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Economic Foundations of Contraceptive Transitions: Theories and a Review of the Evidence

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ABSTRACT

Economic Foundations of Contraceptive Transitions: Theories and a Review of the Evidence

We review the foundations of the economic development-contraception nexus, focusing on the pathways through which economic factors drive contraceptive adoption and change. We investigate the channels through which the relationship between economic development and contraceptive dynamics are mediated. Using global data, we document the correlations between economic development and contraception transitions over time and across geographies. We briefly examine the evidence of the role of fertility, both desired and realized, as a central pathway through which the relationship has been historically theorized and empirically verified. We also discuss a range of mechanisms through which economic development drives contraceptive use independently from fertility decline. Finally, we assess the state and quality of evidence of these relationships and propose directions for future inquiry.

JEL Classification: J13, J16, J11, J18, I12, I15

Keywords: fertility, contraception, demographic transition, development

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1. INTRODUCTION

Contraception, fertility, and economic development are inextricably linked. While some of the links between these variables are well documented, there continues to be debate regarding the directionality of these relationships and the mechanisms that drive them. A large body of evidence has examined pathways from social and economic development to fertility, whereby contraception and family planning play a mediating role in this relationship (Canning and Schultz, 2012; Cleland et al., 2006; Guinnane, 2011). On the other hand, social and economic development may increase incomes, augment markets, and change social norms, all of which in turn may alter the demand for contraception even when fertility preferences remain constant (Abiona, 2017; Agha et al., 2021; Dettling and Kearney, 2014; Haider and Sharma, 2013; Herbert, 2015; Lovenheim and Mumford, 2013; McKelvey et al., 2012). Moreover, the relationship between contraception and development may be bi-directional, as has been highlighted by a large literature exploring the extent to which fertility change has contributed to economic development (Ashraf et al., 2013; Bloom et al., 2003; Bloom and Williamson, 1998; Coale and Hoover, 1958; Joshi and Schultz, 2007; Karra et al., 2017; Kelley and Schmidt, 1995; Lee and Mason, 2011).

We describe the links between economic development and contraceptive transitions through the lens of economic theory. To focus on the role economic development plays in contraceptive transitions, we focus on the literature describing the unidirectional channels by which economic development does (or does not) drive contraception dynamics; while we have acknowledged the bi-directional relationship, our treatment of the role of contraception on economic development in this effort is cursory. We assess the evidence on these unidirectional mechanisms and discuss the extent to which contraceptive transitions can be reasonably driven by economic development and social change. We then briefly document the empirical correlations between economic development and contraception transitions over time and across geographies, highlighting the dynamic regional variations in the relationship between economic development and contraceptive use, particularly with the introduction of modern contraceptive methods over the last 50 to 70 years. Finally, we describe current conceptual and evidence gaps in the literature on the links between economic development and contraceptive transitions, particularly focusing on the omitted role of the utility of contraceptive use that are external to the existing frameworks.

2. CONTRACEPTION, FERTILITY, AND ECONOMIC DEVELOPMENT: THE ONGOING DEBATE

2.1. Working Definitions. As a means to promote consistency and clarity, we preface this paper with a brief overview of key terms and definitions that we use throughout the paper. For the purposes of this paper, we specifically distinguish contraception from family planning and emphasize that though these concepts are correlated, they are by no means synonymous (even though they are often used as such), nor can one concept necessarily be subsumed into the other. **Family planning** comprises of the universe of educational, medical, and social policies, programs, interventions, and behaviors that effectively enable individuals (men, women, couples, minors, etc.) to *plan their family*, namely, to freely determine the quantum and spacing of their attempts to have children over their lifetimes and to freely select how these preferences may be achieved. In this sense, contraception is one means through which individuals are able to plan their families, but it is not the only means to do so. Conversely, **contraception**, in its broadest sense, can be defined as the universe of methods, behaviors, and practices that aim to prevent pregnancy (and not necessarily for the objective to plan a family). Within this universe, contraceptive methods can be classified as either being traditional or modern, with a key distinguishing feature that traditional methods require no supply and

are primarily implemented by individual behavioral means. In contrast, modern methods of contraception require additional inputs and efforts beyond individual behavior change, such as supply of a technology or commodity and/or implementation support from an external agent (e.g. a health professional or service provider).

We also call for clarification when distinguishing terminology for preferences from demand and choices. Terms such as demand, supply, preferences, choices, intentions, wants, and needs – particularly in relation to fertility, contraception, and family planning – are understood differently across academic disciplines, as well as among policy makers and the general public. In our view, **preferences** are the functional mapping of an individual’s unconstrained relational ranking over different alternatives. This view of preferences as a ranking over a set of possibilities in the absence of social, economic, and all other constraints differs significantly from common practice in much of the literature, where preferences are simply understood as what an individual reports they want at a given moment in time, while taking into account their specific life circumstances and constraints. In this view of preferences as an ordered ranking of many alternatives rather than a single choice outcome, individuals have both relative preferences over each of the means of fertility regulation (contraception, abortion, frequency of sexual intercourse, etc.) as well as preferences within a given means of fertility regulation (e.g. choice of contraceptive method), and these preferences can vary by individual. Since these preferences are a ranking over a set of possibilities, it is completely possible for an individual to express different choices or wants at different points in time as her life situation changes, without inconsistency in her underlying preferences. Here, we note the distinction between fertility preferences (preferences over the quantum of births as well as over the timing / spacing of births) from contraceptive preferences (preferences over the decision whether or not to contracept and over the choice of contraceptive method).

In this framework, we note that alternatives are costly, and these costs (broadly defined) may be different for different individuals. Each individual has constraints that may limit the extent to which they may be able to realize an alternative that they prefer without constraints - some alternatives may be infeasible because constraints are binding. An individual’s **demand** for an alternative or set of alternatives is her revealed preference for the alternative in the face of constraints. An individual has a demand for an alternative if she prefers that alternative over all other feasible alternatives given her constraints. An individual does not have a demand for an alternative if: 1) an alternative is infeasible under the constraints that she faces, or 2) if she reveal-prefers other alternatives that are feasible given her constraints. The **choice** that an individual makes over an alternative is therefore the realization of an individual’s demand given her constraints. An individual’s **behavior** is the empirical observation of her realized demand.

2.2. The Economists’ View. The first and most fundamental descriptions of the linkage between economic development and contraception were proposed through rational choice models of fertility change, most famously from the works of Gary Becker and Richard Easterlin (Becker, 1981; Becker et al., 1960; Easterlin, 1975; Easterlin et al., 1980). A significant portion of this work rests on the rationale that if children are costly, women and couples will choose to have fewer of them. More formally, as incomes and human capital levels increase, and as time becomes more scarce for women, couples, and families, so too do the opportunity costs of childbearing and childrearing. In addition, broad technological changes in the nature of work have contributed to increasing returns to human capital, inducing parents to invest more in each child, thereby indirectly making each child more costly. (Galor, 2012; Galor and Weil, 1996, 2000). As a result, women’s and couples’ desired fertility may decline, and they may choose to use either modern or traditional forms of contraception and family planning to meet their desired fertility (Schultz, 1992, 1997).

As economic theories of fertility are heavily founded on the model of rational choice, much of the literature, and most economic models to date, has focused on how increased contraceptive use by women and couples is driven by their reduced number of desired children, not as a means of reducing accidental pregnancies. (Becker, 1969; Robinson, 1997). Here, reducing the discrepancy between intended and unintended fertility shocks (either positive or negative) would minimally contribute to fertility transition, since it is the fall in desired children which matters most. When taking this idea to its logical conclusion, many economists have argued that the use of contraception would therefore have a limited role in fertility transitions and have favored explanations that identify more fundamental economic drivers of desired fertility choice. If this argument were true, it would imply that contraceptive transitions and fertility transitions may be only weakly associated, and observed correlations between the two processes may more likely be determined by distal factors that relate to cultural and social change, education and economic empowerment (particularly for women), and shifts in economic incentives that shape the desired number of children. These views are presented in Pritchett (1994), who offers a particularly forceful challenge to the effectiveness of contraception and family planning programs in driving variations in fertility. Using cross-country data, Pritchett (1994) concludes that only 5 to 10 percent of differences in fertility levels across countries could be attributed to family planning programs or to a lack of access to contraceptives.

