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Urbanization and fertility decline:

Cashing in on structural change

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Massive urbanization in the developing world is one of the major structural shifts of the 21st century. Well managed, it has enormous potential in promoting social inclusion and providing people with real choices, including in the area of reproductive health. This study finds support for the idea that urbanization not only has a direct impact on fertility behaviour, but that it has an important influence on its other major social and economic determinants. Thus, the exclusive focus of the population establishment on intermediate variables affecting fertility has kerbed more far-reaching policy options. 'Good' urbanization, however, is not occurring spontaneously and needs explicit, proactive attention from policymakers.

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1 Introduction

Demographic processes have again been propelled to the forefront of the major challenges facing humankind in the 21st century. Intense press coverage of the 7 billion population theme, together with increased concern over major global threats such as climate change and food crises have once more thrust issues of population growth into the public spotlight. Often overlooked in these debates is the even more striking fact that all of this future growth will occur in the towns and cities of the developing world. Global population is projected to increase by 2.4 billion between 2010 and 2050. In the same time span, however, because rural areas will decrease, the urban population is expected to grow by 2.7 billion, with 94 per cent of that growth concentrated in less developed regions (United Nations, 2012).

Overall population growth and urbanization processes are evidently related. Although the debate has focused most attention on the speed and volume of population growth per se, the economic, social, environmental **and** demographic welfare of the human population actually hinges on the progress of those localities that will absorb almost all of this growth: the towns and cities of the developing world.

Recent concern with global population increase has inevitably led to renewed discussions as to the best means to abbreviate the transition to low fertility and population stabilization. Public opinion (as well as that of many donors and policymakers) in developed countries supports the introduction of massive family planning campaigns in high fertility countries, on the assumption that this represents the most effective approach to rapid fertility reduction and thus to mitigation of the alleged 'population pressure'. This intuitive approach, sometimes known as 'The Northern Perspective',[1] finds support in the ideology, research and actions of the population establishment that emerged in the wake of fears of a 'population explosion'[2] in mid-20th century. However, then as now, family planning programmes tended to be erroneously projected as a determinant of fertility decline whereas, in fact, they are actually an 'intermediate variable' or 'proximate determinant' that makes it possible for people to achieve their lower fertility desires more easily, if and when such aspirations arise.

The crucial question, which this perspective overlooks, is what makes people want to reduce their fertility in the first place. A large body of research that has sought to understand when, how and why fertility declines needs to be more carefully reviewed. Analysis of the historical record shows that social and economic processes have invariably been significant in accelerating fertility decline since the inception of the demographic transition. As aptly put by Amartya Sen: 'There can be little doubt that economic and social development, in general, has been associated with major reductions in birth rates and the emergence of smaller families, as the norm.' (Sen, 1994, n.p.). In essence, the very demand for fertility regulation information and methods stems from improvements in economic and social conditions. A combination of changes linked to human development and to the exercise of human rights – *inter alia*, urban residence, education, infant and child mortality reduction, women's empowerment, wage labour, women's participation in the labour force, increased consumption aspirations and social mobility – are among the main factors that motivate people to regulate their natural fertility.

Urbanization – the process through which an increasing proportion of the total population resides in towns and cities – has long been touted by analysts as a main factor in fertility decline. It is almost universally acknowledged that urban fertility is lower than rural fertility, except in the very poorest urban slum areas. On the surface, this would appear to be attributable to

1. Cf. Hummel *et al.* (2009)

2. The term 'population establishment' refers to a heterogeneous group of organizations that have the common purpose of reducing population growth in developing countries. Government and multilateral agencies, NGOs, foundations and pressure groups provide grants and subsidies to various institutions to promote research and action towards that goal (Cf. Hartmann, 1997).

the fact that urban populations, across the world, enjoy advantages over rural populations in relation to all those factors that affect fertility levels, including education and employment of women, gender equality and better access to all types of services.

Others have disagreed with this perception, alleging that the impacts of urbanization on fertility are inconsequential. As will be shown in this paper, simple correlations between fertility decline and urbanization are not always consistent, for a number of reasons stemming from the great variety of urbanization and fertility trajectories. Other discrepancies stem from data limitations, defective study designs or different theoretical perspectives. But still others would appear to be, at least in part, influenced by differentiated perceptions regarding the nature of population problems and, consequently, the nature of priorities to be highlighted in population policy. Concern with rapid population growth and the desire to intervene more directly in the process of fertility decline have not only prompted a greater focus on the proximate determinants of reproductive behaviour, and thus on the importance of family planning programmes, but has sometimes led to the negation of the very impact of structural changes on fertility decline.

This paper attempts to combine an analysis of structural and proximate causes. As such, it is part of an ongoing paradigm shift that makes a sustained case for taking structural factors more seriously and for not assuming that their influence is only through proximate causes. Supported by new techniques, this approach ascribes causality to structural/social factors that would previously have been described as distant factors of less direct relevance. As aptly stated by Cockerham (2013: 25) in relation to health research: 'A number of factors, including the pervasiveness of the biomedical model in conceptualising health problems, a research focus on health from the standpoint of the individual, and the former lack of appropriate statistical techniques have all combined to relegate social structural factors to the background in the quest to discover the social connections to health. But this situation is changing in the direction of a more realistic approach in which the relevance of structure is not only being recognized, but endowed with causal properties with regard to health and disease. In fact, it can be argued that a major paradigm shift toward a neo-structural perspective is now appearing in 21st-century medical sociology. This is seen in the greater emphasis upon structure in both theory and research that is stimulated by the need to acquire a more comprehensive understanding of the social causes of health and illness in contemporary society. The work in medical sociology…is evidence of this paradigm shift.'

It is our belief that the actual impact that urbanization has on fertility is a critical question that has important policy implications and thus warrants further elucidation. Given the massive scale of urban growth currently being experienced by developing regions, the issue is certainly not trivial. This paper proposes to do two things: a) contribute to a clarification of the part played by urbanization in the reduction of fertility, and b) discuss the importance of getting the policies right in the ongoing urban transition in developing countries, both for the promotion of social development in general, and for improvements of reproductive health in particular.

The next two sections of this paper review some of the main contributions in the lengthy debate over the relative impact of urbanization on fertility decline. This will show that the results of a long series of studies concluding that rural–urban migration favoured fertility decline (Section 2) have been questioned by other schools of thought, particularly by researchers who were concerned with the need for a more hands-on approach to fertility decline in the developing world (Section 3). The subsequent section (4) then re-examines both perspectives with the object of clarifying the sources and policy significance of these discrepancies. The final empirical section (5) reviews recent fertility trends, worldwide and in a specific country study, in order to better understand the correlation between fertility levels and a wide variety of factors that have been posited as having an influence on fertility decline. To this purpose, recent data from a large number of countries are first analysed. Then, more detailed data from Brazil, a developing country that has practically completed both its fertility and urban transitions, is used in order to explore differences in the process of fertility decline between rural and urban areas within a more homogenous setting, using a multivariate approach. A final section (6) wraps up the main arguments and discusses their implications for policy.

The empirical analyses presented in Section 5 show that, although urban fertility levels are systematically lower than those in rural areas, and although urbanization is itself highly correlated with practically all of the factors that affect fertility reduction, the simple correlation between levels of urbanization and fertility is not always impressive. This apparent discrepancy gives room to different interpretations. However, more complex models and a case study permit closer examination of the factors involved and would suggest that urbanization is a major vehicle in promoting a variety of social changes that affect the fertility transition. The argument is made that the ongoing process of massive urbanization is one of the most important structural changes of this century. It needs to be accepted and promoted in order to yield its benefits for human development, favouring the exercise human rights in a variety of areas, including in the dissemination of quality reproductive health services that allow people to choose and manage their reproductive behaviour.

2

The case for urbanization's strong role in fertility decline

2.1 Migration, urbanization and fertility: theory and field studies

Interest in the influence of urbanization on fertility has a long history in demographic studies. Prior to World War Two, and only a decade or so before the onset of the modern concern with rapid global population growth, below-replacement fertility was a main preoccupation in developed regions of the world. Therein, urbanization was perceived as a strong, universal force that was accelerating fertility reduction. Several prominent demographers analysed the subject in the 1930s and 1940s; their findings unanimously portrayed urbanization as a main factor in the fertility reduction of developed countries. Warren Thompson wrote: 'Urban–rural differential fertility was studied in a number of non-European countries as of the present time and in a number of European nations and in the United States during the early nineteenth century. With but one exception the rural fertility rate was observed to be substantially higher than the urban rate.' (Thompson, 1935:153). Kingsley Davis was so concerned with the strength of urbanization in fertility decline that he advocated a return to rural areas in order to avoid population decline and to save the family (Davis, 1937:289–306).

In 1942, Alfred Jaffe's extended research of the relation between urbanization and fertility decline to developing countries, commenting that: 'It is a well-established fact that in our modern European culture fertility rates are generally higher in rural areas than in cities. This has been demonstrated by a number of investigators who used a large variety of analytical techniques and several different measures of fertility… Urban–rural differential fertility is far more widespread than was originally thought. Not only does it exist today in the European nations and in those lands whose population is predominantly of European descent, but it is also found among the populations of Latin-American countries where there is a large admixture of native blood, among at least some of the native Asiatic populations, among the Moslems in Palestine, among the native Negroes and the Asiatics in South Africa, and among the nonwhite groups (other than Negro) in the United States.' (Jaffe, 1942:48 & 57). Jaffe then asked what might cause this differential. He first discarded the greater availability of modern contraceptives, observing that all peoples have always known ways and practices to avoid having children. He then attributed the fertility reduction strength of urbanization to the greater 'plane of living' of urban populations and to the greater desire to achieve this better standard in the future (Jaffe, 1942:58–59).

These types of observations fed into the broader perspective of demographic transition theory, which posited both a reduction in mortality levels and a subsequent fertility decline as a result of a general process of development. Notestein (1945) provided a seminal analysis that reaffirmed the importance of urbanization within the framework of economic

factors that are associated with fertility reduction. In his view, fertility was necessarily high in traditional rural, agricultural societies in order to provide needed labour and to offset high mortality. Economic and social changes such as industrialization, urbanization, and increased education accelerated a decline in mortality. Subsequently, the declining economic value and the rising cost of children in urban life and the desire of parents to promote better health and education for their children prompted fertility decline in developed countries, and this could be expected to soon reduce fertility in developing countries as well.

The influence of such factors on the micro-level of decision-making would be famously formalized in the later works of Becker (1960), Schultz (1972) and others. While the previous macro-perspectives had focused on the impact of broad social change on demographic dynamics, neoclassical micro-economic theory emphasized the proximate determinants that directly influence the decisions of individual couples. Changes in the demand for children would occur due to changes in family income and to changes in the relative cost of children and other consumer goods.

A spate of field studies focused on migration and fertility in developing countries during the late 1960s and early 70s generally supported the hypothesis that urbanization, as an integral component of the process of 'modernization', was speeding up fertility decline in different parts of the developing world. However, interest in these studies was primarily centred on rural–urban differentials, rather than on explanations of why or how urbanization affected fertility. The findings of earlier studies in the United States showing that rural–urban migrants exhibit higher fertility rates than urban natives were later confirmed, *inter alia*, by Goldberg (1959, 1960), as well as Freedman and Slesinger (1961) (studies cited in Beine *et al*., 2009). A review of other studies on rural–urban fertility in the United States concluded that 'the evidence indicates that prior to World War II in the general population migrant fertility was substantially higher than that of urban residents and the differential increased with age'. (Zarate and Zarate, 1975:123). Moreover, the authors found that the overall level of migrant fertility is closely associated with the higher level fertility of the migrant population from rural areas and small towns (Idem:135).

Myers and Morris (1966) and Macisco(1968), as well as subsequent studies in Puerto Rico, vindicated such findings, although some nuances and intervening variables were highlighted. In Latin America, Zarate and Zarate (1975) reviewed the findings of some 16 studies using different approaches, methodologies and data, involving 17 different cities and 9 different countries and concluded that: 'In view of this heterogeneity, the consistency of findings in this region is impressive. With only one exception, the fertility of migrants to urban areas is higher than that of natives… regardless of place of birth, except in Santiago and Monterrey.' Moreover, 'the fertility of rural migrants is almost always higher than that of other migrants…' (Idem:134). The authors concluded that, although the methodology of some of the earlier studies might be considered suspect due to lack of controls for such factors as age and proportions married, the results pointing to pervasive higher rural fertility had also been confirmed by later and more sophisticated studies.

Other studies from the 1970s in Asia and Africa generally reaffirmed the differences in rural–urban fertility and explicitly highlighted the significance of urban-wards migrations in promoting fertility decline. An enduring discussion of whether the lower fertility of migrants was due to adaptation, selectivity or disruption[3] was launched during this period.

