

The Impact of Freedom on Fertility Transition: Revisiting the Theoretical Framework

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Abstract

Demographers have worked for decades to identify the conditions common to the final stages of the demographic transition. The most widely respected theoretical explanations of fertility decline focus on couples' decisions about their family size, decisions presumed to be driven by distal factors in society that are usually socioeconomic in nature. The theoretical explanations generally overlook the many barriers preventing women from having fertility regulation methods and the information they need to manage whether or when to have a child. Many of these barriers are often ignored by policy makers, even though from the consumer perspective they may be virtually insurmountable. This paper suggests that an opportunity model, which could also be viewed as an adjustment to existing theory, may provide a plausible explanation for the timing and pace of fertility decline. It proposes that what is often viewed as latent desire by women to control their fertility, ascribed to those women who used contraception or desired a smaller family size in the absence of the normally expected distal factors, may be simply a shift in the results of their implicit cost-benefit analyses. Women's success in managing their childbearing appears to be largely dependent on their opportunities. In recognizing women's rational reasoning based on the information they have available, from a policy perspective it is important to ensure that the barriers to the correct information and the technologies they need are reduced, as called for in ICPD. With this perspective, we can see that average family size can decline, and often has declined, by purely voluntary means, within a human rights framework.

Introduction

"A theory is a good theory," writes Stephen Hawking, "if it satisfies two requirements. It must accurately describe a large class of observations on the basis of a model that contains only a few arbitrary elements, and it must make definite predictions about the results of future observations." (Hawking, 1988)(page 9). Classic and economic theoretical explanations of the demographic transition neither predicted nor explained the below replacement level fertility now found in Russia, parts of Europe or Japan. The classic and economic theories do not explain the fall in Iran's total fertility rate (TFR) from 5.2 to 2 in the 12 years between 1988 and 2000 (Vahidnia, 2007, Tarmann, 2005), or Addis Ababa's decline in TFR to 1.6 while the whole of Ethiopia remained at a TFR of

5.9 (Sibanda et al., 2003). Leading demographers in the 1960s, such as Kingsley Davis were adamant that the early efforts to make family planning more accessible would not work (Davis, 1967).

Establishing causation in demography is notoriously difficult. Demographers have long sought to identify the conditions influencing the timing of fertility decline in the final stage of countries' demographic transitions. The many expressions of Notestein's classic theory of the demographic transition (Notestein, 1945; 1953) all assume (a) that couples make decisions about family size, and (b) that these decisions are driven by distal factors such as urbanization, improved or worsening economic conditions improved employment opportunities, education or reduced infant or child mortality. Also centered on couples' decisions and dependent on the distal factors are the microeconomic explanations for family size, led by Leibenstein and Becker. In these theoretical explanations, couples are seen as weighing the costs and benefits of having a next child (Leibenstein, 1957; Becker, 1991.) Behind both of these groups of theories is an assumption that poor couples want to have many children until a change in one or more of the distal factors causes them to rethink family size; along with a second assumption that couples will find a way to achieve their smaller family size through the proximate determinants of contraception, abortion, age of marriage or breastfeeding.

The original demographic transition theory was conceptualized before any society had unconstrained access to modern contraception and safe abortion, and before large scale pattern of below-replacement fertility emerged. It was informed by the types of data that were available, mainly socio-economic variables such as education, wealth and income (Lesthaeghe, 1977), and these data correlated handsomely with fertility change across much of the world. Since that time, the theories dependent on distal factors have been criticized (Cleland and Wilson, 1987, Robinson and Cleland, 1992) and its many models have been technically falsified. *Population in Twenty-first Century: The Role of the World Bank* recognizes the many discrepancies, for example in Bangladesh or Indonesia, between the theory that couples have fewer children in response to socioeconomic changes actual patterns of fertility decline, for example in Bangladesh and Indonesia where these conditions were not present (World Bank, 2007).

In 1997 Karen Mason noted, "A claim that only one factor causes all fertility transitions can be destroyed by discovering a single exception....Exceptions to all the major theories of fertility transitions have been found..." (Mason, 1997)(page 446). In spite of this observation, there still remains a lingering assumption that changes in society that are exogenous to the couple, essentially the familiar distal factors, are driving their fertility decisions. "It appears," wrote Simon Szreter in 1993, "as if the modern international field of study that addresses large-scale change in fertility behavior is permanently wedded to the conceptual scheme with which it started . . . after World War II." For example, writing about the success of organized family planning programs in the 1960s and 1970s, Bongaarts and Watkins admit that "there is no tight link between development

indicators and fertility,” but then go on to assert that “the role of socioeconomic development in accounting for fertility declines remains inherently plausible, and benefit-cost models of individual decision making are central to the most influential interpretations of fertility decline” (Bongaarts and Watkins, 1996).