Another commonly used piece of evidence for this idea is that fertility transitions in high-income Western countries commenced before the introduction of modern contraception, and therefore could not have been primarily driven by modern contraceptive use, but rather by preceding shifts in desired fertility driven by economic development (Dribe et al., 2017; Guinnane, 2011; Schultz, 1997). In high income countries, modern hormonal methods of contraception that were invented in the 1950s (the pill), 1960s (the copper IUD), and 1980s (the contraceptive implant) were introduced well after these countries had already achieved low fertility. For example, the total fertility rate in the United States was already at 2.17 in 1935, decades before the invention of modern contraception. The broader industrialized world was likely set on paths to achieving high income status and lower fertility following the Second World War (Barro and Sala-I-Martin, 2003; Cornia, 2004).¹ For these countries, the use of modern contraception for averting unwanted pregnancies may, in fact, be more linked to outcomes related to family formation, employment, and socioeconomic well-being than for fertility reduction primarily (Sweeney et al., 2015; Zakharov, 2008). Taken together, the evidence from historical and ongoing fertility transitions might imply that countries undergo two phases of transition, each of which is distinguished by how contraception and family planning (broadly defined) may play a different role in facilitating fertility change. In the first phase, the transition of population-level fertility from high fertility (7 or more children per woman) to moderate fertility (3 to 5 children per woman) may be driven by first-order determinants of fertility change, including delays in age of marriage and changes to marital fertility, delays in age of sexual debut, postpartum abstinence and the use of traditional and natural methods of contraception (withdrawal, lactational amenorrhea), and changing socioeconomic conditions. Where modern contraception and family planning programs may play a more prominent role in fertility change are in the second phase, where aggregate fertility declines further towards replacement rate or lower.

¹Analyses of fertility declines in Europe in the 19th and early 20th centuries have identified delays in age of marriage and postpartum abstinence, potentially driven by changing economic conditions and urbanization, to be primary determinants (Dribe, 2009; Schultz, 2001; Szreter and Garrett, 2000; Watkins, 1987; Weir, 1984). The contraceptive methods that were available during this period of structural economic transformation were mainly withdrawal, periodic / rhythmic abstinence, and postpartum abstinence. While condoms and other barrier methods had existed for centuries, they were not used widely until in more recent decades following innovations in their production (Amy and Thiery, 2015; Youssef, 1993).

2.3. Responses to the Economists' View. Understandably, the proposition that desired fertility dominates unintended fertility (thereby downplaying the role of contraception and family planning programs) is controversial (Bongaarts and Hodgson, 2022; Bongaarts and Sinding, 2009; Casterline, 2009; Cleland and Wilson, 1987; Ibitoye et al., 2022). If a large fraction of births are unintended, then a more effective means to realize fertility preferences through the use of modern contraception would demonstrate that modern contraceptive transitions, through increased supply and the implementation of family planning programs, should be tightly linked to fertility transitions. In many countries, fertility decline and contraceptive uptake have occurred simultaneously. It is intuitive that this should be the case: one of the main – if not primary – functions of modern contraception is to facilitate sexual activity and intercourse that does not result in pregnancy. However, fertility decline is not an inevitable product of modern contraceptive use alone, as contraception can also be used to better time and space pregnancies rather than solely reduce their quantum, prevent sexually transmitted diseases, or even be used for other sexual health benefits beyond pregnancy, such as the regulation of menses or the management of sexual pleasure and functioning. In addition, fertility may also change independently from changes to modern contraceptive practices and behavior, particularly where the costs of other proximate determinants of fertility, including other traditional, natural, or alternate methods of contraception, decline relative to the cost of modern contraceptive use.²

While it is intuitive that transitions in modern contraceptive use are fundamentally and primarily linked to fertility decline, it would be shortsighted to assert that: 1) fertility transitions are exclusively a product of modern contraceptive transitions; and 2) the economic drivers of contraceptive transitions are the same as those that drive fertility transitions. As a result, the causal and mechanistic links between economic development, fertility transitions, and contraceptive transitions are not only difficult to disentangle empirically but are also challenging to conceptualize theoretically given the sheer number of possible linkages between them.

3. ECONOMIC DRIVERS OF CONTRACEPTIVE CHANGE: CONCEPTS

We separate the pathways by which economic development impacts contraceptive change into two typologies: 1) those channels that operate through fertility decline, and 2) those channels that do not. Here, we again emphasize that while economic development can certainly affect fertility and contraception, it is important to recognize that the directionality of these pathways can be reversed. In our theoretical framing, we focus on the unidirectional effect of economic growth on contraceptive use for multiple reasons. First, this review focuses on the economic forces driving contraceptive use; whether contraceptive use drives growth is a related but tangential question to this purpose. Second, contraceptive use has a theoretically important, yet limited, role in promoting economic growth, where studies have highlighted that even the most intensive family planning programs that have been implemented would only close income gaps between rich and poor countries, a 32-fold (or 5-doubling) difference, by one doubling at the most (Karra et al., 2017). Figures 3.1 and 3.2 presents this preliminary theory of change / causal framework.

We first examine the development-contraception nexus by considering the role of fertility, both desired and realized, as the dominant mediating channel. This approach implies that the effect of economic development

²Robinson (1997) effectively summarizes the ways in which fertility can be controlled, namely 1) the regulation of sexual intercourse; 2) the use of contraception to prevent pregnancy during intercourse; 3) the prevention of pregnancy during intercourse through permanent means; 4) the termination of a pregnancy after it has occurred; or 5) the termination a birth after it has occurred. Each of these modes of fertility control comes with costs. While costs related to most of these modes are relatively unknown, a growing literature has documented the economic and social costs of contraception, demonstrating that these costs to using contraception may be relatively higher than what is estimated, thereby leading to a lower level of demand for contraception.

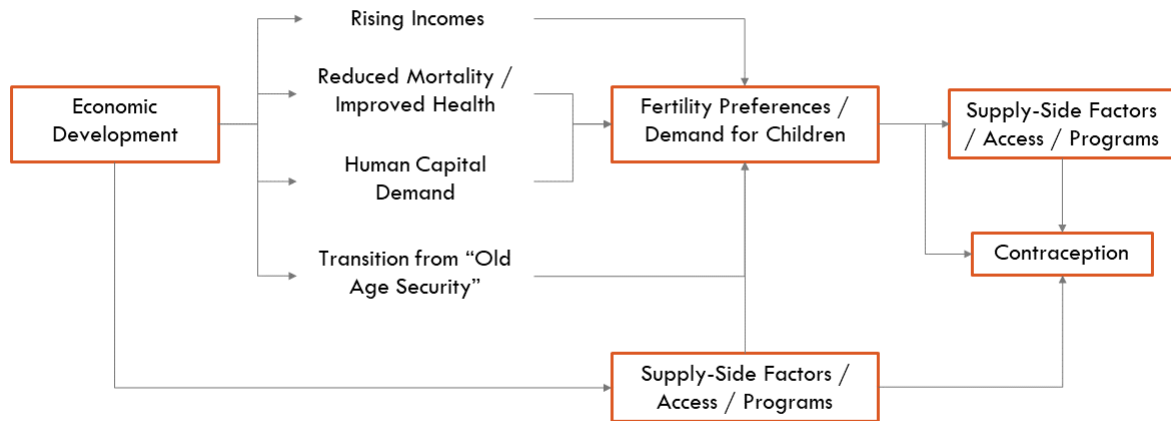


FIGURE 3.1. Theory of Change - Economic Development to Contraception, via Fertility Preferences and the Demand for Children

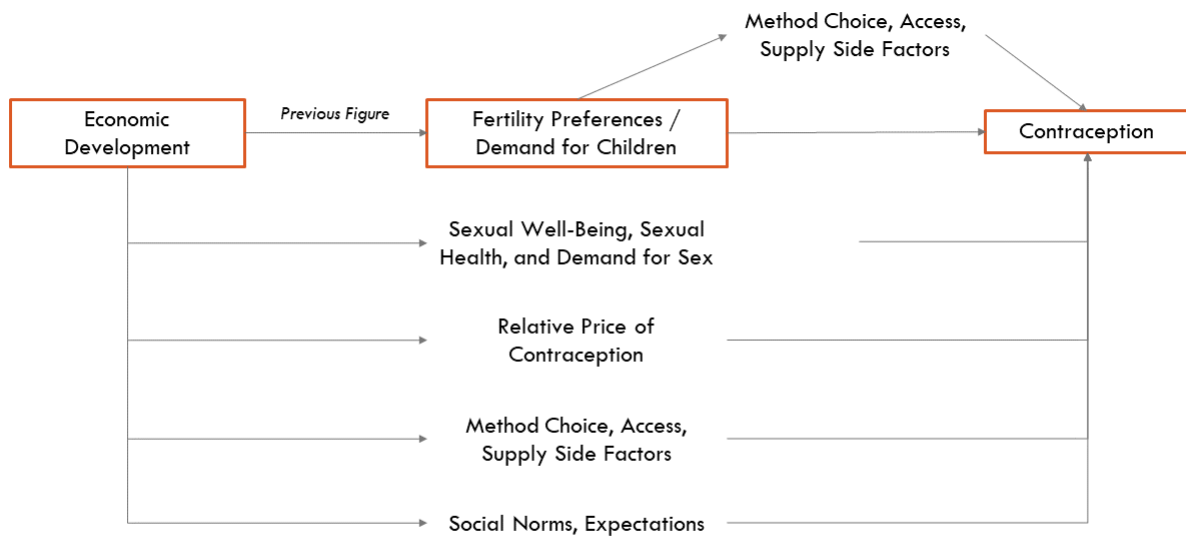


FIGURE 3.2. Theory of Change - Economic Development to Contraception, with Other Channels

through demographic transitions may drive both current contraceptive use as well as the current demand for contraception, which in turn affects future fertility and contraceptive behavior. Key channels through which this relationship is defined include:

