive to remove, at least so long as the constraints governing reproduction and rearing remain unchanged (see the first section).

If the costs of divorces are high, the market converges to an equilibrium because the fraction of persons married to each other increases at every round (or, in the language of Hicks, every week).[58] The fact that many unions do not dissolve does not by itself, however, tell us whether welfare is maximized (whether the equilibrium is on the contract curve, or in the core). Many other things, including the factors that make for high divorce costs, have to

be taken into account before welfare judgments can be made.

To understand why divorce costs are high, we have to examine the opportunities of men and women separately. The costs of entering the marriage market, searching for a mate, formulating an offer, and settling down to found a family are significant. If men can impose large costs on women who would want to divorce them, they can avoid incurring those costs anew in a second marriage. To put it differently, by making it difficult for women to divorce them in traditional marriage markets, men can avoid the costs of second or subsequent marriages. Men would find it easier, and would be more willing, to make divorce difficult for women if opportunities were readily available to acquire the services (such as sex and companionship) that their marriages are not providing.

I suggest that an examination of traditional marriage markets and of related markets would reveal that sex outside the family is readily available for men (hence the classic ambiguity of legislation dealing with prostitution and the notorious differential treatment of men and women where it is illegal and the parties are apprehended by the police). It would also show that companionship outside the family is equally easy for men to purchase through institutions such as private clubs, bars, and taverns for men only, and other similar institutions that are, consequently, requirements of equilibrium in traditional marriage markets.

For women who are married in traditional markets, it is the cost of exiting from marriages that is high. Women, when that organizational form dominates, can only acquiesce to, or refuse an offer. If, after accepting one, they reject it (get divorced), they have no assurance that another offer will be any better.

Also, before entering the traditional marriage market, women "know" these things or at the very least have a general apprehension of them. Based on that knowledge and/or comprehension, they will have acquired a portfolio of human capital appropriate for that context. Therefore a divorce would not only place them anew in the marriage market with no assurance of any better offers and it would not simply leave them alone with children, it would also, by obsolescing their human capital, inflict on them significant capital losses. The literature on the psychological and emotional distress that follows divorces indicates that these capital losses are often significant: they take the form of a feeling of hopelessness and of an inability to cope.[59]

What will the equilibrium of a traditional marriage market look like? What properties will it possess? I suppose that the most obvious of these will be the dominance of the nuclear family, as distinguished from the extended family in which one finds not only the husband and wife with their children but also the grandparents, and even brothers and sisters of the husband and wife with their children. The nuclear family can be monogamous or polygamous, tending towards the first if the penalties for entering the sex market (fines, social reprobation, the incidence of venereal infection, and so on) are not large and, in addition, if birth control technology is relatively inefficient, so that the probability of birth attached to coition is high, implying that a "locale" for rearing children is needed.

This property of equilibrium can be used to make predictions about the real world: 1) one expects polyandry to be a rare phenomenon, observed only when the sex ratio is dramatically lower than one; 2) one expects that the incidence of polygyny would be less where penalties for entering the sex market are lower and where contraception is better, more accessible, and cheaper; 3) one expects that monogamy would be associated with a greater tolerance for adultery; and, conversely, where polygyny is permitted, adultery would be severely punished, possibly by death. (Could that explain the rules of Islam?)

A second property of equilibrium in traditional marriage markets is that married women, will in general, be housewives, allocating a large fraction of their time to the rearing of children. Germaine Greer's indictment of the suffragettes for "settling down" after their victories of 60 years ago, which she bases on motivational and cultural factors,[60] is misplaced. The suffragettes "settled down," because conditions in the marriage market and related markets did not change as a result of their victories.[61]

I indicated earlier what equilibrium in a traditional market dictates in terms of human capital investment for women; I need not repeat this argument here. Note now, however, in anticipation of the discussion in the following section, that improvements in birth control technology will have effects on that equilibrium, but only indirectly, by changing the mode of operation of the marriage market. If a traditional marriage market could survive with the existence of perfect contraceptive technology – which, I shall argue, is not possible – the properties of the equilibrium that I have just described would still be observable.

One last feature of equilibrium in a traditional marriage market is that some women, as well as some men, will remain involuntarily single. (I use the term "involuntarily," to describe a situation in which the status of being single was acquired by refusing

offers that were deemed unacceptable, by not having ever received an offer, or by having all of one's offers rejected.) These involuntarily single men and women will not differ from married ones in terms of the characteristics of the human capital portfolio that they will have acquired. Comparisons of single and married men and women (whether divorced, separated, or still married), without regard to whether the former are voluntarily or involuntarily single, will present a biased picture of the effects of marriage, children, education, and so on, on salary, occupational, and other differences.[62]

Modern Marriage Markets

The distinguishing feature of pure modern marriage markets is that all parties searching for mates with whom to found families enter the market as equals and make the offers they wish. Modern marriage markets are not influenced by the preferences of parents, nor are they dominated by the preferences of men. In comparison with traditional markets, modern ones are more favourable to women. This follows from the simple fact that under this organizational form, women can take the initiative to found families; this is not the prerogative of men only, as in traditional markets.

The fact that women can make offers as well as refuse them has many implications, only a few of which are directly relevant to the issues examined here. Among the most important are the following: 1) because they can make offers, women will be less reluctant to seek a divorce, therefore the incidence of divorce will be higher than when the marriage market is organized on other bases; 2) women will, on average, marry at an older age; 3) expenditures on cosmetics and other adornments by women will not exceed the sums spent by men for comparable products; 4) and, for reasons that are discussed later, because modern marriage markets require efficient contraception, women will more readily enter the sex market than when either traditional or old-fashioned market forms predominate.

But the main effect of modern marriage markets on women is that it raises the prospective value of human capital and thus makes investment in that type of capital more attractive. As women acquire more human capital, they are able to participate in the labour force on the same basis and on the same terms as men. It is important to stress that not all women will choose to acquire a portfolio of human capital that permits labour force participation equal to that of men; the prospective conditions in the marriage market will make that possible, but expectations about the efficiency of birth control technology will continue to play a role.

That role can, however, be very different than when other forms of organization prevailed in the marriage market. To understand that point, it is sufficient to consider the likely behaviour of women who assume that contraception will enable them to control precisely the number, timing, and therefore spacing, of births and who, on that assumption, make decisions about their participation in the labour market and therefore about the volume, type, and composition of human capital that they should acquire. Failure of contraception – that is, an unplanned pregnancy – would, if it resulted in a birth, most likely impose a capital loss that could be substantial.

There are a number of ways that are, more or less, good substitutes for each other and through which such capital losses can be avoided: daycare centres, paternity leave, domestic help, and so on; these all make it possible for the mother to have the child without obsolescing her human capital too much. Earlier, I mentioned that the emergence of modern marriage markets would be accompanied by a rise in divorce rates. The reason for this should now be clear: divorce is often a way to avoid capital losses on human capital, especially when these losses would be caused by the obligation to move. Furthermore, the cost of divorce is more easily absorbed by women if they are earning market income. One would therefore expect, as has indeed been observed,[63] that divorce rates are higher among women who are better schooled and better trained and among the more mobile.