We are suggesting a shift in thinking about fertility decline which in our view fits more closely with what we are seeing in modern instances of fertility decline than the classic and economic models of the demographic transition – or its various modifications. Simply stated, the opportunity model says that the timing of recent fertility decline appears to be dependent on the degree to which the woman has freedom from unnecessary constraints to fertility regulation so that she can obtain both the technologies and the supporting information she needs to manage whether or when to bear a child. We emphasize the wide range of barriers that stand between women and the information and technologies they need to manage their fertility. We acknowledge that couples may well make decisions together about their family size, which, where this works, it is a more harmonious and efficient pathway to fertility control, but we also recognize that in many low income settings this spousal cooperation often does not happen.

It is also important to understand that this model is not concerned with family planning programs, but instead with the ability of individual, and specifically the individual woman, to obtain fertility regulation methods easily if she wants them, from any convenient source, regardless of whether any program is present.

Our argument begins with a description of a mismatch between assumptions in the classic and economic models of fertility and the biology of human reproduction. The next section explores how the many barriers to family planning have been treated in the past. We discuss contraceptive decisions in the framework of consumer theory, and tie to what is often viewed as a latent desire to control fertility. After a discussion of data problems and research challenges, we explore the explanatory power of an “opportunity” model to explain rapid fertility decline, and suggest some predictions that future events will test.

A biological perspective on human reproduction

Any model of fertility decline must be congruent with the biology of human reproduction. The model of parents weighing the costs and benefits of having a child, much as they would weigh the costs and benefits before making purchase decisions for durable consumer goods, such as major appliances or an automobile (Becker, 1991), is not consistent with the biology of human reproduction. The fact that humans have sexual intercourse many hundreds or even thousands of times more frequently than is needed to achieve the desired number of pregnancies obviates the possibility of applying rational decision-making about when to have a baby. Unlike other mammals, ovulation is concealed in women, and given frequent intercourse, we are forced to take

frequent, repeated, persistent, and perfect steps *to separate sexual intercourse from childbearing*. If human reproduction were like purchasing a major appliance for our homes, we would have to take the initiative of asking the store several times a week *not* to send a new appliance, and if we failed to do this repeatedly, perfectly, and persistently, one would be delivered, by default, at our door a few days later. This however is not the model implied in economic analyses of fertility decline.

If the above generalization is true then it implies that human beings are not 'hard-wired' to have any particular number of children, although human beings normally have a strong drive to nurture and protect a child once born (Potts, 1997). Also, there is no biological or empirical basis for assuming any intrinsic equilibrium between birth and death rates. Indeed, genetic studies suggest that about 150,000 years ago the death rate may have exceeded the birth rate to such an extent that human populations could have been reduced to perhaps 20,000 individuals (Cann et al., 1987). In short, there is no biological basis for the assumption that births and deaths should eventually balance one another and there is neither anything surprising nor anything needing explanation about the below replacement fertility now common in Europe and in many emerging economies.

Lastly, biology provides a useful perspective on the virtually universal double standard in sexual behavior. Darwin understood, not only do different species compete with one another, but the two sexes can have different and intrinsically competitive reproductive agenda. Unlike other apes, human males identify their children - or those they believe to be their children - and invest time and energy in their upbringing. When a woman has a baby it naturally carries half her genes, while a man might be a cuckhold where he invest in a child he believes to be his but was actually fathered by another man. In many cultures men have devised way – sometimes of great cruelty such as female genital mutilation – to ensure paternity and to control female reproduction. It is also true that women may attempt to optimize reproduction over a life time, for example, by interrupting a mistimed pregnancy. A plausible case can be made that some of the many barriers surrounding access to contraception and safe abortion may be manifestations of this widespread drive of men to control female reproduction (Potts Why can't a man)

An opportunity model

We hope to demonstrate that a woman's opportunity to access technology and information has the power to explain the final stage of the demographic transition. We recognize that this could be framed as a new model, or it could be viewed instead as simply a needed adjustment to existing demographic transition theory which places much greater emphasis than previously on the formidable barriers that all too often separate women from the means to manage their childbearing. Whether it is a new model or an adjustment, the opportunity model, as we will show later, has important policy implications.

The role of demand for contraception or of the desire for a smaller family is not disputed. Instead, the distinction between the opportunity model and the classic and economic theories turn on the weight, source and timing of the initiation of this demand. The newer perspective is based partly on the observation that the distal factors assumed as required in the classic and economic theories, while they can often be influential, are neither necessary nor sufficient for fertility decline to take place. For example, it appears that education is not a prerequisite for fertility decline, while at the same time we recognize that educating girls is immensely important for their empowerment and health, and for the well-being of their families and communities. In contrast, we suggest that the reduction of barriers to fertility regulation where fertility is high may be both necessary and sufficient for lowering average family size regardless of women's or couples' education, wealth and other socioeconomic factors.