Thus, Goldstein (1978) used census data in Thailand to analyse the fertility behaviour of migrants to Bangkok and found that they tended to assimilate the fertility behaviour of the native population at destination when they moved from rural areas and smaller urban areas to larger cities. Migrants to Bangkok had lower fertility than those to other urban places, especially if they had an urban origin. This suggested to Goldstein that 'selectivity' and 'adjustment' have a joint impact on fertility levels. His findings suggest strongly that in Thailand movement from rural to urban places is associated with considerable reduction in fertility and that this results both from the initial selection of persons with lower fertility and from the adherence to lower fertility levels than the non-migrant population in the urban metropolis, at least in the period immediately following migration (Goldstein, 1973:238).

Several more recent studies from the field of demography have continued this line of research and suggested that urbanization somehow contributes to fertility decline. Some of these were carried out in China. For instance, Yi and Vaupel (1989) found that birth rates in rural areas were higher and that childbearing started earlier there. The Total Fertility Rate (TFR) of rural areas in 1981 was 2.9, compared to 1.4 in urban areas. The authors calculated that continued urbanization would thus have a major impact on fertility levels and could reduce the overall population size by 133 million by 2050. In a similar vein, Goldstein *et al*. (1997) compared fertility rates of migrants, non-migrants, temporary migrants and urbanites in China and found that migrant fertility is systematically lower. Moreover, contradicting common lore in that country, the

3. According to the selectivity hypothesis, rural–urban migrants have distinctive characteristics, among which is a greater propensity to lower fertility. The adaptation hypothesis suggests that migrants modify their reproductive behaviour as they adjust to the urban environment. The disruption hypothesis considers that physical separation and the stress of migration itself interrupts the normal reproductive cycle of migrants.

study found that temporary migrants do not contribute to higher fertility. More recently, Guo *et al* (2011) observe that not only was urbanization important in China's fertility decline but that it will become the primary factor in future fertility decline, allowing China to relax its 'one child' policy.

The relevance of urbanization in fertility decline has been highlighted in other studies on developing countries. Thus, Shapiro and Tambashe (2002) analysed Demographic and Health Surveys (DHS) data from 29 African countries and explored in some detail the role of urban areas as the place of origin for the fertility transition in sub-Saharan Africa. The paper provided an overview of reproductive change and quantified the importance of the various factors contributing to the differentials in fertility. Specifically, it carried out exploratory analyses on the extent to which urban–rural differences in fertility (and hence, presumably, changes in fertility) are linked to differences (and changes) in schooling, age at marriage, contraceptive use, and infant and child mortality.

The Shapiro and Tambashe study did not specifically analyse the role of migration and thus of 'urbanization' in fertility decline, but it did find pervasive differences between rural and urban fertility; considerable diversity across countries in terms of urban–rural differences in age-specific fertility rates and in the pace and nature of fertility was also emphasized. Urban–rural fertility differentials in this study are attributed to a combination of expected factors, including the differential availability of services and a differentiated population composition in rural and urban areas.

More recently, a review by Beine *et al.* (2009:5), which looked at studies in Puerto Rico, Thailand, Colombia, Costa Rica, the Philippines, Korea, Brazil, Mexico, Papa New Guinea, Estonia and 13 African countries, concluded that 'Internal migration studies that examine the fertility impact of rural–urban migration have found support for the convergence of migrants' fertility rates to those of natives.' These authors study both international and internal migration and conclude that most studies on migration's fertility impact have confirmed that its reduction is due to adaptation of migrants' fertility behaviour to the patterns prevailing in the host countries (regions).

In sum, a wide variety of field studies focused on rural–urban migration processes in a broad assortment of countries over different periods arrived at similar conclusions. Firstly, they found systematic differences between rural–urban levels of fertility. Secondly, most of them found that rural–urban migrants adapted their fertility behaviour upon settling in urban areas so that it resembled more closely that of urban residents at their destination. The inference that urbanization was a key factor in fertility decline generally followed; a more elaborate theoretical framework centred on the effects of development and the demographic transition was reinforced from this perspective.

2.2 Shoring up field research on migration and fertility – the Ghana studies

Despite the apparently monotonic concurrence of the early theorists and the above-cited field studies concerning the broad role of urbanization on fertility reduction, some analysts suggested that methodological differences and discrepancies in field studies had led to inconsistent results as to the manner and significance of urbanization's impact on fertility behaviour, particularly concerning modern-day trends in developing regions. Different study designs, different ways of operationalizing key concepts, failure to control for selectivity, limited information on the timing of geographic mobility and fertility were, justifiably, cited as some of the reasons for discrepancies in results (Lee,1989:1599; White *et al.*, 2008). Such inconsistencies led to the argument that there was, in fact, no association between migration and fertility, and even to the suggestion that fertility might actually increase with movement to urban areas (cf. several studies cited in White *et al.*, 2008:804).

Such criticism of the methodological difficulties that hampered analyses of the relationship between rural–urban migration and fertility behaviour has motivated more careful field research. That carried out by White and colleagues over a period of several years in Ghana can be cited as a main attempt to improve understanding of this relationship, using improved field research techniques. These studies exploit detailed life history calendar data in order to support a more refined and definitive analysis of the relationship among personal traits, urban residence, and fertility. The results of these studies have been discussed in White *et al.* (2005, 2006 and 2008, and Chattopadhyay *et al.*, 2006).

Initially, the authors note that the actual role of urbanization in fertility decline in Africa has been largely neglected due to a major ideological hurdle – the widely shared assumption among Africans that rapid urban growth in the region is a social problem and a trend that should be discouraged. They also note the fact that the few studies that have been carried out on this topic in Africa have produced contradictory evidence. From DHS data, it is clear that urban areas have significantly lower fertility rates than rural areas, and that Ghana's fertility rate is declining. However, relatively little is known about the contribution of migrants to Ghana's fertility, or about the way in which migration and urban residence operate to alter fertility outcomes. The authors observe that methodological problems have

weakened most previous efforts to establish the role of urbanization in fertility decline, either because they were carried out at a level of aggregation, such as the country level, that could lead to ecological fallacies (that is, wrong inferences about individual behaviour based on aggregate data for a group), and/or because they lacked information relating the timing of residence and of childbearing to individual migrants. Moreover, few of the existing studies examined changes in migrants' fertility rates over time.

To overcome such limitations, White *et al*. used detailed survey data that provided a life history calendar which includes both annual residence and birth information. As the authors observe: 'Such data enable our event-history analysis to more accurately assess the relationship over time between urban living, migration, and fertility, while controlling for conventional personal characteristics. In this way, we can better understand the effect of urban residence overall, and more specifically, the effect of rural-to-urban migration on fertility over the childbearing sequence.' (White *et al*., 2008:804).

White *et al*. analyse two sets of data, the first from the Kumasi Peri-Urban Survey, which was conducted May–July 1998 and which collected information from households and individuals in two migrant settlement zones in Kumasi; and the second from the 2002 Population & Environment (P&E) Survey of the Central Region in Ghana – a household-based survey that is representative of six coastal districts.

The Kumasi study identified first generation migrants, second generation residents with at least one parent who was a migrant, and urban natives of three or more generations. Monthly detail regarding the timing of residence changes and childbearing was collected for the five years prior to the survey. The data also included information about completed and recent childbearing and the socioeconomic characteristics of individuals and households.

The subsequent coastal survey provided a life history calendar on all men and women aged 15 or more that included data on region of residence, urban or rural residence, education, occupation, marital status, and births and deaths of children by yearly intervals. The data cover residence information over the respondents' lifetime, enabling an event-history analysis that provides a more accurate assessment of the relationship between urban living, migration and fertility over time, while controlling for conventional personal characteristics. This favours an improved understanding of the effects of urban residence overall, and more specifically, of the effects of rural-to-urban migration on fertility over the childbearing sequence. The event-history calendar thus provides a more conclusive and refined view of the relationship between residence and childbearing.

Despite differences in sample area, approach and the nature of the data collected, both studies arrive at a similar conclusion; the results indicate clear and significant declines in fertility with migration to urban areas. In essence, White *et al*. find that migrants adapt quickly to urban environments, and that the mechanisms which lead to fertility reductions over urban migrants' lifetimes are solidified by the second generation. 'We find that the effect of urbanization itself is strong, evident, and complex, and persists after we control for the effects of age, cohort, union status, and education' (White *et al*., 2008:803).

Thus, carefully constructed surveys find that the adaptation to, and socialization into, the urban environment is significantly correlated with a relatively rapid reduction in fertility levels. Higher levels of education and other human capital opportunities in urban areas lead to lower fertility but the fertility reduction also occurs independently of education. The authors thus conclude from the Kumasi study that 'What makes urbanization potentially so important in understanding Africa's fertility transition is that all of the models of fertility change outlined above might operate more powerfully and swiftly in urban areas. In other words, whether one privileges macro-sociological changes, mortality decline, household economics, the costs of birth control, or social networks and the diffusion of ideas, there is ample evidence to suggest that any and all of these mechanisms operate with increasing significance in urban environments' (White *et al*., 2005:78).

This observation regarding multiple reinforcing influences on fertility decline in urban areas is further highlighted in the study of coastal Ghana. The urban impact reflects both composition factors and genuine residence effects. Urban norms, opportunity costs, access to family planning services and higher education, as well as broad social changes that are reflected in the clear impact of cohort on fertility, all support lower fertility in urban areas. But urban residence itself, 'among both natives and migrants – further reduces annual rates of childbearing below the level predicted by age and socioeconomic traits alone. Such a result is consistent with the adaptation mechanism' (White *et al*., 2008:815–16).

In short, at least in the case of these two communities in Ghana, carefully designed research into the relations between rural–urban migration and fertility behaviour clearly suggests that urbanization is indeed a strong factor in fertility decline. In that sense, it corroborates, with the aid of a more sophisticated research design, the findings of many other studies cited in this Section of the paper. The studies clearly indicate that living in an urban area heightens the impact of other variables that affect smaller family size preferences while also allowing these preferences to be implemented through

the proximate determinants of fertility. That is, in urban areas, people have more motivation to limit their fertility, greater access to better information, to more modern contraceptive methods and to better general healthcare conditions, while also postponing entry into a marital union.

Despite these clear findings, it can still be argued that the research covered only two small communities in one African country and thus that, at least in principle, other patterns may emerge elsewhere and may even be more predominant. This is exactly the position that evolved in other analyses of the urbanization/fertility relation, reviewed in the next section.

3

Scepticism and reaffirmation concerning the role of urbanization in fertility decline

3.1 Changing policy concerns and revision of the role of development – and thus of urbanization – in fertility decline

Despite the large number of empirical studies in developing nations finding evidence of rural–urban differences in fertility as well as of a negative correlation between fertility and urban-wards migration, the role of urbanization on fertility decline still came under sceptical scrutiny in the latter half of the 1960s. The assumption that fertility decline is largely attributable to the structural changes associated with development and its component transformations – such as industrialization, urbanization and educational improvements – began to come under attack from two different but interlinked directions. On the one hand, a surge of concern with unprecedented rates of population growth in developing countries had spawned the birth of a population establishment that demanded more pragmatic and direct responses to the perceived threat of rapid demographic growth. Influential policy sectors considered that it was urgent to make a direct impact on fertility rates and family planning programmes were the obvious instrument to achieve this. In this framework, it was felt that long-term structural changes linked to development and urbanization could not be relied on to produce the desired rapid decline in fertility.

Meanwhile, academic efforts to bolster the empirical underpinnings of the prevalent demographic transition theory with more disaggregated data and improved methods met unexpected problems, opening up a breach that other lines of theoretical thought, more consistent with a hands-on approach to population policy, quickly invaded. The powerful population establishment set up during the late 1950s to counter the new rapid growth threat provided generous funds for analyses, information and the proposal of population policies centred on family planning. This led to a quick expansion of academic training and research in demographic studies. Inevitably, research agendas and outlooks were influenced by the sources of funding which, at least implicitly, hoped to generate effective interventions capable of promoting reductions in rates

of population growth. While the justification, the tools and the institutions were built up for a concerted effort to influence the rate of fertility decline through family planning, the role of development itself in fertility reduction was downplayed and, consequently, that of urbanization as well. Not all analysts agreed with this diagnosis, nor did all developing countries adhere to the family planning formula, giving rise to a debate that transcended the academic field.

In the 1970s, the discussion heated up with battle lines reflecting more clearly the ideological cleavages concerning the primary factors in fertility decline. In developing regions, suspicion of imperialist interests behind the attention given to the 'population explosion' and to the intensified efforts by developed countries to promote fertility-reducing birth control fanned the flames of this debate. The rift famously came to a head in the 1974 Conference on Population and Development, when Indian delegate Karan Singh declared that 'development is the best contraceptive'.

This predictably sparked further controversy and, *inter alia*, motivated what could be called a 'dissenting' stance with respect to the demographic transition's explanation of the roots of the European fertility transition, as well as a revised perspective on the nature of fertility decline in developing countries. What follows is not intended as a review of the vast pertinent literature: it merely purports to illustrate some of the main positions in the debate.[4]

A major research project at Princeton, led by Ansley Coale, spent more than two decades (1963–1986) studying the fertility transition in Europe, initially hoping to establish clearer empirical associations between socioeconomic indicators and fertility decline. This research was focused on sub-national levels of investigation and tried to understand several patterns that were apparently incongruous with the prevailing explanation of the demographic transition generated by a combination of industrialization and urbanization.

