

**Will I Be a Welfare Mother When I Grow Up?
A Theory of Women's Welfare Dependency,
Marriage, and Labor Supply***

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ABSTRACT

This paper provides a rational choice model that simultaneously analyzes women's decisions about welfare dependency, labor supply, and marriage. The model is based on the Demand and Supply (D&S) models of marriage inspired by Becker's theory of marriage. In addition to reproducing old insights about income effects and marriage market effects on welfare dependency, the model offers new insights regarding the effects on welfare dependency of sex ratios, divorce laws, cohort size, and traditional expectations about marriage and family. The model helps understand why welfare is more common among black women in the U.S and offers a new interpretation for past trends in American women's welfare dependency: the big increase in welfare dependency in the late 1960s is interpreted as a baby-boom phenomenon and recent reductions in welfare dependency are partially seen as the expression of young women's better marriage market opportunities.

1. Introduction

A number of studies have shown that marriage is a major factor pulling American women out of welfare dependency (see e.g. Bane and Ellwood (1983), O'Neill et al. (1984), Ellwood (1986), Tienda (1990), and Moffitt (1992)). It has also been shown that in U.S. cities where more potential mates are available, and marriage markets are thus more favorable to women, women have a lower likelihood of welfare dependency (see e.g. Fitzgerald (1991, 2003) and Winkler (1994)). However, few economic models analyze women's choice between marriage and welfare dependency. This paper offers a model that seeks to improve our understanding of the determinants of mothers' welfare dependency.

The model analyzes women's choices among three alternative 'careers' and 'life-styles': welfare dependency, marriage, and labor force participation. Like many previous rational choice models dealing with family formation, the following model is part of the New Home Economics (NHE) tradition pioneered by Jacob Mincer (1962, 1963) and Gary Becker (1960, 1965). Some previous rational choice models of welfare dependency (such as Moffitt 1983) focus on the choice between work in the labor force and welfare dependency, ignoring the choice between welfare and marriage. The welfare/marriage choice is also ignored in consumer choice models of welfare dependency, such as Nechyba (2001).

The few rational choice models that analyze the choice between welfare dependency and marriage, such as Becker (1981), Danziger et al. (1982), Rosenzweig (1999), Neal (2002), and Fertig, McLanahan, and Garfinkel (2003), either fail to take account of marriage market conditions as determinants of welfare dependency, or ignore choices between welfare

dependency and labor supply. What is unique about the following model is that it simultaneously considers the choice between welfare dependency and lone motherhood and the choice between welfare and work, and that it incorporates marriage market effects on all three behaviors: welfare dependency, marriage, and labor supply.

The model follows Becker's (1973) original theory of marriage in (1) conceiving of marriages as non-profit firms and comparing singles looking for a match to entrepreneurs interested in hiring workers; (2) applying a Demand and Supply (D&S) model of marriage that recognizes possible heterogeneity of marriage market participants and assumes competition; and (3) assuming that marriage involves work in marital production, which includes reproduction and childrearing. The first two features of Becker's theory of marriage appear in both Becker (1973) and in the *Treatise on the Family* (Becker 1981). The third feature of Becker's theory of marriage, which encouraged a number of Becker's students in the 1970s to borrow more analytical tools from labor economics, appears only in the 1973 version of the theory.¹ The following statement in Becker (1973) is particularly clear: "...the 'shadow' price of an hour of t_f [wife's work in marital production] to a single M [male]—the price he would be willing to pay for t_f —would exceed w_f [the female wage], and the 'shadow' price of an hour of t_m [husband's work in marital production] to a single F [female]—the price she would be willing to pay for t_m —would exceed w_m [the male wage]." This application of a demand for labor to the case of work in marital production is dropped in the *Treatise*.²

As is clear from this quotation, Becker assumes that the value of time of spouses working in marital production is the wage that they would obtain if they participate in the labor force. Nowhere in his theory of marriage does Becker specify who makes decisions about allocation of time in marital production. Do spouses decide over their own time allocation? Is who works in marriage a joint decision? Or is it the head of the household who decides? Becker does not clarify the identity of the agent.

Grossbard-Shechtman (1984, henceforth Grossbard 1984) pursues the analogy with labor

¹ An example of a Becker student who borrowed further tools of labor economics and applied them to the economics of marriage is Michael Keeley, who pioneered search models of marriage (see Keeley 1977).

² Furthermore, in the latter publication the analogy with labor economics models is less obvious in that the *Treatise* does not include a D&S model assuming heterogeneity of marriage market participants. For more differences

economics models further than Becker (1973) by clarifying the agency of the decision-maker choosing levels of work in marital production. Grossbard assumes that (1) it is the self who decides whether to work in marital production or not, and if so, how much to work, and that (2) in making such choices the self takes into account market conditions in competitive markets for workers in marital production.³ These two assumptions are now examined more carefully.

- The self-agency assumption states that workers in marriage supply their own labor in marital production. In Grossbard's (1984) D&S model of marriage individual and market supplies of work in marital production are analogous to supplies of labor to other non-profit or regular firms. Essential to all D&S models dealing with workers, whether they work in the labor force or in marriage, is the assumption that workers have portable human capital (HC) and that they decide whether to bring this HC to a firm or not. If they start working, they can decide whether to keep this HC in the same firm or to bring it from one firm to another. The same applies to workers in marriage who can bring their HC into a marriage with a specific partner and then decide to move it out of this marriage, perhaps to then allocate it to another marriage. In that sense, the supply of services in marriage is a particular form of supply of labor services. To the extent that work in marital production involves having children desired by a spouse, individual women can be said to supply genetricial (child-production) services to men and the skills related to such production can be defined as genetricial human capital (see Grossbard 1976).⁴
- Labor supply in competitive labor market models is a decision by individuals willing to supply varying amounts of services at varying compensation levels.

between the two versions of Becker's theory of marriage, see Grossbard (2004).

³ See also Grossbard-Shechtman and Neuman (1988) and Grossbard-Shechtman (1993). Note that the degree of competitiveness in a marriage market is correlated with the ease of divorce: the more divorce is accepted in a society, the freer agents are to choose their mates, the lower the costs of exit, and the more the assumption of competition applies.

⁴ I first presented this view of 'occupation: wife' in Grossbard (1976), a model applied to an Eastern Nigerian society where women did not participate in the labor force, women's choices were limited to either remaining single (and die..) or accepting a career in occupation-wife. The expression 'occupation: wife' is inspired by Helen Lopata's (1971) book "Occupation: housewife." A housewife is generally defined as a full-time wife. In this paper, women can be housewives on a part-time basis, and the same holds for men who work in marital production.