The opportunity model asserts that women make implicit cost-benefit analyses about their childbearing, based on the best information they have. However, because of frequent sexual intercourse, which is common across all human societies, women who are constrained by the many barriers to fertility regulation methods and correct information they need are often unable to implement the results of such analyses. Our focus on the availability of fertility regulation methods for women is derived in large part from previous theoretical work by a number of leading demographers. A quarter of a century ago Cleland suggested, "...knowledge of birth control, access to methods and their moral acceptability may constitute an important, independent part of any explanation of fertility decline." (Cleland, 1985)(page 227). Two years later Cleland and Wilson described problems in models of fertility that depended on couples' demand for contraception, including the unevenness with which demand applied to experience across geography and time (Cleland and Wilson, 1987). Cleland's own subsequent work on diffusion and ideational change, with credit to Everett Rogers' early concept of diffusion (Rogers, 1983), plays an important role in our own theoretical explanation (Rogers, 1983, Cleland, 2001b). Rutenberg and Watkins have reminded us that information spread through local communities may be supportive of contraceptive use, or it may hinder its uptake (Rutenberg and Watkins, 1997). Mason observes that relative equality between the sexes within the conjugal family evidently lowers the cost of fertility regulation; and in this way gender systems appear to play an important role in fertility transition, although not as master determinants (Mason, 2001). One way to interpret this, we suggest, is that gender inequality serves as a barrier to fertility regulation.

We also offer a new interpretation of latent desire to control fertility, suggesting it may be simply rational decision making, rationality that we should view as a natural attribute among women. Cleland has provided this insight:

“(T)he direct threat of pregnancy and childbirth to the life of the mother is no small consideration...It would thus hardly be surprising if, in most societies throughout most of history, reproduction has been regarded not as something to maximize but rather as a mixed blessing” (Cleland, 2001a)(page 66).

Women’s success in managing their childbearing appears to be largely dependent on their opportunities. We are not new in addressing this concept, which appears to have been already on the minds of a number of leading authors. Curtis and Westoff, who were testing the predictive validity of intentions to use family planning on actual use in Morocco, observed that “women in societies, or in subgroups of the population in which contraceptive use is widespread, may find it *easier* to act on their contraceptive intentions, particularly if they are weakly held, than women in societies or communities in which contraceptive use is less common” [emphasis added] (Curtis and Westoff, 1996)(page 240). Magnani et al. suggested a supply-side influence on fertility preferences (Magnani et al., 1999). In 1992, Robinson and Cleland observed “a very genuine latent desire to limit further childbearing collides with very high perceived costs attached to the only birth limitation methods available” (Robinson and Cleland, 1992)(page119). Casterline recognizes the need for attention to this problem in research: “[T]he scant empirical attention to the magnitude of contraceptive costs and their effects on contraceptive decision making reflects less than full respect for the potential power of the various possible obstacles to contraceptive use” (Casterline et al., 2001b)(page107). Examining three decades of economic theory of fertility, Robinson explains that in societies with fertility below replacement level, economic explanations of fertility decline have lost all of their explanatory power, and he reminds us that “fertility is a byproduct of the pursuit of heterosexual pleasure unless some deliberate control is used...” (Robinson, 1996)(page 68). In Africa, providing general as well as specific information through the broadcast media has had positive influence on contraceptive use (Westoff and Bankole, 1997). Caldwell recognized that one of the factors generating any fertility transition is the increased ability of women to determine their own fertility (Caldwell, 1983). Freedman wrote that availability of contraceptives can crystallize latent demand (Freedman, 1997). Taking this a step farther, Bulatao suggests that improved access to fertility regulation, assuming some initial at least *latent desire* for it, should give an impetus to fertility decline (emphasis added) (Bulatao, 2001).

We recognize that the costs (in the broad, economic sense) of using or seeking fertility regulation methods are often perceived to be, or are actually, so high that many women do not act on it. We suggest it is logical, and indeed wise, for woman not to act on a latent desire to control fertility if she views the cost to be higher than the benefits. It is when a woman learns that the costs are lower than the benefits of using or seeking a fertility regulation method that she can see she has options about her childbearing. It appears then that she has activated her latent desire and will seek contraception; but another way could interpret this change is that with better information and

opportunities, her benefit-cost balance has shifted and she makes (another) rational decision, this time moving proactively to manage her family size.

Barriers to fertility regulation

The ICPD Programme of Action, states, "Governments should [remove] unnecessary legal, medical, clinical and regulatory barriers to information and to access to family planning services and methods." (United Nations, 1994b). This goal is still a long way from being fulfilled, and a comprehensive review of barriers to fertility regulation in developing countries was completed in 2006 (Campbell et al., 2006).

The barriers separating women from the information and technologies they need to limit childbearing are so vast and deeply infused into societies and medical structures that many fertility regulation options are some methods are immediately crossed off in women's minds before they are even tried, due to widespread misinformation and arbitrary medical rules. Barriers to fertility regulation involve a series of functional obstacles, varying in height, including the status of women, geographic access, unaffordable financial costs, medical rules and restrictions, shortfalls and breaks in commodity supplies, contraceptive side effects, misinformation, and laws restricting the provision of safe abortion. They all exist in the developed as well as the developing (Postlethwaite et al., 2007).

