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BECKER ON THE INTERACTION BETWEEN QUANTITY AND QUALITY OF CHILDREN

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In his *Treatise on the Family* Becker makes the weighty claim that "the most promising explanation [for large fertility changes in various countries during relatively short time spans] is found in the interaction between the quantity and quality of children" (p. 107),[1] which interaction is "probably the major contribution of the economic analysis of fertility" (p. 93). The errors in Becker's analysis appear to have been overlooked or ignored in the book reviews[2] but they ought to be pointed out because of the practical importance of the subject.

In the decision problem that Becker first considers where "quality" is an aspect of choice, one maximizes the numerical utility function $U = U(n, q, Z)$ where n is number of children, q is quality of each child, and Z is a composite variable for other commodities, subject to the budget constraint

$$p_c\, nq + \pi_z Z = I$$

where p_c is the cost[3] per unit of q and π_Z the price of Z. The shadow prices of n and q are $\pi_n = p_c\, q$ and $\pi_q = p_c\, n$ respectively. "If p_c, π_z, and I were held constant, an exogenous increase in n would raise the shadow price of q, π_q $(= np_c)$, and thereby would reduce the demand for q. The reduction in q lowers the shadow price of n because it de-

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[1] G.S. Becker, *A Treatise on the Family* (Cambridge, Mass.: Harvard University Press, 1981). Unless otherwise stated, page references in this comment pertain to this book.

[2] In particular, those by Y. Ben-Porath in the *Journal of Economic Literature* 20 (1982), 52-64; M.T. Hannan, *idem*, 65-72; J. Humphries, *Economic Journal* 92 (1982), 739-740; W.B. Arthur, *Population and Development Review* 8 (1982), 393-397.

[3] Becker defines q as "the expenditure on each child" (p. 95) so presumably he means "in real terms" in order for q to have a price.

pends on q, which further increases the demand for n. But this raises π_q and lowers n still further, and so on. The interaction between n and q continues until a new equilibrium is established" (p. 104).

Note that if p_c, π_z and I are held constant and the initial position is an equilibrium, which Becker assumes, an exogenous increase in n must lead to one of two things. If preferences are unchanged, the only possible result is to go back to the original equilibrium (in Becker's static model, reversibility has to be allowed or no equilibrium exists under the stated conditions). On the other hand, if preferences have changed in order to permit the increase in n, there is of course a new set of parameters and q in the new equilibrium could well be the same or higher with Z less. In either case, there is no "interaction between n and q" to speak of.

In Becker's other formulation the budget constraint is

$$p_n n + p_q q + p_c nq + \pi_z Z = I$$

where p_n and p_q are fixed costs per unit of n and q respectively and p_c is made a function of q. As before, π_n and π_q can be calculated which depend on q and n, and Becker considers an exogenous cost increase: "an increase in, say, the fixed cost of n, perhaps because of reduced child allowances or reduced costs of contraception, would induce a substitution away from n and toward q as well as Z, because π_n would increase relative to π_q as well as π_z. The interaction between n and q implies that the increase in q raises π_n further, which encourages still more substitution away from n and toward q. The decrease in n and increase in q could be sizeable even if the increase in the fixed cost of n were modest" (pp. 107-108).

This argument, like the other, is invalid. Obviously, a higher p_n means a lower real income — it is not possible to stay on the same indifference curve — so one might even have a lower q as a result. Also, it should not be forgotten that shadow prices are defined only with respect to an equilibrium position. If some cost is changed exogenously, there is then simply a new equilibrium with its own set of shadow prices, but there is no in-between series of shadow prices connecting the two equilibria. The supposed interaction between n and q "that magnifies normal substitution"[4] is an illusion.

Child quality in some sense is certainly an important aspect of choice, but the trouble with Becker's analysis — independently of its technical errors — is that the basic framework is patently wrong.

[4] Arthur, *loc. cit.*, p. 395.

Consider a couple, both college graduates, who are in an equilibrium position with two college children. In Becker's framework, there is some number $n' > 2$ of children less educated who are equally desirable from the couple's viewpoint; indeed, there is some number $n'' > n'$ of such children that they prefer to their two college children, but they chose their two instead of the n'' because their budget constraint did not permit them to have the latter. Can anyone really believe this? What has gone wrong is the assumption that there is always some large enough number that can substitute for quality. Surely the facts are different.

I should like to suggest the following condition on choice: A couple will want their children to have at least the same level of education that the lesser educated partner has had. Though very weak, this condition serves as a constraint on the number of children because of the costs involved. If the constraint is binding and education costs are higher, one would have less n or Z but the same q.[5] Becker would permit a lower q and higher n. Which is more plausible?

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[5] Arthur (*loc. cit.* p. 396) has correctly noted this possibility even in Becker's model. Under the stated hypothesis, it would be a necessary result.