Likewise, decision-makers deciding whether to enter a career working in marriage have supply functions before they ever enter a match, their supply reflecting their willingness to work at various potential compensation levels. When all demands and supply interact in the market, actual compensation levels are established. A drawback of D&S models is that they rely on the operation of a price mechanism. This drawback is minimal when prices are observed, as has been the case in labor markets since feudalism disappeared in the modern world. It is more of a problem in markets for workers in marital production who rarely get compensated with observable wages. Grossbard (1984) reinterprets Becker's D&S model of marriage markets as a market model for work in marital production. Such markets establish an equilibrium value of an hour of work in marital production that varies as a function of the potential competition between all marital workers--including singles looking for jobs as marital producers--and all marital employers (including singles also looking for marital producers). This market value has pecuniary as well as non-pecuniary dimensions, and it varies by factors that segment markets for work in marital production, such as age, education, and race. In Grossbard (1984) it is this market-established compensation that individuals consider when making allocation of time decisions between marriage and work: it is an occupational choice model of work in marital production.

The following model extends this occupational choice to choices among work in the labor force, work in marital production, and welfare. Before presenting the model and showing how it explains a number of findings in the empirical literature on welfare dependency –such as black/white differences and cohort differences in women's welfare dependency—a few words comparing this model to the most popular models currently used in economic analyses of marriage: bargaining models. Since they were pioneered by Manser and Brown (1980) and McElroy and Horney (1981), bargaining models of marriage--interpreted broadly as models analyzing issues of intra-household allocation--have become more popular than D&S models of marriage (see also Weiss and Willis (1985), Chiappori (1992), Lundberg and Pollak (1993), Del Boca and

Flinn (1994), and Del Boca and Ribero (2003)).⁵ While these models are very useful in dealing with distribution problems faced by a husband/wife dyad, they are less useful when it comes to production decisions including a young person's decision to work in one occupation—such as work in marital production--or the other. While D&S models have the drawback that they require the existence of some form of price or compensation mechanism, they have the great advantage of simultaneously addressing problems of production, allocation, and distribution. A D&S model such as the one below may thus model a single and childless individual's choice of welfare versus marriage in a simple way that seems difficult to do with a bargaining model adapted to in-marriage decision-making.

2. An Individual Optimization Model

It is assumed that a single rational decision-maker is choosing between four future time uses: leisure and three forms of making a living: work in the labor force, welfare, or marriage to a spouse who pays the bills. It is assumed that welfare and the other two forms of making a living are exclusive, since other income disqualifies from welfare.⁶ However, work for commercial firms and work in marital production may not be exclusive.

This single rational individual has not yet made any commitments to work and does not yet have a child. The younger the decision-maker and the less she has made any career commitment, the more the model is applicable. Few individuals may simultaneously be at the margin among all three careers. For simplification, this is a one-period model, the period being a representative period in the future.

Four time uses. The individual compares costs and benefits of the four future activities in a model that expands the well-known occupational choice model in which a person chooses

⁵ A third type of marriage model is an optimal sorting model (see Grossbard 2004). In contrast to how labor economists traditionally analyze human capital, Edlund (2002) models a transfer of rights over the child as a one-time sale of human capital.

⁶ The incompatibility between welfare dependency and marriage was clear-cut when the major welfare program in the United States was Aid for Families with Dependent Children (AFDC), a program that was available mostly to unmarried mothers. Since 1996 AFDC has been replaced by TANF (Temporary Assistance for Needy Families) and it is easier for couples to qualify for state assistance. Therefore, currently the choice between welfare dependency and couple formation (including marriage) is not as drastic as it was before 1996. Nevertheless, this choice continues to be relevant to poor women, e.g. because lone mothers are more likely to qualify for public housing. An institutional expression of the substitutability between marriage and state can be found in welfare laws requiring that child support payments by fathers

between leisure and two occupations.

The welfare option is conceptualized as an occupation. One way for a single person to qualify for welfare is to have a child without having sufficient income.⁷ This is generally easier for women than for men.⁸ The time costs include the costs of a child as well as the opportunity cost of meeting time-consuming requirements established by welfare agencies. There also are direct costs of giving up certain freedoms. For instance, in the U.S. the state limits welfare recipients' freedom to negotiate mutually agreeable arrangements with a sexual partner (see Brito 2000). The cost of qualifying for welfare also involves the stigma associated with welfare dependency.⁹

Working in marital production is also conceptualized as an occupation.¹⁰ A woman may supply work in marital production benefiting a man who has a demand for such work—possibly because he has a demand for her genetricial services—and is willing to compensate her for this work. It is assumed that compensation levels for work in marital production are given to the individual after being established in markets for such work. It is also assumed that marital workers are aware of the level of compensation that they can possibly obtain from a prospective spouse. This level of compensation is a function of market conditions that possibly vary according to a number of characteristics, including gender, education, and ethnicity.

Men also work in marital production benefiting a woman, but it is less likely that they will get their bills paid this way. Both men and women may very well be 'hiring' each other to produce marital goods that they personally enjoy. They may then trade or barter, which complicates the analysis. To simplify, I will assume that women are the workers in marital production.

Workers in marital production often produce goods in marriage that are not only valuable to the spouse but also to themselves (i.e. they may produce marital public goods). This implies that

of children on welfare be used to reimburse the state.

⁷ In the same vein, Clarke and Strauss (1998) consider children born to lone mothers as 'income producing assets.'

⁸ The idea that poor single women may have chosen to have children as a career is also found e.g. in Murray (1984) and Nechyba (2001).

⁹ On costs of being on welfare, see also Moffitt (1983) and Nechyba (2001).

¹⁰ Even though I use the term 'marital production', I really mean 'production in couple'. Whether the couple is officially married or not is not at issue here. Finer distinctions in marital status are made in Grossbard-Shechtman and Mincy (2003), where the choice between single motherhood, cohabitation, and marriage is analyzed.

workers in marital production may also enjoy the fruits of their own labor. This will be incorporated in the utility function: work in marital production is likely to generate positive utility, and to the extent that work is a burden, one expects the disutility of work in marital production to be smaller than the disutility of work for commercial firms.

