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A REVIEW OF CALDWELL'S THEORY OF FERTILITY DECLINE*

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I have benefited from the comments of my colleagues D. Weir and K. Wolpin on a first draft of this review. They are of course not responsible for what remains. Forthcoming in March 1983 issue of Population and Development Review.

Book Review of Theory of Fertility Decline by John C. Caldwell*

This is a collection of nine previously published papers, two unpublished conference papers, and a six page introduction. Although common themes and an evolving analytical viewpoint tie the papers together, they have not been edited to fit together cumulatively. Repetition in reasoning and in illustrative examples remain and there is no index to point the way to treatment of related topics. But the papers are, in many cases, important; having them collected in one place should add to their appreciation, and the juxtaposition helps one to understand how the various strands in Caldwell's thinking interrelate.

There are many strong technicians at work today in demography, but they often duck the dramatic paradoxes and bold challenges of the field, preferring to refine an estimate, or to propose a new tool (or readjust an old one), or to discuss descriptive correlations without reference to an interpretation of cause and effect. Caldwell does not eschew the controversial interpretation of his reading of the evidence, nor does he resist for a moment speculation on the causal forces behind demographic stability or change.

Caldwell's foundation for generalization is considerable, with 20 years of field experience in West Africa and Asia between stopovers in Australia and New York. He also has the credential of being one of the first to criticize the consensus on population policy that grew out of the 1950s and flowered in the 1960s. According to that consensus the reason fertility was high in low income populations was their lack of access to modern

*New York: Academic Press, 1982.

contraceptive techniques. Already in the 1960s Caldwell suggested that high levels of fertility in West Africa appeared to be a practical response of reasonable people to the relative gains they enjoyed by having a large family. Needless to say, among his colleagues at the Population Council in New York he did not get much of a hearing. From being an outspoken skeptic of the "family planning" solution to rapid population growth, Caldwell has gradually assumed a more central position in the field of transition studies, though his flamboyant style and keen wit would have us believe that he is still a radical and beleagured heretic, diametrically opposed to mainstream sociologists, to quantitative survey researchers, and to the many misguided schools of economic demographers. While Caldwell has not changed his course appreciably, he has eclectically drawn on others, and the field has overtaken him to a substantial degree. Regardless, this book provides an historical record of the last ten years during which time Caldwell has organized and extended his hypotheses concerning the origins and structure of the family, the social and economic accounting system that traditionally justified high levels of fertility, and the sources of change in the family's environment that have made the majority of the world's population reassess traditional reproductive goals and sharply reduce their fertility. Rather than trace the evolution of Caldwell's thinking, which can be occasionally discerned in this book, I shall start by recapitulating very briefly Caldwell's final thesis, even though it will be familiar to many readers of Population Development Review.

Caldwell starts from the premise that people behave rationally; that reproductive behavior in particular is economically rational within bounds

set for the individual"by biology and psychology."There exist essentially two types of society, in Caldwell's view, one of stable high fertility where there is no net economic gain to the family (or its decision-maker) from lowering fertility, and the other society where economic factors imply the undesirability of childbearing. In the former society, children provide their parents, over their lifetime, with more economic resources than they receive, and in the latter society children receive resources from their parents, on balance. When this cumulative flow of resources between generations, which Caldwell awkwardly designates the "wealth flow," 1/ changes direction from the regime which favors parents to that which transfers resources to children, parents lose the key incentive to have children, and fertility falls to a low level. Caldwell argues that this reversal in the direction of intergenerational transfers within the family is associated with mass education (chapter 10), the shift in employment opportunities from family production to wage labor markets (chapter 12), and the cultural influence of Western ideas on the family (chapter 9), all of which have the effect of equalizing consumption among family members and weakening the moral obligations of individuals to the traditional extended family, the broader kinship system, and the local community or tribal unit.

1/ Caldwell selected the term "intergenerational wealth flow" to characterize the cumulative lifetime flow of resources from parent to child or vice versa. However, "wealth" usually refers to a stock at one moment in time, whereas "income" refers to a flow of resources during a specific time period. Thus, the more appropriate term of "intergenerational transfer" of income is used in this review to reduce misunderstanding. It should be noted that Caldwell would like to include in his concept of intergenerational transfers all "money, goods, services and guarantees that one person provides to another," (p. 333) cumulated and presumably discounted over the parent's lifetime allowing for risk aversion.

To provide a fuller understanding of the mechanisms underlying these general propositions, it may be helpful first to show how Caldwell's series of hypotheses differ from approaches guiding other studies of the demographic transition. Then, several steps in Caldwell's logic will be examined, as they potentially lead to empirical predictions that might be used to appraise the validity of his framework.