Detailed research by the prominent Princeton studies, however, failed to demonstrate that rates of industrialization and urbanization were strongly correlated with the decline of provincial fertility levels. It eventually concluded that the relation between modernization (including urbanization) and fertility is neither direct nor deterministic. Reflecting on these findings in an influential paper, Coale (1979) re-examined the demographic transition and abandoned the idea that a development threshold needed to be reached in order to trigger a reduction in the average number of children in a society. In this view, fertility reduction was now perceived as possible in a variety of socioeconomic contexts and development was characterized as a sufficient, rather than a necessary condition for fertility change.

In retrospect, it has been suggested that the failure of the Princeton studies to correlate development to fertility decline might well have been due to the studies' level of aggregation and their inability to detect the many linkages at the household level between social and economic change and demographic change (Kertzer and Hogan, 1989, cited in Casterline, 2001:2). Be that as it may, the difficulties in establishing a clear causal linkage to developmental trends by this prestigious study favoured and fostered the growth of an entirely different line of research. This was based on the notion that attitudes and behaviours favourable to fertility decline become more prevalent in a given population through their spread from some individuals to others. Fertility decline was thus attributable primarily to changing cultural contexts, rather than to changes in social, economic or demographic structures. Within this perspective, demographic historians began to take another look at the fertility histories of clusters of European or American families and to examine the cultural settings in which these various groups of families made the transition from high to low fertility.

Diffusion theories spread quickly and branched out into several variants, all united by their belief that fertility decline was more or less dependent on the spread of knowledge, beliefs and behaviours from lower fertility groups to other sectors of a society or region. It is impractical to try to review the many offshoots of this approach and their respective nuances here. However, an important facet of this switch from structural to cultural determinants, and one which is not immediately apparent, is the fact that it had clear political and ideological overtones. As rightly observed by Casterline, citing Bogue, 1967; Palmore, 1967; and Rogers, 1973: 'Early efforts to apply diffusion theory to fertility change were not submitted as challenges to the dominant social scientific theories of demographic transition; rather, they were directed to the more practical and programmatic goal of accelerating the adoption of contraception' (Casterline, 2001:3).

Articles by van de Walle and Knodel (1979 and 1980), re-examined the history of European demographic trends within the Princeton series of studies. They suggested that the transition from high to low fertility and mortality represented a shift from natural fertility to family limitation and that differences in the start and speed of the fertility decline were determined more by cultural than by socioeconomic conditions. It is not surprising that the authors also concluded that a certain level of socioeconomic development is not a precondition to fertility decline and that family planning programmes can be effective, even in underdeveloped areas (van de Walle and Knodel, 1980).

4. For more detailed and insightful discussions, from which this section borrows heavily, cf. Casterline (2001), and, *inter alia,* Thomas and Price (1999).

In this context, Johansson (1997) also reviewed Kingsley Davis's early seminal work linking urbanization and fertility decline in Europe and criticized its alleged lack of historical basis. He also censured Davis's later forays into this domain as well as the fact that they deflected attention from what was already being perceived by others as the major demographic problem, namely the 'population explosion' (Johansson, 1997). According to Johansson, Davis had been unable to comprehend the 'forms of historical complexity that made it possible for predominantly rural and agrarian families in countries like France and the United States to pioneer a fertility transition supposedly caused by economic development, while families in the most industrialized and urbanized country (Britain) lagged behind' (Johansson, 1997:730).

More emphatic postures from the population establishment went beyond this type of criticism and inferred a mechanistic role for contraception as a direct or proximate determinant of fertility decline, independently of development processes or family size preferences. According to this view, aimed at influencing a wider base of political and public opinion, high fertility is, in large part, the result of inadequate contraception due to the inaccessibility or high cost of contraceptive services. Thus, the provision or subsidization of contraceptive services offers the possibility of substantial reductions in fertility rates, independently of broader development trends (cf., for instance, Robey *et al*., 1993). Although access to contraception was obviously a critical need (and still is for 215 million women, according to WHO, 2011), the emphasis placed on contraception per se, given the geopolitical context and North–South conflicts over 'population control' of the era, evidently positioned such writings at a considerable distance from former perspectives on the strong role of development and/or urbanization.

The 'dissenting' stance also inspired some of the more well-known studies of fertility decline in developing regions. For instance, Cleland and colleagues (1987 and 1994) analysed data from the series of World Fertility Surveys carried out during the 1974–1982 period and explicitly denied both the influence of development and urbanization on fertility reduction. Cleland, one of the more prominent demographers involved in this debate, stressed the importance of the diffusion through society of ideas favourable to fertility control and insisted that family planning programmes are more important than development or urbanization in reducing fertility. Essentially, he concluded that fertility declines result from the translation of fertility desires into practice through the improved availability or acceptability of family planning services.

Cleland and associates did find considerable differences in fertility levels by rural/urban residence as well as by city size in their analyses of fertility decline in Africa. Nevertheless, contrary to preceding studies that had simply inferred the influence of urbanization on fertility decline from such large rural–urban differentials, these authors were not convinced that such a relationship existed (Cleland, 1985; Cleland and Hobcraft, 1985; Cleland and Wilson, 1987, studies cited in Montgomery *et al*., 2003:212). On the contrary, they hypothesized that urbanization could even increase marital fertility by discouraging breastfeeding and other traditional birth-spacing practices.

Along the same lines, a more recent review and analysis of African fertility by Garenne also finds clear differentials in rural–urban fertility in that region, but nevertheless concludes that urbanization is largely irrelevant: 'These observations are compatible with a detailed analysis of the European fertility transition (van de Walle and Knodel) that also showed virtually no relationship between fertility decline and urbanization or socioeconomic indicators' (Garenne, 2008:30).Other researchers have also concluded that the association between migration and fertility is either neutral or negative (cf., for instance, Cleveland 1991; Diop 1985; Hollos and Larsen 1992; Lee 1992, cited in White, 2008).

3.2 Reactions to diffusion theory and its view of the role played by family planning programmes in fertility decline

In time, other perspectives that continued to stress diffusion, but without neglecting the importance of socioeconomic development, emerged. For instance, John and Pat Caldwell, prominent analysts of fertility behaviour in sub-Saharan Africa, gradually moved to recognizing the critical influence of both development and urbanization. Initial work by John Caldwell (1976) had posited that the key to understanding fertility behaviour is the intergenerational flow of wealth. In high fertility regimes, wealth flows from children to parents, whereas it flows in the opposite direction in low fertility groups. Within this framework, the key issue in understanding the fertility transition becomes the direction and magnitude of the intergenerational flow of wealth. A reversal in the direction of this flow can be determined by social changes such as the move of the family structure from extended to nuclear, rather than from changes in economic conditions. Thus, high fertility can co-exist with development if unaccompanied by specific social changes.

Later, the Caldwells argued that sub-Saharan Africa offered greater resistance to fertility decline than other world regions due to cultural reasons emanating from

a religious belief system that brings rewards to high fertility (John and Pat Caldwell, 1987). When surveys showed signs of an irreversible fertility decline in the region, they highlighted the importance of good family planning programmes. But, they argued, 'Going beyond the mechanisms for fertility control to the reasons for it, a great deal depends on continued socioeconomic development. Fundamental is the continued decline of infant and child mortality, a process that has slowed everywhere, and has reversed in parts of East and Southern Africa. Means will have to be found for ensuring that the market is not the only determinant of health services. Education is also important and much the same can be said about it as about health services. *Certainly, continued urbanization will help to drive the African fertility transition, and, indeed, is probably a more significant determinant in the region than anywhere else in the world. Ultimately, of course, these changes will be driven by economic growth*' (John and Pat Caldwell, 2002:4 – emphasis added).

Despite being associated with different sides of an ongoing debate, the cultural and developmental approaches – and even the micro-economic ones – are not actually mutually exclusive. Indeed, Retherford and Palmore (1983) attempted to conciliate the different approaches, showing that the process of modernization facilitates the rise of innovative groups and the diffusion of new ideas, in addition to changing the cost/benefits of children. Thus, the fertility transition has multiple determinants and reflects both macro- and micro-economic determinants as well as cultural changes.

In a landmark paper, Bongaarts and Watkins (1996) also adopted a more encompassing approach, seeking to counter criticism of the diffusion theory by adapting and transforming it into a social interaction approach. They examined the empirical record of trends in fertility and socioeconomic development in 69 developing countries. Their research corroborated at least part of the original Notestein hypothesis about the effect of development: they found that at any given date, standard measures of development are correlated with the level of fertility. Nevertheless, the authors inferred that other factors must be at work since the pace of fertility decline was not closely associated to conventional measures of development.

To move forward, Bongaarts and Watkins thus pointed to the role of 'social interaction' as a critical and neglected process in fertility transitions. This term was intended to signal a broader view of ideational change. The authors suggest that the pace of fertility decline within a country depends on the level of development, both because it influences the demand for children and because it facilitates or hinders social interaction. In this perspective, 'once innovative fertility behavior has been adopted by a group of individuals within a community, by a community within a country, or by a few countries within a region, social interaction can become a powerful force that accelerates the pace of transition in the rest of the community, the nation, or the world society, and stimulates its onset elsewhere' (Bongaarts and Watkins, 1996:669).

More direct criticism of what we are here calling 'the dissenting perspective' came from economists who continued to find a strong relation between development and fertility decline. Perhaps the most resounding and categorical statement in this connection was that proffered by Lant Pritchett, who used both World Fertility Survey as well Demographic and Health Survey data to argue that fertility is strongly correlated with the demand for children, which is itself modified by development, and that family planning efforts have very little independent effect on fertility. He famously stated that 'analyses purporting to demonstrate the dominant importance of the provision of family planning services (in fertility reduction) are typically based on analytical errors' (1994:2).

This stance echoed an earlier discussion by Becker who argued that 'improvements in birth control methods are mainly an induced response to other decreases in the demand for children rather than an important cause of the decreased demand' (1991:143). Paul Schultz had also re-analysed the European demographic transition and found strong evidence relating fertility decline to economic factors, to development in general and, specifically, to urbanization. For instance, his analysis of the Swedish fertility decline concluded that 'about one-third of the 25 per cent decline in total fertility rates for Sweden in the period 1860 to 1910 can be attributed to these externally driven increases of women's wage opportunities, whereas the rest of the decline in this half century is associated with urbanization and the increase in child survival, under the assumption that these are exogenous developments (Schultz 1985). A similar demographic pattern was to have unfolded in Denmark, which was also relatively open to international agricultural trade, while its demographic transition was only slightly less rapid than in Sweden' (Schultz, 2001:13).

The solid impact of industrialization and urbanization on fertility decline was proclaimed in other countries and the apparently non-conforming British experience (which Johansson – as noted above – had cited to disprove the purported urbanization–fertility connection) was explained by the fact that urban children were useful even in urban areas for working in factories during the first decades of the Industrial Revolution (Wrigley, 1978). Further corroboration came from Richards' analysis of the German fertility decline between 1880 and 1910: 'When regional persistent or fixed-effects are introduced in the analysis of times series of cross sections, the evidence of strong partial effects of industrialization and urbanization emerge' (Richards 1977, as cited in Schultz, 2001).

Within this same line of thought, Thomas and Price concluded from another re-examination of the role of development in Europe's historical demographic transition that economic growth and the distribution of its product have been unjustifiably neglected; meanwhile, the role of contraceptive diffusion has been exaggerated in the dominant theoretical position. According to these authors: 'The evidence points to a close negative correlation between income distribution and fertility, at national and regional levels. However, fertility decline is also sometimes driven by poverty, but evidence and theory point to the likelihood of such change being both partial and reversible… the issues are so complex that it is impossible to develop an overarching explanatory model which "proves" the necessity of development to fertility decline, in all places, at all times, and among all classes. It is nevertheless important to refute the astonishingly simplistic paradigm which decouples development from fertility decline, as this has been simplified still further (and vulgarised) by all kinds of media, political interest groups, and donor agencies' (Thomas and Price, 1999:779 &799).

The social interaction approach was appraised in detailed studies focused on the Brazilian fertility transition by Potter *et al*. (2002, 2010) and Schmertmann *et al*, (2008). These studies performed separate aggregations for rural and urban areas in each of the 518 Brazilian micro-regions to explore differences in the process of fertility decline in these two contexts. This approach had an advantage over some previous analyses of fertility and development in that it was based on reasonably small geographic areas and used a methodological approach that took into account persistent unmeasured heterogeneity that may exist across those areas. Moreover, the data encompass a nearly complete transition in fertility, ranging from very high and clearly pre-transitional levels in 1960 and 1970, to levels at or near replacement in 1991.