The time constraint. If l denotes time allocated to labor, m work in marital production, s self-oriented time, and a is time on welfare, then the time constraint is

$$(1) \quad T = l_i + m_i + a_i + s_i,$$

where subscript i is an individual woman and T is the maximum time available (e.g., 24 hours on a representative day).

Utility function. The individual woman is assumed to maximize a utility function U that includes the four uses of time mentioned above. Furthermore the woman i derives utility from the goods and services that she purchases: services obtained from a spouse (work in marital production m supplied by man j) and all other goods and services x (commercial goods). The individual woman accordingly has a utility function:

$$(2) \quad U_i = U_i(l_i, m_i, s_i, a_i, m_j, x_i),$$

Assuming monogamy is legally imposed, work in marital production can only be supplied by one spouse and hence only a single m_j appears in the utility function.

The marginal utility of labor and work in marital production can be either positive or negative (it is positive e.g. if people derive satisfaction from contributing to others' well-being). Time on welfare has a positive utility to the extent that the woman enjoys the child that she gave birth to in order to qualify for welfare. However, utility is negatively impacted by the direct costs of welfare dependency and the stigma involved in being on welfare. To the extent that the unpleasant aspects of labor, work in marital production, and time on welfare dominate, these activities generate disutility. Relaxing the assumption of exclusivity will lead to a higher marginal utility from work. For instance, if time on welfare can be combined with enjoyable leisure, the total marginal utility of time on welfare could be positive. Likewise, if time in marital production can be combined with enjoyable leisure, this raises the total marginal utility of work in marital production.

The budget constraint. Her wage is given to the individual, and so is the payoff to a unit of time spent qualifying for welfare. Likewise, it is assumed that the compensation that a prospective

spouse j can be expected to pay per hour of i 's work in marital production is also given. Prices are given, as well.

On the expenditure side, individual i can spend her income either on work in marital production supplied by spouse j or on commercial goods and services. The individual thus maximizes utility function 2 subject to time constraint 1 and a monetary budget constraint:

$$(3) \quad w_i l_i + y_i m_i + b a_i + V_i = p_i x_i + y_j m_j,$$

where w is hourly market wage for labor, y is hourly compensation for work in marital production, b is the welfare benefit translated into an hourly payment, V is other income, and p is a price vector for commercial goods and services. The left-hand side of the budget constraint indicates that possible sources of individual income consist of labor earnings, 'earnings' from work in marital production, welfare benefits, and other income sources unrelated to the three income-earning activities. The right-hand side consists of the individual's expenditures on commercial goods and services and work in marital production supplied by a spouse.

Optimality condition. Maximizing utility function 2 subject to constraints 1 and 3 yields first-order conditions. Assuming $p = I$, we derive the following optimality conditions from the first order conditions:

$$(4) \quad w_i + \frac{MU_{l_i}}{MU_{x_i}} = y_i + \frac{MU_{m_i}}{MU_{x_i}} = b + \frac{MU_{a_i}}{MU_{x_i}} = \frac{MU_{s_i}}{MU_{x_i}},$$

optimality conditions reminiscent of the optimality conditions obtained in traditional occupational choice models. Equation 4 indicates that in equilibrium the individual expects to derive equal amounts of dollar equivalents from each kind of work, work for firms and work in marital production, and that these compensations for work be equal to the total value of being on welfare. The dollar equivalents generated by each kind of work consist of a given 'wage' plus the dollar value of the marginal psychic benefits that the individual woman derives from that activity (the marginal utility of that time use divided by the marginal utility of goods). The total hourly welfare compensation consists of welfare benefits translated into an hourly benefit plus the value of marginal disutility from being on welfare. In equilibrium, the value of each type of work to the person also has to equal the marginal rate of substitution between time for self and goods (the term on the right side of equation 4). Note that if we ignore the two terms in the middle of equation 4 and assume that labor for commercial firms does not carry any marginal utility (as is assumed in the

Robbins (1930) model), optimality condition 4 collapses into the well-known leisure/goods trade-off. Next, we derive testable predictions from optimality condition 4.

3. Implications for Predicting Welfare Dependency

A rational individual woman making a life-style/occupational choice as described in this model uses optimality condition 4 to compare the pay-off to welfare with the pay-offs to work in marital production and in commercial firms. From this condition we can derive two reservation wages for welfare dependency: one comparing welfare to work in marriage and the other comparing welfare to work in the labor force. If welfare and marriage are compared, the marital reservation wage for welfare, ya^* , is equal to the given compensation for work in marital production *plus* the difference in value of marginal utilities of time on welfare and work in marital production. This is shown in equation 5:

$$(5) \quad ya^* = y + \frac{MU_m}{MU_x} - \frac{MU_a}{MU_x},$$

Likewise, if welfare and labor are compared, one can calculate a LF reservation wage for welfare equal to the wage in the labor force *plus* the difference in value of marginal utilities between time on welfare and work. An equation for such reservation wage looks like equation 5 except that it includes wage in the labor force (LF) and the difference between the value of the marginal utility of work in the LF and of being on welfare. Given that both work in marriage and work in the LF are alternatives to welfare, the relevant trade-off for the decision-maker will be a comparison between either the hourly welfare benefit and the marital reservation wage ya^* , or between the hourly welfare benefit and the LF reservation wage, depending on which is highest. The decision to go on welfare or not is modeled as a function of the double comparison shown in function 6, where wa^* stands for LF reservation wage:

$$(6) \quad A = A(b \begin{matrix} > \\ < \end{matrix} ya^*, b \begin{matrix} > \\ < \end{matrix} wa^*)$$

It follows from expressions 5 and 6 that welfare dependency is a function of parameters b , w , and y ,

and of factors affecting the marginal utility of various activities. The following discussion of factors affecting an individual woman's propensity of choosing welfare versus marriage or LFP is organized into individual factors characterizing the woman herself, factors influencing her marriage market prospects and therefore the marital reservation wage that she can expect, and other factors influencing her costs and benefits.

Personal Characteristics

Own wage. To the extent that work and welfare are substitute forms of income, i.e. they are exclusive, the compensated cross-wage effects will be negative. The higher the compensation for labor w that can possibly be obtained, the higher the reservation wage for welfare dependency in terms of labor force, and the less the individual is likely to participate in welfare programs.

Income not from work. Another parameter that influences welfare dependency is income from sources other than work, V . Individuals with higher income from other sources V are expected to work less, to be less dependent on welfare, and to work less in marriage. This follows from the assumption that goods and leisure are normal and have a positive income elasticity. The effect of V is a pure income effect.

