

Fertility Inefficiencies and Development

Larry E. Jones* Alice Schoonbroodt[†] Michèle Tertilt[‡]

February 2011

1 Extended Abstract

The relationship between fertility and development (as measured, for example, by GDP per capita) is negative and strong in cross-country data. Based on this correlation, much practical development policy is aimed at reducing fertility. A widely used, yet very controversial, policy are lump-sum payments for sterilizations. Such policies were for example in place in India between 1975 and 1977.¹ Similarly, the one-child policy (or monetary child penalties) in China. There are also various family planning policies aimed at reducing fertility in a variety of other countries, particularly in Africa.² Recent randomized field experiments try to assess the impact of contraceptive subsidies and information on fertility outcomes (e.g. Ashraf, Field, and Lee (2010)).

*University of Minnesota

[†]University of Southampton

[‡]University of Mannheim and Stanford University

¹See Chomitz and Birdsall (1990) (p. 310) for a discussion of sterilizations policies on the Indian subcontinent.

²E.g. the USAID family Planning Program which began in 1965 with the explicit goal to reduce birth rates in developing countries.

Are policies aimed at reducing births in developing countries successful development policies? And more generally, are these desirable policies? Even if a policy increases GDP per capita, it might make people worse if they derive a direct benefit from children and large families. What is sometimes ignored is that (most) people have children for a reason. When people are forced to have fewer children than desired (e.g. by the one-child policy in China), or when the relative price of children is distorted through policy intervention (e.g. through abortion subsidies), parents may be worse off. It is therefore critical to identify the precise sources of inefficiencies before one can justify fertility disincentives as a desirable development policy. Isolating the exact nature of the relevant friction(s) will also help identify appropriate policy instruments.

To identify inefficiencies, a welfare concept is needed. Unfortunately Pareto efficiency is not defined in environments with changing population sizes. However, Golosov, Jones, and Tertilt (2007) develop notions of efficiency that are applicable in environments with changing populations: $\mathcal{P}$ -efficiency which takes all potential people into account and $\mathcal{A}$ -efficiency which focuses on alive people. We use these concepts to identify and discuss several frictions that may be responsible for inefficiently high fertility rates in developing countries. We also develop and analyze policies to correct for such friction and implement the first best. We also ask to what extent such policies contribute to economic development. We analyze these frictions in the form of concrete analytical examples.

In the analysis we find it useful to distinguish between *inter-family* and *intra-family frictions*. This distinction is particularly relevant for the design of policies. For example, inter-family trades typically do not operate through markets and therefore policies aimed to correct the functioning of markets will likely be ineffective. We first analyze inter-family frictions and then turn to intra-family frictions.

The first friction we analyze are *global externalities*. It is well-established that the existence of (congestible but not excludable) public goods such as publicly owned land, waterways, and the ozone layer leads to overconsumption. In this paper we show that the same friction can also lead to overpopulation.³ Similarly, publicly provided education and health benefits can also lead to inefficiently high fertility. In both cases the reason is that the private cost of having a child to the parent does not include the social cost of the child (in form of additional pollution or public expenditures). In equilibrium then, the social cost is higher than the social benefit and a dominating allocation with fewer births exists that makes everyone better off. Note, however, that merely scarce factors do not lead to overpopulation. As shown in Golosov, Jones, and Tertilt (2007), scarce factors constitute a simple pecuniary externality, and do not by themselves imply an inefficient level of fertility.

A second reason for inefficiently high fertility may be due to infectious diseases. When diseases are passed on from person to person and mortality increases in population density, we have an epidemiological externality. People may then have too many children because they ignore the fact that having more children will make it easier for the disease to spread and thereby increase (child) mortality. This effect might be particularly important for cities in developing countries, where infant mortality rates are often higher than in rural areas. As a policy implication, one would need people to internalize the effect of fertility on disease prevalence, for example by taxing fertility. Alternatively, reducing infectious diseases through public health campaigns (for example mandatory vaccination programs) will also address the problem, albeit in a very different way. The former policy would reduce fertility, while the latter would not. Rather, by elimi-

³See Chomitz and Birdsall (1990) and Lee and Miller (1990) for a verbal discussion of the issue.

nating the externality, it would make high fertility efficient.

