Bequest motives and fertility decisions

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Abstract

We compare altruistic and strategic bequest motives and examine which one induces the higher demand for children. Although parents with strategic bequests have the stronger demand for filial attention, they choose to have fewer children than those with altruistic bequests.
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1. Introduction

The purpose of this paper is to clarify the interaction between bequest motives and fertility decisions. As discussed in the literature on bequest motives, what causes parents to leave bequests depends on assumptions about parents’ preferences and the economic environment. Since such assumptions also affect parents’ decisions on fertility, the type of bequest motives and the demand for children must be closely related. Given the lack of consensus on bequest motives after numbers...
of empirical works, it is worth examining how different bequest motives affect fertility. One of a few studies addressing this issue is Zhang and Zhang (2001), who compare fertility and other variables under four different bequest motives. While several important results are obtained, the relative magnitude of the fertility rate between different bequest motives is indeterminate in most cases in their study.

In this paper, to draw explicit relationships between fertility and bequest motives, we focus on two well-known hypotheses, i.e., altruistic bequest motives (Barro, 1974) and strategic bequest motives (Bernheim et al., 1985). Considering a family consisting of an altruistic parent and selfish children, we examine two different assumptions about the parental and filial preferences for attention the children give to the parent, i.e., the optimal attention level for the parent is either equal to or greater than that for the children. Under the first assumption, since there is no conflict between parents and children, parental bequests would be motivated solely by altruism, as in Becker and Barro (1988). Under the second assumption, parental bequests would be used strategically in order to induce the children to enhance their attention, as in Cremer and Pestieau (1991).1

We will show that parents with altruistic bequest motives choose the greater number of children than those with strategic bequest motives, although the latter have the stronger demand for filial attention. The reason is as follows. Parents with strategic bequest motives choose higher bequests than those with altruistic ones in order to elicit more attention from their children. This implies that strategic bequest motives involve the higher marginal cost of a child. Furthermore, with strategic bequest motives, the optimal attention level for parents cannot be achieved while the children are placed on the reservation utility level. This implies that the marginal benefit of a child is lower with strategic bequest motives.

While Cremer and Pestieau (1991) have shown that there is a bias towards high fertility in the strategic bequest equilibrium, our results further imply that such a bias is greater in the altruistic bequest equilibrium than in the strategic one.

2. The model

Consider a family consisting of a parent and children, all of whom are equally potential heirs. The timing is as follows: (i) the parent chooses the number of children \( n \) \((\geq 0)\); (ii) the parent chooses the bequests to each child \( b \) \((\geq 0)\) (or commits to a bequest rule); (iii) the children observe \( b \) (or the bequest rule) and then choose the attention level \( a \) \((\geq 0)\).

The utility function for the parent is given by

\[
U^p(c_p, a_i, n, U_i^k) = u_p(y_p - n(b + \beta)) + \sum_{i=1}^n w_i(a_i) + \sum_{i=1}^n \delta_i(n)U_i^k,
\]  

(1)

where \( c_p = (y_p - n(b + \beta)) \) is the parent’s consumption, \( U_i^k \) is the utility of each child, \( y_p \) is the parent’s income, \( \beta \) is the cost of rearing a child, and \( \delta_i(n) \) is the weight the parent attaches to each child’s utility.

1 In a strategic bequest model without altruism, Cremer and Pestieau (1991) show that, without the cost of rearing children, the parent may choose to have as many children as possible. This paper introduces the rearing cost, which is assumed to be high enough to ensure an interior solution for the number of children.
Assuming that the children are identical, we have \( w_i = w, \ a_i = a, \ \delta_i(n) = \delta(n), \) and \( U^k_i = U^k \) for all \( i \). Hence, Eq. (1) can be rewritten as

\[
U^p(c_p, a, n, U^k) = u_p(y_p - n(b + \beta)) + nw(a) + \delta(n)nU^k. \tag{2}
\]

We assume that \( u^p_0 > 0, \ u^p_0 < 0, \ 0 < \delta(n) < 1, \ \delta'(n) < 0, \ \delta(n) + \delta'(n)n > 0, \ 2\delta'(n) + \delta''(n)n < 0, \) and \( w(a) \) first increases and then decreases in \( a \).