Own desire for children. An individual woman's desire for children will influence her utility function 2, regardless of her expectations as to the environment in which the child will grow up. The higher her desire for a child, the higher her marginal utility of time on welfare a and her willingness to supply work in marital production. The more she wants children, the more she will organize herself to become a mother which, for simplicity, she can do either as a welfare mom or as a married mom who is not on welfare. The marital reservation wage ya^* is not likely to be affected if a greater desire for children equally raises the marginal utility of both welfare and work in marriage. Her supply of time on welfare is thus not expected to grow relative to her supply of work in marital production, but both supplies are expected to grow relative to supply of work in the LF, for her LF reservation wage wa^* will go down as a result of higher marginal utility from having a child on welfare. The woman is thus likely to increase her supply of time on welfare relative to her supply of work in the labor force.

Expectations from the child's father. The more a woman considers it important that her child be raised not only by her but also by a father with whom she would enter a durable relationship, the higher her marginal utility from supplying her own work in marital production and from consuming the father's work in marital production. This leads to an increase in marital reservation wage ya^* , and therefore to a reduction in the propensity for welfare dependency relative to marriage. Young women planning their lives in line with this model may have drastically differing views on what to

expect from a father, depending on the environment in which they grow up.

If she grew up in a well-functioning intact family, she is more likely to give high utility to work in marriage, both her own and the child's father's. However, if she grew up as the child of a single mom she may not expect much value from durable relationships with men. It follows that lone mothers on welfare transmit the propensity to be a mother on welfare to their daughters.

Likewise, if a woman grows up in an environment where 40% of all men have been incarcerated and many men can be expected to be jailed again, as is the case among the black respondents in the Fragile Families Study (see Fertig, Garfinkel and McLanahan 2003), she is unlikely to expect men to be effective fathers to her future children. The higher the incarceration rate of men in a young woman's neighborhood, the more a young woman is likely to rationally opt for becoming a single welfare mom.

Own education. Own education is expected to be associated with lower female welfare dependency for at least two reasons. First, it raises the wage a woman can obtain in the labor market, leading to a higher LF reservation wage. Second, education is also expected to raise the compensation that a woman can obtain for her work in marital production, to the extent that education makes people more productive in marital production.¹¹ Indirect evidence that education raises women's compensation for work in marital production can be found *inter alia* in the following findings: more educated women are less likely to divorce (Lehrer 2003), and more educated women are more likely to be in a married couple versus in an unmarried couple (Grossbard-Shechtman 1993).¹² Evidence that men have a demand for educated female work in marital production can also be found in the higher marriage rates for educated women in the U.S. (Goldstein and Kenney 2001). If education raises compensation for work in marriage ya^* then education can also have a discouraging effect on welfare dependency via the welfare/marriage

¹¹ Here it is possible that a year of high school education contributes more to the compensation for women's work in marital production than a year of graduate school, i.e. that there is a non-linear relationship between education and compensation for women's work in marital production (see Grossbard-Shechtman 1993).

¹² In a different cultural context, that of a polygamous society, it also seems to be the case that more educated women

choice.

Compensation for work in marital production. Education is only one of the personal traits that influences the market value of a woman interested in supplying work in marital production. According to function 6, welfare dependency is a function of the marital reservation wage, ya^* , and therefore of y , the compensation for work in marital production. To the extent that welfare and work in marital production are substitute forms of income, i.e. exclusive, the compensated cross-compensation effects will also be negative. Any factor that raises the expected compensation for work in marital production y will raise the marital reservation wage for welfare dependency, and therefore lower the likelihood that a woman participates in welfare programs.

Markets for wives and mothers are segmented not only by education, but also by many other factors, such as race, social class, religion, and location. The following factors are expected to have an impact on the compensation y which a woman can expect to receive if she finds a match in the marriage market and marries a man who could be her child's father. Therefore, these factors are expected to affect the likelihood that a young woman decides to become a lone mother on welfare.

Marriage Market Factors

Many characteristics may influence the perceived market value of the marital work that a young single woman contemplates supplying. This perceived market value is likely to be close to the actual market value established at the intersection of demand and supply in the market for work in marital production to which the woman belongs. Marriage market factors include other people's characteristics, not her own, that affect aggregate demand and supply in a market for work in marital production.

Men's income. Single women choosing between being a welfare mom and a married mom are more likely to participate in welfare programs when and where fewer high-income men participate in marriage markets, or when men's average income declines. This assumes that women's work in marital production is normal in the sense that its demand by men varies positively with men's income. *Declining male incomes lower the demand for women's work in marital production, lower market-clearing compensations y , lower the marital reservation wage ya^* , and*

have a lower likelihood of sharing a husband with co-wives (Grossbard 1976).

therefore increase the likelihood of welfare dependency. One expects this effect regardless of the source of income. One also expects the demand for women's work in marital production to increase more as a result of men's higher wage earnings than as a result of men's higher income from sources other than labor: if men's wages are higher their demand for women's work in marital production will increase not only as a result of a pure income effect, but also as a result of substitution between male and female work in marital production (see Grossbard-Shechtman 2003).

Income of Other Women in the Market. The likelihood that a woman of given characteristics joins the welfare rolls is a function of the income of the other women who participate in the same markets for work in marriage. When the other women residing in her proximity have lower real incomes, aggregate supply shifts to the right in the market for women's work in marital production. *Lower aggregate female incomes reduce market-clearing compensation y , thereby lowering a given woman's marital reservation wage (ya^*).* In turn, lower marital reservation wages encourage welfare dependency. So welfare dependency is not simply a function of a woman's own income. It is also a function of the income of other women affecting a given woman's market value in markets for labor in marital production. A woman will be hurt directly by her own limited opportunities in the labor market. She is hurt indirectly by the fact that if most other women in her environment are also doing poorly in the labor market the *market-clearing compensation y* is low, and marital reservation wages are low.¹³

Sex ratios. When relative to the number of women, large numbers of men participate in marriage markets, i.e. *sex ratios* are high, the compensation y that women can expect for supplying work in marital production is higher, and therefore when sex ratios are high one expects less welfare dependency.¹⁴ This sex ratio effect may influence the whole market for women working in marital production or just some segments of that market, depending on the causes of variation in the number of participating men and women. The model in Grossbard (1984) also implies that sex ratios are inversely related to women's LF participation (LFP).¹⁵

¹³ Also, as far as demand for men's work in marital production is concerned, lower women's incomes will decrease the demand for men as partners and fathers. This lowers men's equilibrium compensations for work in marital production and may encourage women to marry to the extent that they are mostly on the demand side of work in marital production, not mostly on the supply side.