It is important to emphasize that modern marriage markets and the associated efficient birth control technology make it possible for women to participate in the labour market on the same terms and conditions as men; yet it remains true, that, even with daycare centres, paternity leave, and so on, there is still a trade-off for women between the level of market income and the number of children. The trade-off will be more favourable, the easier it is to assign the care and rearing of children to others; but it is unlikely that the trade-off will be removed completely for the majority of women.

In conclusion, I note that the incidence of polygyny is not likely to be very high in modern marriage markets, unless the resources of a husband are distributed very unequally among his wives. Indeed, women who have acquired a large amount of human capital will have to be given a larger share of resources than those who have not acquired such capital. Such a distribution may be possible under competition. But, to the extent that the accumulation of human capital is a process that takes many years, being associated with on-the-job training and the acquisition of experience, connections, specific rules

of thumb, and so on, polygynous wives would have to be allowed to leave the harem to participate in the labour market and to move from job to job and from location to location. This does not seem to be a likely feature of the equilibrium in modern marriage markets. Similarly, and for essentially the same reasons, polyandry is not likely to be a feature of modern marriage markets.

Evolution of Marriage Markets

So far, I have described some of the properties of alternative structures of marriage markets without indicating when one kind is likely to dominate. I did associate modern markets with more efficient contraception, but this was done without any justification. In this subsection, I suggest that the predominance of one market form and the transition from one to another are closely related to changes in institutions or technologies that alter the constraints against which men and women who found families maximize their respective utility functions.[64] This discussion will explain why a particular organizational form dominates at one time and place, and why a different form prevails at another time and place. Finally, the discussion will explain why organizational structures are seldom, if ever, observed in a pure form.

From Old-Fashioned to Traditional Markets

Marriage markets change their organizational forms in response to changes in the constraints facing those who participate in them. To explain the transition from old-fashioned to traditional marriage markets – that is, from markets structured to satisfy the demands of parents to markets organized to meet the demands of the mates themselves (although predominantly those of men) – one must look at the most important changes that have taken place in the way that the security that parents sought to acquire in marriage markets now becomes available to them.

As I have already noted, there are many institutions besides families that can provide security: churches, religious foundations, guilds, firms, corporations, markets, governments, and so on. I surmise that the predominance of old-fashioned marriage markets is inversely related to the importance and efficiency of some of these bodies in providing security. It is important to note that for none of these organizations is the primary function the provision of security. Consequently, it is not their mere existence that is inversely correlated with the significance of old-fashioned marriage markets, but their involvement in providing security. In modern times, as governments and corporations have become prime providers of security or insurance against the risks of unemployment, old age, sickness, and other similar events, they have displayed in that task an efficiency that children and marital alliances (and many other organizations) could not match. As a consequence of this social innovation, parents eventually stopped entering the marriage market. To put it differently, the passage from old-fashioned to traditional marriage markets was the result of, among other things, the development of alternative, more organizational forms of providing security. It is interesting to note in this connection that in many societies today where the welfare state and the modern corporate sector are still very small (societies like those of India and Pakistan, for example), an important fraction of the marriage market is of the old-fashioned variety.

But the growth of the welfare state and of modern corporations is not the only force that has fostered the traditional marriage markets. The spread of schooling – indeed, the achievement of virtually universal attendance in schools, for a considerable number of years – has encouraged the development of networks of relationships out of which business, professional, and other connections have developed. Because these networks are an outgrowth of similar patterns of human-capital formation and because they are allowed to grow in an organic fashion, they have a comparative advantage over connections that are the product of necessarily formal alliances derived from marriage. Large governmental and corporate bureaucracies have acted in similar fashion to schooling, thus reinforcing its effects.

The growth of schooling has not only affected the comparative advantage of old-fashioned marriages in producing connections, it has also had a decisive effect on how reputations are produced, by slowly eroding the significance of marital alliances that were often based on names and genealogies.

One should note that the introduction of high rates of taxation on incomes and on the inheritance of wealth has also acted to reduce the value of alliances contracted in old-fashioned markets, to the extent that these were aimed at preserving the integrity of a stock of wealth. Finally, the fact that much wealth is now being held in a more fungible form than land means that the desire to preserve the integrity of the stock of wealth has itself become less important.

From Traditional to Modern Markets

In western societies, the dominant organizational form of the marriage market is the traditional one. There are signs – but yet only signs – of a new form emerging, which I have labelled "the modern marriage market." The forces that are ushering in the modern marriage market are related to changes in the conditions pertaining to the birthing and rearing of children.

The changes affecting the birthing of children are related to improvements in the knowledge of sexuality, in the technology of contraception, as well as in the ease of using that technology. What these improvements do is alter the conditions under which women enter the marriage market, as well as the terms of exchange that result from an agreement to found a family. To put it differently, improvements in the control that women have over their biology and sexuality make it possible for them to enter the marriage market not as is done in traditional markets (where, it will be recalled, they can accept or reject offers, but can make none of their own) but by making offers themselves.

How can improvements in knowledge of sexuality and in the techniques to control it affect the terms of trade in the marriage market? To answer that question requires that we recognize that the process of trading and exchanging is one of more or less explicit negotiation between the parties involved. If negotiations are to be fair, the conditions that influence both parties must be roughly equal. If, to be less abstract, it is understood at the outset that women must not only house the fetus and give birth to the child, but also care for it and be assigned the bulk of the domestic chores, then negotiations with respect to the other aspects of family formation and development will reflect this *a priori* situation. Decisions about labour force participation, about the investment of savings, about the allocation of time for vacations, about travel, and about a host of other issues will be conditioned by the *a priori* assumption.

The phenomenon will appear less paradoxical if it is recognized that, in coming to an agreement on contractual matters, decisions on all clauses of the contract interact with each other. The same is true of marriage contracts. Consequently, improvements in contraception, and therefore in the number and, just as importantly, timing and spacing of children, imply an equalization of the terms and conditions under which women meet men in the marriage market: because they are able to negotiate as equals, women will necessarily feel that they can initiate transactions with men.

Changes in the conditions governing the caring and rearing of children will produce similar results. As already noted, the conditions related to the rearing of children are very closely related to control over fertility; that is, the demands placed on parents by children are likely crucially affected by their numbers and their spacing. If, however, the number and spacing is optimal – the definition of which varies from woman to woman and from couple to couple, depending on health, physical strength, emotional stamina, occupation, age, and so on – other factors will affect the conditions governing the rearing of children, such as paternity leave, daycare centres, part-time employment, staggered working hours, and others.

In discussing the evolution of marriage markets, I may have given the impression that the evolutionary process is a linear and inevitable one – a process in which one particular kind of institution fully replaces another. If so, I would like to correct that impression.

First, though there may be an evolution from one type of market structure to another, in general, two (or even three) market structures may coexist in a given society at a given time, especially, if the polar extremes described above are found in attenuated form. There is, therefore, much scope for interaction between the forces at work. Consider the relationship between old-fashioned and traditional marriage markets and assume that, in the former, parents enter that market to acquire security only. As collectives (churches, firms, or governments) emerge, some security needs can be met more efficiently by them than by marital alliances; consequently, the price that families will be willing to pay when buying husbands will fall. The supply of "husbands through families" will be reduced; the value of marriage as a supplier of security will be impaired; and the value of collectives increased. Development of the collectives will further reduce the place of the family in supplying security, thus increasing anew the demands on the collectives.