- (1) *The impact of economic development on the epidemiological transition, which contributes to reductions in child and infant mortality and improvements to child health.* These improvements to child health and survival, in turn, reshape women's fertility preferences and desired family size. In following the predictions from economic and demographic models of child mortality on fertility (Barro, 1991; Canning et al., 2013; Lloyd and Ivanov, 1988), parents may reduce their demand for children based on their reduced need to replace children who may die in an environment of high mortality and poor child health (the replacement effect); and b) their reduced preference to bear more children than they ultimately want to have out of fear that fewer will survive than they anticipate (the insurance effect³). These updated beliefs and expectations around fertility, in turn, impact demand for contraception and contraceptive behavior.
- (2) *The substitution between child quantity and "quality".* The rise in demand for human capital in production, particularly during industrialization, urbanization, and structural transformation, implies a movement away from labor-intensive production to capital-intensive and skill-based production. This increase in demand for skilled labor induces households to increase their investment in their own human capital as well as their children's human capital (Herrendorf and Schoellman, 2018; Lewis, 1954; Porzio et al., 2021), which in turn increases the cost of raising a child. In addition, the increased human capital investment per child may contribute to preferences for child quality as well as to the cost of investing in children. As a result, a "quality-quantity trade-off" in fertility is observed (Becker and Lewis, 1973), which increases the demand for (and use of) contraception.
- (3) *A reduction in precautionary childbearing,* and in particular, a transition away from childbearing as a means of insurance in old age (the "old-age security hypothesis") (Willis, 1979; Zhang and Nishimura, 1993).⁴ In the absence of capital markets which permit inter-temporal lending and borrowing, children serve as an asset that permit parents to transfer income to old age. Hence, the establishment of capital markets in the process of development has reduced this motivation for rearing children, contributing to the contraception and subsequent demographic transition (Nugent, 1985).
- (4) *Changes to the opportunity cost of childbearing, particularly for women.* Rising incomes and improved economic conditions may result in the following two outcomes. On the one hand, if the rise in incomes is driven by expanded economic opportunity (increased labor force participation, employment, rising wages, etc.), particularly for women, then these changes would drive the opportunity cost of childbearing up, which may lead to a substitution effect whereby women may choose to forego childbearing, and therefore increase their contraceptive use in favor of other productive activities. On the other hand, the rise in income may also create a wealth effect, where women and couples may be able to afford to have more children and therefore choose to have more children, reducing their demand for contraception. Finally, increased economic development may come with more robust social welfare programs, which may more easily allow parents and especially mothers to combine childbearing

³More specifically, there exists a precautionary demand for children whereby women and couples may be risk averse with respect to their expected number of surviving offspring and therefore hold a "buffer stock" of children in a high-mortality environment) (Ben-Porath, 1976; Galor, 2012).

⁴This is similar to the "insurance effect" noted above, except that this mechanism runs solely through the desire for old age support in the absence of capital markets, while the former deals with the desire for a certain number of surviving offspring more generally in the context of an uncertain mortality environment. The current mechanism can be linked to the mortality environment, but not necessarily.

and productive activities, thereby increasing desired fertility. Examples include increased access or provision of childcare services, or parental leave programs. Inasmuch as these developments increase demand for children, contraceptive use may decline.

Taken together, most economic models of contraception that operate through fertility set up the decision problem as one where the trade-off in having another child depends on the marginal cost of having another child relative to the marginal benefit that each child brings to parents, in which a child is valued as a means of old-age security, a source of labor, another means of support, or as a direct source of happiness (Galor, 2012; Galor and Weil, 1996, 2000). In contrast to the demographic theory on fertility, most of the economic frameworks used to conceptualize the contraception (family planning)-fertility relationship may be categorized into two types, namely household demand models as presented by Becker (1969), Becker and Tomes (1976) and Pollak (2003), and synthesis models as presented by Easterlin (1978) and Easterlin et al. (1980). In household demand models, in which child quality and quantity are explicitly accounted for as arguments of the household utility function, family planning (which is mainly conceptualized through the operationalization of contraception) decreases the cost of a couple’s ability to optimize their fertility, which in turn raises the price of having children relative to child quality (i.e. the “quality-quantity trade-off”).

3.1. Operationalizing Fertility Preferences: Contraceptive Demand. As a starting point, we turn to the classic synthesis model of fertility by Easterlin (1975), which delineates the links between fertility preferences and the demand for contraception. In the Easterlin framework, parental utility is a function of consumption, fertility, and expected contraceptive effort, which is an argument that represents the disutility faced from contraceptive use (Montgomery, 1987). In the model, contraceptive preferences are distinct from (though linked to) fertility preferences. This distinction has significant implications for how the demand for contraception, and the calculus around contraceptive choice given a couple’s fertility preferences, may be independently interpreted from the demand for children.

Beyond Easterlin, very few economists have attempted to separately model the demand for contraception beyond simply assuming it is perfectly related to the demand for children. Identifying the demand for contraception requires an analysis of contraceptive preferences across both the extensive (the decision whether or not to contracept) and intensive (choice of contraceptive method, conditional on choosing to contracept) margins. Decision-making across both of these margins are shaped by both the set of alternatives that are available to women and couples, as well as the costs and constraints that these agents face when they make choices over alternatives.

If such a model were created, the costs of contraception would optimally be broadly defined to include a range of constraints that women and couples face, including: a) information constraints, which comprise both a lack of information as well as misconceptions / misplaced beliefs around contraception, either generally more specifically around particular methods; b) access constraints for those methods that require supply, which include the cost and opportunity cost of commodities, physical barriers to access (mobility barriers, transport costs, waiting times at facilities), and other supply-side constraints (stock-outs, poor service quality, etc.); c) costs that are realized from using contraception, including method-specific side effects, complications, and risks to health (including risks to future fertility); and d) a wide range of barriers to decision-making even when information and availability are accounted for, including household bargaining over contraceptive choice and spousal discordance, social norms and stigma against contraceptive use, restrictive social norms and normative opposition, and behavioral constraints (e.g. procrastination, hyperbolic discounting, etc.). Decision-making around contraception is complicated by the variation in available contraceptive methods,

with methods differing across a range of attributes and features⁵, to the extent that no single contraceptive alternative strictly dominates all other alternatives across all attributes for all types of women.

Additionally, theories of contraceptive demand would benefit from a concrete structure of contraceptive choice and behavior that is founded on the following principles. Firstly, preferences for and choices over contraception are identified through an assessment of the utility and costs of contraception, both broadly defined. Specifically, women and couples assess the expected welfare gained from contraception over a broad range of outcomes that extend well beyond fertility alone, including: 1) the risk of unwanted pregnancy (beyond fertility, such as health or mortality risks), 2) the convenience for spacing and postponement of pregnancy between children, 3) the risk of sexually transmitted infections and other adverse health outcomes from sexual intercourse, 4) sexual satisfaction and well-being (such as the utility derived from sex, and how it varies by method choice). The marginal utility gained from contraceptive across these outcomes would be weighed against the costs of contraception as defined above, both overall as well as by method type. Given the range of method attributes and the variation in attribute features for each method, the impacts of each method choice on outcomes are also expected to vary across women. To this end, a deeper exploration of how some of these attributes are revealed and characterized through decisions about method choice is warranted.