How does Caldwell's concept of "intergenerational transfers" differ from the conventional concept of an economic "price" of a child? Standard microeconomics suggests that a decline in fertility in an era when per capita income increases can be explained in terms of an increase in the relative price of children (or by other price changes) or by a change in tastes. Since explanations that posit changing tastes open the door to all manner of outcomes, and therefore empty the microeconomic analytic framework of testable implications, the most common practice among economists is to search for a change in relative prices (or technology). Leibenstein (1954) and Becker (1960) both emphasized the role of price changes fostering the secular decline in fertility. At this level of complexity there is nothing to distinguish the concept of the market price of a child from Caldwell's notion of the net resource cost of a child over the parents' lifetimes.

But according to Caldwell the crucial attribute of the intergenerational transfer is its sign, not its magnitude, since parents' demand for children is assumed either unlimited if the price is negative or nonexistent if the price is positive. In contrast, the economic approach provides two mechanisms for achieving an equilibrium level of fertility. If the price of inputs

required to produce a child were fixed by the market and the technology exhibited constant returns to scale, the direct consumption benefits parents derive from an additional child would still tend to decrease with a larger number of children, due to satiation of consumer demand. This would lead parents to have children up to the point where the price was expected to exceed the declining schedule of marginal consumer benefits. But there are reasons to expect that the price of an additional child also varies for different sized families, due to the shifting importance of economies and diseconomies of family scale. For example, a second child may cost less than the first, but eventually one expects the marginal price of a child would increase because of economic and biological factors. By omitting consumer benefits of children and neglecting changes in the marginal price of children, Caldwell assumes away the conventional marginalist mechanism for sustaining an equilibrium level of fertility between the biological maximum and none. Though Caldwell has here proposed a bold simplification of the world, I think it leaves much to be desired.

Another difference between the "intergenerational transfer" and the "market price" of a child is that Caldwell's transfer represents in part a choice by parents, whereas an important aspect of a market price for the purposes of understanding the causes for fertility is that the price must be determined independently of the parents' behavior. Caldwell's "intergenerational transfer" combines market fixed prices of child inputs and outputs, as well as changes in the amounts of these inputs and outputs. One can, of course, imagine circumstances where the amount of resources committed to children would be affected by public sector policy or modified by community pressures (p. 338). Caldwell seems

to have this in mind when he concludes that the fertility decline was induced by "compulsory mass schooling" which made children more costly and increased the transfer of resources from parent to child (p. 347). But one can also imagine circumstances in which parents decided for themselves how much resources to devote to their children. Caldwell has mixed together in his concept of "intergenerational transfer" the effects of child prices--the components of which might include the cost of contraception, the opportunity value of a mother's time, the time and market prices of health and educational inputs--and social and parent decisions regarding the resource intensity of child rearing--such as, how much time mothers spend with each child, how much health care and years of schooling they receive, and so on. Consequently, the intergenerational transfer is more properly treated as another family choice variable. A correlation between transfers and fertility cannot be given a causal interpretation, because both are chosen jointly and to some extent simultaneously. Caldwell himself is critical of those who would "explain" fertility in terms of related aspects of the family's chosen social and economic structure, for these correlations shed little light on why fertility has declined (p. 228). In the case at hand, the exercise is less tautological, but subject to the same criticism, if the goal is to develop a predictive theory.

Becker (1960) was the first to discuss explicitly the substitution possibilities that confront parents, when they consider how many children to have and how much of their resources they want to allocate to each child. Although this idea of parents calculating a quality-quantity trade-off in their families was at the time a provocative feature of Becker's original paper (Blake, 1968;Duesenberry, 1960), it has become the conceptual paradigm for most subsequent research by econommists on fertility (e.g., Willis, 1974; Rosenzweig and Wolpin, 1980), and is exploited with equal success by biologists in the quantitative study of survival strategies of nonhuman species (Wilson, 1975). 2/

One factor that has concentrated the focus of research on the trade-off of quality and quantity is the encouraging regularity of the inverse empirical relationship found in cross sections between fertility and schooling of children. This pattern is observed in countries at many levels of development, at the regional level and across families (Schultz, 1971), one such study being Caldwell's own in Ghana (1967). Many students of the demographic transition note the strong inverse relationship between mother's education and fertility, holding the father's income constant, but fewer notice the equally strong association between the schooling of children and their parents' fertility (p. 306). Again,

