Economics Bulletin

Volume 36, Issue 2

Spousal Age Gap and Fertility Preferences within a Family

Tao Li
University of Macau

Abstract

This paper studies the gender-specific fertility preferences within a family when i) children are investment goods and ii) there exists a sizable spousal age gap. Old husbands tend to demand less children because relatively young wives are substitutes of children for old-age support. On the other hand, young wives, expecting a significant period of widowhood, tend to demand more children. This gender conflict of interest is intensified when only working husbands may receive pensions.

Tao Li is assistant professor at the University of Macau, Faculty of Social Sciences, E21-4058, Macau (Telephone: +(853) 8397 8335, Fax: +(853) 2883 8312, Email Address: litao@post.harvard.edu, taoli@umac.mo). I would like to thank Yuk-fai Fong, Xinhua Gu, Li Han, Han Li and seminar participants at Peking University and University of Macau for helpful comments on drafts of this paper.
Citation: Tao Li, (2016) "Spousal Age Gap and Fertility Preferences within a Family", *Economics Bulletin*, Volume 36, Issue 2, pages 970-975
Contact: Tao Li - litao@post.harvard.edu.
Submitted: February 29, 2016. **Published:** June 11, 2016.

1 Introduction

Husbands tend to be older than their wives. There is strong evidence that large spousal age gap is correlated with high fertility level. This correlation is explained by the argument that young wives are pressured by their more senior husbands to produce more children (e.g. Bankole and Singh 1998, Das and Das 2013). In the absence of pressure from husbands, women are assumed to desire less children because they are the ones who bear the direct costs of children.

This paper provides an entirely different explanation to the above correlation. We extend the classic intertemporal consumption model that treats children as the sole investment goods for old-age support (Cigno 1991) to a situation where spousal age gap may exist. We show that young wives become substitutes of children for old-age support of husbands, making husbands prefer less children than their wives. The gender conflict of interest becomes more severe when only working husbands receive pensions, as is the case in many developing countries. The idea of pension reducing fertility is not new, and is supported by many empirical evidences (Basso *et al* 2014). What is new in our theory is its gender-specific impact on fertility preferences when spousal age gap exists.

2 Model

2.1 Setup

Following Cigno (1991), we construct the following intertemporal consumption problem. An agent may live for 4 periods. In period 0 (infant) and 3 (old age), he or she is a pure consumer. In period 1 or 2 (young & middle age), he or she is productive and allocates resources between child rearing (the sole means of investment) and consumption.

There are three possible marriage rules under which all marriages are arranged: Rule 1A (everyone marries at period 1), Rule 1B (everyone marries at period 2), and Rule 2 (women marry at 1 and men marry at 2). This paper focuses on Rule 2.

Suppose the consumption for period i is C_i, with $i = 0, 1, 2, 3$. Assume the life-long utility function of each agent (regardless of the sex) is:

$$U = U^I(C_0) + U^Y(C_1) + U^M(C_2) + U^O(C_3)$$

Under Rule 2, the consumption for male and female differs in each non-infant period. For the male, we have

$$C_i = \begin{cases} h & \text{if } i = 0 \\ Y_1 - \frac{t}{2} & \text{if } i = 1 \\ \theta\frac{Y_1+Y_2}{2} - \frac{hn}{2} - \frac{t}{2} & \text{if } i = 2 \\ \theta\frac{Y_2+Y_3}{2} + \frac{tn}{2} & \text{if } i = 3 \end{cases}$$

where Y_i is all the time devoted to producing an aggregate goods, which include both market and household goods, by the agent during period i, $\theta \geq 1$ measures the gains to marriage, h is the time devoted to child-rearing for each child (shared between the couple), n is the number of children produced after marriage, and t is the time devoted to producing household old-age support.

We implicitly assume that husband and wife split the cost of children, siblings share the cost of elderly support, and that the marginal product of old-age support production is diminishing in the number of parents being supported simultaneously.