The utility function for each child is given by

\[
U^k(c_k, a) = u_k(y_k + b) + v(a), \tag{3}
\]

where \( c_k = y_k + b \) is the child’s consumption, and \( y_k \) is the child’s income. We assume that \( u_k^0 > 0, \ u_k^0 < 0, \) and \( v(a) \) first increases and then decreases in \( a \).

3. Altruistic and strategic bequest motives

Even though the parent is altruistic in that her utility directly depends on her children’s utility, conflict occurs between the parent and her children regarding the children’s attention when the optimal attention level for the parent \( a^*_p \) fails to coincide with that for each child \( a^*_k \). Since \( a^*_p \) and \( a^*_k \) are respectively derived from \( \partial U^p / \partial a = w'(a) + \delta(n)v'(a) = 0 \) and \( \partial U^k / \partial a = v'(a) = 0 \), given \( n \), we have \( a^*_p \neq a^*_k \) if \( \text{argmax}_a w(a) \neq \text{argmax}_a v(a) \). This implies that the parent has an incentive to use bequests strategically in order to manipulate the children’s behavior. On the other hand, if \( \text{argmax}_a w(a) = \text{argmax}_a v(a) \), then \( a^*_p = a^*_k \). In this case, the parent need not influence the children’s decisions, and thus behaves as a pure altruist in choosing bequests.

3.1. Altruistic bequest motives

In the case with altruistic bequests, we replace \( w(a) \) with \( w^A(a) \) in Eq. (2), and assume that \( \text{argmax}_a w^A(a) = \text{argmax}_a v(a) \).

Given \( n \), the equilibrium of the subgame beginning at the second stage \( (b^A(n), a^A) \) is characterized by

\[
v'(a) = 0, \tag{4}
\]

\[-u'_p(y_p - n(b + \beta)) + \delta(n)u'_k(y_k + b) = 0. \tag{5}\]

In the first stage, the parent chooses \( n \) so as to satisfy

\[
dV^A(n)/dn = -[b^A(n^A) + \beta]u'_p(y_p - n^A[b^A(n^A) + \beta]) + w^A(a^A) + \delta(n^A) + \delta'(n^A)n^A[u_k(y_k + b^A(n^A)) + v(a^A)] = 0. \tag{6}\]

3.2. Strategic bequest motives

In the case with strategic bequests, we replace \( w(a) \) with \( w^S(a) \) in Eq. (2), and assume that \( w^S(a) = w^A(a - \alpha) \), where \( \alpha > 0 \). This implies that \( \text{argmax}_a w^S(a) > \text{argmax}_a v(a) \).
The equilibrium of the subgame beginning at the second stage \((b^S(n), a^S(n))\) can be obtained as \(b\) and \(a\) that maximize the parent’s utility subject to the children’s participation constraint \(U_k^0 = u_k(y_k + b) + v(a)\), where \(U_k^0 = U_k(y_k, a_k)\). The first-order conditions for the problem are

\[
-nu'(y_p - n(b + \beta)) + [\delta(n)n + \lambda]u'_k(y_k + b) = 0, \tag{7}
\]

\[
nw^S(a) + [\delta(n)n + \lambda]'(a) = 0, \tag{8}
\]

\[
u_k(y_k + b) + v(a) - U_k^0 = 0. \tag{9}
\]

where \(\lambda\) is the Lagrange multiplier associated with the children’s participation constraint. Note that \(a^S(n)\) is lower than the parent’s optimum when the children’s participation constraint is binding. In the first stage, the parent chooses \(n\) so as to satisfy

\[
dV^S(n)/dn = -[b^S(n^S) + \beta]u'_p(y_p - n^S[b^S(n^S) + \beta]) + w^S(a^S(n^S)) + [\delta(n^S) + \delta'(n^S)n^S][u_k(y_k + b^S(n^S)) + v(a^S(n^S))] = 0. \tag{10}
\]

3.3. Comparison of the two bequest motives

We now contrast the strategic bequest equilibrium (SBE) with the altruistic bequest equilibrium (ABE). The number of children in SBE \((n^S)\) and that in ABE \((n^A)\), respectively, derived from Eqs. (10) and (6). The first term in Eqs. (10) and (6) is the marginal disutility of \(n\) from the decrease in the parent’s consumption, and can be defined as the marginal cost of a child. The second and third terms are the increase in utility (derived from attention and the children’s welfare, respectively) from adding an additional child for given amounts of consumption. The sum of these two terms can be defined as the marginal benefit of a child.