The Potter *et al*. studies find strong and consistent relationships between the decline in fertility and measurable changes in social and economic circumstances. Such findings undermine the Bongaarts and Watkins argument that the fertility decline gathers inevitable momentum over time via social diffusion and thereby challenge some of the arguments for ideational change, diffusion, or social interactions. Nevertheless, the authors comment that such findings have little bearing on the discussion of the relative importance of material versus ideational change. Ultimately, they believe that both types of change have a complementary influence on fertility.

4

Refocusing the role of urbanization in development and fertility decline

As the foregoing discussion suggests, the role of development and, by association, that of urbanization, in fertility decline has been the object of much academic discussion, at least some of which is tinged with ideological overtones. Earlier studies had almost unanimously agreed that since urban fertility rates were systematically lower than rural fertility rates, then there must be something about urban areas in general that induces lower fertility. Thus, urbanization was considered a key process through which development accelerated fertility decline. Later, in a significant departure from the generalized assumptions made by earlier demographers, critics have tended to overlook the role of urbanization in fertility decline, or else denied its influence altogether.

The continuing scepticism towards the role of urbanisation in reducing fertility was evident in the prestigious National Academy of Sciences (NAS) study entitled *Cities Transformed* (Montgomery *et al*., 2003), which hedges in relation to the broader connection between development, urbanization and fertility decline, while being less sceptical of largely unidentified neighbourhood effects. It asserts that, although the World Fertility Surveys had yielded clear differences in rural–urban fertility levels 'they left unresolved the question of the urban connection to fertility transitions' (Montgomery *et al*., 2003:211). Looking at the time trends in urban TFRs by region, the NAS study detects a downward trend in fertility over time, but also a good deal of variation: 'It is difficult to determine what portion of this trend is attributable to economic development' (Ibid:228). Yet the study draws attention to the disparity of fertility levels within cities and finds that 'This spatial expression of reproductive diversity suggests, although it does not prove, that urban neighbourhoods must exert an important influence on fertility decisions' (Ibid:201).

Such differences in position merit further reflection, given the enormity of the ongoing worldwide urban transition. It appears that, in addition to the ideological preferences and the methodological difficulties of empirical studies noted earlier, there may be underlying but unspecified differences in perspective as to what aspects of 'urbanization' are considered to be valid or relevant in establishing a relationship between it and fertility. In reality, the term 'urbanization' does indeed conflate a variety of economic, social and demographic processes that are normally associated with 'development' (Stage *et al*., 2009). Thus, it would seem possible that different analysts are focusing on varying aspects of the 'urbanization' phenomenon, leading them to different conclusions.

To reduce the potential confusion, we would like to be clear that, in both the text and in the statistical modelling

presented in Section 5 of this paper, we are using urbanization to refer not just to the shift in population from rural to urban locations, but implicitly also to the changing capacities and motivations commonly associated with this demographic shift. Moreover, we are considering both the direct and the indirect effects of urbanization on fertility. In the case of the statistical modelling, direct effects are those independent of the other influencing variables that have been specified. More generally, to say that a structural variable like urbanization is having a direct effect on fertility is only meaningful in relation to the other factors under consideration – it should not be taken to imply that it would be impossible to seek out and identify other intermediate variables. It is, therefore, important to consider what are the most important ways in which urbanization is likely to influence fertility.

Generally, urbanization is also associated with an economic shift into industrial activities that are not well suited to dispersed production in agricultural settlements. The very concentration of population in urban areas entails well-established economic advantages of scale and proximity in the production of goods and services since they reduce costs and foster synergies among different sectors. These benefits of industrialization and concentration are transferred and replicated in the social domain through better jobs and higher incomes, cheaper access to infrastructure and services and contribute to the almost universal urban–rural differentials in aggregate poverty or income levels. Such advantages include easier access to reproductive health services. The qualities of urban living are also likely to influence the desire to have children. It has long been observed (see for example Notestein, 1945) that children are an 'asset' in rural areas and more of a 'liability' in urban areas. As shown by Martine (1975) in a study of reproductive behaviour among poorer women in Rio de Janeiro, the particular combination of restrictions and perceived opportunities in a large city motivates young women, even those recently arrived from rural areas, to take any means at their disposal to limit their offspring. Deprived of access to family planning information and services, they frequently turn to a variety of unsafe abortion methods.

As repeatedly demonstrated in the literature, reductions in infant mortality are a precondition for the reduction of fertility rates. Urbanization has a direct effect on mortality, especially on infant mortality, given the aggregate advantages of cities in terms of basic sanitation (clean water, sewerage and garbage collection), of health services that help reduce foetal deaths through prenatal care, of paediatric care and of better coverage through vaccination campaigns. Moreover, urbanization is correlated with greater access to better sexual and reproductive health services that allow effective regulation of fertility.

A 1999 study by Cavenaghi found that that the existence of hospital infrastructure in Brazil – a typical urban feature – was correlated with the country's fertility transition. On another level, Merrick (2001) showed that, although decisions concerning fertility regulation are made in the private domain, the existence of public policies and a favourable institutional climate in order to supplement the deficiencies in health and education systems that inhibit informed decision-making are also important. More generally, cities are privileged sites for securing citizenship rights (UNFPA, 2007) and, in that way, exert a direct impact on fertility behaviour. In short, urban concentration has a number of direct effects on fertility decline.

Among the more indirect impacts of urbanization are those whose influence derives from the impact that the social and economic advantages of urban concentration have on other key fertility-reduction variables such as education, income, participation of women in the labour force, greater opportunities for social participation and access to information, and women's empowerment in general. That is, those socioeconomic variables that have been found to have the greatest influence on fertility reduction are much more likely to be found in urban areas. Another distinctive set of indirect factors influencing fertility behaviour in urban areas stem from what the literature has repeatedly characterized as 'adaptation' to urban life. That is, as migrants adjust to urban conditions, they not only react to the stimuli and limitations that life in the city imposes on their lives, but also adapt to the cultural values and mores of their urban milieu in relation to the benefits of smaller families.

The distinction between direct and indirect effects of urbanization will be taken up again in the aggregate analyses featured in Sectioon 5 of this paper. Clearly, several of these variables are difficult to measure, particularly in relation to their indirect effects, which may help explain why the literature has bypassed this rich vein of investigation. Path analysis techniques will be used to try to piece out direct effects and remaining indirect effects.

For now, it is worth noting that the combined impact of direct and indirect influences of urbanization on fertility levels is universal, despite the enormous discrepancies in the definition of 'urban' between different countries and the varying levels of correlation between urbanization and economic growth or social development among countries. Indeed, Table 1, which presents data on rural–urban fertility differentials from DHS surveys on the 83 countries having available data for the latest year presented, shows that in every country, without exception, rural fertility is systematically higher than urban fertility. The un-weighted average difference is 1.5 more children in rural areas. In 30 per cent of the countries surveyed, the rural–urban difference was more than 2 children.

Table 1: Differences in rural–urban fertility levels by groups of countries

SIZE OF RURAL–URBAN DIFFERENCE IN TFR	NUMBER OF COUNTRIES
Less than 1 (0 - 0.99)	25
1 - 1.99	33
2 - 2.99	19
More than 3 (3 - 3.60)	6
TOTAL	83

Source: Measure DHS, most recent year available per country.

Given the well-known fact that small deviations in the fertility path can result in major differences in the world population size (e.g. the disparity between the high and medium United Nations population projections stems from the assumption of only one-half a child difference per childbearing woman), these rural–urban differentials can be considered enormous. Moreover, it is noteworthy that such differentials are universal, despite the fact that all of these countries are affected in different ways and to varying degrees by vastly differentiated processes of urbanization. Universal lower urban fertility also occurs despite cities absorbing large contingents of rural migrants having higher fertility patterns and a higher proportion in reproductive age groups than the resident urban population.

In short, it seems clear that urban areas, at the aggregate level, have more of those direct and indirect factors that individually or collectively have been shown to affect fertility motivation and behaviour. That is, despite all their problems, especially in developing countries, urban areas provide conditions that stimulate lower fertility while also making it easier to provide people with at least some of the advantages of modernization and some of the components of citizenship that allow them to take somewhat better control of their lives, including in the reproductive domain. In this light, the enhancement of these urban advantages through more effective approaches to urban growth, given the inexorable and massive trend towards urbanization, represents a significant domain for policy intervention.

In the framework of today's massive urban growth, the types of policies that are adopted with regards to the absorption and integration of migrant and poor populations into the urban framework are therefore crucial. It can be postulated that countries and cities adopting a more positive and proactive approach to urbanization and to the integration of poor people will present better Human Development Indices (HDI), as well as smaller differences between desired and actual fertility and, thus, a lower fertility level. In short, improved paths to urban growth can propitiate the exercise of human rights in a number of effective ways, including those in reproductive health (UNFPA, 2007).

In this light, statements that urbanization has no influence on fertility, despite the fact that rural–urban fertility differentials are pronounced and universal, are based on an interpretation of influence that implicitly privileges proximate causes over structural causes. Either they focus only on the demographic definition of urbanization rather than its socioeconomic significance, or else they can be interpreted as a manifestation of a particular policy-oriented viewpoint, one in which the immediate or proximate factors in fertility are highlighted to the exclusion of others. Whatever the case, a critical entry point for policy formulation is being overlooked.

For instance, the previously-mentioned Garenne study observed clear and pronounced rural–urban differentials in fertility levels in sub-Saharan Africa, as well as the fact that the fertility transition started earlier and has progressed further in urban areas. Yet the study explicitly dismissed the role of urbanization on the grounds that 'urbanization appears to be a structural factor because social change is more rapid in urban areas than rural areas'. This type of statement reflects an exclusive interest in proximate determinants of fertility – those that can be influenced by standard programmatic interventions in family planning – perhaps because structural changes are seen simply as a background, or because they are seen to be beyond the practical grasp of policymaking.

However, within the context of the ongoing paradigm shift in research that combines the analysis of structural and proximate causes, the critical importance of structural changes that, in the long run, have a major influence on development in general, and on fertility decline in particular, cannot be dismissed outright as objects of policy intervention. On the contrary, the growth of towns and cities and of urbanization is not an autonomous process that is impervious to policy intervention. Appropriate policies have been shown to facilitate and orient the process, especially as regards the absorption of poor people into cities, and this can have an important impact on all the determinants of social well-being, including the ability to control one's own reproductive preferences (UNFPA, 2007). Conversely, the lack of appropriate policies leads to an urbanization process that can actually increase poverty and the expansion of destitute slum areas, thus denying the structural potential of the urban transition. Even in sub-Saharan Africa, where the physical move out of rural areas often implies putting up with dire conditions of underemployment and poverty in the towns and cities, urban areas still concentrate, under an appropriate policy framework, the factors underlying social development, including those that facilitate fertility decline.

In this perspective, negating the role that urbanization plays in fertility decline would seem to be at least as unwise as denying the merits of good reproductive

health programmes. Part of urbanization's modernizing force comes exactly from all the advantages that urban areas have over rural areas in terms of a facilitating socioeconomic context for the exercise of human rights and, coincidentally, for heightening their direct and indirect effect on fertility preferences and behaviour.

Under the same logic, the fact that there is considerable variation in fertility levels by neighbourhood, as noted by the NAS study (Montgomery, 2003:201) would not seem to detract from the more general finding that urbanization favours fertility decline. On the one hand, those neighbourhoods having higher fertility are likely to have a higher proportion of people – including a higher proportion of migrants – whose fertility behaviour will likely change over time. On the other hand, studies in rural areas also show considerable differentials in levels of fertility, but this does not change the basic fact that the overall fertility rate of rural areas continues to be systematically higher.

We contend that further progress in this discussion requires analyses that are capable of measuring the direct and indirect effects of 'urbanization' on fertility levels. Such analyses would need to incorporate information on both structural explanatory variables and on proximate determinants. The ideal information for this would consist of longitudinal data at the individual (or couple) level. Given the nonexistence of such data, and considering the fact that fertility is universally higher in urban than rural areas, as shown above, an aggregated approach can help us establish the relations between the effects of urbanization and levels of fertility.[5] To this purpose, we first fit a model at the country level using data from a large number of countries and then, by using only one country, we fit a more disaggregated model at the micro-region level in Brazil, both applying Structural Equation Modelling (SEM).

5. The aggregate approach has the disadvantage of not allowing conclusions at the level of the individual. Thus, it does not permit us to conclude that individuals will have a propensity to lower fertility by the fact that they live in an urban area. However, if urbanization affects the level of fertility negatively, we can at least state that the people who live in rural areas are not the ones having lower fertility.

5

The factors underlying fertility change and their relation to urbanization: bivariate and multivariate analyses at the aggregate level

The following subsections present both bivariate and multivariate analyses of the factors affecting the relation between fertility and urbanization for countries having available data on key variables.