For the female, we have

$$C_i = \begin{cases} h & \text{if } i = 0 \\ \theta\frac{Y_1+Y_2}{2} - \frac{hn}{2} - \frac{t}{2} & \text{if } i = 1 \\ \theta\frac{Y_2+Y_3}{2} - \frac{t}{2} & \text{if } i = 2 \\ Y_3 + \frac{tn}{2} & \text{if } i = 3 \end{cases}$$

To simplify our main analysis, let us assume that $Y_1 = Y_2 > Y_3$, and that $U^Y(\cdot) = U^M(\cdot)$.

2.2 Main Results

When conflict of interest arises under Rule 2 (spousal age gap), the optimal fertility level of females (n^*_{2W}) is always higher than that of their husbands (n^*_{2H}). We have the following Proposition.

Proposition 1. *Under Rule 2,* $n^*_{2H} < n^*_{2W}$.

Proof. To find the optimal fertility level under Rule 2, we derive the first-order condition for the wife as

$$\frac{t}{h} = \frac{U_n^Y(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2})}{U_n^O(Y_3 + \frac{tn}{2})} \tag{1}$$

For the husband, we have the first-order condition as

$$\frac{t}{h} = \frac{U_n^M(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2})}{U_n^O(\theta\frac{Y_2+Y_3}{2} + \frac{tn}{2})} \tag{2}$$

The left-hand side of the equation is simply the rate of return of the investment in children plus one. It is exogenously given. The right-hand side of the equation is simply the marginal rate of substitution (MRS) between the young (or middle) age and old age consumption. The MRS is a function of n. The optimality is reached when these two quantities are balanced.

Since $\theta \geq 1$, $Y_2 > Y_3$, and $U_n^O(\cdot)$ is a standard diminishing marginal utility function, for a given n we have

$$U_n^O(\theta\frac{Y_2+Y_3}{2} + \frac{tn}{2}) < U_n^O(Y_3 + \frac{tn}{2})$$

Since $U^Y(\cdot) = U^M(\cdot)$, $MRS_{2H} > MRS_{2W}$. Also note that the MRS is an increasing function of n because its numerator (denominator) is increasing (decreasing) in n. The proposition is then proved. □

The intuition is that the existence of spousal age gap improves the old-age consumption of the husband, which makes his marginal utility of old-age consumption low. As a result, the husband is unwilling to transfer consumption from his middle age to his old age through investing in children. This translates into high MRS for the husband on the right-hand side of the Equation (2) and lowers his optimal fertility level.

We assume that the family fertility level is a weighted average of the optimal fertility levels of the husband and the wife.

$$n_2^* = \alpha n_{2H}^* + (1-\alpha) n_{2W}^*$$

where α measures the relative bargaining power of the husband, with $0 < \alpha < 1$.

Whether spousal age gap raises family fertility level or not depends on α and θ.

2.3 The Impact of Alternative Investment Tools

We consider two types of alternative investment tools: mandatory pension plan and commercial life insurance.

Assume the cost for mandatory pension plan is $\frac{p}{2}$ for both young and middle age, and the payoff at the old age is q. The existence of such a pension plan decreases consumption at the young and middle age, and increases consumption at the old age. As a result, the MRS increases for the agent who participates in such a plan. The existence of mandatory pension plan tends to reduce the reproductive incentive of the agent who is covered by the plan. This is a well-known thesis.

Here we focus upon the potential gender conflict of interest introduced by the pension plan. It is often the case that only working husbands participate in such a pension plan in developing countries. Because we assume that the couple shares resources when they live together, there is no gender conflict over fertility choice under Rule 1 even if only the husband gets pension payoff at the old age. However, the existence of spousal age gap under Rule 2 changes the calculus. The wife may be denied her husband's pension payoff if her husband dies. She has to rely on her children to provide all the old-age support. We assume that both sexes pay $p/4$ for the pension contribution when they are married, and the husband pays the remaining $p/2$ when he is a bachelor at the young age. At his old age, the husband shares the pension payment q with his middle-aged wife. We have the following Proposition.