¹⁴ Heer and Grossbard-Shechtman (1981) is one of the first publications that attributed the rise in illegitimacy in the late 1960s to a drop in the sex ratio. Willis (1999) also reaches the conclusion that sex ratios (as defined here) are expected to be negatively related to illegitimate births, but his model is considerably more complex than the model presented here.

¹⁵ Empirical evidence indicating that sex ratios are negatively associated with married women's labor supply

A number of studies have reported negative sex ratio effects on welfare dependency. These studies analyzed individual U.S. data on entry into the major welfare program offered prior to welfare reform in 1996: Aid For Dependent Children (AFDC) as well as exit from AFDC. Fitzgerald (1991, 2003) and Winkler (1994) examined the association between the race-segmented sex ratio in a woman's city of residence and welfare dependency (see also, Wilson 1987). For example, in a study based on data for 1681 months collected for 191 white women interviewed for the Survey of Income and Program Participation (SIPP) collected in 1984, Fitzgerald (2003) found that white women living in cities with higher sex ratios have a significantly higher likelihood to exit AFDC. A parallel finding for black women was not found. This black/white difference can also be explained in light of this model of choice between welfare and marriage, as is explained below.

Black versus non-Black. Welfare-dependent populations of lone mothers concentrate spatially: welfare dependency rates are considerably higher in predominantly black neighborhoods such as Harlem than in predominantly white neighborhoods such as Long Island. Ceteris paribus it has been found that black women are more likely to participate in welfare programs than white women (Ellwood and Bane 1985, Moffitt 1992, Hoffman, Duncan and Mincy 1991, Keane and Moffitt 1995). Nechyba's (2001) offers a cultural explanation for that spatial concentration: illegitimacy rates in Harlem are considerably higher than on Long Island due to the fact that if illegitimacy was slightly higher originally, higher levels of illegitimacy trigger more social acceptance of illegitimacy, and therefore lead to increasing numbers of women opting for illegitimacy as a state-supported life-style.

Higher welfare dependency rates for blacks can also be explained in terms of black/white differences in marriage market conditions.¹⁶ Every single one of the three factors affecting

includes Grossbard-Shechtman and Neideffer (1997) and Chiappori, Fortin and Lacroix (2000).

¹⁶ Previous economic analyses such as Heer and Grossbard-Shechtman (1981), Guttentag and Secord (1983), Willis (1999) and Nechyba (2001) have also attributed the higher illegitimacy and welfare dependency rates among blacks

marriage markets that have been discussed so far--men's wages, women's wages, and sex ratios—tends to cause more favorable marriage market conditions for whites. To the extent that black men and women have lower wage incomes and that blacks have lower sex ratios relative to whites, black women can expect lower compensations for work in marital production, and therefore black women are less likely to wait until marriage in order to have children.¹⁷

In turn, there are at least two reasons why, on average, black women in the United States tend to face lower sex ratios than their white counterparts. First, there is a tendency for intra-group marriage (endogamy) and a relatively small number of marriageable black men per marriageable black woman in comparison to the number of marriageable white men per marriageable white woman, due e.g. to large numbers of young black men who are either incarcerated or on parole. Second, there are considerably higher rates of inter-group marriages (exogamy) involving a black man and a white woman in comparison to marriages between black women and white men: according to Michael et al. (1995) there were four times more intermarriages between black men and white women than among black women and white men. More recent data indicates that black men/white women marriages are about twice as popular as black women/white men marriages (Cose 2003).

Reproductive technology. The equilibrium level of compensation y that women can expect for supplying work in marital production is also expected to vary with any factor that influences the aggregate demand or supply of work in marital production. Technology affecting the effectiveness of contraception is a factor that influences markets for work in marital production, given that the production of children is a major aspect of marital production. The fewer the available alternatives to coupleship and the more costly these alternatives, the higher the demand for marital production and the larger the supply. When good contraceptive methods are not easily accessible intimacy achieved through couple formation and marriage is more valuable to both men and women: sex without commitment and partnership is more costly to

to lower sex ratios.

¹⁷ Robert Cherry (1998) assumes that the equivalent of what I call the quasi-wage for women has a negative value. Many of his examples relate to the marriage market for blacks in the U.S.

women who have a higher pregnancy risk. It is also more costly to the men who love these women and are likely to share the costs of an unwanted pregnancy resulting from uncommitted sexual intimacy. Costlier or less available contraception thus raises both the demand and the supply of women's work in marital production. From women's supply perspective, the higher risk of pregnancy raises the utility of marriage as some form of pregnancy insurance. With increases in both demand and supply for women's work in marital production, equilibrium levels of compensation y are not necessarily higher when contraception is costly, but the total benefit that women perceive from engaging in work in marital production, which also includes the value of marginal utility of that activity, will be higher and therefore there will be higher marriage rates and lower welfare dependency rates (see Akerlof, Yellen, and Katz (1996)).¹⁸

Value of children and marriage to men. The higher men's demand for in-wedlock children in the marriage market in which a particular woman participates, the higher that woman's compensation y , the higher her marital reservation wage ya^* , and therefore the lower her likelihood of welfare dependency. We are not talking solely about how many children men want, but also about their demand for child quality. Men may have a demand for women's work in marital production because in some ways they want to raise their children with their mother and parental time of husband complements wife's parental time. In other ways, men's demand for women's parental time may result from mother's time and father's time being substitutes. Assuming the market for women's work in marital production is free to clear, a higher demand by men will lead to a higher compensation y that men are willing to pay, and the more it is likely that women will chose marriage over welfare, even if they themselves—and the men they marry--don't agree with the ideology that leads many of the men in their market to want to be married. However, as is discussed in the next sub-section, markets for women's marital production don't always clear at market equilibrium.