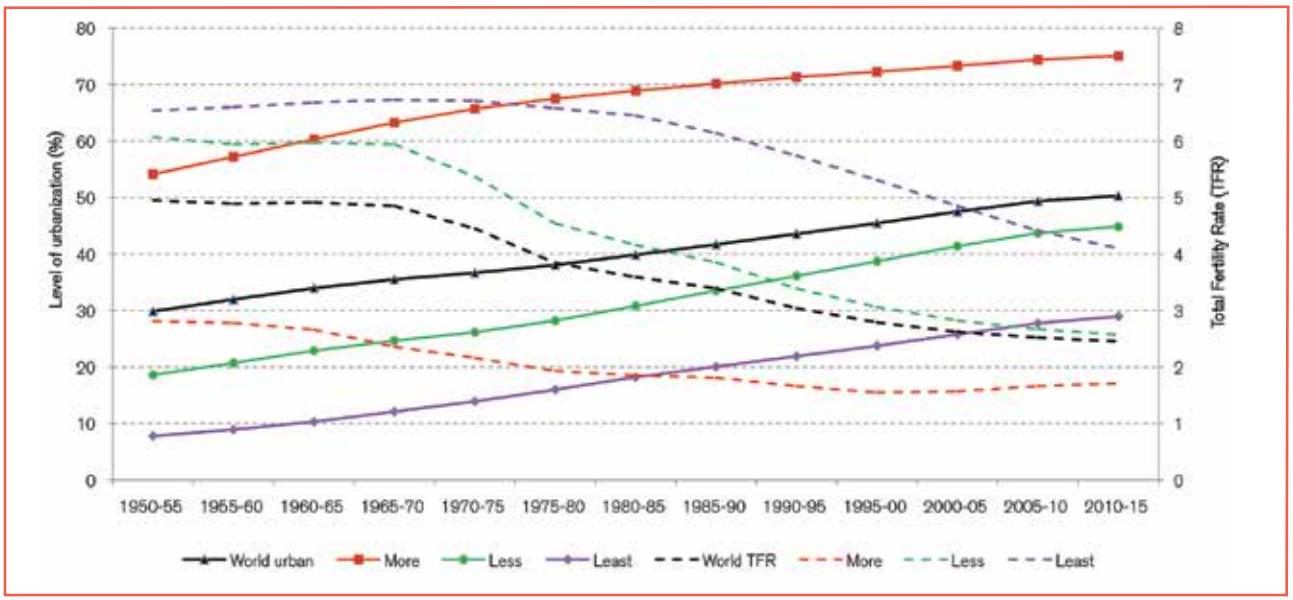
5.1 The bivariate approach at the global level

Figures 1 and 2 review trends in fertility and urbanization at different levels of aggregation, using data from 181 countries. Interestingly enough, they initially appear to corroborate the strong worldwide rural–urban differentials shown earlier, but also show enough apparent inconsistencies to warrant – or to at least explain – the doubts expressed in part of the literature concerning the strong role of urbanization in fertility decline.

Figure 1 further corroborates the data presented earlier in Table 1 by showing consistent trends in urbanization and fertility for the world and for different regions according to their respective levels of development. It presents a clear inverse relation between trends in urbanization and fertility over time at all development levels. For the world as a whole, the level of urbanization was around 30 per cent in 1950 and the TFR was around 5 per woman in the 1950–55 period. Urbanization levels increased throughout the 1950–2010 period, while TFRs began a steady decline after 1970.

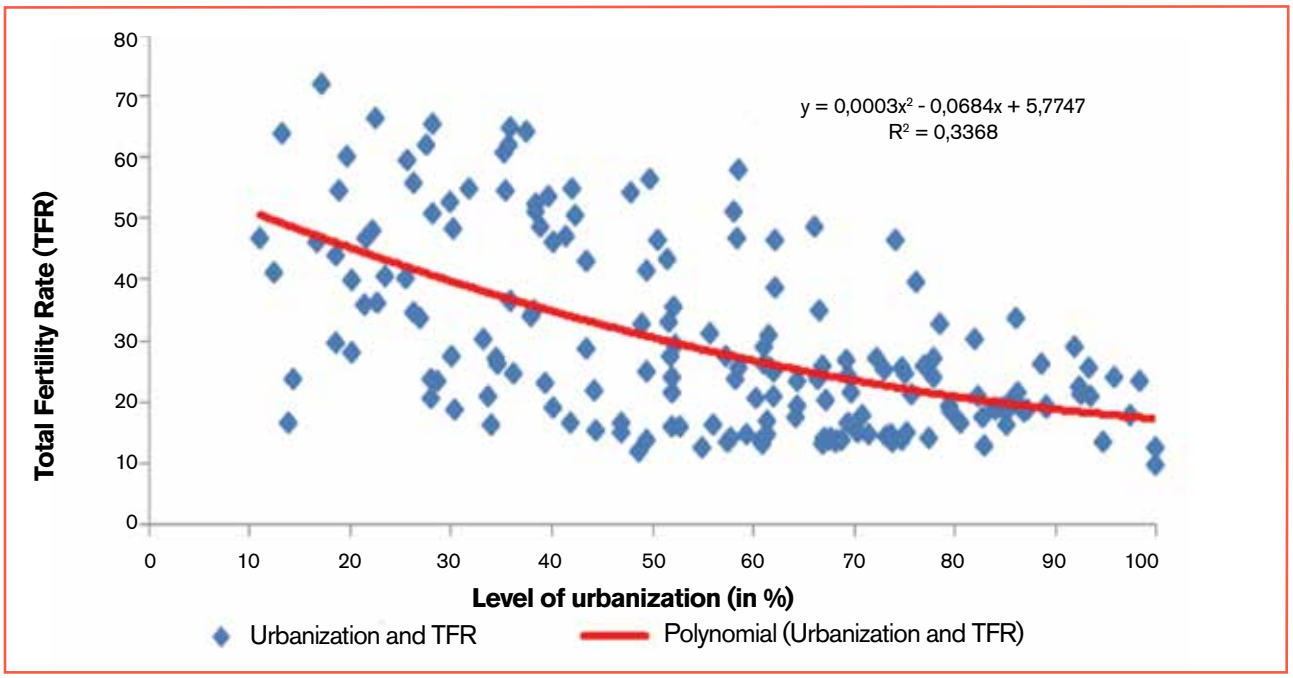
In the more developed countries, urbanization was above 50 per cent throughout the second half of the 20th century and the TFR was below 3 per woman. For countries at lesser levels of development, urbanization was lower and fertility decline began later, but the overall

Figure 1: Percentage of the population in urban areas (full lines) and Total Fertility Rate (dotted lines) for the world and sub-regions, by level of development, 1950–2015



Source: UN/ESA, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm and World Population Prospects: The 2008 Revision and World. Visited on 11 November, 2011.

Figure 2: Level of urbanization (in %) in 2010 and Total Fertility Rate in 2005–10, for 181 countries

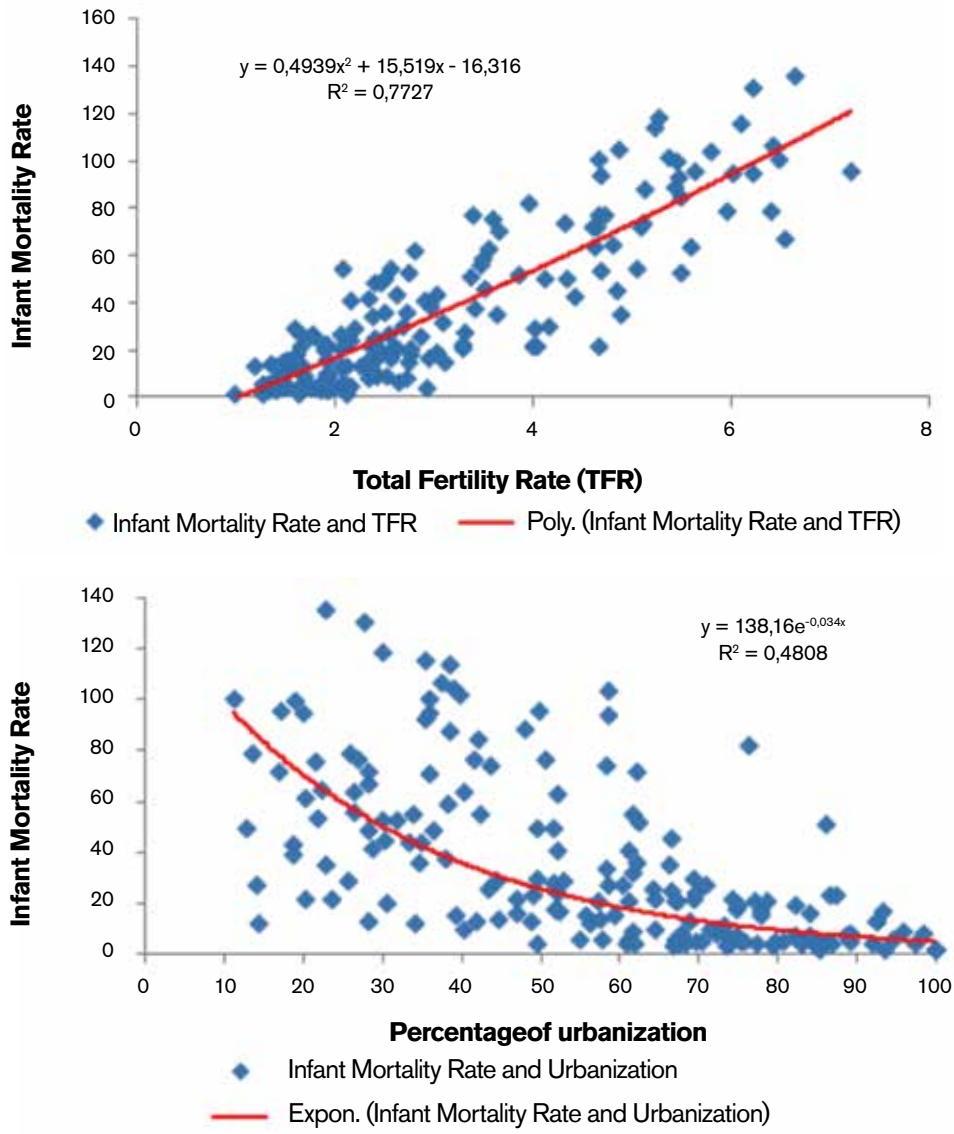


Source: UN/ESA, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm and World Population Prospects: The 2008 Revision and World. Visited on 11 November, 2011.

patterns were the same: increases in urbanization levels were followed by decreases in fertility. Thus, at the lower extreme, the least developed countries (LDCs) had a level of urbanization of only 8 per cent in 1950, along with a TFR of 6.5 children in the 1950–55 period. By the 2000–05 period, urbanization had reached 28 per cent and the level of fertility was down to 4.4 children per woman. It is important to note that, in addition to the decline in fertility and the increase in urbanization, the relative range of variation in both indices in the 1950s as well as in the 2010s is large, with the least developed countries having fertility levels that are twice those of the more developed.

When the same data are disaggregated to the country level, however, the correlation between fertility and urbanization reveals certain irregularities. Figure 2 presents a correlation between levels of urbanization and levels of fertility for 181 countries at the end of

Figure 3: Correlation between Infant Mortality Rates (2005–10) and Total Fertility Rates (2005–10) and level of urbanization in 2010 (in %), for 181 countries (latest data)



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm UNDP – International Human Development Indicators: http://hdr.undp.org

the first decade of the 21st century. It does generally re-affirm the existence of an inverse relation between these two variables but the degree of dispersion is high and only one third of the variance between countries is explained by this correlation. Some of the outliers in Figure 2 presenting low urbanization and low fertility include Trinidad & Tobago (14 per cent and 1.64 TFR), Sri Lanka (14 per cent and 2.4 TFR), Vietnam (30 per cent and 1.9 TFR) and Thailand (34 per cent and 1.63 TFR). At the other extreme, high fertility and high urbanization co-exist in Angola (59 per cent and 5.8 TFR), Gambia (58 per cent and 5.1 TFR), Occupied Palestine Territory (74 per cent and 4.7 TFR) and Saudi Arabia (82 per cent and 3 TFR).

Part of the dispersion can certainly be explained by the fact that the list of 181 countries analysed here encompasses a wide variety of development stages, urbanization processes and urban situations– whether or not they utilize similar criteria to define an 'urban' population. Moreover, it is undoubtedly true that levels of development (and within that, of the factors that more directly affect fertility) also vary within urbanization levels. As noted by Dyson (2011:35): 'processes like fertility decline and urbanization have been occurring in settings where sustained economic growth and industrialization are largely absent'. Thus, some countries combine low levels of urbanization with relatively high levels of human development and vice-versa. In addition, differential policies and attitudes with respect to reproductive rights

Table 2: Summary of correlations between selected socioeconomic variables with fertility and urbanization levels, 181 countries

SELECTED SOCIOECONOMIC VARIABLES	R^2 CORRELATION WITH TFR	R^2 CORRELATION WITH URBANIZATION
Infant Mortality	.77	.48
Life Expectancy	.66	.39
Mortality Levels	.64	.43
Income	.59	.57
Years of Schooling	.62	.34
Index of Gender Equality	.67	.37
Index of Human Development	.73	.55
Use of Contraception	.63	.30

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm UNDP – International Human Development Indicators: http://hdr.undp.org

and female autonomy co-exist at different urbanization levels. Another important factor in this apparent discrepancy from the expected high levels of correlation between fertility and urbanization is sure to be the type and quality of urbanization that is currently being processed in developing countries. That is, different policies in relation to urban growth also determine a variety of outcomes.