Such a process will, in all likelihood, not end in the elimination of the family as a provider of security, though it is likely to reduce the role of parents in the marriage market to a fairly limited one. Still, one can imagine circumstances in which, even when traditional forms predominate, the role of parents is important, especially as lenders of funds, and as providers of housing services, of food, and of accommodations for vacations, and so on. As long as parents play that kind of role they will have an influence on the equilibrium that obtains in marriage markets, even if they do not themselves sign marriage contracts.

In the real world, therefore, one is likely to observe the predominance of one organizational form but also traces (sometimes significant) of other forms at the same time. This makes empirical analysis more difficult and it certainly complicates the implementation of public policies aimed at improving the labour force participation of women; but, then, the real world has always been difficult to domesticate!

An Overview

The hypothesis developed in this essay is a simple one, though the length of the discussion may belie

that fact. It may therefore be of some usefulness to briefly summarize the main propositions of the model and to show succinctly how they are related to each other.

The facts are fairly clear-cut. Men and women do not participate in the labour force in the same way. Women are less schooled than men; their occupations and training are different; they earn less than men, and the distribution of those earnings over their lives is different; and, finally, the extent to which men and women participate in the labour force differs. These are not disjointed facts; on the contrary, they are closely related. Any hypothesis that purports to explain them must explain them together.

The explanation (or hypothesis) proposed in this essay rests on some organizational features of marriage markets. In other words, I suggest that the difference in the conditions and terms under which men and women participate in the labour force is related to the structure of marriage markets and of the markets in which the commodities produced in marriages can also be purchased – namely, sex, children, security, and so on. The model is simple. The structure and operation of marriage markets help to determine the desirable volume and type of human capital that men and women should and do acquire. That, in turn, determines the nature of the labour force participation, its extent, and the rewards related to it.

To put it differently, the structure of the marriage market helps to determine the differences between men and women in the volume of schooling acquired, in the type of subjects studied, and in the occupational choices made. These differences, in turn, help to determine the differences in the extent of labour force participation, and in the level and configuration (age profile) of earnings. Aggregate data are not useful to test these propositions, because of the fact that in any society more than one marriage structure will exist at the same time. To test the proposition, it would be necessary to classify men and women according to the properties of the marriage markets that they have entered or are likely to enter.

The reason why the structure of marriage markets plays such a significant role is that this structure helps to determine the terms of marriage contracts through which the gains resulting from family formation are divided between men and women. There are many ways to measure the gains from trade in marriages. One is to compare pre-trade with post-trade wealth or welfare. I have argued in this essay that some structures lead to greater improvements in the wealth or welfare positions of women relative to men. One index of that improvement would be participation in the labour force on terms and conditions that more closely resemble those which men encounter.

The structure of marriage markets, I have argued, is not a given of nature like the motion of planets; instead, it is a reflection of the technological and institutional constraints that face utility-maximizing men and women. Given that, it follows that changes in the characteristics of these constraints will generate changes in the structure of marriage, and related markets. One should note that changes in constraints have never been preordained to lead to changes in the structure of marriage markets that would necessarily improve the terms and conditions under which women could participate in the labour force. That they appear to have done so is very much a reflection of the desires and ambitions of women.

In broad terms, it would seem that the approach adopted here is consistent not only with the picture that emerges from the broad trends summarized earlier in this essay, but also with a wide spectrum of microdata. For example, it appears consistent with the fact that women's plans about labour force activity are related to expected fertility,[65] that childbearing constrains labour force participation,[66] but in an indirect and complicated way related to occupation and educational achievement,[67] and that discontinuous labour force participation adversely affects earning patterns.[68]

I should note in concluding this section that I have not discussed attitudes and motivations. This is not because the problems raised by these issues are unimportant. Many men resent what is currently happening in marriage and labour markets, just as many of their counterparts in earlier days, no doubt, lamented the passage of old-fashioned marriage markets. Social problems of all sorts are attributed to the relationships that working parents have with their children. Some women resent having to play a more active role in family formation and hark back to earlier days of greater passivity.[69] And many men and women deny biological and other differences between them and feel diminished at the idea that they may be important. All these, and others like them, are important problems. But, as I read the world, they are consequences of the working of the more basic forces that I have tried to outline in this essay.

Those who believe that a change in the attitudes of men would improve the situation of women, or that a

change in the attitudes of women would ameliorate the lot of men, are possibly right, but, I would argue, not unless those attitudinal changes led to changes in real forces. I would hope that no one would rely on attitudinal changes alone to improve the labour force status of women.

3 Policies

The model suggested in the first two sections of this essay is in the nature of a positive or descriptive hypothesis. In this section, I turn my attention to normative or policy considerations, restricting myself to those which follow from the positive model. That may give the appearance that the policy analysis is more definitive than it really is; but, at the same time, it indicates where the prescriptions come from.

Background

Only two broad policy questions will retain my attention.[1] The first pertains to whether private decisions – that is, decisions by parents – with respect to the number of children are optimal, in the sense that they lead to the number of children that is socially desirable. The second relates to whether the labour force participation of women and the factors surrounding that participation are also optimal.

These questions can be answered in a number of "normative frameworks." For example, if I postulate that the state is the arbiter of what is socially desirable and if I assume that the size of population that maximizes the state's social welfare function is "large" because, let us say, the state is preparing a military expedition, then it is likely that private decisions alone will lead to a population size that is inferior to that desired by the state. In that context, the social value of children is greater than their private value.

The normative game is endless; it can lead to the conclusion, as in the foregoing, that children have positive external effects (positive externalities) or it could lead, with the same ease, to the conclusion that they shed negative externalities. The framework that I shall adopt for the following discussion – a framework that for lack of space and to avoid personal aggravation, I shall not defend – is the following. The arbiters of what is socially desirable are individuals and not collectives; their decisions are optimal when certain conditions pertaining to the environment are satisfied; and the task of policy analysis is to focus on the environment or, more generally, on the conditions governing or conditioning decision making.

In the positive model of the marriage markets that I have suggested earlier in this essay, these conditions pertain in the final analysis to only two things: 1) the constraints on men's and women's choices; and 2) the structure of the marriage market. To put it as simply as possible, optimality requires a "perfectly functioning" marriage market – that is, a market characterized by equality and symmetry in the conditions under which decisions are made by men and women and under which exchange is effected. Failures in the market in which families are founded will lead to a larger number of children than is socially optimal and to less labour force participation by women than is socially desirable. I must stress – although Chapter 2 should have made that point abundantly clear – that a perfectly functioning marriage market is more than a competitive market. To function perfectly, certain structural characteristics must also be met. In particular, the needs, demands, and influence of "outsiders" – typically parents – must have no effect on the decisions made by the parties involved. In addition, women, as well as men must not be prevented – by conventions, customs and social pressures – from making offers or from accepting or rejecting any that are made to them.

I have argued earlier that this exchange equality between men and women requires that women be able to control their biology and that they not be "determined" to certain tasks by the obligation to care for and rear their offspring. I shall return to that point shortly. In the meantime, note that when the dominant organizational forms of marriage markets are the old-fashioned or the traditional ones, there is a tendency towards a division of labour in families where the welfare of men and women is not as large as is technically possible and where the number of children is larger – and the labour force participation of women, smaller – than the optimum. It is important to understand what this argument says and what it does not say. To that purpose, let me focus on the case of old-fashioned marriage markets, in which I assume that parents marry off their children for the sake of obtaining security for themselves.