Preferences for (informal) polygamy. To the extent that informal polygamy is found in the U.S., preferences regarding informal polygamy could help explain variations in welfare dependency and marriage. More specifically, where both men and women are more tolerant of polygamy, the relative value of having a child in monogamous marriage will be lower and

¹⁸ This interpretation differs from that found in Akerlof et al. They predict that more costly contraception reduces sexual activity outside marriage, and see the outcome 'lone mother' as an accidental byproduct of women's sexual activity. The model presented here conceives women as choosing between getting pregnant in couple or alone, and then choosing the type of male/female relationship that leads to their preferred result. A precursor of the analysis presented here is found in Heer and Grossbard-Shechtman (1981).

welfare dependency among the poor is more likely to be observed. Preferences for polygamy among men and tolerance for such polygamy among women may vary by ethnic group: immigrants from polygamous societies may be more tolerant of such arrangements than people who grew up where polygamy is illegal. Welfare dependency is likely to concentrate in certain areas of the US, where cultural norms are more accepting of *de facto* polygamy. This may also help explain the lower likelihood of marriage among African Americans, since polygamy is more widespread in Africa than in any other continent.

Divorce laws. Divorce laws influence the expected benefits of entering marriage. Therefore these laws influence either the marginal utility of women's work in marital production or the market level compensation y that can be expected based on aggregate demand and supply in markets for work in marital production. For example, as argued in Grossbard-Shechtman, Ekert-Jaffe and Lemennicier (2002), it is expected that legal regimes ruling on property division in the common law tradition are associated with lower market-level compensations for women's work in marital production than legal regimes offering division rules based on community property. It is therefore predicted that relative to a common law state, in a state with community property where women can expect more protection in case of marriage and subsequent divorce, women are more likely to have children in couple and less likely to be lone mothers on welfare. Ekert-Jaffe and Grossbard (2004) find some evidence for this prediction using international comparisons.

Education of Other Women in the Same Market. Education may enhance both productivity in the labor force and productivity in marriage. To the extent that education primarily enhances productivity at work, it will be reflected in income and this was discussed in the previous paragraph. The number of educated women in a marriage market has an impact on the equilibrium compensation y that a woman of given education can obtain when supplying work in marital production. To the extent that women's education primarily enhances their productivity in work in marital production and therefore raises men's demand for such work, when a woman participates in a local marriage market with more educated women this will be detrimental to the market conditions faced by aspiring mothers who are poor and uneducated. Their market value y will be lower where there are more educated women competing for the same men. The reservation wage being lower, her chances that she will become a welfare mom are higher. High concentration of welfare dependents among women with low education suggests that marriage markets penalize women with low education.

Men's Use of Violence against Women. Where men commonly use violence against women, or where other abusive behavior by men against women is prevalent, the market for women's work in marital production will not work properly, and women are unlikely to obtain the

compensation y that they would have obtained if their market for work in marital production had cleared. This implies that women who have grown up in families where wife abuse is common, or women who have themselves experienced abuse by a husband or a boyfriend, are more likely to become lone mothers and go on welfare than women without such experiences.

Other Factors in the Environment

Welfare benefits. Equations 5 and 6 lead to a prediction that has also been derived from previous rational choice models of welfare dependency or lone motherhood (e.g. Moffitt 1993 and Nechyba 2001): the level of welfare benefits is positively associated with welfare dependency. According to a recent survey of the literature, there is mixed evidence that more generous welfare benefits attracted more welfare dependency via lone motherhood (Nechyba 2001).

Prices. If prices for goods and for men's work in marital production are higher, women's real income is reduced and this leads to an increase in the supply of work and/or increased propensity to go on welfare. Furthermore, the level of compensation that women are expected to 'pay' in order to obtain men's work in marital production will also affect a woman's choice of occupation due to possible complementarity or substitution between the two types of work in marital production. The more complementary these two forms of work in marital production, the more there are benefits to marriage as a lifestyle and the less welfare dependency is likely to be selected.

4. Implications of the Theoretical Model of Welfare Dependency

This section covers two implications: new interpretations of certain trends in welfare dependency observed in the U.S. in the last forty years and more insights on previously documented black/white differences in welfare dependency

4.1 A New Interpretation of Time Trends in Welfare Use

Between 1960 and 1975 the U.S. experienced a very large increase in out-of-wedlock births and welfare dependency: the percentage of all births occurring out of wedlock increased from 5.3 percent in 1960 to 14.3 percent in 1975 (Heer and Grossbard-Shechtman 1981), and the proportion of all children under 18 receiving AFDC payments increased from 3.5 percent in 1960 to 11.9 percent in 1975 (U.S. Bureau of the Census 1976). Moffitt (1992 Figure 1) shows that AFDC caseloads, after having grown slowly from the inception of AFDC in 1935 until the mid-1960s, exploded around 1965. Table 1 in Moffitt (1992) indicates that in part the AFDC caseload grew due to increased AFDC participation rates of female heads with children. These rates jumped from 42% in 1969 to 62% in 1975, while the ratio of AFDC benefits to earnings declined from 66 to 52.

Rational choice models that explain welfare dependency primarily in terms of fluctuations in welfare benefits can't account for much of the enormous changes that the US experienced in the late 1960s and early 1970s.

Theoretical models that focus on the choice between welfare and work don't help explain that explosion either, for the late 1960s and early 1970s also witnessed dramatic increases in women's LFP, including that of married women. What then explains that in the late 1960s and early 1970s American women became more likely to both depend on welfare and enter the labor force? I believe that a substantial deterioration in young women's potential marriage offers explains both of these developments. In the period 1965-75 this deterioration took the form of a substantial decrease in sex ratios among people of marriageable age.¹⁹

Sex ratios vary over time for they vary from cohort to cohort: different cohorts of people enter labor and marriage markets in different periods. The cohorts experiencing the most rapid increases in welfare dependency are the women of the first baby boom born in the years 1946-1950 and reaching peak ages of susceptibility to single motherhood and welfare dependency in the late 1960s and early 1970s. These are also the cohorts of women experiencing the most rapid growth in LFP when they reach the age of typical entry into the labor market, around the same time (see Grossbard-Shechtman and Clive Granger (1998)).

Cohorts vary in sex ratio due to two major facts: (1) men are typically older than the women they date and marry, apparently the result of a preference women have for marrying older men (on average, two years older) as well as a preference of men for marrying younger women, and (2) the number of births fluctuates over time. Sex ratios decreased dramatically around 1965, when first baby-boom women—defined as women born in the years 1946 to 1950, right after World War II—started being old enough to date and marry. When entering marriage markets, these first baby-boom women have experienced the lowest sex ratios in the 20th century: assuming a fixed age difference at marriage of two years²⁰, for every 100 women born in the years 1946 to 1950, there were 87 men born in the years 1944 to 1948,²¹ implying a shortage of 13 men for every 100 women (see Grossbard-Shechtman and Neuman 2003)! No other cohort of women born in the twentieth century has experienced such marriage squeeze when reaching marriageable age.

