The intergenerational economics of infertility, childrearing, and assisted reproduction

The field of demography has been described as the study of private decisions with public effects: in recognition of the instrumental role that population dynamics can have on economic and political systems. This definition could equally apply to the study of infertility and fertility treatments; mostly, a private matter often shared with medical professionals, with public importance. Central to these veiled descriptions of human reproduction underscores the role that children play in society and their importance for economic growth and intergenerational fiscal sustainability. Through such a lens, the efficacy of medically assisted reproduction (MAR) reimbursement for a society may be examined.

The 20th century gave rise to many publicly funded benefit programs to support retirement, health care, and disability among other government programs. These public programs are almost exclusively paid for through taxation under pay-as-you-go schemes funded by those of working ages with monies mostly redistributed to younger and older aged cohorts. Almost all of these redistributive intergenerational programs were established when workers were more plentiful than recipients and inherently reliant on future workers for maintaining financial integrity.

The best way to reflect this fiscal dependency is using the old-age dependency ratio. In simple terms, the old-age dependency ratio describes the number of workers in the economy supporting older individuals who are out of the work force. Over the next 40 years, developed economies will transition from roughly 4 workers supporting 1 retired person to approximately 2 persons supporting each retired person. This shifting demographic in advanced economies has raised concerns over the solvency and affordability of many of these cherished public programs and how to raise funds to pay for these obligations. The old-age dependency ratio also suggests that future workers are likely to face higher rates of taxation to pay for these promises than current workers.

Economists with an interest in the role of the government in the broader economy often estimate lifetime "net taxes" paid by different age cohorts over their lifetime as a measure of intergenerational fairness in terms of taxes paid and benefits received. Lifetime net taxes paid can be influenced by a range of factors, including rates of taxation, past, current and future birth rates, and the likely public benefits received at each stage of life. Lifetime net taxes can be directly influenced by the number of children born each year because this represents the taxable base to fund government promises. The more children who become workers in the future economy, all things being equal, the necessity for raising taxes to pay for public programs is reduced. Within this intertemporal framework, we can understand how the annual MAR conceived cohort will influence the future taxes paid by the cohort of non–MAR-conceived children. Importantly, as net taxes are positive for the government, i.e., on average more taxes paid than benefits received, at the margin each additional child adds fiscal value to the government.

Because MAR children augment the future workforce of non–MAR-conceived children, we can see that infertility is not only a problem for individual couples, but aggregate infertility and resulting unborn children can negatively influence the finances of the cohort of non–MAR-conceived children to which they belong. Although the contribution of MAR to national births is currently modest (approximately 2% of births in the United States, and much higher in many European countries), it does reduce the fiscal pressure on other tax-payers as these children mature and enter the workforce. Without MAR conceived children, more strain is placed on the cohort of non–MAR-conceived children required to pay for spending promises that can lead to increased tax rates, which can further suppress the economic growth. Considering the fiscal externalities of children underscores why infertility as a private matter has public importance.

If one accepts that children represent the societal infrastructure that are required to fund public systems into the future, this provides a framework by which to evaluate fertility, and childrearing. Many of these arguments were outlined by the economist Nancy Folbre in an article titled "*Children as public goods*" in which the intertemporal fiscal cycle of life among parents, children, and government are described (1). Because older generations have some claim over the economic output of future generations, and the claim is nonexcludable, this suggests that children can be described in the language of economists as "public goods" from which all members of the society benefit. Taking into consideration the intergenerational nature of our publicly funded systems, i.e., Social Security, Social Security Disability Insurance, health care, we can assign a value to parenting based on the future contributions of these children.

If children are public goods for which parents receive no remuneration, what can be said about the public economics of parenting? The precise value of donated labor attributed to parenting, in which the discounted present value was estimated to be $219,000 based on the future lifetime net taxes paid by each child (i.e., Σ [taxes] $-$ Σ [benefits received] $=$ net tax) (2). Because parenting is mostly a noncompensated employment, the time, resources, and sacrifices to raise children can be viewed as a public service, which creates a windfall for governments. This public service is freely given, and most importantly, is a service that all members of the society benefit from in the future.

If all members of the society can benefit from the public service of parenting and the productive output of future children, this suggests that society and governments should enable as well as encourage those willing to make the sacrifices of parenthood to optimize economic and fiscal gains. Many countries embrace pronatalist policies to encourage or lessen the financial burden of family formation, in which a dramatic uptick in such policies has been observed over the past 20 years according to an annual United Nations survey.

Importantly, a recent review of pronatalist policies (e.g., child tax credits, allowances, baby bonuses) that reduce the financial burden of children on households by 10% was shown to have a modest effect on birth rates that ranged from 0.5%–4.1% (3). Although these programs do achieve the stated aim of influencing births, they can be costly.

Turning our attention to couples experiencing infertility, the effects of pronatalist policies are futile for 1 in 7 couples who are unable to reproduce without MAR. By comparison, it has been observed that in countries with a generous public subsidy for MAR, the number of children born every year are comparable or exceed most pronatalist policies (4). This suggests that MAR, when funded adequately, can produce as many children every year as most accepted and funded pronatalist policies. Although infertility is a medical condition, an effective medical intervention clearly acts in a similar manner to pronatalist policies. This might suggest that governments seeking to increase the birth rate might benefit from turning their attention from the able but unwilling, to the willing but unable couples experiencing infertility who could benefit from treatments. There are recent examples where this has occurred, and governments have increased funding of MAR for the stated aim of increasing national birth rates.

The economics of children in countries with aging populations are favorable. However, there can be notable inconsistencies in policies from governments regarding family building. Although many countries claim to want additional children, even providing financial support to do so, they seldom consider funding MAR as part of the policy-mix despite the large numbers of children compared with other pronatalist policies. Is this shortsighted or mindful policy? If one considers the rising prevalence of infertility, and the potential for augmenting birth rates with MAR, excluding public funding for treating infertility can seem negligent. However, there could be concerns that embracing MAR wholeheartedly might create a society reliant on technology for conception. The ideal policy-mix should embrace family building over the life cycle, one that encourages couples to conceive without MAR at a time that suits them, and to have public programs to support those medically infertile.

Although the emotional toll of infertility and its treatment is undeniable; a powerful, dispassionate economic argument can also be made for public funding. From a fiscal standpoint, the investment in MAR may be one of the best investments made by health care services, with a potentially more than sevenfold return on investment for the government in future discounted net-tax revenue per child (5).

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