The fact that an old-fashioned marriage market structure fails with respect to the issues discussed (children and labour force participation) follows from the recognition that those who benefit from what is being produced are not those who produce it. To assume that these variables would be optimal under those conditions, one would be obliged to point to an intergenerational market in which children provided their parents with security, in exchange for a *quid pro quo* of comparable value that they would expect to receive from their own children. The conditions required for this kind of intergenerational exchange to exist are almost impossible to fulfill.[2] In addition, the historical evidence pertaining to the laws, regulations, and practices that societies have enforced to ensure that children will provide security for their parents when the state does not do so belies the view that such exchange arises naturally.

One need not stress that in a modern marriage market – one in which parents play no role in the exchange relationship between mates – children may still choose to supply their parents with security and other similar goods. The point, however, is that in such a market the decision to found a family is not governed by those considerations.

As already noted, the equality and symmetry between the parties (that is, between men and women) that characterize the exchange conditions of a modern marriage market constitute only a necessary condition for optimality with respect to the division of labour between mates, the labour force participation of women, and the number of children. It is impossible in an essay such as this to specify the conditions that would suffice; however, it is possible to state that, in addition to a well-functioning marriage market, the optimum division of labour in families and the optimum number of children would require that certain conditions be met in related markets also.

Suppose that in the rearing of very small children, there are significant economies of scale that could be reaped through such arrangements as daycare centres, nurseries, and kindergartens. The presence of these economies of scale over a significant number of children could make the efficient private provision of such services unprofitable; other forms of supply might therefore be required, such as cooperative arrangements or public support. If these are not forthcoming for one reason or another, even a perfectly functioning modern marriage market would lead, in this particular case, to a number of children that was socially too small, if, as is likely, the mere expectation of having to care for children of itself induced women either not to marry or to have very few or no children; something they can decide to do in the context of a modern marriage market where contraception is efficient. In that situation – a failure in the market for daycare services – the labour force participation of women would be socially excessive.[3]

There is no need to pursue this argument any further. Once the division of labour in families is acknowledged to be a consequence of individual decisions conditioned by technological and institutional constraints, there is a distinct possibility that the labour force participation of women and the number of children would be less than optimal. Improvements in market structures, in the control over biological reproduction,[4] in the modes of private and social insurance against old age, sickness, and so on; and in institutions that enable a redistribution of the burden of caring for and rearing children – all of these push in the direction of a more ideal division of labour in marriages, a more ideal participation of women in the labour force, and a more ideal number of children.

Policy Analysis

The hypothesis suggested in the foregoing pages can serve as a guide for policy analysis, as well as for policy recommendations. As the reader will have been able to establish for himself or herself, the model focuses on long-run forces and on the determinants of long-run equilibrium positions. That must be the perspective adopted here also. Consequently, such issues as the lack of information that employers may have regarding potential employees, (which could have a significant influence in the short run) may not be important determinants of outcomes in the longer run.

This point is important enough that it will be useful to dwell on it briefly. Suppose that, to prevent certain forms of discrimination that it believes to be important, the state makes it illegal for employers to inquire into the (real) marital status of prospective women employees. By so doing, it inadvertently prevents employers from acquiring information on the probability of a birth on the part of those employees, since it is reasonable to assume that that probability varies with, among other things, marital status. Because birthing usually implies some more or less lengthy absence from the labour force, it tends to affect in an adverse fashion the value of that part of human capital that is not specific to birthing. The extent to which this human capital is adversely affected in this way will vary with the occupation, the age of the person, the length of absence from work, and other variables.

Because of the law, we can assume that if entrepreneurs are unable to ascertain the differences in

the probability of birthing on the part of prospective employees, they will impute the same probability to all in a given cohort. Since that probability must be positive and since it affects the value of human capital adversely, we must conclude that the legislation, though it may be successful in eliminating one type of discrimination, will result in all women earning less than men of equivalent ability, age, training, and so on.

Is such a result likely to persist in the longer run if a modern marriage market emerges? I would suggest that in all likelihood it will not. Why? Simply because, as a modern marriage market emerges, women will acquire the kind and volume of human capital that they desire through schooling, experience, and job mobility, and these will become the true indexes of the expected probability of birthing. It will then be possible for employers to differentiate between the value to their enterprise of a prospective woman employee without any information about marital status, since it will be possible to infer the information about the probability of birthing from her portfolio of human capital.

To put it in different terms, women will reveal to the market their expectations with respect to the number, timing, and spacing of children by the decisions that they will have made about marriage and human-capital formation. It is in this perspective that the following discussion of policy is conducted.

If the model developed in the previous pages is at all successful in capturing some significant forces that help to determine the labour force participation of women, then the policies that will redress any market "failures" will have to be policies that foster the emergence of modern marriage markets. Many of the more important policies may already be in place in the industrialized societies, but because historically many laws, regulations, and government practices have discouraged the emergence of modern marriage markets, a new look at the existing policies in such areas as pensions; health and hospital insurance; kindergartens, nurseries, and primary school arrangements (schedules, days off, or opening and closing times),[5] and so on may be rewarding. It may shed light on the extent to which these policies still support aspects of old-fashioned and traditional marriage markets – in particular, the fostering of the indebtedness of children towards parents.

There are some aspects of the welfare state, however, that hinder the emergence of modern marriage markets. Let us look briefly at two of these: maternity leave and family allowances. First, maternity leave has the effect of increasing the cost of employing women, compared to employing equivalent men; thus it lowers the demand for women's labour.[6] Second, maternity leave lowers the cost of birthing for women and thus increases the demand for children on the part of women. These two effects both operate in the direction of reducing the demand for nonbirthing human capital on the part of women and thus of biasing the conditions for equal labour force participation by men and women. Against these two (substitution) effects, which I suspect probably dominate other effects in the long run, there exists a sort of income or wealth effect that, by guaranteeing work after a pregnancy, increases the attachment to the labour force and hence the demand for human capital. My hunches notwithstanding, the overall effect of maternity leave is an empirical question. (A better policy with respect to leave is discussed below.)

Family allowances also have substitution and income effects. If tailored to do so, they will alleviate poverty, and they may place own-money in the hands of women; that effect is probably neutral with respect to the labour force participation of women and to the demand for human capital, at least as long as the sums paid remain as modest as they are now in all countries where such programs exist. The substitution effect is the same as for maternity leave.

Turning to a different subject, it is often argued that one thing that would improve the conditions under which women participate in the labour force would be the development of part-time jobs for women that would enable them to earn an income by selling time in the market, while at the same time birthing and rearing children. That part-time employment opportunities would, in the short run, improve the working conditions of women cannot be denied. But again, the long-run (substitution) effect of such opportunities would be to induce women to acquire a portfolio of human capital that would bias the terms of labour force participation against them, when compared with men.

There is no doubt that the ability to participate in the labour force on a part-time basis would make the rearing of children much easier. Consequently, it would make it possible for parents to have the number of children that would maximize the utility of each and at the same time, allow them to engage in productive labour force activities (an income effect). The point to be stressed, however, is that the development of such part-time opportunities should not be focused on women any more than on men. In other words, only if both men and women can enter the labour force on a part-time basis will either be able to devote the time needed to care for and rear the children. Parenting in lieu of mothering would then be the observed pattern, on average.