As suggested under biological perspectives above, there may be deep seated reasons behind the patriarchal control of female reproduction (Potts, 2005). Non-evidence based medical practices, such those in parts of Francophone Africa requiring blood tests before hormonal methods can be obtained, are often deeply entrenched and surprisingly difficult to remove (Stanback, 1994). As a result of lobbying by women's advocacy groups in India, injectable contraceptives are excluded from the government health programs, even though these are eagerly used by women in many other parts of the world. For example, many women perceive birth control pills to be more dangerous than pregnancy – which is wrong by an order of magnitude. In Madagascar nulliparous women are refused oral contraceptives, while in Tanzania women with five or more children are refused this method. Social conventions also impose formidable barriers, and for example, women in Afghanistan cannot leave home without their husband's permission and even then only when accompanied by a chaperone. In Tanzania women are refused oral contraceptives if they have had five or more children, and in Madagascar if they are nulliparous. Many of these barriers are easily overlooked by policy makers, even though from the consumer perspective they may be virtually insurmountable.

Fear of side effects is widespread, and it is one of the most important explanations for non-use of contraception (Asturias de Barrios et al., 1998, Bongaarts and Bruce, 1995) (Casterline et al., 1997, El-Zanaty et al., 1999, Stash, 1999, Viswanathan et al., 1998, Yinger, 1998, Hashmi et al., 1993, Shah and Shah, 1984, Casterline and Sinding, 2000,

Grubb, 1987). In anything to do with sex and reproduction the diffusion of information occurs continuously, and as noted above, Rutenberg and Watkins have reminded us that the transfer of information is sometimes helpful and sometimes misleading. For example, in many cultures oral contraceptives are perceived as more dangerous than childbirth, but in reality, in a low resource setting having a baby can be up to a thousand times as dangerous as taking the Pill. Some African women believe that pills and injectables can cause infertility (Castle, 2003). Qualitative interviews in a study in Punjab, Pakistan by Casterline et al. revealed as a prominent factor women's fears of the detrimental side effects of contraceptives on health (Casterline et al., 2001b). Fear harmful side effects also undermines contraceptive in the Philippines, where "[w]omen with an unmet need were more likely to view the pill and tubal ligation as more or equally harmful to health, compared with pregnancy" (Casterline et al., 1997)(page 181). In the US and Europe, commercial interests trump the evidence that oral contraceptives could be sold over-the-counter (Potts and Hunt, 2000). Although safety is not a problem (World Health Organization, 2004b, World Health Organization, 2004a), oral contraceptives remain on prescription in many developing countries, reinforcing the idea to both health workers and consumers that this method is dangerous.

All societies use a combination of contraception and abortion to limit family size (Tietze and Bongaarts, 1973; Van der Tak, 1974; Kulczycki, 1999; David, 1999; Potts et al 1977), and perhaps the single most important barrier facing women is whether they can obtain a safe abortion. Tietze and Bongaarts calculated the role of abortion in fertility regulation and suggested, "unless there is a major breakthrough in contraceptive technology or major modifications in human sexual behaviour, levels of fertility required for population stabilization cannot be easily obtained without induced abortion" (Tietze and John Bongaarts, 1975)(page 119). Montagu has demonstrated graphically in logistic regression after adjusting for income, urban/rural density and education that if abortion is accessible in a country, the TFR is likely to be one child lower than if abortion is not accessible (Montagu, 2005). The observation Kingsley Davis made over 40 years ago, "Induced abortion, for example, is one of the surest means of controlling reproduction, and one that has been proved capable of reducing birth rates rapidly....Yet this method is rejected by nearly all national and international...programmes" (Davis, 1967)(page 732) is perhaps even more true today. Information we have obtained across 170 countries indicates that no country has reached replacement level fertility without widespread access to safe abortion for poor women as well as the rich, who tend to have this access everywhere. Yet abortion remains illegal in many countries and even where it is legal, as in India, it is not universally available. Many of the world's women lack access to safe abortion (Henshaw et al., 1999), making the cost of interrupting a pregnancy high and even life threatening. Barriers to access for abortion for low income women in developing countries can include price, sexual exploitation, pain, imprisonment and death. Conversely, in some places safe abortion has been made available even in the face of restrictive laws, and then family size has fallen, as in Bali, Indonesia where the availability of safe abortion not only helped limit family size, but

also improved the adoption and continuation of contraceptive use (Potts et al., 1970, Campbell et al., 2006).

Culture and religious traditions are commonly viewed as influential on women's decisions to use contraception. However, we suspect that culture may very often influence women's family planning options more than their preferences, as it often plays out through provider biases or medical barriers to use. Where the status of women is low, social barriers to accessing family planning can be more formidable than the direct financial costs. Working in Matlab, Bangladesh, Phillips and colleagues describe a common situation of a young woman for whom seeking help for problems with a contraceptive is costly, in that she must manage any visit to a clinic through conversation with her husband who in turn will talk with his mother (1996). In the young wife's calculation, the social costs of managing a contraceptive problem may actually be greater for her than the cost of bearing and raising another child (Phillips, *et al.* 1996). In the Punjab, Pakistan, Casterline and colleagues made detailed measurement of various perceived costs of practicing contraception and of the motivation to use contraception. They found that two leading obstacles to using a contraceptive were the woman's perception that use would conflict with her husband's preferences and attitudes toward family planning, and her perception of the social or cultural costs of using family planning (Casterline et al., 2001). Another recent study from Pakistan also indicated psychosocial barriers as the most important self-reported obstacle to the use of family planning among the urban poor, where physical and economic barriers were reported much less frequently. The psychosocial barriers were defined as religious interpretations and value systems that limit the mobility and decision making abilities of women who were dominated by the males and older women (mothers-in-law) in the family (Stephenson and Hennink 2004).