2/ On the other had, Leibenstein (1977) had second thoughts about the utility of conventional microeconomic theory for the study of fertility, and Easterlin, Pollack and Wachter (1980) have explicitly allowed tastes to change within demand theory, despite the resultant loss of predictions.

the strong correlation between quality and quantity of children only confirms that they change together. It does not inform us of which one causes the other to change, since anything that is exogenous to the system may change them together. Of greater interest would be the conditions outside of the parent's control that are thought to predispose parents to want to increase the schooling of their children and to curb their fertility (Rosenzweig and Wolpin, 1980 and 1982). The path followed by Caldwell, from the Westernizing effects of schooling, to greater family egalitarianism, and eventually to a reversal in intergenerational transfers, is clearly parallel to that being explored by economic demographers. The problem that both face in proceeding with their distinct research agendas is finding a satisfactory causal explanation from outside of the family economy that could be responsible for changing the parents' investment strategy in children.

Economists have reasoned a priori that parents would be willing to school their offspring only if the market rate of return to schooling was sufficiently high and parents care about the economic welfare of their children. Unfortunately, these working assumptions have not been extensively documented; it is not clear whether different patterns of parental investment in child schooling are, in fact, explained by differences in private returns to schooling. Even if these direct empirical patterns were found, many statistical problems remain to be assessed due to the way data tends to be generated on different levels of schooling and on market wage rates for nonrandom samples of children and workers, respectively.

The most widely encountered explanation for the increase in school enrollment rates in the developing world, other than increasing incomes,

hypothesizes that technical change and increased longevity increase the private returns to schooling, occupational training and migration. Technical change is ascribed a central role because it contributes to changing relative prices of traditional inputs and outputs while diffusing modern inputs and outputs. Returns to education reflected in increased wage rates are partly due to the increased efficiency with which the more educated perform traditional productive activities. But these wage premia are also associated with the profit the more educated worker can sustain by exploiting disequilibria generated by modern economic growth (Welch, 1970; T.W. Schultz, 1975). Since more productive opportunities for schooled workers are not uniformly distributed by region or sector of the economy, the frequency of migration tends to be greater among the more educated, with enhanced selectivity of migration toward technologically dynamic areas. Gains in life expectation offer parents an increased chance for themselves and for their heirs to benefit from their children's prolonged periods of schooling and reinforcing human capital investments.

Another way to think about these changes in investments in children and fertility is to construct a general equilibrium system in which prices are determined endogenously within the model. A general equilibrium approach to the macro economic problems of growth, investment and consumption over time has been formulated around a microeconomic theory of exchange between overlapping generations. Although the general framework dates from Samuelson (1958), the redirection of this model from monetary phenomena to the analysis of the demographic-economic transition is quite recent, and this literature is well summarized by Willis (1982). This

general equilibrium growth framework provides a suitable setting in which to also treat the fertility decision as endogenous. Eckstein and Wolpin (1982) show that as capital accumulates and wage rates increase, there is a substitution away from children and toward the consumption of goods, given the time cost of children. At the same time, as income per-capita grows, the demand for children increases. The path of fertility generated by this model depends, thus, on the relative magnitude of the goods cost and time costs of raising children. But it may be misleading to emphasize further the analogies between these very different modes of thinking about economic-demographic interactions, even if they both are informed by common stylized facts.

The unanswered puzzle in Caldwell's "theory" is what explains the strength of parent demand for their children's schooling among so many of the world's poorest people. I find few suggestive answers to this question in this book, and fewer hypotheses that appear testable. The conclusion that compulsory universal schooling triggers the decline in fertility (e.g. pp. 329, 349) is not tenable, given what we know of the legislative record and enforcement capabilities of most low income countries. Cultural compatability with Westernizing mass education is too vague, for my tastes. Appeals to unspecified "lags or acceleration" in the effects of "material forces of production" on "family structure

and fertility" because of "culture" may be in some sense correct (p. 207), but virtually tautological. If the "timing and speed of fertility decline is (determined by) the rate at which family relations are Westernized" (p. 229), then it is appropriate to explain what these words mean and even give some empirical indicators of what constitute the essential features of Westernized family relations. Firm empirical magnitudes for many of Caldwell's concepts are hard to find, and harder to deduce from any comprehensive framework. The "egalitarian ideology of the West" is assigned a central role in equalizing consumption and work opportunities in the family and even in educating girls (p. 176). Yet the "very considerable degree of inequality of consumption within the household" sustained high fertility in the West until the onset of the twentieth century (p. 347). How was this Western egalitarian ideology assembled so quickly and so irresistably that it could be successfully exported to the rest of the world within a few decades? There are many puzzles here, but Caldwell provides few testable hypotheses for resolving them and little or no evidence.