4. ECONOMIC DEVELOPMENT AND CONTRACEPTIVE TRANSITIONS: EVIDENCE

4.1. Transitions through Fertility Change.

4.1.1. *Macro-Level Evidence:* Empirical evidence of the development-contraception nexus that operates through the demographic transition present a complex story. A number of researchers have documented the secular increase in the use of contraception, due, in part, to supply-side factors that contribute to improved access to contraception. Economic demographers, however, remain skeptical of the relevance and impact of increased contraceptive access, supply, and use on modern fertility transitions (Richard Easterlin’s work being the exception). This skepticism was reinforced by [Pritchett \(1994\)](#)’s study but has been more recently questioned by [Lam \(2011\)](#) in his presidential address at the annual meeting of the Population Association of America. [Lam \(2011\)](#) uses data from 185 DHS surveys for 74 countries, a considerably larger set of surveys than [Pritchett \(1994\)](#) used, and investigate changes in desired and actual TFR. He finds that while desired fertility fell by an average of 0.038 births per year, the TFR fell by 0.060 births, implying that 47 percent of the average decline in the TFR may be attributed to harnessing better ways to achieve fertility targets and not just from changes in desired fertility. These findings may be rationalized and reconciled through an innovation-adjustment modeling approach ([Bhattacharya and Chakraborty, 2017](#)) where the mechanisms of action through which desired fertility and contraception impact fertility, either independently or jointly, may be disentangled. In particular, conditional on a contraceptive method, variations in TFR seem to be driven by changes in desired fertility (due to income growth, better child survival, increases in the demand for human capital, etc.). Over time, changes in the availability and adoption of alternative, more effective or efficient contraceptive methods may account for an increasingly significant part of TFR declines. With this said, however, the onset of the fertility decline likely stems from factors other than just the availability of contraceptives through contraceptive transitions alone (including others identified in Bongaarts’ proximate determinants framework).

⁵Examples of method-specific attributes or features include: effectiveness at preventing pregnancy, ease of use, risk of side effects, duration of effectiveness, need for re-supply, need for clinical intervention, and partner dependence, among others.

In low- and middle-income countries in particular, the transition to modern contraceptive use may be more directly linked to fertility reduction and economic well-being, particularly over the second phase of the fertility transition. Examples from the "Asian Tiger" countries in East and Southeast Asia have identified export-oriented growth, openness to trade, and foreign direct investment, combined with the concurrent expansions of family planning programs, increases in contraceptive use, and declines in fertility to be catalysts in the development process (Bloom and Williamson, 1998; Cleland, 2012; Li et al., 2018). Following East Asia, South Asia's transition to lower fertility was also, in part, due to family planning efforts in the 1970s and 1980s, including campaigns and incentives that promoted female sterilization and smaller families (Bloom et al., 2011; Tsui, 2013). In Sub-Saharan Africa, contraceptive transitions are observed more recently, with significant variation across countries and regions (Canning et al., 2015). Moreover, the role of family planning and contraception as a means to space births may better inform current and likely future trends in the region, where reported desired fertility is higher than in other settings (Baah et al., 2013; Canning et al., 2015; Westeneng and D'Exelle, 2011; Yeakey et al., 2009). The potentially significant contribution of birth spacing to fertility change in Sub-Saharan Africa has been documented by scholars, who have noted that both the lengthening of birth intervals and the postponement of births may explain patterns in fertility decline in the region (Casterline and Odden, 2016; Timæus and Moultrie, 2008).

4.1.2. *Micro-Level Evidence:* Recent empirical studies have estimated the impact of economic drivers on contraceptive adoption and change by exploiting spatial and variation in contraceptive prices, changes to women's socioeconomic conditions, and other shocks. Using data from Indonesia, McKelvey et al. (2012) estimate the effect of changes in contraceptive costs and household resources on contraceptive behavior. The authors find that large changes to contraceptive prices and decreases to household resources following an economic crisis had little impact on both the decision to use contraceptives and on contraceptive method choice, even among the poorest couples. Similarly, studies in Tanzania and Ghana found that contraceptive use, and, in the case of Tanzania, the use of traditional methods such as abstinence and the rhythm method, to increase as a result of adverse agricultural and income shocks; this increased demand for contraception could be attributed to the shift in women's and couples' demand for delaying and limiting childbearing during periods of economic hardship (Abiona, 2017; Alam and Pörtner, 2018). Recent findings from Ashraf et al. (2014) show that household bargaining over fertility is particularly important because most methods of contraception are perfectly observable only to women. The introduction of contraceptives that are privately targeted to women, without requiring an explicit consent from their husbands or partners, can lead to large increase in their use and reduction in fertility⁶. Finally, evidence from a field experiment in Malawi, which provided pregnant and postpartum women with a two-year package of family planning and reproductive health services, found that the provision of free contraceptives and supplemental services (transport to the clinic, coverage of contraceptive-related side effects, etc.) not only increased women's contraceptive use but also lowered their likelihood of short birth spacing (Karra et al., 2022)

In reviewing the empirical evidence, the extent to which contraception accounts for fertility change may be entirely country specific; moreover, the proximate determinants of that change may likely vary from region to region. Unlike 19th century Europe, women's changing status in emerging economies may have as much of a role on the how social and economic benefits accrue to ease access to and use of contraception. With this said, however, it bears repeating that access to contraception by itself may not be effective at promoting

⁶Although, such an intervention may not necessarily be welfare-improving for either women or couples, given that women may be compelled to hide their contraceptive use from their partners, which may erode trust within the couple, exacerbate anxiety and stress, and contribute to intra-household conflict.

use and generating demand – rather, other (both proximate and distal) factors that lower the demand for children may play more fundamental roles.

4.2. Transitions Beyond Fertility Change. In the context of economic development, either at the macro or micro levels, the linkages between contraception and economic development are most commonly conceptualized and identified through the lens of fertility. However, the development-contraception nexus can also be realized through a number of alternative mechanisms that are independent of fertility, both desired and achieved. Alternative channels include:

- (1) *Income effects that may be independent of fertility*, whereby increases in income and improved economic conditions directly relax credit constraints and improve purchasing power of all goods, including contraception. As a result, these improvements can be seen to drive the increase in demand for and utilization of contraception even when holding fertility preferences and family size constant. Limited evidence from studies of cash transfer programs have shown generally positive, but modest, impacts of such transfers on contraceptive use (Bastagli et al., 2019), while recent randomized controlled trials of family planning interventions have shown increased contraceptive use as a result of either partial or full subsidization of contraception and coverage of related family planning services (Anukriti et al., 2022; Karra et al., 2022; Tran et al., 2018, 2020)
- (2) *The changing nature of sexual partnerships and the demand for sex*, which are reshaped in the face of economic development and social secularization, leading to changes in demand for contraception independently from – or in tandem with – changes in fertility behavior. In the sociological literature, most of these effects have been explored in the context of the drivers of the second demographic transition (Lesthaeghe and Surkyn, 2007). These behaviors include a disassociation of traditional partnership formation and childbearing, driven by cultural shifts toward postmodern attitudes and norms such as individuality and self-actualization (Van de Kaa, 1994). As a result, the demand for sex and the demand for children become more tenuously linked, leading to changes in contraceptive demand independently of fertility shifts.⁷ These forces may still be at play even in a purely economic framework. For example, as incomes increase, time and monetary resources spent on basic necessities shrink, increasing the demand for other goods and activities, including sex. If the quantity and quality of sexual experiences are desirable, and if contraception plays a role in satisfying either, economic development will likely be accompanied with a contraception transition through economic forces alone, decoupled from fertility.

The links between contraception and sex have been tangentially incorporated in synthesis models that have introduced utility gained from frequency of intercourse and disutility gained from contraceptive use and from infant mortality. Here, family planning interventions (either through family planning programs or through other mechanisms) and contraception are perceived as technological innovations that reduce the disutility associated with contraception while allowing for more frequent intercourse for a given fertility rate (Miller, 2005). Although the relationship between contraception and sex is intuitive, there is little empirical evidence of the interplay between sexual well-being and

⁷This potential independence between contraceptive use and intention to conceive among women and couples can be observed through: 1) discordance in use, where women and couples may use contraception even when they have no (indirect or direct) intention of averting a preventing a pregnancy; or 2) discordance in intention, where women and couples who seek to avert pregnancy may also have no desire or demand for contraception (Fennell, 2014; Higgins and Hirsch, 2008).

satisfaction, including sexual pleasure and partnerships, and contraceptive decision-making (Higgins and Hirsch, 2008; John et al., 2015).⁸

- (3) *Increased contraceptive use that are driven by other welfare related outcomes that are not directly captured by income.* A number of non-contraceptive benefits have been identified from contraceptive use, most notably the prevention of HIV and other sexually transmitted infections from the use of condoms and barrier methods (Davis and Weller, 1999). In addition, the use of oral contraceptives and hormonal contraceptives like the IUD have also shown to treat heavy menstrual bleeding, dysmenorrhea, pelvic pain, acne, and endometriosis and even may lower the risk of endometrial cancers (Adeyemi-Fowode and Bercaw-Pratt, 2019; Williams, 2000). These additional health and welfare impacts that are conferred through the use of contraception may be sufficient cause to increase contraceptive use independently of fertility as incomes rise.