This is not to say that both men and women should undertake part-time work activities, but simply that if part-time work opportunities existed for both groups, it would sometimes be one and sometimes the other who would engage in the labour force, just as it would sometimes be one and sometimes the other who would assume the main burden of parenting.

Above, I argued that maternity leave probably biases adversely the long-run terms and conditions under which women participate in the labour force. The argument used there applies *mutatis mutandis* to part-time labour force opportunities designed especially for women. But, in similar fashion, if a rectification of the terms and conditions under which women participate in the labour force can be partially achieved by creating part-time jobs for men, a further improvement could be achieved by the implementation of paternity leave or, much better, by the introduction of a scheme whereby parents could decide for themselves whether to select maternity or paternity leave – call it instead, "birthing leave." Such an opportunity would dramatically change the terms of trade in the marriage market and would make it rational for women to acquire human capital portfolios (schooling, health, mobility, experience, training, and so on) that were much more commensurate with the portfolios acquired by men.

The pursuit of such a policy objective is not an easy one, since such developments in labour markets can only be indirectly influenced by governments. Still, if that became a desired policy, one would expect that tax laws, wage subsidy schemes, development programs, and labour laws in general would come under intense scrutiny to evaluate all the barriers to the development of such a scheme.

This may be the time to note that women are unlikely to be unanimous on the implementation of policies that would foster the emergence of a modern marriage market and the development of unbiased terms and conditions for labour force participation. Some women will not want to participate in the labour force ever and will not want to acquire human capital portfolios that are appropriate for that participation. These women may even oppose birthing leave or part-time job opportunities for men on the grounds that such development would adversely affect their own material and/or psychic position. A similar argument could be made for some men.

There can be little doubt that if modern marriage markets emerge, the social and cultural dislocations, as well as role confusions, that would result from the fact that some men and women would participate full-time in the labour force, while others would devote substantial time to parenting, would create individual crises. That, no doubt, will make the implementation of apposite policies even more difficult.

Birthing leave and part-time job opportunities for men are unlikely to provide more than part of the incentive for the development of modern marriage markets and the appearance of unbiased terms and conditions for labour force participation by women. In the short run, at the very least, institutions such as daycare centres will be required. In the language adopted in this essay, daycare centres are "market" (or nonfamily) institutions in which parents can "purchase" caring and rearing services for their child or children. They are substitutes for nannies, nurses, maids, tutors, and preceptors. They enable both men and women to participate in the labour force on a full-time or nearly full-time basis.

The logic of the foregoing is clear enough: the development of a modern marriage market – the only kind of market that would make it efficient for women to acquire human capital portfolios commensurate with those of men – would require such institutions as birthing leave, part-time employment for men and women, and daycare centres. All these things absorb resources. The question that must be faced therefore, is whether the growth and operation of these institutions should be subsidized in one way or another by public bodies or whether their emergence should be left to market, cooperative, or other private forces?

The question should be rephrased. Public bodies can play either a negative or a positive role in any area; they can, in other words, place barriers that will prevent an outcome (a negative role) or they can offer incentives that will stimulate the outcome (a positive role). Except for a few (admittedly important) exceptions, there is a growing consensus today that barriers should be removed. The question pertains to the positive role of public bodies. Should they subsidize birthing leave, the introduction of part-time work for fathers or mothers, daycare centres, and so on? I wish to stress that I am seeking an answer that is related to the efficiency of institutional forms. This is not to deny the relevance and power of positions that pertain to justice and equity, but merely to say that efficiency problems are simpler and, on that ground, should presumably be resolved first.

The case for public intervention of the type described above – if a case can be made – must, in the first instance, rest on the optimality properties of modern marriage markets. That question was disposed of earlier. If that is granted, the remaining problem concerns the optimality of positive state intervention (when all barriers are assumed to be removed) to promote such a marriage market. The problem can be stated in an alternative way: Are there forces at work that, in the absence of state

intervention, would prevent the emergence of the subsidiary institutions (birthing leave, daycare centres, and so on) needed for the efficient operation of modern marriage markets, and therefore for the optimal participation of women in the labour force?

The answer to this question, I would suggest, is in the affirmative, without wishing to prejudge the most efficient form of state intervention. The justification for my answer is as follows: when men and women make decisions with respect to volume of investment in human capital, when they enter the marriage market to transact with each other, and when they come to contractual arrangements (possibly implicit) about the number, timing, and spacing of children, they must have a guarantee of sorts that what I have called the subsidiary institutions of modern marriage markets will exist *when they need them*. Since they are, in general, unable to provide these institutions themselves and since they need to postulate the existence of these institutions in order to make optimal decisions, someone must provide them. That "someone" need not be the state; but, in most instances, I suspect that the most efficient agent will be the state.

The absence of subsidiary institutions will imply market failure, in the same way that the absence of insurance markets implies that, in some instances, economic agents will not make optimal decisions.[7] Alternatively, one could base the argument of the last paragraph on the notion that subsidiary institutions, like clubs,[8] are pure public goods.

In summary, the case for public intervention – that is, for public subsidization of leave, daycare centres, and so on – rests on the fact that when the relevant decisions about investment in human capital and about labour force participation are made, those who make them cannot (because they are not there) signal their demand for these institutions. The market failure is the same as that which arises because intergenerational market trading is not usually possible.[9]

4 Conclusion

It would serve no purpose to present a detailed summary of the hypothesis suggested in this essay. A brief one, designed to indicate how the major building blocks are tied together, will suffice.

The question addressed in the essay, and the one that governs the entire development, is: Why do women participate in the labour force under terms and conditions that differ markedly from those that characterize the participation of men?

The starting point is the marriage market. I argue that the constraints facing men and women who make decisions with respect to the number, timing, and spacing of children, as well as with respect to security and sex, differ greatly for both. Consequently, one of the "problems" that marriage markets resolve is the "coordination" of these different decisions.

I further argue that the nature of the "coordination" achieved in marriage markets differs considerably between market structures. Some (like those which I call "old-fashioned marriage markets") bias contractual marriage terms against women, in the sense that the outcome of trade, while it may make women better off than if they (or their parents) had not entered the market, leaves them worse off than in some more ideal structure. In these less-than-ideal structures, the number of births is determined to a large extent by biological considerations.

The ideal marriage market structure, I argue, is the modern marriage market, where conditions of exchange are symmetric or equal. That structure allows women (and men) to make optimal decisions with respect to the goods that are produced in marriages, but also with respect to investment in human capital and thus labour force participation.

Also, modern marriage market structures are ideal in that they generate an optimum number of children and optimal labour force participation by women and, therefore, by men. Therefore, the case for public intervention to promote a labour force participation by women that is more equal to that of men cannot rest, in the first instance, on departures from these optima, at least if modern marriage markets are emerging. That case must rest on the need for subsidiary institutions (such as birthing leave, day-care centres, and so on) to guarantee the emergence of ideal marriage market structures and accompanying results.

Notes

CHAPTER 1

1 G. S. Becker, *The Economics of Discrimination*, 2nd edition (Chicago: University of Chicago Press, 1971).

2 K. J. Arrow, "Models of Job Discrimination," in *Racial Discrimination in Economic Life* A. H. Pascal, ed., (Lexington, Mass.: D. C. Heath, 1972).