Without clearer concepts and some attempt to measure intrafamily consumption inequalities, this appealing line of inquiry cannot go far. There are at least two distinct dimensions of family egalitarianism. The differences in consumption standards between children and parents are directly related to intergenerational transfers, and hence to Caldwell's motivation for childbearing. The second dimension of family inequality, the difference between adult male and female consumption opportunities, is not derived by Caldwell from the family's environment, nor is it analytically

related to the decline in fertility. In the latter case, the relative value of the time of women compared with that of men has been emphasized by economists as an important component in the market price of children, whose variation may explain both cross-sectional differences and time-series declines in fertility. But empirical study has thus far concentrated on the cross section, and education has generally served to proxy women's value of time. To complete this framework, there remains the task of showing how the value of women's time is determined by the economy's structure, and how the value of women's time is associated with the relative consumption status of women and children in the family, as well as the sex segregation of production activities in the home and market.

It should be obvious that there are extensive and challenging opportunities for conceptual and empirical work on these questions of intra-family resource allocation. For example, if differences in child mortality between boys and girls are viewed as a useful proxy for differences in the consumption opportunities of boys and girls within the family, the evidence of sex discrimination and consumption inequality is clear from India (Rosenzweig and Schultz, 1982) and elsewhere. Since anthropometric measures of child height and weight are useful indicators of cumulative nutritional status, sex differences in these measures might be analyzed in the same framework proposed to interpret sex differentials in child mortality.

The segregation of work among age and sex groups is interpreted by Caldwell as an economically inefficient means for maintaining unequal consumption opportunities within the family, particularly in Bangladesh (pp. 257, 357). If a price is being paid by the family patriarch in

terms of inefficiency in order to maintain such a segmented labor market within the family, it should not be difficult to document empirically this cost of segmentation, and see how it mounts among families that sustain a sex imbalance in their membership. The question is important, the stylized facts are widely known, but Caldwell's conclusions appear to spring from his own careful but unsystematically evaluated observations.

Another link between "family relations" and fertility is forged around the form of the labor market. Caldwell believes that familial production is exploitative and induces high fertility while capitalistic production has the opposite effect. Competitive markets for labor may reduce the margin for monopsonistic exploitation of labor within the family; with many potential employers, a worker is more likely to receive his marginal product. But when Caldwell contrasts the capitalistic mode of production with familial production, it is unclear whether he has this microeconomic distinction in mind. Alternatively, wage labor is generally assumed to be able to work as many hours as desired without affecting the offered wage rate, whereas the self employed or family worker may realize a declining marginal product for his or her labors. This difference in the wage determination process may motivate different fertility behavior in families that are fully or partially engaged in wage labor markets (Schultz, 1981). For example, increasing the husband's income or the family's wealth will tend to increase fertility by a greater amount (or decrease it by a lesser amount) if the wife is a wage worker than if she works only within the family (Willis, 1974). Is this the distinction that Caldwell has in mind in contrasting the family production

unit and the wage labor market? Although one is intrigued by Caldwell's intuitive grasp of a reasonable hypothesis or statement of an interesting issue, it is not always possible to reconstruct the reasoning and evidence that have led him to this observational judgment.

In conclusion, on rereading this collection of Caldwell's pioneering and popular papers, I gained many new and provocative insights. But what I missed most was data. After the first two papers, in which survey attitudes toward family and fertility are tabulated for Nigeria, the form of documentation shifts to a multitude of secondary sources. As the level of abstraction and generalization increases, the nature of the data might be expected to also change. But the growing neglect of empirical underpinnings has, I suspect, changed the nature of Caldwell's scholarship. Because questions are not framed in a form that they might be empirically confirmed or rejected, the concepts have become more expansive and much less tractable to eventual empirical analysis, while logical consistency among hypotheses has been sacrificed.

When Caldwell first proposed the notion of lifetime intergenerational transfers or "wealth flows," he immediately began designing survey instruments that would seek to measure his new concept. He also set about fielding these instruments around the world. Nearly a decade has passed and there is no evidence I have seen that the hard measurement problems have been resolved or the process of constructing and testing empirical counterparts for his concepts has advanced. Instead, many subsidiary and topical issues have been addressed. I hope the additional levels of speculation

do not preclude more systematic empirical analysis and clarification of his core idea. The rich data that Caldwell is now involved in producing from village projects in Bangladesh and India could still advance this important goal. Meanwhile, Theory of Fertility Decline is not complete. For a theory of the demographic transition to pass muster, it must confront systematically the empirical record.

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