While the history of contraception is beyond the boundaries of this paper, it is worth noting here the work by Lesthaeghe examining Belgium's fertility decline between 1800 and 1970. He found that the one factor that consistently accompanied fertility decline was secularization. When we recognize that relatively low status of women in many societies is kept in place by culture and traditional values, then we must consider also among the barriers to fertility regulation the religious rules that constrain women's options about their childbearing, along with numerous other rules and restrictions in their lives.

Normal consumer behavior

Poor and uneducated women, who according to the classic and economic models of the demographic transition are not good candidates for family planning, have shown rapid uptake of contraception when it became realistically available for them (Curtis and Westoff, 1996, Magnani et al., 1999, D'Agnes, 2001, Bhatia, 1982). The research needed to understand this exists not in the literature on human fertility but in the business literature on marketing.

When a woman who did not want contraception decides after it becomes realistically available to her that she prefers a small family and wants to use a modern method to achieve this, her action is consistent with other well-documented examples of normal consumer behaviour. There are many examples of products for whom demand arose only after the product has shown up, and these include, for example, the original Xerox machine, *Cuisinart* food processors, disposable diapers, automated teller machines, personal computers, TV remote controls, iPods, and Post-its.

Magnani et al. suggested that the availability of contraception was influencing influence on fertility preferences (Magnani et al., 1999). In analyzing patterns of contraceptive use in Matlab, Bangladesh, Phillips observed that latent demand for contraception was activated by appropriately delivered, socially sensitive supply in an impoverished society, and it also influenced desired family size. "While Matlab brings into question conventional notions of supply, it demonstrates that the supply side can comprise an important institutional determinant of fertility change" (Phillips et al., 1988) (page 328). The authors called for more research, noting, "A shift in emphasis is needed from an analysis of the institutional determinants of demand to those of supply" (Phillips et al., 1988) (page 328), but in fact market research already understands this process. Everett Rogers observed, "An individual may develop a need when he or she learns that an innovation exists. Therefore, innovations can lead to needs as well as vice versa" (Rogers, 1983)(page 166). Rex Campbell recognized that consumers may either follow a rational problem solving process, when the consumer becomes aware of the problem and then looks for a solution, or they become aware of the innovation before he or she recognizes the problem (Sheth, 1974). It seems plausible that as consumers we treat contraceptive methods in the same fashion as any other products that we never knew we wanted until they arrived as new options in our lives.

In all of these cases, representing a variety of settings not associated with any significant improvement in socioeconomic status, the introduction of family planning options appears to have driven a rise in contraceptive use, and in several cases explicit survey evidence exists documenting the downward shifts in desired family size (Campbell, 2006). Mason has observed that high CPRs can occur in the absence of large-scale socio-economic change (Mason, 2001). This has been documented in, for example, Nigeria (Farooq and Adeokun, 1976), Bangladesh (Phillips et al., 1996, Konje and Ladipo, 1999, United Nations, 2003, Caldwell and Caldwell, 1992, Haaga and Maru, 1996), Morocco (Curtis and Westoff, 1996, Magnani et al., 1999), Guatemala (Bertrand et al., 2001, Bertrand et al., 1999), West Bengal, India (Chacko, 2001), Pakistan (Shelton et al., 1999), and Ghana (Debpur et al., 2002). Fertility declined similarly in South Korea and Cuba with extremely different economic profiles (Noble and Potts, 1996). One especially interesting case has been Morocco, where the 1992 DHS-II and 1995 panel surveys, with data for 910 women, showed that approximately 30% of those women who reported in

1992 that they did not intend to use a contraceptive in the future were actually using a method in the 1995 survey (Curtis and Westoff, 1996, Magnani et al., 1999).

Freedman argued that the rapid rise in contraceptive prevalence (CPR) in Ishaan, Nigeria was doubtful and its documentation may reflect a problem in the survey (Freedman and Berelson, 1976). However, an even more extreme rise in CPR occurred among Cambodian refugees in the 1970s, where in one camp of 140,000 people, the CPR jumped from virtually zero prevalence to 52% of married women using contraceptives within one month (D'Agnes, 2001), and in a camp of 35,000 people 60% of women chose to use contraceptives in a matter of weeks (Potts, 1981). In yet another camp, 2,252 out of 10,000 married women sought family planning advice in a three day interval. In one week, contraceptive prevalence jumped more than it climbed in most countries in a generation (Potts, 1980).

In a broad review of the demographic transition, Caldwell recognizes that it is unlikely that many people will express a preference for a smaller family before they have access to contraception: .