3 J. Jones, *Prejudice and Racism* (Reading, Mass.: Addison-Wesley, 1972).

4 Calling the residual "discrimination" is a convention. Those who would choose to call it "oppression," or "submissiveness," or "lack of motivation," or any other name could do so with complete legitimacy. The residual could also be labelled "the extent of our ignorance!"

5 Current efforts do not, in my view, amount to a model. Becker's approach, which is the most elaborate of the existing approaches, amounts to conjectures about properties of utility functions from which discrimination coefficients are derived. (Becker, *op. cit.*).

6 V. R. Fuchs, "Differences in Hourly Earnings Between Men and Women," *Monthly Labor Review* (May 1971).

7 B. G. Malkiel and J. A. Malkiel, "Male-Female Pay Differentials in Professional Employment," *American Economic Review* 63, no. 4 (September 1973):693-705.

CHAPTER 2

1 See G. S. Becker, "A Theory of Marriage: Part I," *Journal of Political Economy* 81, no. 4 (August 1973); "A Theory of Marriage: Part II," *Journal of Political Economy* 82, no. 2, Part II (April 1974). See also Becker, *A Treatise on the Family*, (Cambridge: Harvard University Press, 1982), p. 39.

2 In that sense, Buchanan's clubs are families; see J. M. Buchanan, "An Economic Theory of Clubs," *Economica* 32, no. 125 (February 1965):1-14. The literature on clubs generally assumes, however, that the services produced and/or consumed by members are public or nonprivate goods. The consumption of families is not restricted in that way, although elements of publicness have a role to play, as I shall undertake to show later on.

3 For themselves or for others; (see below, especially the section of this chapter on family formation).

4 G. S. Becker, "A Theory of the Allocation of Time," *Economic Journal* 75, no. 299 (September 1965); and K. J. Lancaster, "A New Approach to Consumer Theory," *Journal of Political Economy* 74, no. 2 (April 1966).

5 Adding someone else's consumption or utility to one's utility function and calling the relationship "love" is strictly formal and not very enlightening.

6 Becker's efforts notwithstanding; see Becker, "A Theory of Social Interactions," *Journal of Political Economy* 82, no. 6 (November-December 1974).

7 I have been told that families have utility functions; that they do not, but that the mates maximize jointly!; that mates have different functions before marriage but the same after marriage (and, I imagine, different again after divorce!); that the functions are different, but that love allows us to treat them as unique; some commentators have even mentioned the social welfare function as a way of having individual utility functions for mates and a collective utility function for the family; whose social welfare function is left unsaid. The problem is that there is an interaction between mates that one must decide to model in one way or another. I find it more enlightening to represent that interaction as an exchange or trade process. That is a defensible research strategy. Those who prefer merged utilities to exchange will, I suspect, find it hard to understand the marriage market as a locus of give and take. But that, too, is a defensible research strategy.

8 These markets may be characterized by various "imperfections." This is certainly true of the market for sex and of that for children. The fact that there are often black markets may complicate the analysis but does not deny substitution. In particular, the near-universal ban on black markets for babies, though it surely reduces the supply of children and hence the availability of substitutes for home-produced children, is certainly welfare enhancing.

9 These are, of course, the same as those listed above, except that the quantity and quality of children are distinguished.

10 Let X be the "nonfamily" services for women and Y those for men (as the chromosomes are labelled!) and let I be sex or intercourse, N the number of children, Q their quality, and S security. Then, the utility functions of women are:

$$U^w = U^w(I,N,Q,S;X); \quad (1)$$

those for men are:

$$U^m = U^m(I,N,Q,S;Y) \quad (2)$$

11 As I emphasize below, it is essential when analysing the division of labour in marriages and the consequent participation (or non-participation) of women in the labour force to distinguish between pregnancy control (contraception), birth control, and fertility control. Even then, "perfect" birth control is not easy to define. It certainly requires 100 per cent protection against unwanted *and* unplanned births. Keyfitz, with contraception in mind, would require that it "be so simple and automatic that no one could forget to apply it" so that "there would be no need for abortion as a back-up," and also that it be "entirely harmless and inoffensive so no one could feel disinclination to use it;" see N. Keyfitz, "How Birth Control Affects Births," *Social Biology* 18, no. 2 (June 1971):118.

12 Though it plays no role in his model, such a relationship is recognized by Becker, in *A Treatise on the Family*, p. 44.

13 This birthing function can be written as

$$\bar{N} = B(I,m_i,\beta) \quad (3)$$

in which $\bar{N}$ is the expected number of births, m_i are the birth control devices, ordered according to level of efficiency, and β is a vector of variables like age, fecundability, and so on. If β is consistent with pregnancies, we see from (3) that, for women, $N = 0$ implies $I = 0$ unless m is "perfect." The marginal productivity of intercourse is given by

$$\frac{\partial \bar{N}}{\partial I} = B_I > 0 \quad (4)$$

with (see Keyfitz, "How Birth Control Affects Births," p. 113).

$$\frac{\partial^2 \bar{N}}{\partial I^2} = B_{II} < 0 \quad (5)$$

14 Surgical contraceptive sterilization (including hysterectomies, often performed on poorer women) is used to end pregnancies and births (at least as long as Fallopian ligations and vasectomies are irreversible), not to control them, in any meaningful sense of the word. This is one reason for distinguishing between pregnancy control and birth control.

15 See, for example, R. J. Willis, "A New Approach to the Economic Theory of Fertility Behaviour," *Journal of Political Economy* 81, no. 2, Part II (March-April 1973):S.17; and H. Leibenstein, "An Interpretation of the Economic Theory of Fertility: Promising Path or Blind Alley?" *Journal of Economic Literature* 12, no 2 (June 1974):459-60. Becker writes ("I believe that these improvements in birth control methods [the diaphragm and the pill] are mainly an induced response to other decreases in the demand for children rather than an important cause of the decreased demand;" see *A Treatise on the Family*, p. 101. This is not an outright rejection of the effect of birth control on fertility (nor is the explanation on p. 99 of why he has reversed the view he held in 1960), but it serves to exclude birth control technology from the formal model that follows, though not from applications (see, for example, pp. 107-108, 112, and 251).

16 Becker, *A Treatise on the Family*, p. 101 [italics added].

17 On the use of infanticide to regulate fertility, see Y. Brissaud, "L'infanticide à la fin du Moyen Âge, ses motivations psychologiques et sa répression," *Revue historique de droit français et étranger* 50 (1972); M. M. McLaughlin, "Survivors and Surrogates: Children and Parents from the Ninth to the Thirteenth Centuries," in *The History of Childhood*, ed. L. de Mause (New York: Psychohistory Press, 1974); and S.C.M. Scrimshaw, "Infant Mortality and Behaviour in the Regulation of Family Size," *Population and Development Review* 4, no. 3 (1978).

18 For a measure of the efficiency of breast-feeding; see J. Henripin, *La population canadienne au début du XVIII^e siècle* (Paris: Presses Universitaires de France, 1954), pp. 86-89.