5. DESCRIPTIVE EVIDENCE OF THE CONTRACEPTION-DEVELOPMENT NEXUS

While there is considerable debate surrounding the mechanisms that shape the associations between economic development, proxied most often by income measures, and contraceptive use – including the direction of causality – the existence of a positive association is beyond dispute. To narrow our empirical focus on the relationship between income and contraception, we provide simple country-level visualizations of the relationship between contraception use and time by income group, and contraception use and income itself. Figure 5.1 presents contraceptive use over time across four groups of countries: high-income countries (countries with an income per capita of \$12,695 or higher), upper-middle income countries (countries with an income per capita between \$4,096 and \$12,695), lower-middle income countries (countries with an income per capita between \$1,046 and \$4,096), and low income countries (countries with an income per capita lower than \$1,046).⁹

As seen in Figure 5.1, there are clear and distinct patterns of contraceptive use over time and by income groups that suggest a strong and persistent relationship. Average contraceptive use increases monotonically by income group and generally increases over time with rising income levels. The only income group for which contraceptive use has not increased since 1980 is in high income countries, where contraceptive use has been similarly high. It is also interesting to note that contraceptive use levels off in each of the high, upper-middle, and lower-middle income groups, but that this plateauing of uptake occurs at different times and at different income levels.

Figure 5.2 eliminates the dimension of time and simply presents the relationship between log income and contraceptive use.¹⁰ This figure consists of 1,192 country-year observations from an unbalance sample of 169 countries between 1950 and 2019. The most striking feature of this figure is the stability of the income-use relationship across income levels. The estimated slope of the trendline corresponds with a 14.7 percentage point increase in contraceptive use as income doubles. Further applying this estimate implies that moving from the average income and contraceptive use levels of the average low-income country in our sample (\$1,691 and 25.8%, respectively) to the income of the United States (\$58,543) would yield a predicted increase in

⁸On the other hand, there is the relatively larger literature examining the potential impact of specific contraceptive methods, particularly the condom and (to a lesser degree) hormonal methods, on sexual pleasure (Fennell, 2014; Higgins and Wang, 2015; Randolph et al., 2007; Smith et al., 2014).

⁹Use is defined as the fraction of women of reproductive age 15-49 using any method of contraception (traditional, modern, or folkloric), from the United Nations 2021 *World Contraceptive Use* dataset (Division, 2021).

¹⁰Income per capita estimates are obtained from the Penn World Tables (Feenstra et al., 2015).

contraceptive use to 77.4%. This is comparable to, though slightly higher, than the level of contraceptive use that is observed in the average high-income country in our sample (at 68.3%).

Since these are simple associations that pool observations across space and time, one may wonder whether this association is driven by differences in contraceptive use across countries rather than within countries over time. For example, it could be the case that European countries have higher contraceptive use at all levels of income relative to sub-Saharan Africa, and therefore the income-use relationship is driven by cross-country differences rather than by economic development. However, the empirical data suggests that this does not seem to be the case. Controlling for these country-specific levels and estimating country-specific associations yields an average association of an 11.1 percentage point increase in contraceptive use as income doubles, compared with a 14.7% increase overall. This suggests that the income-use relationship is driven by changes in income within countries rather than across countries, and that moving from the income of a low-income country to that of the US, for example, should increase contraceptive use to 64.8%.

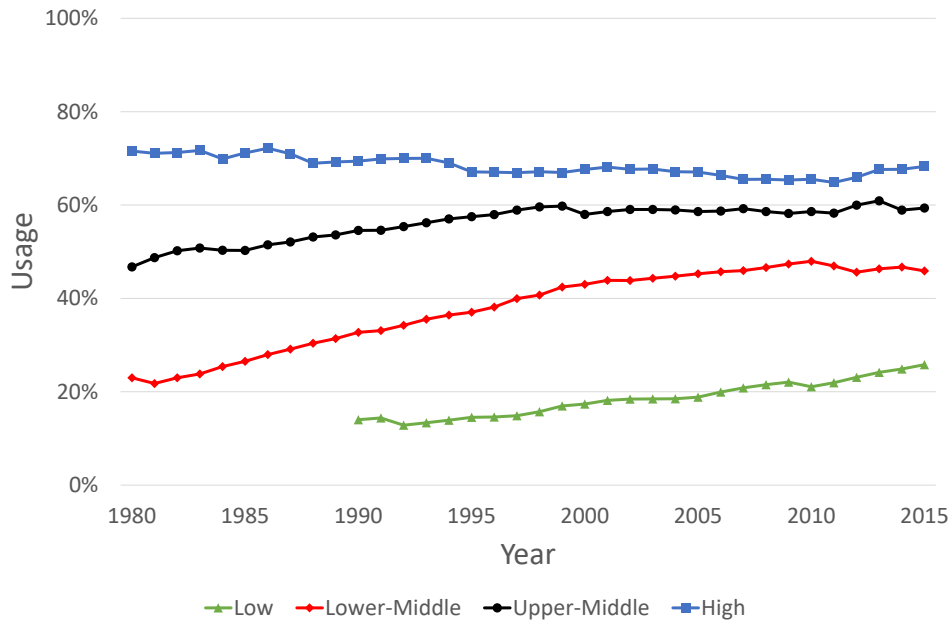


FIGURE 5.1. Contraceptive Use Over Time: Any Method, by Country Income Group. Use is defined as the fraction of women (generally between 15-49, with some variation) who report using any contraception method (traditional, folkloric, or modern) from the UN World Contraceptive Use Dataset 2021. Income groups are defined as by the World Bank in 2021. Reported values represent the arithmetic average over all countries in the same, where, missing contraceptive use values between two observed years at the country level were imputed linearly. Data points not reported in the figure were truncated due to too few reported values.

The relationship between income and contraceptive use is driven by modern methods. In Figures 7.1 and 7.2 in the Appendix, we show that modern method use is strongly correlated with income, while traditional

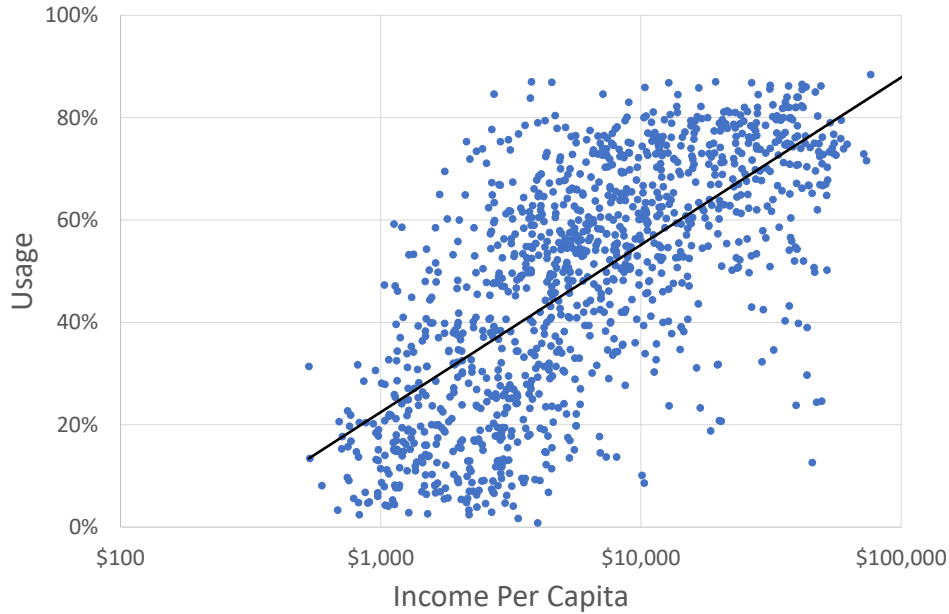


FIGURE 5.2. **Contraceptive Use vs Income: Any Method.** Use is defined as the fraction of women (generally between 15-49, with some variation) who report using any contraception method (traditional, folkloric, or modern) from the UN World Contraceptive Use Dataset 2021. Income per capita is defined as real GDP per capita, output method, using 2017 international (PPP adjusted) dollars from the Penn World Tables 10.0. Observations are at the country-year level.

contraceptive methods are not. In fact, a high prevalence of traditional method use is only a middle-income country phenomenon – countries at the lowest and highest income levels both experience very low levels of traditional method use. This suggests that rising incomes may be associated with increased use of contraception – both modern and traditional – and then at high levels of income modern methods continue to increase while traditional methods are crowded out. As was the case with overall use, the increase in modern method use also is driven by within-country changes rather than across countries.¹¹