Proposition 1. \(n^S < n^A\).

Proof. Replacing \(n^A\) with \(n^S\) in Eq. (6), we have

\[
[dV^A(n)/dn]_{n=n^S} = -[b^A(n^S) + \beta]u'_p(y_p - n^S[b^A(n^S) + \beta]) + w^A(a^A) + [\delta(n^S) + \delta'(n^S)n^S][u_k(y_k + b^A(n^S)) + v(a^A)]. \tag{11}
\]

Comparing the first terms in Eqs. (10) and (11), since, \(b^A(n)<b^S(n)^2\) we have

\[
-[b^S(n^S) + \beta]u'_p(y_p - n^S[b^S(n^S) + \beta]) < -[b^A(n^S) + \beta]u'_p(y_p - n^S[b^A(n^S) + \beta]). \tag{12}
\]

As to the second terms in Eqs. (10) and (11), we have \(a^A < a^S(n)\) since the parent should set \(a^S(n)\) at a level higher than the children’s optimum \(a^*_k\), which is equal to \(a^A\). However, \(a^S(n)\) is still smaller than the

\(^2\) Define \(F(b, \theta) = -u'_k(y_p - n(b + \beta)) + \delta(n)u'(y_k + b) + \theta(\lambda/n)u'(y_k + b) = 0\). Note that this equation reduces to Eq. (7) when \(\theta = 1\), whereas it reduces to Eq. (5) when \(\theta = 0\). We have \(\partial F/\partial \theta = (\lambda/n)u'(y_k + b) > 0\) and the second-order condition implies that \(\partial F/\partial b < 0\). Using the implicit function theorem yields \(dB/\partial \theta = -(\partial F/\partial \theta)/(\partial F/\partial b) > 0\), hence, \(b^A(n)<b^S(n)\), given \(n\).
parent’s optimum in SBE while $a^T$ coincides with the parent’s optimum in ABE. Noting that
\[ w^S(a) = w^A(a - \alpha), \]
this implies that
\[ w^S(a^T(n^S)) < w^A(a^T). \] (13)

Comparing the third terms in Eqs. (10) and (11), the children’s utility is placed on the reservation level
in SBE. With any positive bequests, therefore, the children obtain a higher utility as long as they can
choose their optimal attention. This implies that
\[ u_k(y_k + b^T(n^S)) + v(a^T) \geq u_k(y_k + b^S(n^S)) + v(a^S(n^S)) = U_0 \] (14)

From Eqs. (10) (11) (12) (13) and (14), we have
\[ \left[ \frac{dV^A(n)}{dn} \right]_{n=n^S} \geq \left[ \frac{dV^S(n)}{dn} \right]_{n=n^S} = 0. \]

Therefore, the second-order condition $\frac{d^2V^A(n)}{(dn)^2} < 0$ implies that $n^S < n^A$. \qed

4. Conclusions

Investigating the effect of bequest motives on fertility decisions, we show that the parent with
altruistic bequest motives chooses a greater number of children than the parent with strategic bequest
motives. In SBE, the parent, who has an incentive to elicit a higher level of attention from her children,
leaves higher bequests, and thus faces a higher marginal cost of a child than in ABE. Furthermore, in
SBE, the optimal attention level for the parent cannot be achieved, although the children’s utility remains
at its reservation level. This implies that, the marginal benefit of a child is lower in SBE than in ABE.
Therefore, the parent with altruistic bequest motives faces a higher marginal net benefit from a child
relative to the parent with strategic bequest motives.

References