For 40 years we have been asking, in surveys and one-on-one anthropological investigations in sub-Saharan Africa, rural South India, and rural Bangladesh, both of contraceptive users and nonusers, whether their parents used contraception or worried about the inability to control family size. The answers have been the same. The parents had not practiced birth control because they had no access to services. They had never contemplated restricting family size *because, without the methods for doing so, it was unimaginable* (Emphasis added) (Caldwell, 2001) (page 103).

Data problems, research challenges, and definitions

While all countries have comparable measures of education, economic status, industrialization and urbanisation, none collect systematic data on the personal biases of family planning providers, or the non-evidence based decisions that deny women contraception or abortion. The demographic literature often makes little distinction between actual side effects and the perception of harmful health impacts from using contraception. We would classify the latter as misinformation.

National statistics on legal abortion are often incomplete, and the various methodologies used to estimate illegal procedures rarely give consistent results. In Hungary, women reported only 55% of the legal abortions that were known to have taken place (Klinger, 1969), and 30 years later it was found that only 47% of legal abortions in the US were reported in the National Survey of Family Growth. Consequently, in a complex area burdened with ambiguous data, the role of abortion is commonly underestimated. The evolutionary forces behind the continued attempts to control women's reproductive lives (Potts, 2003), even in their residual phase in more progressive societies, also spur

secrecy around the use of abortion. Recent DHS data from Bangladesh shows a fall in TFR without a rise in contraceptive use or any major change in the age of marriage. (National Institute of Population Research and Training Dhaka Bangladesh, 2007). A rise in abortions is likely, but as the data was collected with the support of USAID during the second Bush administration, it was not possible to explore this possibility in detail.

The most obvious challenge for future research is to try to quantify the barriers to fertility regulation. A second and related challenge is to ask, under what circumstances could a demographic theory be supported credibly with compelling evidence that is not derived from large data sets? In contrast to the large and convenient data sets used to support the classic and economic theories of the fertility transition, in developing the opportunity model we are compelled to work with uneven, scant data.

Some of the key terms used in the field of demography may inadvertently yet subtly obfuscate concepts (Potts and Short, 1999). We will focus on just two of them. The first “cost” is often used in demography, in the broad economic sense, as a proxy for barriers to family planning, including perceived disadvantages of using contraception such as social disapproval or side effects (Casterline, 2001a). The term does not encompass many of the barriers to fertility regulation, including medical restrictions, provider bias, or the absence of method options. Nor does it cover misinformation or the absence of information. In addition, it implies that a person could obtain the technology by paying a higher social or financial price. In using this term, then, authors can inadvertently diminish the size and importance of barriers to fertility regulation.

Finally, the terms “supply and demand” are sometimes used in confusing ways. Knowledge can be categorized as under “demand”, such as when a society believes that their culture people should have many children, or that contraception is safe or unsafe; and local values can prevent providers from allowing single women from having access to fertility regulation methods. Misinformation is a major barrier to contraceptive use and fertility decline, and correct information should be made available as a part of “supply”. In our view, when we are discussing theory it is more practical not to try to define the elements of fertility regulation as supply and demand, but rather to focus on whether unnecessary barriers are prohibiting women from having easy access to the means they need to manage their childbearing.

Testing the opportunities model

Hawking’s criterion for a scientific theory that “it must make definite predictions about the results of future observations” is difficult to apply to demography. Experimental tests of the opportunity theory must include easy access to safe abortion as well as multiple methods of contraception. The experience of Addis Ababa, Bangladesh and Bali, Indonesia, Where abortion has been made easily available in a high fertility setting, and family size declined rapidly, is a partial validation of the opportunity model. Further support comes from what can be termed “natural experiments”. It is useful to

compare contemporary Philippines and Bangladesh. The Philippines has a relatively low infant mortality rate (25), but a relatively high TFR (3.5). Bangladesh has a lower TFR (2.7) but higher IMR (65). Citizens of the Philippines have 2.5 times the purchasing power of those of Bangladesh.

The strength of the opportunity model is that it also reverses the equation and suggests that when enhanced access to family planning and safe abortion occurs, the TFR will also fall to similarly low levels rapidly regardless of whether there are significant socio-economic changes taking place. For example, the TFR in Addis Ababa fell from 3.1 in 1990 to 1.8, with a desired family size of 1.6 (Central Statistical Authority Ethiopia and ORC Macro, 2001) (Central Statistical Authority Ethiopia and ORC Macro, 2001), and it is even lower than it was in Vienna in the 1920s, even though Addis is an order of magnitude poorer. The rapid fall in Addis does not fit the classic and economic theories and was not predicted by any demographer. As recently as 1990, "Ethiopia was not considered among the countries at or near the start of the transition to low fertility" (Sibanda et al., 2003). The age of marriage has risen and premarital childbearing remains low and while this has an obvious impact there are settings, such as Pakistan where the mean age of marriage in Pakistan has risen significantly but family size has fallen less than in Addis. Sibanda et al. "suspect that abortion and increased access to contraception are the immediate mechanisms by which out of wedlock births are being averted among single women in Addis Ababa" (Sibanda et al., 2003)(page 6). We suggest that the rapid fertility decline in Addis reflects unusually ready access to safe abortion and good contraception. In 2005, Ethiopia reformed its abortion law and abortion data became more openly available. In 2005, Marie Stopes International, which runs several reproductive health clinics in Addis Ababa, saw 85,000 clients and over 30,000 safe abortions were done (Marie Stopes International, 2005). Knowledgeable informants know that large numbers of safe abortions were being performed even before legal reform, exactly as happened before and after the 1970 change in the New York law (Tietze, 1973). It seems plausible that once women learn that they have an option to manage their own childbearing through means that are safe, then the idea of limiting the size of their family becomes a liberating thought, presenting an attractive alternative in shaping their reproductive lives, over which they previously had had virtually no control. Our hypothesis is that if the unconstrained access now available in Addis were to be made available in Lagos or Kampala, then the TFR would fall in the same way.