6. CONCLUSIONS

The links between contraception and development are complex. While a cursory exploration of the trends in contraceptive use and measures of economic development over time find a strong and consistent correlation, a closer examination of these findings have shown the relationship to be dynamic, multidirectional, and multidimensional. To date, the significant majority of evidence linking development drivers to contraceptive use and behavior, both theoretical and empirical, have focused on the role of fertility, both desired and realized,

¹¹We estimate an association of a 12.9 percentage point increase in modern contraception for a doubling of income overall, vs. an 11.0 percentage point average increase using just within-country variation. This is compared with a 14.7 and 11.1 percentage point increase for all methods as reported previously.

as the (singular) mediator in this relationship. We find the mapping between fertility and contraceptive behavior to be both limited and incomplete, particularly when observing that contraceptive use may be driven by a range of demands that are shaped by changes to intimate and sexual relationships, gender roles, empowerment and autonomy, and the demand for sex and sexuality, among others. These drivers of contraceptive demand are either independent of or simultaneously determined by fertility change, yet empirical evidence of their role decoupled from fertility dynamics remains sparse. To this end, this paper calls for efforts that aim to re-examine and expanding the field’s understanding of contraceptive demand beyond that which is driven by standard fertility objectives, such as averting an unwanted pregnancy or meeting a target family size or spacing preference.

Empirical evidence of the causal effects of economic drivers on contraceptive use and behavior, either at the macro or micro levels, is surprisingly limited. While the development-contraception nexus has been observed at the macro level, contraception as a variable has almost exclusively been viewed through the lens of fertility, even when fertility objectives may be second-order. Moreover, establishing a causal relationship with macro data has been challenging. On the other hand, a few experimental or quasi-experimental studies have documented modest causal impacts of cash transfers or income shocks on short-run contraceptive use and method mix, but the long-run impacts or general equilibrium effects of such interventions have not been assessed.

More broadly, we find that the field’s understanding of the components and dimensions of contraceptive demand, which would require an exploration of the demand for sex, sexual health, contraceptive preferences, consumer method choice research, and reproductive autonomy, to be limited and understudied. This may be the case because the field has traditionally not viewed contraceptive demand, and the decision whether or not to contracept, as an outcome in and of itself but as a first stage to a larger (fertility-oriented) welfare process. A treatment of contraceptive demand as an outcome may improve our understanding of the choice calculus that women, couples, and societies choose to make when deciding if, when, and how to use contraception.

REFERENCES

- Abiona, O. (2017). The Impact of Unanticipated Economic Shocks on the Demand for Contraceptives: Evidence from Uganda. *Health Economics*, 26(12):1696–1709. _eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/hec.3487>.
- Adeyemi-Fowode, O. A. and Bercaw-Pratt, J. L. (2019). Intrauterine Devices: Effective Contraception with Noncontraceptive Benefits for Adolescents. *Journal of Pediatric and Adolescent Gynecology*, 32(5, Supplement):S2–S6.
- Agha, S., Morgan, B., Archer, H., Paul, S., Babigumira, J. B., and Guthrie, B. L. (2021). Understanding how social norms affect modern contraceptive use. *BMC Public Health*, 21(1):1061.
- Alam, S. A. and Pörtner, C. C. (2018). Income shocks, contraceptive use, and timing of fertility. *Journal of Development Economics*, 131:96–103.
- Amy, J.-J. and Thierry, M. (2015). The condom: A turbulent history. *The European Journal of Contraception & Reproductive Health Care*, 20(5):387–402. Publisher: Taylor & Francis _eprint: <https://doi.org/10.3109/13625187.2015.1050716>.
- Anukriti, S., Herrera-Almanza, C., and Karra, M. (2022). Bring a Friend: Strengthening Women’s Social Networks and Reproductive Autonomy in India. IZA Discussion Paper 15381, Institute of Labor Economics (IZA), Bonn, Germany.

- Ashraf, N., Field, E., and Lee, J. (2014). Household Bargaining and Excess Fertility: An Experimental Study in Zambia. *American Economic Review*, 104(7):2210–2237.
- Ashraf, Q. H., Weil, D. N., and Wilde, J. (2013). The Effect of Fertility Reduction on Economic Growth. *Population and Development Review*, 39(1):97–130. tex.copyright: © 2013 The Population Council, Inc.
- Baah, B. W., Nketiah, A. E., and Frempong, R. (2013). The effect of fertility and education on female labour force participation in Ghana. *Ghanaian Journal of Economics*, 1(1):119–137. Publisher: Porthologos Press.
- Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, 106(2):407–443.
- Barro, R. J. and Sala-I-Martin, X. I. (2003). *Economic Growth*. MIT Press, second edition edition.
- Bastagli, F., Hagen-Zanker, J., Harman, L., Barca, V., Sturge, G., and Schmidt, T. (2019). The Impact of Cash Transfers: A Review of the Evidence from Low- and Middle-income Countries. *Journal of Social Policy*, 48(3):569–594. Publisher: Cambridge University Press.
- Becker, G. (1969). An Economic Analysis of Fertility. In *Demographic and Economic Change in Developed Countries*. National Bureau of Economic Research, distributed by Columbia University Press, New York. OCLC: 2079323.
- Becker, G. S. (1981). *A Treatise on the Family*. Harvard University Press, Cambridge, MA.
- Becker, G. S., Duesenberry, J. S., and Okun, B. (1960). An economic analysis of fertility. In *Demographic and economic change in developed countries*, pages 225–256. Columbia University Press.
- Becker, G. S. and Lewis, H. G. (1973). On the Interaction between the Quantity and Quality of Children. *Journal of Political Economy*, 81(2):S279–88.
- Becker, G. S. and Tomes, N. (1976). Child Endowments and the Quantity and Quality of Children. *Journal of Political Economy*, 84:S143–S162.
- Ben-Porath, Y. (1976). Fertility Response to Child Mortality: Micro Data from Israel. *Journal of Political Economy*, 84(4, Part 2):S163–S178. Publisher: The University of Chicago Press.
- Bhattacharya, J. and Chakraborty, S. (2017). Contraception and the Demographic Transition. *The Economic Journal*, 127(606):2263–2301. tex.copyright: © 2016 Royal Economic Society.
- Bloom, D. E., Canning, D., and Rosenberg, L. (2011). Demographic Change and Economic Growth in South Asia. PGDA Working Paper No. 67, Harvard University, Cambridge, MA.
- Bloom, D. E., Canning, D., and Sevilla, J. (2003). *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. RAND Corporation, Santa Monica, CA.
- Bloom, D. E. and Williamson, J. G. (1998). Demographic transitions and economic miracles in emerging Asia. *The World Bank Economic Review*, 12:419–455.
- Bongaarts, J. and Hodgson, D. (2022). *Fertility transition in the developing world*. SpringerBriefs in Population Studies. Washington, DC : World Bank.
- Bongaarts, J. and Sinding, S. W. (2009). A Response to Critics of Family Planning Programs. *International Perspectives on Sexual and Reproductive Health*, 35(1):39–44.
- Canning, D., Gunther, I., Bloom, D., and Linnemayr, S. (2013). Fertility Choice, Mortality Expectations, and Interdependent Preferences: An Empirical Analysis. *European Economic Review*, 63(C):273–289.
- Canning, D., Raja, S., and Yazbeck, A. S., editors (2015). *Africa’s Demographic Transition: Dividend or Disaster?* The World Bank.
- Canning, D. and Schultz, T. P. (2012). The economic consequences of reproductive health and family planning. *Lancet*, 380(9837):165–171.