19 For analyses of the evidence, see Social Policy and Research Department, United Community Services, *Babies by Choice Not by Chance*, vol. I (Vancouver: 1972); D. A. Dawson, D. J. Meny, and J. C. Ridley, "Fertility Control in the United States Before the Contraceptive Revolution," *Family Planning Perspectives* 12, no. 2 (March-April 1980):82-83; J. Blake, "Income and Reproductive Motivation," *Population Studies* (November 1967):198-99; T. R. Balakrishnan, J. F. Kantner, and J. D. Allingham, *Fertility and Family Planning in a Canadian Metropolis* (Montreal: McGill-Queen's University Press, 1975), p. 22; B. Berkov and J. Sklar, "Does Illegitimacy Make a Difference? A Study of the Life Chances of Illegitimate Children in California," *Population and Development Review* 2, no. 2 (1976); J. Henripin, *La population canadienne*, p. 55; and C. F. Westoff and N. B. Ryder, *The Contraception Revolution* (Princeton: Princeton University Press, 1977), Chapter 4; and D. A. Dawson, et al., *op. cit.*, p. 85.

20 See E. W. McDonnell, *The Beguines and Beghards in Medieval Culture* (New York: Octagon Books, 1969). I return to the beguines later; beghards were never quantitatively significant.

21 In the world of historical experience, many variables enter the utility function besides those upon which I have focused. Consequently, many more alternatives are open to women. The above list is only illustrative.

22 The evidence points in that direction; see C. F. Westoff, "Coital Frequency and Contraception," *Family Planning Perspectives* 6, no. 3 (Summer 1974):136-41.

23 See S. N. Cheung, "The Enforcement of Property Rights in Children and the Marriage Contract," *Economic Journal* 82, no. 326 (June 1972); and also McLaughlin, "Survivors and Surrogates," pp. 124 ff.

24 When birth control methods are insufficient and medical knowledge is poor, repeated pregnancies do

not only increase births, but they can endanger the health and the lives of mothers (as has often happened).

25 See McLaughlin, "Survivors and Surrogates," pp. 126-27.

26 Let p_l be the price of sex when it is obtained outside marriage. (In practice, p_l is more a vector than a scalar, since the product has many components; see second next footnote). The budget constraint is therefore

$$p_l I + \ldots + = M \tag{6}$$

where M is income. In the maximization of (2) subject to (3) and (6), one expects that in many instances only one of the constraints will be binding. For an explanation of why that is so, the reader is referred to the text.

27 There are other reasons besides those derived in the text, why men (and women) may enter the market for sex. To obtain these reasons from the analysis and not as intuitions or *obiter dicta*, more detailed utility functions and more constraints are needed than I provide in the text.

28 The price of sex can be understood to include, in addition to the cash payment that has to be paid and the value of time forgone, when purchasing the product, the other conditions ruling in the market, such as the incidence of syphilis, the cost of being apprehended if the market is a black one, the expected cost of punishments, including the publication of one's name in the local paper, and so on. When contraception is imperfect, the price of extramarital sex also includes the expectation that men may be held responsible and/or made to support financially the children issuing from the relationship – an expectation that surely varies considerably between societies. For an interesting discussion of the relationship of price to the incidence of extramarital affairs, see R. C. Fair, "A Theory of Extramarital Affairs," *Journal of Political Economy* 86, no. 1 (February 1978):45-61.

29 For an interpretation of some evidence as pointing towards a biological basis for mothering, see A. S. Rossi, "A Biosocial Perspective on Parenting," *Daedalus* 106, no. 2 (1977). The evidence is not strong. Rossi marshalls it well; though in some instances, she does push very hard. She reports, for example, that mothers "cradle their infants in their left arm, regardless of their particular handedness" (p. 6) in support of the notion of a strong mother-infant relationship. But surely, unless evidence is adduced that fathers cradle their infants in their right arm, regardless of their handedness, nothing has been demonstrated by such evidence.

30 For a longitudinal study of the adjustment and success of a cohort of orphans confined at different ages to a very "institutional" or "bureaucratic" orphanage, which *implicitly* downplays biological factors, see B. M. Flint, *New Hope for Deprived Children* (Toronto: University of Toronto Press, 1978).

31 See, for example, G. S. Becker and H. G. Lewis, "On the Interaction Between the Quantity and Quality of Children," *Journal of Political Economy* 81, no. 2, Part II (March-April 1973); Willis, "Fertility Behaviour"; J. N. DeTray, "Child Quality and the Demand for Children," *Journal of Political Economy* 81, no. 2, Part II (March-April 1973); and Becker, *A Treatise on the Family*, Chapters 5, 6 and 7.

32 On the assumption that in family production only the time of parents is used to produce quality, the hypothesis in the text is that:

$$\sigma_{wm} = R(N,D) \tag{7}$$

with $\sigma_{wm} = dt^w/dt^m < 0$, in which t^w and t^m are the time inputs of women and men, respectively, N the number of children and D a vector of market substitutes for t^w and t^m, such as daycare centres, nannies, and so on. I further assume that

$$R_N = \frac{\partial \sigma_{wm}}{\partial N} < 0 \tag{8}$$

and that

$$R_D = \frac{\partial \sigma_{wm}}{\partial D} > 0 \tag{9}$$

The justification for the signs of (8) and (9) is given in the text. I should add that R_{NN} is most certainly negative, at least after a point.

33 McLaughlin reports that medieval practice among the nobility of Europe was to place children between the ages of five and seven in monasteries to be trained and educated; see "Survivors and Surrogates," pp. 128-30.

34 Given equations (3) and (7), we obtain the following:

$$\frac{d\sigma_{wm}}{dm_i} = \frac{\partial \sigma_{wm}}{\partial N}\frac{\partial N}{\partial m_i} > 0 \tag{10}$$

35 In addition to children, there are many factors that increase material security; together they constitute wealth – the discounted stream of all material benefits accruing to someone. I hold all of these constant in the present discussion, since they do not appear to be important for the topic of this essay. (But see the discussion that follows on alternative ways to acquire security).

36 See A. Breton and R. Wintrobe, *The Logic of Bureaucratic Conduct* (New York: Cambridge University Press, 1982), Chapter 4.

37 A similar argument could be developed from the hypothesis advanced by Y. Ben-Porath on identity in "The F-Connection: Families, Friends, and Firms and the Organization of Exchange," *Population Development Review* (March 1980).

38 The notion that many of the activities of modern governments are, in effect, a provision of security is already found in J. M. Buchanan and G. Tullock *The Calculus of Consent* (Ann Arbor: University of Michigan Press, 1962).

39 See Cheung, "Enforcement of Property Rights."

40 See McLaughlin, "Survivors and Surrogates"; and R. Gryson, "Dix ans de recherches sur les origines du célibat ecclésiastique – Réflexion sur les publications des années 1970-79", *Revue Théologique de Louvain* 11, no. 2 (1980).

41 If one relates investment in offspring to the prices they will fetch in the marriage market, one would have to conclude that when the sex ratio (*w/m*) is greater than one, larger investments are made in boys; while when it is less than one, they are made in girls.

42 This may be the place to repeat that this is not an essay in history. I have been told that the "old-fashioned marriage market" was restricted to certain social classes and never extended to all the groups in a society. I am well aware that this was the case in Europe, though it is less clear that it was so in other societies. I would go further still: among the nobility and the wealthy of Europe, where that structure predominated for a period, it never existed in pure form. I did wonder about whether the historical facts given in the text help the reader more than they hinder him or her. The overwhelming weight of opinion among those I have consulted is that they are useful.