A third possible reason for overpopulation is *asymmetric information* about contraceptives or a distortion in the market for contraceptives. This was first discussed in Chomitz and Birdsall (1990). The logic is simple. If, for example through monopoly power, the price of contraceptives is artificially high, then the private cost of avoiding a child is above the social cost. Therefore fertility will be above the social optimum. A similar, but more subtle, argument can be made based on missing information about contraceptives. One cost of using contraceptives is the associated health impact. Suppose it's relatively safe to use contraceptive implants, but that due to superstition, the subjective belief about side effects is artificially high. Then the private perceived cost of avoiding a child is above the true cost and this will lead to excess fertility. Recent randomized field experiments have been introduced with the aim of reducing such asymmetric information about birth control (see for example Ashraf, Field, and Lee (2010)). To the extent that these programs are successful, they may point towards the existence of asymmetric information.

A fourth reason for overpopulation may be related to *missing annuity markets*, or more generally, distorted capital markets. If there is no insurance for longevity (or the return on capital is artificially low), people may use children as an investment. While this logic sounds convincing, we show that it is less straightforward than one might think. Even if the "return" on children is high in the sense that their expected future wage is high relative to expected interest payments on savings, it is not always the case that the parent is the recipient of this return. On the contrary, typically the child has ownership over his or her own future wages. On the other hand, if children are altruistic towards parents and voluntarily support their elderly parents, or if social norms exist which assure that children take care of their elderly parents, then capital market distortions

may well lead to overpopulation. Our analysis also shows that the link from missing annuity markets to excess fertility is even less obvious. If there is uncertainty about the age at death, then people would like to insure against longevity. If this is not possible, then they will have to invest in non-state contingent assets. Whether the alternative assets are capital goods or children depends on the relative returns, but not directly on the fact that annuity markets are missing.

A fifth reason is based on an argument made by Becker and Murphy (1988). If there are frictions that lead to underinvestment in the human capital of children (e.g. credit constraints), then children are relatively cheap. Quoting from Becker and Murphy (1988): “The suboptimal expenditure per child “artificially” lowers the effective cost of an additional child [...and] may induce families to have too many [...] children.” We show that this logic is not necessarily true. Depending on the details of the utility function, such a friction may well lead to inefficiently low fertility. The outcome depends on whether quality and quantity of children are complements or substitutes.⁴

The results from the field experiment in Ashraf, Field, and Lee (2010) may point to a possible intra-family friction. The study provides evidence from Zambia showing that fertility falls when women have access to concealable contraceptives. One interpretation is that men make fertility choices while women bear most of the costs. In this scenario, the private benefits from children exceed the social cost, since men do not take the effect on their wives into account. In a formal example we show that this argument is somewhat problematic. In such a scenario, women would have an incentive to compensate their husbands for lower fertility rates. What would prevent them from doing so? One possibility might be en-

⁴See also Section 5 in Jones, Schoonbroodt, and Tertilt (2010) where we revisit the quantity-quality trade-off in a different context.

forcement problems. Assume a wife makes a payment to her husband in order to prevent further births. What prevents him from breaking the agreement later on? If such contracts are not enforceable, then equilibrium fertility may be excessively high. We provide an example involving spousal bargaining about fertility to shed more light on this issue.

Another possible intra-family friction may be related to a missing market for contracts between parents and children. If children (rather than parents) reap the benefits from education expenditures, then parents may have an incentive to under-invest in child quality and overinvest in child quantity.

References

- ASHRAF, N., E. FIELD, AND J. LEE (2010): "Household Bargaining and Excess Fertility: An Experimental Study in Zambia," unpublished manuscript, Harvard University.
- BECKER, G. S., AND K. M. MURPHY (1988): "The Family and the State," *Journal of Law and Economics*, 31, 1–18.
- CHOMITZ, K. M., AND N. BIRDSALL (1990): "Incentives for Small Families: Concepts and Issues," in *Proceedings of the World Bank Annual Conference on Development Economics, 1990*, pp. 309–339, Washington, D.C. World Bank, chomitz91.
- GOLOSOV, M., L. E. JONES, AND M. TERTILT (2007): "Efficiency with Endogenous Population Growth," *Econometrica*, 75(4), 1039–1071.
- JONES, L. E., A. SCHOONBROODT, AND M. TERTILT (2010): "Fertility Theories: Can They Explain the Negative Fertility-Income Relationship?,"

in *Demography and the Economy*, ed. by J. B. Shoven. NBER, Forthcoming.

LEE, R. D., AND T. MILLER (1990): "Population Growth, Externalities to Childbearing, and Fertility Policy in Developing Countries," in *Proceedings of the World Bank Annual Conference on Development Economics, 1990*, pp. 275–304, Washington, D.C. World Bank.