- Casterline, J. B. (2009). Fertility Desires and the Prospects for Fertility Decline in Africa. In *Annual Meeting of the Population Association of America*, volume 29, page 31.
- Casterline, J. B. and Odden, C. (2016). Trends in Inter-Birth Intervals in Developing Countries 1965–2014. *Population and Development Review*, 42(2):173–194. _eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1728-4457.2016.00134.x>.
- Cleland, J. (2012). Will Africa Benefit from a Demographic Dividend? page 24.
- Cleland, J., Bernstein, S., Ezeh, A., Faundes, A., Glasier, A., and Innis, J. (2006). Family planning: The unfinished agenda. *The Lancet*, 368(9549):1810–1827.
- Cleland, J. and Wilson, C. (1987). Demand theories of the fertility transition: An iconoclastic view. *Population studies*, 41:5–30.
- Coale, A. J. and Hoover, E. M. (1958). *Population Growth and Economic Development in Low-Income Countries: A Case Study of India's Prospects*. Oxford University Press, Bombay, India.
- Cornia, G. A. (2004). *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization*. OUP Oxford. Google-Books-ID: 7g9REAAAQBAJ.
- Davis, K. R. and Weller, S. C. (1999). The Effectiveness of Condoms in Reducing Heterosexual Transmission of HIV. *Family Planning Perspectives*, 31(6):272–279. Publisher: [Wiley, Guttmacher Institute].
- Detting, L. J. and Kearney, M. S. (2014). House prices and birth rates: The impact of the real estate market on the decision to have a baby. *Journal of Public Economics*, 110:82–100.
- Division, U. N. P. (2021). World Contraceptive Use Dataset 2021. Technical report, United Nations, New York, NY.
- Dribe, M. (2009). Demand and supply factors in the fertility transition: a county-level analysis of age-specific marital fertility in Sweden, 1880–1930. *European Review of Economic History*, 13(1):65–94. Publisher: Cambridge University Press.
- Dribe, M., Breschi, M., Gagnon, A., Gauvreau, D., Hanson, H. A., Maloney, T. N., Mazzoni, S., Molitoris, J., Pozzi, L., Smith, K. R., and Vézina, H. (2017). Socioeconomic status and fertility decline: Insights from historical transitions in Europe and North America. *Population studies*, 71(1):3–21.
- Easterlin, R. A. (1975). An Economic Framework for Fertility Analysis. *Studies in Family Planning*, 6(3):54–63. ArticleType: research-article / Full publication date: Mar., 1975 / Copyright © 1975 Population Council.
- Easterlin, R. A. (1978). The Economics and Sociology of Fertility: A Synthesis. In *Historical Studies of Changing Fertility*. Princeton University Press, Princeton, NJ, c. tilley edition.
- Easterlin, R. A., Pollak, R., and Wachter, M. L. (1980). Toward a more general economic model of fertility determination: Endogenous preferences and natural fertility. In *Population and Economic Change in Developing Countries*, pages 81–150. University of Chicago Press, Chicago, Illinois, r. a. easterlin edition.
- Feenstra, R., Inklaar, R., and Timmer, M. (2015). The Next Generation of the Penn World Table. *American Economic Review*, 105(10):3150–3182.
- Fennell, J. (2014). “And Isn’t that the point?”: pleasure and contraceptive decisions. *Contraception*, 89(4):264–270.
- Galor, O. (2012). The Demographic Transition: Causes and Consequences. *Cliometrica*, 6(1):1–28. tex.pmcid: PMC4116081.
- Galor, O. and Weil, D. N. (1996). The Gender Gap, Fertility, and Growth. *The American Economic Review*, 86(3):374–387.

- Galor, O. and Weil, D. N. (2000). Population, Technology, and Growth- From Malthusian Stagnation to the Demographic Transition and beyond. *The American Economic Review*, 90(4):806–828.
- Guinnane, T. W. (2011). The Historical Fertility Transition: A Guide for Economists. *Journal of Economic Literature*, 49(3):589–614. Publisher: American Economic Association.
- Haider, T. L. and Sharma, M. (2013). Barriers to Family Planning and Contraception Uptake in Sub-Saharan Africa: A Systematic Review. *International Quarterly of Community Health Education*, 33(4):403–413. Publisher: SAGE Publications Inc.
- Herbert, S. (2015). Social norms, contraception and family planning. GSDRC Helpdesk Research Report 1249, GSDRC and University of Birmingham, Birmingham, UK.
- Herrendorf, B. and Schoellman, T. (2018). Wages, Human Capital, and Barriers to Structural Transformation. *American Economic Journal: Macroeconomics*, 10(2):1–23.
- Higgins, J. A. and Hirsch, J. S. (2008). Pleasure, Power, and Inequality: Incorporating Sexuality Into Research on Contraceptive Use. *American Journal of Public Health*, 98(10):1803–1813. Publisher: American Public Health Association.
- Higgins, J. A. and Wang, Y. (2015). The Role of Young Adults’ Pleasure Attitudes in Shaping Condom Use. *American Journal of Public Health*, 105(7):1329–1332. Publisher: American Public Health Association.
- Ibitoye, M., Casterline, J. B., and Zhang, C. (2022). Fertility Preferences and Contraceptive Change in Low- and Middle-Income Countries. *Studies in Family Planning*, 53(2):361–376. _eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/sifp.12202>.
- John, N. A., Babalola, S., and Chipeta, E. (2015). Sexual Pleasure, Partner Dynamics And Contraceptive Use in Malawi. *International Perspectives on Sexual and Reproductive Health*, 41(2):99–107. Publisher: Guttmacher Institute.
- Joshi, S. and Schultz, T. P. (2007). Family planning as an investment in development: Evaluation of a program’s consequences in Matlab, Bangladesh. *Economic Growth Center Discussion Paper*, 951.
- Karra, M., Canning, D., and Wilde, J. (2017). The Effect of Fertility Decline on Economic Growth in Africa: A Macrosimulation Model. *Population and Development Review*, 43(S1):237–263. 00002.
- Karra, M., Maggio, D., Guo, M., Ngwira, B., and Canning, D. (2022). The causal effect of a family planning intervention on women’s contraceptive use and birth spacing. *Proceedings of the National Academy of Sciences*, 119(22):e2200279119.
- Kelley, A. C. and Schmidt, R. M. (1995). Aggregate population and economic growth correlations: the role of the components of demographic change. *Demography*, 32(4):543–555.
- Lam, D. (2011). How the World Survived the Population Bomb: Lessons from 50 Years of Extraordinary Demographic History. *Demography*, 48:1231–1262.
- Lee, R. D. and Mason, A. (2011). *Population aging and the generational economy: a global perspective*. Edward Elgar Publishing.
- Lesthaeghe, R. and Surkyn, J. (2007). When History Moves On: The Foundations and Diffusion of the Second Demographic Transition. In *International Family Change*. Routledge. Num Pages: 38.
- Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School*, 22(2):139–191.
- Li, Q., Tsui, A. O., Liu, L., and Ahmed, S. (2018). Mortality, fertility, and economic development: An analysis of 201 countries from 1960 to 2015. *Gates Open Research*, 2:14.
- Lloyd, C. B. and Ivanov, S. (1988). The Effects of Improved Child Survival on Family Planning Practice and Fertility. *Studies in Family Planning*, 19(3):141–161. Publisher: [Population Council, Wiley].

- Lovenheim, M. F. and Mumford, K. J. (2013). Do Family Wealth Shocks Affect Fertility Choices? Evidence from the Housing Market. *The Review of Economics and Statistics*, 95(2):464–475.
- McKelvey, C., Thomas, D., and Frankenberg, E. (2012). Fertility Regulation in an Economic Crisis. *Economic Development and Cultural Change*, 61(1):7–38. Publisher: The University of Chicago Press.
- Miller, G. (2005). Contraception as Development? New Evidence from Family Planning in Colombia. *NBER Working Paper 11704*.
- Montgomery, M. R. (1987). A New Look at the Easterlin "Synthesis" Framework. *Demography*, 24(4):481–496. Publisher: Springer.
- Nugent, J. B. (1985). The Old-Age Security Motive for Fertility. *Population and Development Review*, 11(1):75–97. Publisher: [Population Council, Wiley].
- Pollak, R. A. (2003). Gary Becker's contributions to family and household economics. *Review of Economics of the Household*, 1(1):111–141. 00199.
- Porzio, T., Rossi, F., and Santangelo, G. V. (2021). The Human Side of Structural Transformation. NBER Working Paper No. 29390, National Bureau of Economic Research, Cambridge, MA.
- Pritchett, L. (1994). Desired Fertility and the Impact of Population Policies. *Population and Development Review*, 20(1):1–55.
- Randolph, M. E., Pinkerton, S. D., Bogart, L. M., Cecil, H., and Abramson, P. R. (2007). Sexual Pleasure and Condom Use. *Archives of Sexual Behavior*, 36(6):844–848.
- Robinson, W. C. (1997). The Economic Theory of Fertility Over Three Decades. *Population Studies*, 51(1):63–74.
- Schultz, T. P. (1992). Assessing family planning cost effectiveness. In Phillips, J. F. and Ross, J. A., editors, *Family Planning Programmes and Fertility*. Oxford University Press, New York.
- Schultz, T. P. (1997). Demand for children in low income countries. In *Handbook of Population and Family Economics*, volume 1, pages 349–430.
- Schultz, T. P. (2001). The fertility transition: Economic explanations. *Economic Growth Center Discussion Paper*, (833).
- Smith, N. K., Jozkowski, K. N., and Sanders, S. A. (2014). Hormonal Contraception and Female Pain, Orgasm and Sexual Pleasure. *The Journal of Sexual Medicine*, 11(2):462–470.
- Sweeney, M. M., Castro-Martin, T., and Mills, M. (2015). The reproductive context of cohabitation in comparative perspective: Contraceptive use in the United States, Spain, and France. *Demographic Research*, 32:147–182. Publisher: Max-Planck-Gesellschaft zur Foerderung der Wissenschaften.
- Szreter, S. and Garrett, E. (2000). Reproduction, Compositional Demography, and Economic Growth: Family Planning in England Long Before the Fertility Decline. *Population and Development Review*, 26(1):45–80. _eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1728-4457.2000.00045.x>.
- Timæus, I. M. and Moultrie, T. A. (2008). On Postponement and Birth Intervals. *Population and Development Review*, 34(3):483–510. _eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1728-4457.2008.00233.x>.
- Tran, N. T., Gaffield, M. E., Seuc, A., Landoulsi, S., Yamaego, W. M. E., Cuzin-Kihl, A., Kouanda, S., Thieba, B., Mashinda, D., Yodi, R., Kiarie, J., and Reier, S. (2018). Effectiveness of a package of postpartum family planning interventions on the uptake of contraceptive methods until twelve months postpartum in Burkina Faso and the Democratic Republic of Congo: the YAM DAABO study protocol. *BMC Health Services Research*, 18(1):439.