The dramatic difference in TFR between the Islamic Republic of Iran (2.0) and its Moslem neighbors (Iraq 4.8), Pakistan (4.6), Syria(4.5), Afghanistan (6.8) confounds the classic and economic models of the demographic transition, but fits a opportunity model. The rapid fertility decline in the Islamic Republic of Iran has been a startling success that cannot be accounted for by exogenous societal factors influencing couples' decisions. In 1987 the religious leadership accepted a policy initiative of the Ministry of Health to make a full range of contraceptive choices available, including voluntary male

and female sterilization, in order to avoid poverty, enhance education and preserve the environment. All betrothed couples are required to receive family planning instruction. A well organized system of health workers introduced family planning in the rural areas. This voluntary program was associated with one of the most rapid declines in TFR ever recorded, from a TFR of 5.6 in 1985 to 2.0 in 2000 (United Nations Population Fund (UNFPA), 1988). The gap in TFR narrowed from 3.6 more births in rural compared to urban areas in 1976 to only 0.6 more births in 2000 (Iranian Ministry of Health and Medical Education, 2002). Iran did not reform the abortion law, but both medical and surgical abortion do seem to be available, at least to some women. The Iran-Iraq war of 1980-88 was deeply disruptive. There was a temporary fall in per capita income followed by a rise while fertility continued to fall. There was no rise in the fertility rate as the men returned from war, as has often occurred in other countries. The government improved access to education, but this would not have affected the older women of childbearing age in this brief period. It seems likely, then, that the access to family planning in the government's campaign in this program, including information contained in the publicity, had significant influence over the fall in fertility. Women's university education increased during this period, and maternal and infant mortality declined, but it is as plausible that these were driven by the declining fertility as vice versa.

Given the limitations in contraception and the dangers of unsafe abortion, it is not surprising that it took England and Wales 50 years for the TFR to fall from 6.16 in 1860 to 3.53 in the decade 1900-9, and the percentage of women having five or more children declined from 63% to 30% (Royal Commission on Population, 1973). Similarly, in the US it took from 1842 to 1900 for family size to fall from 6 to 3.5. For comparison, a century later in Thailand – where enhanced access to contraception and (even to safe abortion in the urban areas) did exist – the same transition took place in 12 years. In South Korea less than 12 years (1960 to 1972) to make the same transition. In Korea modern contraception was actively promoted and safe abortion widely available.

In those cases where we ascribe a rapid fall in family size to enhanced access, as in Ethiopia, Iran or Thailand, the differential in TFR between the upper and lower common quintiles has also shrunk. When family planning is hard to get, the poor have large families because they do not have the education or wealth to climb the many barriers separating them from the technologies and information they need. This was the situation in Sicily, rural Thailand and rural Iran before family planning became easily available. Once enhanced access occurred, the poor were as eager as the rich to enjoy the new freedom.

No demographer predicted the low – and so-called 'low-low' fertility- now found in Europe, the former Soviet Union and East Asia. These 'low' birth rates are a surprise only if it is assumed that births and deaths "ought" to balance one another in some intrinsic way. We believe that viewing fertility decline within an opportunity framework can explain the extremely low fertility found in some parts of the world

because it rejects the notion of an evolved behavioural “kinderstaat” driving the desire to have either a large or a small family. Once unconstrained access to contraception and safe abortion occurs, then more and more women choose to separate the pleasures of sex - or inevitable sexual intercourse depending on whether it is desired nor not - from the burdens of childbearing.

Considering an opportunity model may be important in understanding the stalled fertility decline in many African countries, as well as Afghanistan, Yemen, East Timor, and until this year Bangladesh, just as it explains the persistence of relatively high fertility in the Philippines and Iraq, rural Pakistan, and parts of India and Latin America. The empirical evidence in favor of the opportunity model is particularly strong, because in a number of countries in Africa and in Bangladesh the emphasis on making family planning easily accessible was reversed when the 1994 International Conference on Population and Development broadened the agenda of sexual and reproductive health to include many additional elements, although budgets fell instead of rising. As family planning became less accessible, the disparities in family size between the upper and lower economic quintiles widened again. Another test of the opportunity model comes from the number of countries where fertility decline is stalled.