It follows from the theory presented here that this shortage of men presumably

¹⁹ For a similar explanation, see Heer and Grossbard-Shechtman (1981) and Guttentag and Secord (1983).

²⁰ On average, the age difference at first marriage in the United States stands at 2 years and has not changed much in recent decades (see Brien and Seran 2003).

²¹ In those years women got married at age 20, on average, so women were presumably particularly active in marriage markets when aged 20-25. This sex ratio was calculated by dividing the total numbers of men aged 22 to 26 by the total number of women aged 20 to 24 in the 1970 Census.

experienced by first baby boom women lowered the compensations they could expect for work in marital production (lower demand for given supply, compared to other cohorts with more balanced sex ratios). This led to a decrease in marital reservation wage and thus helps explain (1) increased rates of welfare dependency among first baby boom women, and (2) LFP in this same cohort of women. Low sex ratios characterizing the markets for work in marital production of women born in the first baby-boom thus help explain the rapid increase in AFDC participation in the late 1960s, when these women were in their twenties and thus at peak fertility.

What happened to welfare dependency at a time when the opposite was the case and women who entered marriage markets belonged to cohorts with the highest sex ratios of the twentieth century? Women born in the years 1971 to 1975 have the highest sex ratio: there were 107 men born in 1969 to 1973 for every 100 women born in 1971-1975 (see Grossbard-Shechtman and Neuman 2003).²² I call this the ‘Roe cohort’, for the U.S. Supreme Court decision in *Roe v. Wade* led to publicly funded abortions, thus causing fast decreases in number of births. We expect the Roe cohort to have unusually high levels of unobserved compensation y . The model predicts that therefore Roe women would have high marital reservation wages and would experience decreases in welfare dependency when they reached ages of peak marriageability and fertility. This implies that lone motherhood and welfare dependency would have declined around the time that the Roe cohort reached age 25, close to the average age at marriage around 2000, i.e in the years 1996 to 2004. Welfare dependency rates have indeed been decreasing recently, which is consistent with the marriage market explanation offered here.²³ However, given that welfare reform was enacted in 1996 it is difficult to separate the effect of Roe women’s favorable marriage market conditions from the effect of lower lifetime welfare benefits offered to lone mothers after the reform of the welfare system in the U.S.²⁴

What is clear, however, is that a labor/welfare trade-off model is also of very limited use if we want to explain the decrease in welfare dependency that occurred in the period 1996-2003, for during this period there was not much of an increase in the LFP of women in general, and married women in particular. In fact, Grossbard-Shechtman and Amuedo-Dorantes (2003) show that women born in cohorts and regions with higher sex ratios, such as the women of the Roe cohort, have experienced slower increases in their LFP after marriage. In recent years, young women’s welfare dependency rates have dipped while their LFP rates have been stagnant or

²² This calculation is based on the Census of 2000, when these women were 25-29 and the men 27-31. Note that by that time the average age at marriage was about 25.

²³ See government statistics on welfare participation at <http://aspe.hhs.gov/hsp/indicators03/ch2.htm>.

²⁴ A switch from AFDC to TANF involves lower expected support of lone mothers.

slightly decreasing.²⁵

When the Clinton administration introduced a drastic welfare reform in the US in the mid-1990s, it was feared that this was going to lead to massive increases in the numbers of homeless women and children. Some of the top administrators of the U.S. welfare system resigned in protest. These fears were misplaced, it turned out. Large reductions in expected welfare benefits were introduced without noticeable increases in homelessness. My interpretation is that in view of the favorable conditions in markets for young women's work in marital production at the time, men born in cohorts of high sex ratios, who had relatively few women to choose from, filled some of the gaps left by government agencies. What appears to have happened is that men increased their commitment—including financial commitment—to their children and their mothers, whether in marriage, in unmarried coupleship, or via increased child support payments after divorce. In recent years, marriage rates stopped their dramatic decrease (National Marriage Project 2004). It is also the case that men are now more likely to pay child support to their children: in the last ten years government programs have been successful at enforcing more child support payments.²⁶

4.2 New Insights on Income Effects on Welfare Dependency

The theoretical model that was presented here also sheds new light on well-documented effects of men's income on welfare dependency. In a marriage market characterized by higher male income one expects a stronger demand for women's work in marital production, and therefore higher compensations for that work. This implies that relatively to men in a marriage market favorable to men, men in a marriage market favorable to women (a high sex ratio market) have to either (1) work harder in the labor force to earn the income that they need to afford marriage to a more expensive home producer, or (2) share a relatively higher proportion of their income with their wife. In turn, the more men share their income with their wife, the more women's compensations for work in marital production are expected to vary with men's incomes, and the more the marriage-related reservation wage of welfare will vary with men's income. It follows that *women's participation in welfare programs is more likely to vary with men's income where and when*

²⁵ These statistics are available from the author upon request.

²⁶ Cohort effects on marriage market conditions could also influence the success of child support enforcement programs. Even if we observe a positive correlation between tougher enforcement programs and men's effective child support payments, this result may be spurious: these policies may not be as successful as they seem. It could be that just around the time that tougher policies were enforced the high sex ratio cohorts born in the 1970s were replacing earlier cohorts of women characterized by lower sex ratios. It is possible that it is the more favorable marriage market conditions to women (higher compensation y for women's work in marital production) that led increasing proportions of fathers to agree to pay child support, and not the tougher enforcement programs instituted by state and federal government.

marriage market conditions are relatively favorable to women (higher sex ratios).

Given that black marriage markets have lower sex ratios than white marriage markets, it is predicted that white women's welfare dependency will be more sensitive to changes in men's income than black women's welfare dependency. Indeed, Fitzgerald (1991) found that men's income had more impact on women's white women's welfare dependency than was the case for black women.²⁷ Given that sex ratios are higher for baby-bust women than for baby-boom women, it is predicted that men's income would explain more variation in women's age-specific welfare dependency for women born during a baby-bust than for women born during a baby-boom.²⁸

4.3 New Insights on Education Effects on Welfare Dependency.

To the extent that education improves marriage pay-offs, one expects that where markets for women's work in marital production establish low compensations for all women (educated or not), educated women will receive less of a premium relative to uneducated women than in markets characterized by high compensations for women's work in marital production. It follows that an additional year of education is expected to be associated with larger increases in the marital reservation wage for welfare dependency in marriage markets that favor women (high sex ratios) than in marriage markets that favor men (low sex ratios). In other words, a woman's education is more likely to deter welfare dependency where sex ratios are high and women benefit from strong marriage markets than where sex ratios are low.