Proposition 2. *When there exists a mandatory pension plan for the working husband only, the optimal fertility levels for both sexes under Rule 2 are reduced, and the reduction is more significant for the husband.*

Proof. The first-order condition of the wife under Rule 2 becomes

$$\frac{t}{h} = \frac{U_n^Y(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2} - \frac{p}{4})}{U_n^O(Y_3 + \frac{tn}{2})} \tag{3}$$

For the husband, we have

$$\frac{t}{h} = \frac{U_n^M(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2} - \frac{p}{4})}{U_n^O(\theta\frac{Y_2+Y_3}{2} + \frac{tn}{2} + \frac{q}{2})} \tag{4}$$

Compared to Equation (2), it is quite clear that the MRS for the husband when only he participates in the mandatory pension plan under Rule 2 is even higher than the MRS for the husband without pension plan under Rule 2. □

There are two mechanisms working here. First, the consumption level at the young age is reduced and the husband becomes less willing to move more consumption away from the young age. Second, the consumption level at the old age is increased because of the pension payment, which makes the husband less willing to invest more in his own old-age support production. These two forces reinforce each other to reduce the husband's reproductive incentive. For the wife, only the first mechanism is in force, as the wife does not receive pension payment once her husband passes away in her old age, although she shares her husband's pension in her middle age. As a result, the existing gender conflict of interest under Rule 2 is deepened, since the husband now wants even lower fertility level.

Suppose the pension plan does not change the intra-household bargaining power, the family fertility choice n_2^* will decline with the introduction of the pension. Since when only the male has pension, his bargaining power may be strengthened, this tends to reduce n_2^* even further.

The strong gender conflict of interest can be reduced if the wife can receive her deceased husband's pension (i.e. survivor benefit). Alternatively, purchasing life insurance can also reduce the wife's reproductive incentive.

Proposition 3. *When the husband can purchase commercial life insurance such that his wife can collect payment after his death, the optimal fertility levels for both sexes under Rule 2 are reduced, and the reduction is more significant for the wife.*

Proof. For simplicity, suppose the life insurance also costs p and is shared by the couple. When the husband passes away, the wife receives q as a payment in her old age. Then the first-order condition of the wife under Rule 2 becomes

$$\frac{t}{h} = \frac{U_n^Y(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2} - \frac{p}{2})}{U_n^O(Y_3 + \frac{tn}{2} + q)} \tag{5}$$

For the husband, we have

$$\frac{t}{h} = \frac{U_n^M(\theta\frac{Y_1+Y_2}{2} - \frac{t}{2} - \frac{hn}{2} - \frac{p}{2})}{U_n^O(\theta\frac{Y_2+Y_3}{2} + \frac{tn}{2})} \tag{6}$$

Comparing Equation (1) and (2), it is easy to prove the result.

□

3 Conclusion

We have provided a new perspective to link fertility and spousal age gap. Our theory model suggests that an older husband may prefer to have lower fertility than a young wife, and this gender conflict of interest is intensified if only working husbands have access to pension plan.

References

[1] Bankole, Akinrinola and Susheela Singh, 1998, "Couples' Fertility and Contraceptive Decision-Making in Developing Countries: Hearing the Man's Voice" International Family Planning Perspectives, Vol. 24, No. 1 (Mar., 1998), pp. 15-24.

[2] Basso, Alberto, Howard Bodenhorn, David Cuberes, 2014, "Fertility and Financial Development: Evidence from U.S. Counties in the 19th Century" NBER Working Paper No. 20491.

[3] Cigno, Alessandro, 1991, Economics of the family, Oxford University Press, Oxford.

[4] Das, Kumudini and Kailash C. Das, 2013, "Age, education and caste differences among the couples and its impact on their fertility in India." working paper.