Finally, in Hawking’s words, a practical theory “must make definite predictions about the results of future observations. We posit that if the opportunity theory is valid, then we should expect to see:

1. Over time, wherever women have access to a range of contraceptive methods with correct information and backed up by safe abortion, fertility will reach replacement level or below.
2. As long as the international community fails to focus on family planning, and the shortfall in money and commodities persists, there will be further stalls in fertility decline (or an actual rise in family size), particularly among the poorest economic quintiles in low income countries.
3. A moderate to rapid decline in family size will occur, if and when genuine contraceptive options, backed by access to safe abortion, becomes widely available in African cities other than Addis Ababa.
4. Any country that introduces new constraints to access to contraception, correct information, or safe abortion will see a slowing or reversal in fertility decline, especially amongst the lowest economic quintiles.
5. No country will achieve replacement level fertility before 2050 without *de jure* or *de facto* access to safe abortion.

Conclusion

The widely respected classic and economic theories of the demographic transition frame the distal variables such as education, income, urbanization and women’s employment as the prime drivers of fertility change, and it sees the proximal variables as a necessary

link but not as a driving force. Large socioeconomic data sets are easy to compare with fertility trends, while information on the many barriers to the use of fertility regulation are sketchy and uneven. However, numerous anomalies to the classic and economic theories now exist and the factors with less complete data may actually be more important. A further problem is that the classic and economic theories imply that low fertility cannot be achieved in countries where education is not expanding or wealth increasing – even though these countries that have a well documented unmet need for family planning and where the numbers of unsafe abortions by women desperate to stop the next birth is often exceedingly high.

The impact of unconstrained access to fertility regulation is becoming increasingly apparent. There are now numerous instances of fertility decline occurring as barriers to contraception and abortion are removed. We suggest that the effect of socioeconomic advantages on fertility work through enabling women to avoid or overcome the many barriers that can be insurmountable for uneducated women living in more limited conditions. Education helps women to be critical consumers of information, able to distinguish the correct from the improbable. Our reading is that in settings where family planning is hard to get, the more educated women are better equipped to overcome the barriers to family planning. Beyond the relationship between education and fertility regulation, however, education is an immensely important factor for the empowerment of women, for the well-being of their families and their communities, and for countries' economic and social development. We recognize that a number of factors do influence fertility decline, but even where they are not present, the reduction of barriers can act alone and in fact may serve as the leading impetus to rapid fertility decline. And inversely, the barriers alone all too often delay fertility decline.

The 2007 report of the recent hearings in the UK Parliament on population growth concluded, "the MDGs are difficult or impossible to achieve with the current levels of population growth in the least developed countries and regions. difficult or impossible to achieve with the current levels of population growth in the least developed countries and regions." (All Party Parliamentary Group on Population Development and Reproductive Health, 2007)(page 4). For example, health and education systems in countries with high fertility cannot keep up with their rapidly growing populations. Because of population growth, assuming a class size of 40, the developing world needs 2 million new teachers every year just to stand still, without any increase in the percentage of children in school (Marie Stopes International, 2006).

The rapid worldwide growth of population in the past 200 years can be attributed mainly to reduced mortality following the introduction of life-saving technologies and their associated information, such as clean water, improved nutrition, vaccines, and better hygiene. Death control is universally applauded, while allowing women to have the technologies and information they need for managing their own reproductive leave generates controversy in many societies.

It is useful to note that the classic theory of demographic transition was conceptualised before any society had given women the fully unconstrained access to fertility regulation offered by modern contraception and safe surgical (and more recently medical) abortion. However, even today in many industrialized nations, non-evidence-based medical barriers, misinformation and legislative rules continue to constrain women's access to the means to limit the size of their families.

We have every reason to believe that if the widespread misinformation and misperceptions described above were replaced with correct information, and if the needed technologies were realistically available as well, women would benefit greatly from recognition that they have safe means managing their childbearing for a smaller family size. From a policy perspective, from the evidence gathered for this paper we may infer that average family size is open to change, even rapid change, from high levels of fertility to replacement level, as we have recently seen in Iran and Addis Ababa. And importantly, the opportunity model means that the final stage of the fertility transition does not require an abridgement of rights. Instead, it requires that women be free to have control over their childbearing, enabling them to have access to their preferred method of fertility regulation, within a human rights framework.

Economically marginalized women in low-resource settings often have only limited opportunities, if any, to obtain the technologies and information required for managing their own childbearing. The barriers separating women from the technologies and information they need to limit their family size hurt the most vulnerable women the most tragically.

The opportunities model places women's decision-making center stage. It provides a theoretical framework for interpreting the vast amount of observational data collected on the demographic transition in a wide variety of settings. It sets a research agenda to quantify the many and various existing barriers to access to voluntary fertility regulation, and to reconsider the primacy of evidence based on large data sets; and it suggests the policy priority of reducing the many barriers to fertility regulation.

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