To the extent that weak conditions in markets for all black women's work in marital production also apply to educated black women, it follows that black/white differences in welfare dependency will be more pronounced for educated women than for less educated women. Evidence from the Fragile Families Study indicates that black women with a college education are much more likely to give birth to children out of wedlock than white women with a college education (see Usdansky and McLanahan 2003). Consequently it appears that, in line with this prediction, education is less likely to get a black woman off welfare than it is likely to bring a white woman off welfare.

²⁷ One can interpret in a similar vein Fitzgerald's (1991) finding that cross-city variation in sex ratios had more impact on white women's welfare dependency than on black women's.

²⁸ A similar prediction can be made regarding the effect of husband's income on wife's participation in the labor force. Comparisons of aggregate labor force participation rates for married women across cities in the U.S. indicate a stronger effect of married men's earnings on married women's labor force participation in 1960, before the massive entry of first-baby-boom wives into the labor force, than in 1970, after their entry (Bowen and Finegan 1969, Fields 1976). A recent time series analysis indicates strong male income effects (see Grossbard-Shechtman and Amuedo-Dorantes 2003).

Applying this insight to a comparison between low-sex-ratio baby-boomers and high-sex-ratio baby-busters, it is predicted that educated baby-boom women would have been more likely to have children outside marriage and be on welfare than educated baby-bust women, when each group reached their prime age for welfare dependency. This helps explain why in recent years marriage rates for educated women have increased relative to marriage rates for uneducated women (National Marriage Project 2004).

For the same reasons, one expects stronger effects of education on the labor supply of low-sex-ratio women than on the labor supply of high-sex-ratio women. Applying this insight to black/white comparisons, it follows that relatively to white women, black women in the U.S. would experience stronger own education effects on labor supply. This seems to be the case (Carliner 1981 and Lehrer 1992).

4.4 New Insights on Effect of Number of Children on Welfare Dependency.

One expects that the compensation for work in marital production that can be expected by single childless women will exceed that obtainable by single women who already had a child, assuming that men would rather not take care of another man's child. In a strong market for women's work in marital production the premium a woman may obtain for having had fewer children in the past is expected to be higher than in a weak marriage market. It follows that the more a marriage market is favorable to women, *i.e. the higher the sex ratio, the stronger the discouraging effect of number of previous children on a woman's likelihood of becoming dependent on welfare.*²⁹

It follows that among low-sex-ratio black women one expects a lower marital compensation premium for having fewer children, and that therefore black/white differences in out-of-wedlock pregnancy and welfare dependency will be more pronounced among single mothers with fewer or no previous children. Relative to black women, additional children are more likely to deter a white woman from becoming dependent on welfare: white women stand more to lose. Indeed, Fitzgerald (1991, 2003) found that the presence of more children slows exit from welfare dependency more for white women than for black women.³⁰

It is also predicted that number of children would have had more impact on the welfare dependency of women belonging to the high sex ratio Roe cohort than on low sex ratio baby-boom women.

²⁹ A full theoretical treatment of this hypothesis requires an examination of the effect of children on wages, of the work/welfare trade-off, and of the effect of children on quasi-wages for work in marital production.

³⁰ It also follows from this theoretical model that number of children will have less impact on black married women's labor supply than on that of white married women's, as has been documented by Bell (1974), Carliner (1981), and Lehrer (1992).

5. Conclusions

This paper presented a rational choice model that conceives of young women as planning their fertility in the context of a choice between welfare dependency, marriage, and labor supply. The value of this model is not in its descriptive power, but in its predictive power. This model seems to explain more facts about welfare dependency than alternative models focused on the effects of welfare dependency and the labor/welfare trade-off.

The model explicitly recognizes the individual opportunity costs involved in performing household tasks such as giving birth and parenting. That cost includes the value of foregone individual leisure and it applies to every individual involved in housekeeping and childcare tasks, regardless of whether they are married or not. The model then conceives of that opportunity cost as fluctuating with the equilibrium in a competitive market for work in marital production, where work in marital production is defined as housekeeping and childcare supplied by one spouse and appreciated by the other spouse. Typically, if a spouse gets compensated for such work, it is the wife who gets compensated, and it is the husband who compensates her.

Marital reservation wages are derived, and they are the values that a rational woman compares to the benefits of going on welfare. These reservation wages depend on marriage market conditions. The higher the sex ratio, the higher the expected marital reservation wage and the lower predicted welfare dependency. The analysis helps explain higher observed welfare dependency rates among blacks: sex ratios are typically lower among blacks than among whites. The model presented here also explains why black women's welfare dependency is less likely to vary with men's income and number of previous children, but is more likely to vary with a woman's education.

The model also helps explain recent trends in women's welfare dependency in the U.S. This explanation ties changes over time to changes in cohorts' sex ratios. More specifically, the low sex ratios experienced by baby-boomers help explain the big increase in welfare dependency in the early 1970s, when post-World-War II baby-boomers reached the age for marriage and childbearing, and it helps explain why welfare reform passed so easily: women born in the baby-bust, who have been most likely to become mothers in recent years, have access to a larger pool of men interested in compensating them for being the mother of their child. The model also predicts that low sex-ratio

baby-boom women's welfare dependency was less likely to vary with men's income and number of previous children, but is more likely to vary with a woman's education.

The paper establishes many parallels between the analysis of welfare dependency and that of labor supply. Scholars researching labor supply may also benefit from reading interpretations offered for some existing findings in the labor supply literature.

This model is a static model: the women are comparing their expected satisfaction on a representative future day while living in couple relative to their satisfaction while living alone. It would be a good idea for future research to expand the model to a dynamic model, with a career in marital production involving a training stage, a production stage, and a retirement stage.

Many of the predictions presented here are untested. It is hoped that future research on the determinants of welfare dependency will provide tests for the various untested or insufficiently tested predictions presented here. Tests using data from other countries would also be useful. In particular, it would be fascinating to examine whether the baby-boom/baby-bust comparisons that were made here also apply to other countries.

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