Taken together, the data in Figures 1 and 2 re-assert the significance of rural–urban differentials in fertility but, at the same time, reveal a variety of situations such that the relationship between urbanization and fertility decline is not regular or monotonic. In a sense, this would appear to replicate the perplexities of the Princeton studies, which encountered patterns of fertility decline that did not fit the standard explanations of the demographic transition. This would seem to justify the scepticism expressed by various researchers concerning the straightforward influence of urbanization on fertility decline.

However, rather than simply negating this influence *a priori*, it would seem essential to analyse important differences concerning the manner in which urbanization evolves in different countries and situations. In other words, we need to look beyond urban concentration *per se* in the explanation of fertility decline. The following analysis reviews how fertility and urbanization are themselves correlated with other key aspects of human development.

Much of the discussion in the demographic transition literature focuses on how advances in the health domain have paved the way for fertility decline. Although there has been some controversy concerning the relative impact of improvements in medicine and public health versus changes in income and consumption, particularly of proteins, the work of Johansson and Mosk (1987) demonstrated that reductions in infant mortality as well as improvements in life expectancy derive from a combination of economic, social and cultural variables – rather than from a single determinant variable.

Figure 3 shows the relation between infant mortality and levels of fertility and urbanization in 181 countries. The correlation between low infant mortality and low fertility is high (R^2 = 77%), as expected from any review of the demographic literature. Indeed, a reduction in infant mortality has repeatedly been shown to be a *sine qua non* prerequisite for fertility decline since the rational calculation made by parents of the number of children wanted, although it may not be totally explicit, is based on the number of surviving children. In addition, low infant mortality is highly correlated with access to education and health, which are also prime factors in the fertility transition. In contrast, the correlation between infant mortality and urbanization is important but weaker (R^2 = 48%) since the reduction of mortality in children under the age of one requires a greater degree of social inclusion, rather than simply residence in an urban area. Although the majority of highly urbanized countries present low infant mortality levels, other countries such as Djibouti and Gabon have, for specific historical reasons, very high urbanization levels but poor performance on infant mortality.

Similar exercises were carried out in order to ascertain the correlation between TFR, level of urbanization and the following intervening variables: infant mortality, life expectancy, maternal mortality, income, education, gender equality, contraceptive use and HDI. The results are summarized in Table 2.

Life expectancy is highly correlated with fertility but less so with urbanization. Mortality decreases with both the fertility and urban transitions, but again, the relation is more complex. That is, high maternal mortality is found in countries that have high fertility but this relation is mediated by high levels of unwanted pregnancies and poor access to sexual and reproductive health – often resulting in high levels of unsafe abortions. High fertility levels are also associated with higher levels of pregnancy in adolescents as well as in older cohorts of the reproductive age groups, where the risk of maternal mortality is greatest.

The inverse correlation between income and fertility is one of the clearest and most universal findings in demographic research. Reliable and comparable data on income are more difficult to obtain on an international level but the relation between income, fertility and urbanization can be tested for the 175 countries having available data. It is interesting to observe that the correlation between income and fertility is not particularly high here, but the correlation of urbanization with income is the highest of any of the variables tested. Evidently, this is related to the well-known advantages of urban areas in creating jobs and income as well as in offering public services. Consequently, of the different variables tested, income is the one that shows the most comparable levels of correlation with both fertility (R^2 = 59%) and urbanization (R^2 = 57%). Trinidad & Tobago is again an outlier in this case; an urbanization level of only 14 per cent on this small island coexists with an income of over 20 thousand dollars – thus explaining why this country has such a low rate of fertility despite low levels of urbanization, as shown earlier in Figure 2.

Although income and education are highly correlated, education (measured in number of years of schooling) is somewhat more highly correlated with fertility than was income, but less associated with urbanization. Women with higher education tend to have greater autonomy and also to be better informed about methods of fertility regulation. Not all rich countries invest in education; on the other hand, investments in education do not necessarily require large funds or an urbanized population; hence, to explain these correlations one would have to look at individual countries that have made serious investments in education and in the qualification of human resources, despite not enjoying high levels of income or urbanization.

With respect to gender equality, as Amartya Sen noted some years ago: 'Central to reducing birth rates, then, is a close connection between women's well-being and their power to make their own decisions and bring about changes in the fertility pattern. Women in many third world countries are deprived by high birth frequency of the freedom to do other things in life, not to mention the medical dangers of repeated pregnancy and high maternal mortality, which are both characteristic of many developing countries. It is thus not surprising that reductions in birth rates have been typically associated with improvement of women's status and their ability to make their voices heard' (Sen, 1994).The high correlation between gender equality and fertility decline (R^2 = 67%) is thus an obvious one, but the relatively weak correlation between gender equality and urbanization (R^2 = 35%) is clearly disappointing. Again, this reinforces the notion that population concentration *per se* does not necessarily provide the development benefits that it could potentially offer in greater quality and quantity if a proper policy framework were in place.

The data on contraceptive use are of particularly poor quality and are not available for a standard date. This may be part of the explanation for the relatively low correlation between fertility levels and prevalence of contraceptive use (R^2 = 63%) and the even lower correlation with urbanization (R^2 = 30%). Nevertheless, the figure does give certain credence to Coale's (1979) famous statement, that in order for fertility transitions to occur, contraceptive methods must be available. This view obviously has to be tempered by the observation that the fertility transition has occurred in many cases without 'modern' contraception. Be that as it may, it is undoubtedly important to emphasize that there are still some 215 million women in the world who do not have access to any form or method of fertility regulation.[6]

Finally, the association between the Human Development Index (HDI) and fertility and urbanization is an obvious one since the HDI links together three key dimensions that, individually, are all significantly related to fertility behaviour and also associated, although to a lesser extent, with urbanization. HDI is thus strongly correlated with fertility decline (R2 = 73%) as well as with urbanization (R2 = 55%). Given that the HDI provides a key measure of social inclusion and since it is strongly associated with fertility levels, these correlations can be taken as a strong reinforcement of the idea that the exercise of citizenship is the best contraceptive. At the same time, it is clear, that, *ceteris paribus*, the HDI levels tend to increase with urbanization.

Taken together, what do the results of the various correlations between urbanization, fertility and intervening variables shown in Figure 3 and Table 2 tell us about the relation between urbanization and fertility decline? The correlations unsurprisingly provide additional confirmation regarding key notions that have been developed by demographic research over time as concerns the strong influence of health, education, income and gender equality on reproductive behaviour. However, they also indicate the complexity of the relationships affecting fertility decline, as well as among the variables behind that decline. Bivariate correlations have their known limitations, since they could be reflecting the effects of other variables; in that light the above exercise is suggestive, but ultimately inconclusive. The next sections attempt to move this discussion forward using more complex analytical approaches to get at these relations, using these variables in multivariate models, first at the country level, and then in a more homogenous geographical setting of only one particular country.

6. http://www.who.int/gho/maternal_health/reproductive_health/family_planning/en/index.html. Visited on 25 November, 2011.

Table 3: Descriptive statistics for selected variables, 131 countries, circa 2010

STATISTICS		TFR	PER CENT URBAN	IMR	HDI	AVERAGE YEARS OF EDUCATION	GENDER INDEX	CONTRACEPTIVE USE
N	Statistic	131	131	131	131	131	131	131
Range	Statistic	5.94	89.0	134	.80	11.42	.661	80.8
Minimum	Statistic	1.25	11.0	2	.14	1.21	.174	7.6
Maximum	Statistic	7.19	100.0	136	.94	12.63	.835	88.4
Mean	Statistic	2.8	57.9	33.36	.65	7.74	.54	54.48
	Std. Error	.12	2.0	2.78	.02	.25	.01	1.90
Std. Deviation	Statistic	1.42	22.8	31.83	.18	2.88	.17	21.77
Variance	Statistic	2.03	518.2		.03	8.30	.03	474.11
Skewness	Statistic	1.1	-.21	1.13		-.32	-.40	-.61
	Std. Error	.21	.21	.21	.21	.21	.21	.21
Kurtosis	Statistic	.45	-.84	.33	-.58	-.82	-.93	-.65
	Std. Error	.42	.42	.42	.42	.42	.42	.42

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm UNDP – International Human Development Indicators: http://hdr.undp.org

5.2 Analysing fertility change in 131 countries with multivariate models

As mentioned earlier, several countries lack data for key indicators, such as contraception and gender. There are, however, 131 countries that do have relatively recent data concerning the total fertility rate, per cent urban, infant mortality rates (IMR), HDI, years of completed education, gender index and percentage of women 15–49 using contraception. Table 3 presents descriptive statistics for all these variables, which have very different scales of unit as well as different levels of variation among these 131 countries. It is important to keep these figures in mind because the multivariate models fitted later will have both un-standardized and standardized[7] coefficients since our goal is to explore the relative importance of each predictor on the dependent variable (TFR).[8] For example, in this data, per cent urban ranges from 11 to 100 per cent and infant mortality rates range from 2 to 136 deaths per one thousand births. The standard deviation of per cent urban (22.8) is about half of its mean (57.9), while for IMR the standard deviation (31.8) is 95 per cent of its mean (33.4).

Table 4 presents the bivariate Pearson correlation for the same variables in 131 countries. It can be observed that per cent urban is significantly correlated with all variables, but the highest correlation is with HDI and the lowest with contraception and fertility. This behaviour can be explained in part by Figure 4, which presents a correlation graph between total fertility rates and per cent urban for these countries. Although there is a clear negative correlation among these variables, countries having low percentages of their population living in urban areas present a wide range of TFRs, as noted earlier. That is, countries having urbanization levels below 20 per cent (or even 30 per cent) have TFRs ranging from below replacement levels (Trinidad & Tobago and Viet Nam) to TFRs over 7 children per women on average (Niger and Afghanistan). On the other hand, there are countries with per cent urban lower than 80 per cent, some even lower than 60 per cent, having lowest-low TFR (below 1.5 children per women).

As discussed earlier, in addition to having important differences in their definition of 'urban', these 131 countries vary greatly in size and on a number of underlying structures that affect the level of TFR. For example, lowest-low fertility is found in some countries that have made few advances in gender equity. The correlation coefficient might be picking up some structure in the data that is not directly identified by the percentage of population living in urban areas. While

7. The unstandardized coefficients (betas) inform the difference in the dependent variable (TFR) per unit of change in the covariate at analysis, and the standardized coefficients inform the difference in the standard deviation of TFR per standard deviation in the specific covariate, which in perfect measured variables would allow for comparison among different predictors that have different unit scales.

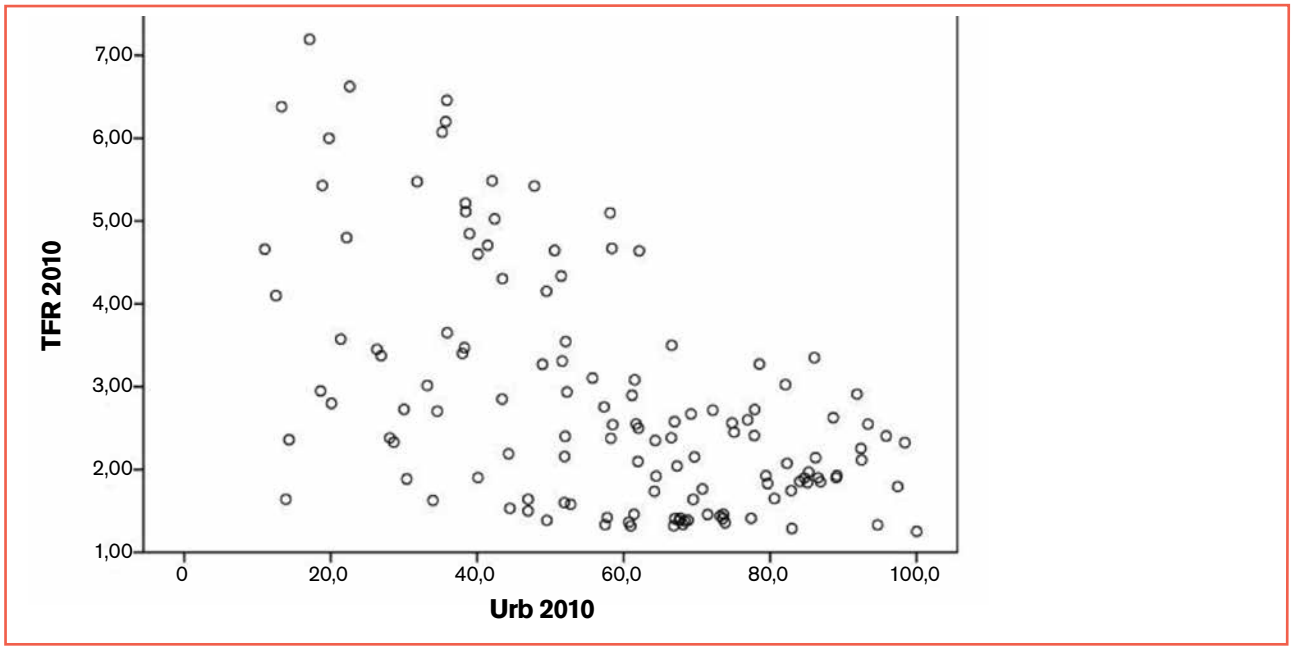
8. The model proposed here is aggregated at the country level, hence there is no claim that the results will provide evidence on causality at the level of individuals. We are simply attempting to establish the relationship between the level of fertility and the level of urbanization and other covariates. Also, it is important to point out that, as shown above, rural fertility is higher than urban fertility in all countries; hence, there is no ground for an ecological fallacy here, since people living in urban areas are the ones having fewer children.