43 I restrict the discussion to the Beguines because it seems that that movement mirrored developments taking place in religious orders fairly well (see below). There is no doubt, however, that a more complete analysis – one that sought to do more than illustrate – would have to examine both types of orders (lay and religious), as well as developments in the orders for men.

44 McDonnell, *Beguines and Beghards*, p. 84.

45 There are still a number of inactive beguinages (residences of beguines) in existence, mostly in Flanders; but the author visited an active one as far south as Greece in 1980.

46 It is not known who created the order, but tradition gives the credit to a priest from Liège (Belgium) called Lambert Begh (or de Bègue) – hence the name "beguine."

47 McDonnell, *Beguines and Beghards*, p. 85.

48 This statement is based on McDonnell's argument. No doubt the demand for distinction and reputation also played a role in determining the distribution of women between nunneries and beguinages.

49 A number of beguinages, especially in the earlier years, were headed by men (priests and monks). If these cases are defined to constitute polygynous families, then polygamy was rampant in early medieval Europe. Two problems require explanation if that definitional convention is accepted: first, since these men were assigned to beguinages by their superiors for periods of variable duration, one must explain the meaning of what was a sort of "rotating" polygyny; second, an explanation is needed for those beguinages (which became more and more numerous as years wore on and as bishops and popes granted permission) that were headed by women and that were composed solely of women.

50 Otherwise, the use of prostitutes, constitutes polygamy as do "extramarital affairs." Such a definitional convention is harmless if one is capable of providing an explanation for the differences in the arrangements commonly known as polygamy, prostitution, and affairs! In any event, such a convention would make it impossible to know anything about the real-world incidence of polygyny and polyandry now or at any other time or place in history.

51 See W. J. Goode, *World Revolution and Family Patterns* (New York: Free Press, 1963), p. 282.

52 There is a bias in the foregoing discussion. To remove it, one would have to refer to "male concubines," to "male harems," and so on. Though I have engaged in only modest research on the subject, I could not find these expressions anywhere. Is the absence of terms such as "male concubines" and "male seraglios" an indication that such persons and places have never existed?

53 The legal right that medieval lords had "to place a leg" in the bed of any newly married bride and, in some parts of Europe, to spend the first night with her. With the passage of time, that right was greatly extended.

54 See R. Wintrobe, "It Pays To Do Good, But Not To Do More Good Than It Pays," *Journal of Economic Behaviour and Organization* 2, no. 2 (1981).

55 See, for example, J. J. McCall, "Economics of Information and Job Search," *Quarterly Journal of Economics* 84, no. 1 (February 1970); and P. Nelson, "Information and Consumer Behaviour," *Journal of Political Economy* 78, no. 2 (March-April 1970).

56 See, for example, D. Gale and L. S. Shapley, "College Admissions and the Stability of Marriage," *American Mathematical Monthly* 69, no. 1 (1962).

57 Assuming that all transactions take place at equilibrium – that is, that no trades are conducted at "false" prices – as is done in virtually all economic literature must rest on the assumption that market processes converge rapidly to equilibrium.

58 J. R. Hicks, *Value and Capital*, 2nd edition (Oxford: The Clarendon Press, 1946), p. 122.

59 This is true for men also – a fact that only strengthens the argument suggested in the text.

60 G. Greer, *The Female Eunuch* (New York: McGraw-Hill; Bantam Books, 1971).

61 It is possible that their victories did, however, contribute to bringing about the changes in the structure of marriage markets that began to emerge many years later.

62 The foregoing discussion has devoted considerable space to the notion of equilibrium. As noted, this is never an easy concept. In addition, references to "involuntary" behaviour, though acceptable to Keynesian analysis, is anathema to neoclassical economics. The problem is further complicated in the case of marriage markets by all kinds of features that are not important in other markets: divorce generally, but mostly divorce that is desired by only one party; single men and women who would like to marry but whose offers are always rejected, or who receive no offers; and so on. These issues have either not been addressed or, when addressed, have not been resolved. Much more work is needed on that difficult subject.

63 See, for example, F. P. Santos, "The Economics of Marital Status," in *Sex, Discrimination, and the Division of Labor*, ed. C. B. Lloyd (New York: Columbia University Press, 1975); and J. Mincer, "Family Migration Decisions," *Journal of Political Economy* 86, no. 5 (October 1978).

64 Clearly, utility functions also change but not in a way that is easy to follow. For that reason, I pay no attention to such change in what follows.

65 L. Bumpass and C. F. Westoff, *The Later Years of Childbearing* (Princeton: Princeton University Press, 1970); P. K. Whelpton, A. A. Campbell and J. E. Patterson, *Fertility and Family Planning in the United States* (Princeton: Princeton University Press, 1966).

66 W. G. Bowen and T. A. Finegan, *The Economics of Labour Force Participation* (Princeton: Princeton University Press, 1969).

67 L. W. Hoffman, "The Employment of Women, Education and Fertility," *Merrill-Palmer Quarterly* (1974) pp. 99-119.

68 S. W. Polachek, "Discontinuous Labor Force Participation and Its Effects on Women's Market Earnings," in C. Lloyd ed. *Sex Discrimination and the Division of Labor* (New York: Columbia University Press, 1975).

69 As witness the very important role of women in the anti-ERA drive in the United States.

CHAPTER 3

1 There are other questions that could be addressed in relation to optimal security provision, optimal incidence of intercourse, and so on. I leave these for further research.

2 For an appreciation of the problems, see P. A. Samuelson, "An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money," *Journal of Political Economy* 66, no. 6 (December 1958); G. S. Becker, "A Theory of Social Interactions"; and R. J. Barro, "Are Government Bonds Net Wealth?" *Journal of Political Economy* 82, no. 6 (November-December 1974).

3 I have been asked: "socially excessive from whose point of view?" Within the framework adopted, the labour force participation of women is excessive from their own point of view, because their decisions are taken with respect to environmental parameters that are not optimal – in this case, the nonprovision of daycare services attributable to the presence of economies of scale.

4 I do not have technical improvements in mind, of course, but rather such things as the diffusion of information, easy access to birth control devices at competitive prices, and so on.

5 Some recent developments in these matters deserve a much closer look than they have been given so far. As a result of the unionization of school teachers, there have developed a number of practices, such as the introduction of professional development days (so-called P-D days) for teachers, that hinder the labour force participation of women by reducing the baby-sitting functions that schools are so efficient at performing.

6 Evidence of this effect is sparse; my own observations, however, are not inconsistent with this statement. See E. G. Bell, "Women at Work in Great Britain," in *Strategies for Integrating Women into the Labour Market*, K. Hvidtfeldt, K. Jorgensen, and R. Nielsen, ed., European Women's Studies in Social Science, no. 1, Copenhagen, 1982, especially p. 245.

7 See K. J. Arrow, *Essays in the Theory of Risk-Bearing* (Chicago: Markham Publishing Co., 1971), especially Chapter 5.

8 See, for example, W. H. Oakland, "Congestion, Public Goods and Welfare," *Journal of Public Economics* 1, no. 3/4 (November 1972):339-58.

9 See Samuelson, "Consumption-Loan Model of Interest."

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