- Tran, N. T., Seuc, A., Tshikaya, B., Mutuale, M., Landoulsi, S., Kini, B., Nkolomonyi, B. M., Kyloka, J. N., Langwana, F., and Cuzin-Kihl, A. (2020). Effectiveness of Post-Partum Family Planning Interventions on Contraceptive Use and Method Mix at 1 Year after Childbirth in Kinshasa, DR Congo (Yam Daabo): A Single-Blind, Cluster-Randomised Controlled Trial. *The Lancet Global Health*, 8(3):e399–e410.
- Tsui, A. (2013). What half a century of family planning can contribute. *East Asia Forum Quarterly*, 5(1):26–27. Publisher: ANU Press.
- Van de Kaa, D. J. (1994). The second demographic transition revisited: Theories and expectations. In *Population and family in the Low Countries*. Swets and Zeitlinger, Berwyn, Pennsylvania/Amsterdam.
- Watkins, S. C. (1987). The fertility transition: Europe and the Third World compared. In *Sociological Forum*, volume 2, pages 645–673.
- Weir, D. R. (1984). Rather Never than Late: Celibacy and Age at Marriage in English Cohort Fertility, 1541-1871. *Journal of Family History*, 9(4):340–354. Publisher: SAGE Publications Inc.
- Westeneng, J. and D’Exelle, B. (2011). The Influence of Fertility and Household Composition on Female Labor Supply: Evidence from Panel Data on Tanzania. *DEV Working Paper Series*, WP29.
- Williams, J. K. (2000). Noncontraceptive benefits of oral contraceptive use: an evidence-based approach. *International journal of fertility and women’s medicine*, 45(3):241–247.
- Willis, R. J. (1979). The Old Age Security Hypothesis and Population Growth.
- Yeakey, M. P., Muntifering, C. J., Ramachandran, D. V., Myint, Y., Creanga, A. A., and Tsui, A. O. (2009). How Contraceptive Use Affects Birth Intervals: Results of a Literature Review. *Studies in Family Planning*, 40(3):205–214.
- Youssef, H. (1993). The history of the condom. *Journal of the Royal Society of Medicine*, 86(4):226–228.
- Zakharov, S. (2008). Russian Federation: From the first to second demographic transition. *Demographic Research*, 19:907–972. Publisher: Max-Planck-Gesellschaft zur Foerderung der Wissenschaften.
- Zhang, J. and Nishimura, K. (1993). The old-age security hypothesis revisited. *Journal of Development Economics*, 41(1):191–202.

7. APPENDIX

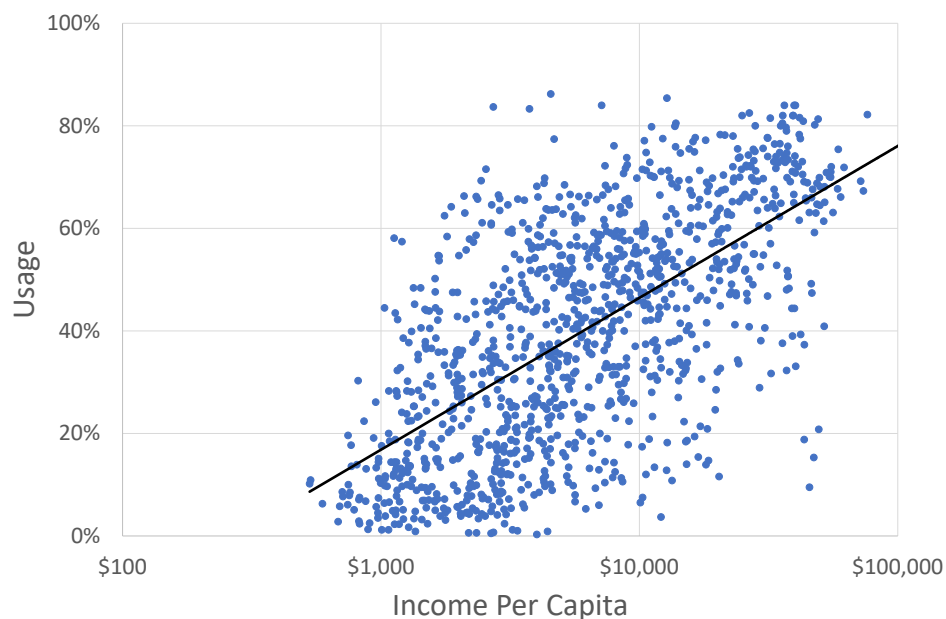


FIGURE 7.1. **Contraceptive Use vs Income: Modern Method Only.** Use is defined as the fraction of women (generally between 15-49, with some variation) who report using modern contraception methods from the UN World Contraceptive Use Dataset 2021. Income per capita is defined as real GDP per capita, output method, using 2017 international (PPP adjusted) dollars from the Penn World Tables 10.0. Observations are at the country-year level.

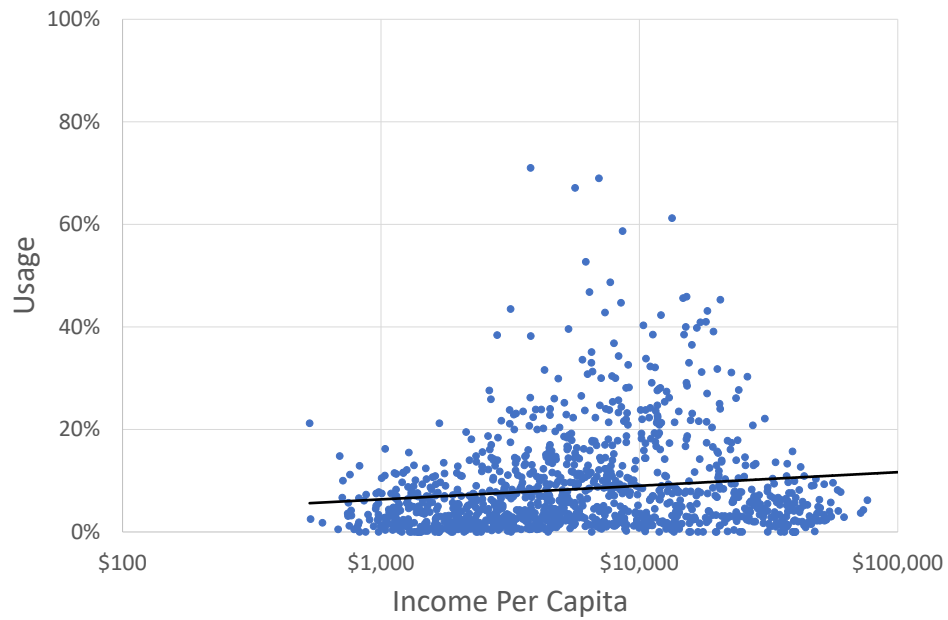


FIGURE 7.2. **Contraceptive Use vs Income: Traditional or Folkloric Methods Only.** Use is defined as the fraction of women (generally between 15-49, with some variation) who report using traditional or folkloric contraception methods from the UN World Contraceptive Use Dataset 2021. Income per capita is defined as real GDP per capita, output method, using 2017 international (PPP adjusted) dollars from the Penn World Tables 10.0. Observations are at the country-year level.