Table 4: Bivariate Pearson correlation coefficients for selected variables, 131 countries, circa 2010

SELECTED VARIABLES	PER CENT URBAN	TFR	IMR	HDI	EDUCATION	GENDER INDEX	CONTRACEPTION
Per cent urban	1.00	-0.56	-0.67	0.75	0.61	-0.59	0.54
TFR	-0.56	1.00	0.90	-0.84	-0.77	0.77	-0.79
IMR	-0.67	0.90	1.00	-0.91	-0.77	0.78	-0.78
HDI	0.75	-0.84	-0.91	1.00	0.87	-0.85	0.75
Education	0.61	-0.77	-0.77	0.87	1.00	-0.79	0.69
Gender Index	-0.59	0.77	0.78	-0.85	-0.79	1.00	-0.67
Contraception	0.54	-0.79	-0.78	0.75	0.69	-0.67	1.00

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm UNDP – International Human Development Indicators: http://hdr.undp.org

Figure 4: Distribution of Total Fertility Rates by per cent urban in 131 countries, 2010

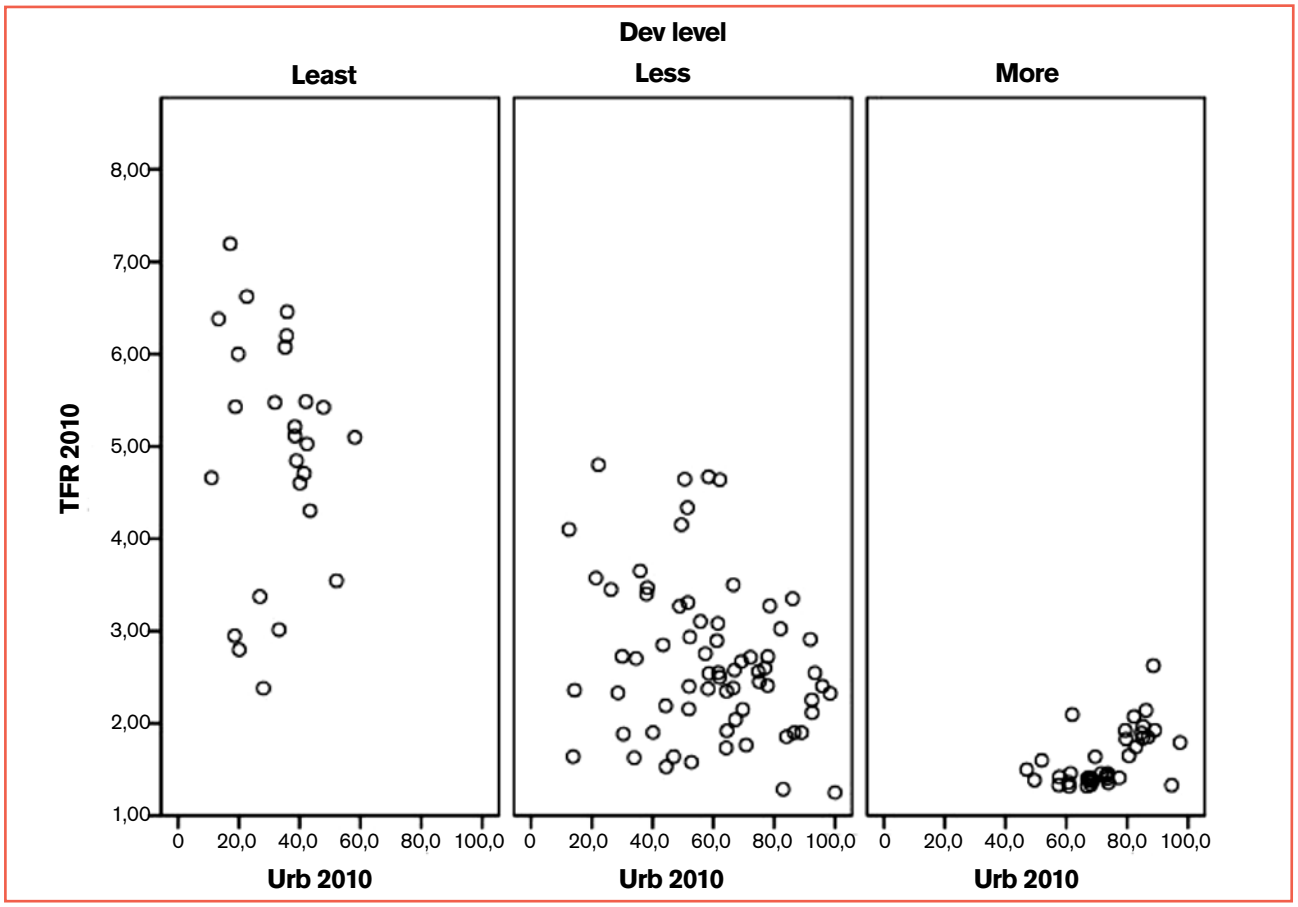


Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm

such questions are difficult to tackle with the type of data available at the national level, different national behaviours can be observed by simply separating the correlation graph of per cent urban by TFR according to countries' level of development, following the standard UN definition (least, less and more developed), as presented in Figure 5. Somewhat surprisingly, it can be seen that, for more developed countries, there is even a positive relationship among TFR and per cent urban; meanwhile, for the least developed countries, the correlation is not statistically significant.

In order to explore the multivariate relationship among TFR and the covariates mentioned in Table 3 at the country level, given the high correlation among all variables, a generalized linear model would not be suitable since the relationships among these variables might not be only directly, but also indirectly determined. The objective is to establish a model that orders variables in a causal manner and that permits us to measure the direct and indirect effects of urbanization (per cent urban) on fertility rate levels of different countries, as affected by variables related to development and modernization, as well as by the proximate determinants of fertility. For that reason, we created a theoretical model of the relationship among these variables as a path analysis model that allows us to find the parameters that describe these relationships simultaneously, as

Figure 5: Distribution of Total Fertility Rates by per cent urban in 131 countries, according to level of development (least, less and more developed), 2010



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm

structural equations, which is a technique suitable for analysing these types of relationships[9] (Retheford and Choe, 1993). The theoretical model proposed here is shown in a graphical scheme[10] in Figure 6. It is important to mention that several models were tested and the most parsimonious one was selected, one in which variables such as the gender index and HDI were not included since they did not significantly improve the fit nor did they alter the relations with other variables included in the final model.[11] Instead of exploratory modelling, we set up a model to mimic the plurality of theories already adduced here, and then we measured in a confirmatory way the magnitude of associations found on direct and indirect pathways in this model (Bollen and Long, 1993).

Let per cent urban (Urb) be identified as variable 1, Contraception as 2, Education (Educ) as 3, Infant Mortality Rate (IMR) as 4 and Total Fertility Rate (TFR) as 5. The model in Figure 6 can be defined as follows:

$$Contraception = a + b_{12}*Urb + b_{32}*Educ + e_2 \quad (1)$$

$$Educ = b + b_{13}*Urb + e_3 \quad (2)$$

$$IMR = c + b_{14}*Urb + b_{34}*Educ + e_4 \quad (3)$$

$$TFR = d + b_{15}*Urb + b_{25}*contraception + b_{35}*Educ + b_{45}*IMR + e_5 \quad (4)$$

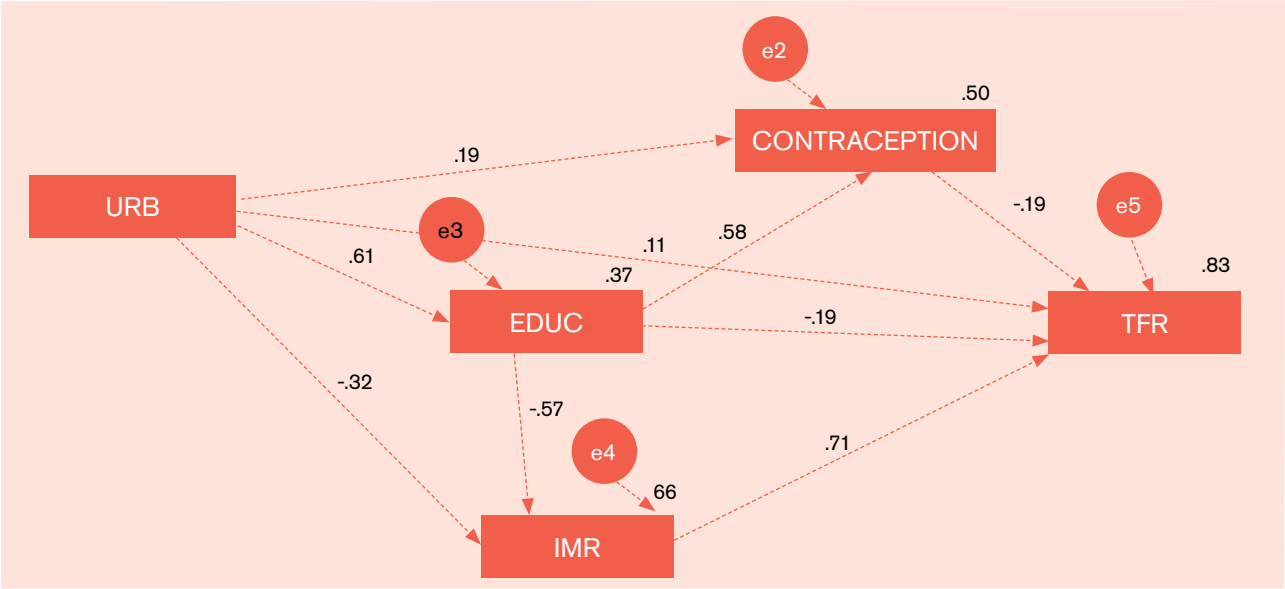
The results of the path analysis fit are presented in Table 5, which shows standardized and unstandardiaed coefficients. As can be observed, all paths have

9. A methodological note about causal relationships is necessary here. In such relationships, it is generally taken for granted that the occurrence of one variable must precede the occurrence of another. In fact, this is one of the most difficult aspects to determine in a causal relationship. One of the major problems resides in the fact that the lag between the occurrence of events is variable and, in most cases, difficult to measure. In path analysis, causality is implicit in the order established in the relations. In the model proposed here, for reasons of parsimony, we have included only selected contemporary variables that represent the important theoretical dimensions of our framework.

10. The model is estimated by using AMOS software (IBM/SPSS), which is suitable for Structural Equation Modelling (SEM).

11. It is important to also mention that some of the potentially useful variables are affected by significant measurement problems and, thus, were not included in the model. This is the case, for instance, of female participation in the labour market, at the global level. This variable, however, was considered in the Brazil model, presented in the next sub-section.

Figure 6: Path diagram for modelling the effects of selected variables on total fertility rate at the country level



Note: Standardized estimates shown in the diagram are defined in equations 1–4 and available in Table 5.

a significant coefficient at 95 per cent level of significance. Panel A in this table shows the total effects of the paths (the b coefficients) and its inferences. In this multivariate model, the relationship found for per cent urban and fertility has a positive signal, which is the opposite of what is shown in the bivariate correlation (this can be understood by the decomposition of direct and indirect effects discussed later). All other variables show an expected sign for the relationship.

The squared multiple correlations estimates indicate that the TFR model (Equation 4) has a very good fit, with 83 per cent of the variance being explained by the variables included in the model. Also, IMR (Equation 3) has a relatively good fit, explaining around 66 per cent of the variance. The other two equations (1 and 2), which fit contraception and education, are not as strong, and explain only 50 per cent and 40 per cent, respectively. This is expected because the model is not set up to explain the variation in these two variables, but how they are related to fertility levels. As an overall measure of the goodness of fit, Bollen's incremental fit index (IFI) is 0.932 (Bollen, 1989), which indicates a good fit. Also, the value of the discrepancy by the degree of freedom of the model is 39.29 compared to 56.73 for the independence model.

Since the main objective of this model is to compare the effects of the covariates on the level of fertility and since the covariates have a different metric, the standardized coefficients (in grey colour in Table 5) can do a better job than the unstandardized for that purpose. From Table 5, panel A, it can be observed that a change in one standard deviation of contraception and education decreases TFR by 0.19 standard deviations. IMR is the variable that best explains the total effect on TFR variation, since a decrease in one standard deviation of IMR decreases fertility by 0.71 standard deviation.

The most important segment of the analysis derived from this model comes from panel B of Table 5, which shows the direct and indirect effects that, together, define the total effect of each covariate on TFR. As can be seen, the total effect of per cent urban in TFR is -04, which is the result of the direct effect of 0.01 we estimated earlier, less the indirect effect of -05. That is, if we take the unstandardized effect, we can say from column P of Table 5 that an increase of 1 per cent in urbanization decreases fertility by 0.04 children and that this effect is statistically significant. Also, it is important to note that the indirect and direct effects of urbanization on contraception are significant, with a total effect of 0.52 (that is a change in 1 per cent of urbanization changes contraception by 0.52 per cent).

The standardized coefficients for this model would imply that urbanization has an important role in defining the level of fertility in these 131 countries, compared to other variables included in the model. For instance, the total effect of education is -0.70, and of per cent urban, -0.58. It is important to note also that contraception lost part of its effect to education. Moreover, the total effect of contraception on fertility is the smallest (-0.19).[12] Another important aspect that the model shows is that urbanization has a large impact on decreasing infant mortality rates and, as we have seen, IMR is the most

12. It is difficult to explain why contraception has a small direct effect on TFR. We can infer, based on the arguments made in the theoretical section, that contraception is a proximate determinant, needed to decrease fertility, but other covariates drive the desire for having fewer children. But it is also important to keep in mind that this variable is not well measured in all 131 countries included in the analysis, and that measurement problems may explain the small size of the direct effect.

Table 5: Parameter estimates of Structural Analysis model on TFR according to selected variables. (N=131 countries), circa 2010

PANEL A

Variables			Coefficient label	Unstand-ardized Estimate	Stand-ardized Estimate	S.E.	C.R.	P
Educ	<---	Urb	b13	0.08	0.61	0.009	8.72	***
Contraception	<---	Urb	b12	0.18	0.19	0.075	2.42	0.016
IMR	<---	Educ	b14	-6.32	-0.57	0.715	-8.84	***
IMR	<---	Urb	b34	-0.45	-0.32	0.091	-4.99	***
Contraception	<---	Educ	b32	4.37	0.58	0.589	7.42	***
TFR	<---	IMR	b45	**0.03**	**0.71**	0.003	11.52	***
TFR	<---	Contraception	b25	**-0.01**	**-0.19**	0.003	-3.67	***
TFR	<---	Educ	b35	**-0.09**	**-0.19**	0.031	-2.92	0.004
TFR	<---	Urb	b15	**0.01**	**0.11**	0.003	2.26	0.024

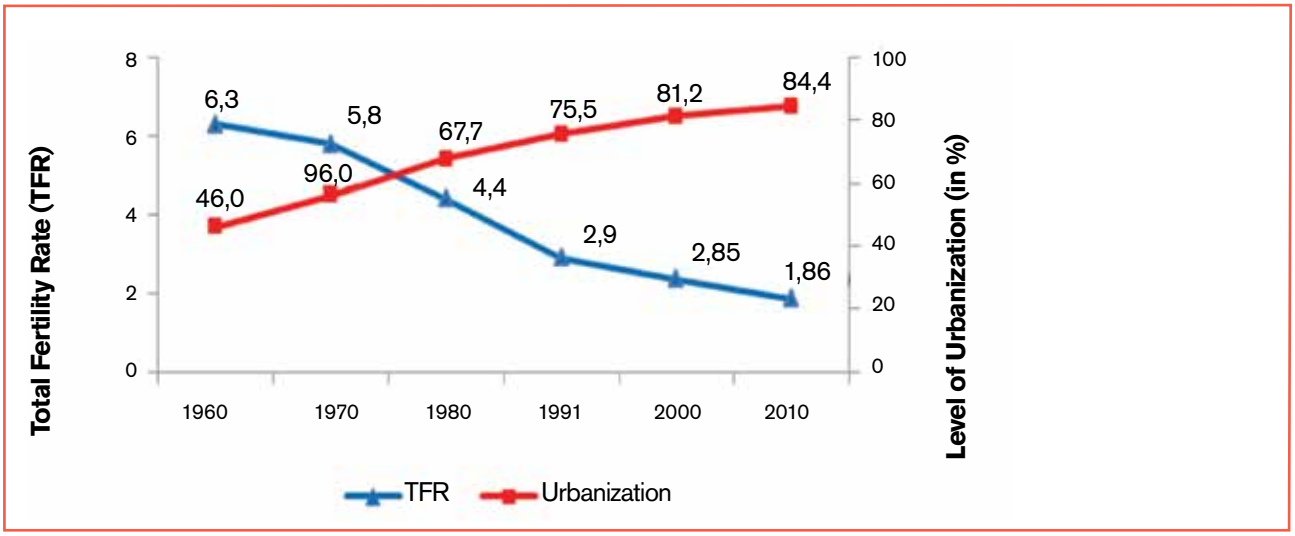
Intercept	Coefficient label	Estimate	S.E.	C.R	. P	Squared Multiple Correlations
Educ	b	3.29	0.548	6.00	***	0.369
Contraception	a	10.23	4.159	2.46	0.014	0.502
IMR	c	108.46	5.051	21.47	***	0.656
TFR	d	2.75	0.330	8.34	***	0.832

PANEL B

			Total Effects	Standard-ized Total Effects	Direct Effects	Standard--ized Direct Effects	Indirect Effects	Standardized Indirect Effects
Educ	<---	Urb	0.08	0.61	0.08	0.61	0.00	0.00
Contraception	<---	Urb	0.52	0.54	0.18	0.19	0.34	0.35
IMR	<---	Educ	-6.32	-0.57	-6.32	-0.57	0.00	0.00
IMR	<---	Urb	-0.94	-0.67	-0.45	-0.32	-0.49	-0.35
Contraception	<---	Educ	4.37	0.58	4.37	0.58	0.00	0.00
TFR	<---	IMR	0.03	0.71	0.03	0.71	0.00	0.00
TFR	<---	Contraception	-0.01	-0.19	-0.01	-0.19	0.00	0.00
TFR	<---	Educ	-0.34	-0.70	-0.09	-0.19	-0.25	-0.51
TFR	<---	Urb	**-0.04**	-0.58	**0.01**	0.11	**-0.04**	-0.69

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision, http://esa.un.org/unpd/wpp/index.htm UNDP – International Human Development Indicators: http://hdr.undp.org

Figure 7: Evolution of the level of urbanization and of the TFR in Brazil between 1960 and 2010



Source: IBGE – Demographic Censuses

statistically important variable in the model for explaining the variance in TFR.

In short, despite the enormous variety of situations found in these 131 countries, the results of structural equation models suggest that the statistics are consistent with urbanization making an important contribution to fertility reduction and that it influences other factors that encourage fertility decline.

5.3 Multivariate model by small areas: a case study for Brazil 1970 to 2000

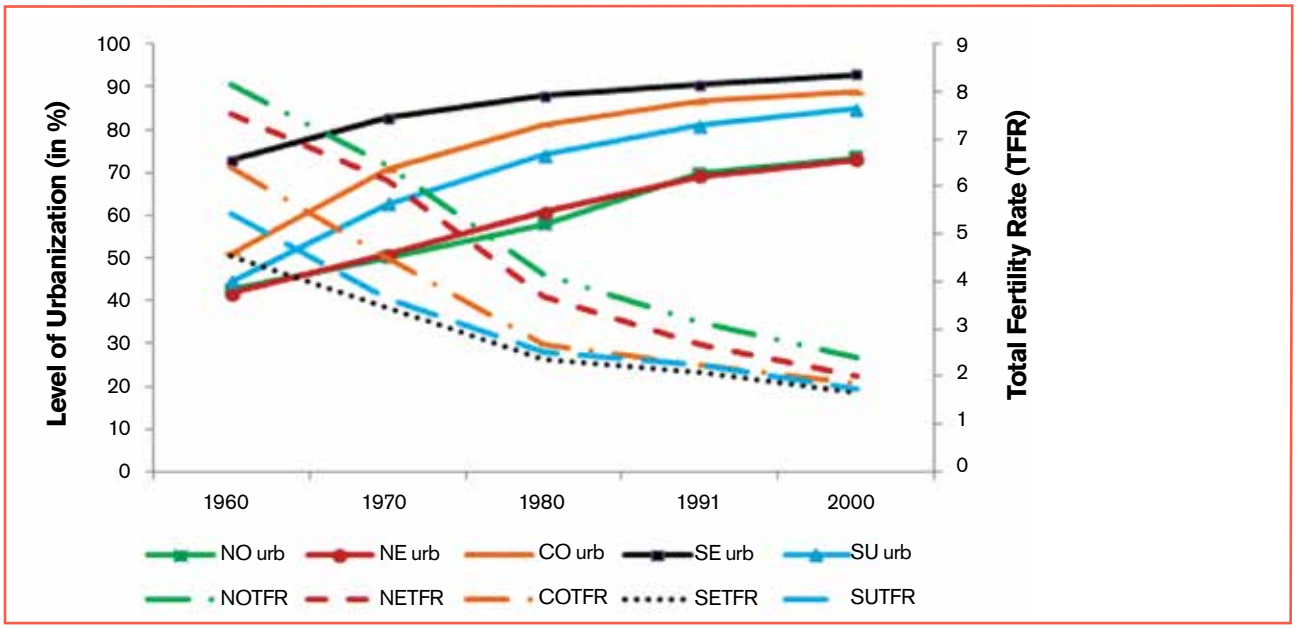
Despite the intriguing results provided by the above models covering 131 countries, the analysis nevertheless suffers from the great heterogeneity in underlying factors affecting fertility in different contexts, as well as from the multiplicity of country definitions of 'urban', neither of which can be effectively controlled by measurable variables. This would suggest that, in order to improve understanding of how urbanization actually influences fertility behaviour, one ultimately needs to look at specific cases in their own context. Analysing the trajectory of fertility decline within an individual country will, in the great majority of cases, reduce the heterogeneity of the data aggregated at the country level due to underlying social and economic processes that are different among countries but very similar within one country. Following this line of thought, the next section focuses on fertility decline in Brazil, which has had, in comparison to most other developing countries, a precocious urban transition and has also completed an early fertility transition. Not only is the definition of urban the same throughout the country, but, more importantly, other important effects that are country specific can be controlled when modelling data for the same country. Important influences, such as religious beliefs and practices, gender relations, and access to contraception, among others, are more or less homogeneous[13] across the country.

Brazil's urban transition began several decades earlier than its fertility transition. The country experienced an early and rapid process of urbanization starting in the 1930s. By 1960, when 45 per cent of the population was living in urban areas, the ongoing urban transition still had not had a noticeable influence on the country's fertility. As shown in Figure 7, which traces the evolution of Brazil's urbanization levels and fertility rates, the country's TFR was still above 6 children per woman as of 1960. However, fertility rates began to decline during the 1960s and the rate of decline was accelerated during the following two decades. Although the rate of fertility reduction slowed in the most recent decades (1990–2010), Brazil's TFR reached replacement levels in 2005 and has since continued to decline to well below that level. In 2010, the level of urbanization reached 84 per cent while the TFR fell to 1.91, according to census data.

Figure 8 shows that the inverse relation between fertility and urbanization has also prevailed, in general terms, at the level of Brazil's five major geographic regions (North = NO; Northeast = NE; Centre-West = CO; Southeast = SE; and, South = SU). Nevertheless, it is interesting to observe that the coefficient of variation in urbanization levels diminished constantly over the 1970–2010 period, while that of fertility levels first increased in the 1970s and then started a steady

13. The idea is not that Brazil is homogeneous, far from it; however, comparing Brazilian regions obviously brings much less heterogeneity into the data than comparisons involving, for instance, Latin American, Asian and African countries in the same equation.

Figure 8 – Evolution of the level of urbanization and TFR by regions, Brazil, 1970–2010



Source: IBGE – Demographic Censuses, 1970–2010

decline in the 1980s. That is, urbanization levels converged steadily between the five regions throughout the entire period under analysis, but fertility levels first showed increasing dispersion before starting to converge on the road to below-replacement fertility.

When the relationship is examined at the level of Brazil's 27 states (not shown), it can be observed that three states already had urbanization levels above 80 per cent in 1970, while three others had less than 30 per cent of their population in urban areas at that date. By 2010, however, a process of convergence had occurred and all states had over 60 per cent of their population in urban areas. Meanwhile, the TFR of Brazilian states varied from 4 to 10 in 1970, but all states had a TFR under 3 by 2000.

In the modelling exercise that follows, however, attention is focused on smaller homogenous spatial units – the country's 502 'micro-regions' (geographic areas that group adjacent municipalities according to criteria of socioeconomic homogeneity). Compared to the previous model, at the country level, this one allows accounting for the large heterogeneity involved in the data; however, since micro-regions are relatively large geographical areas made up of several municipalities that vary in population and territorial size, there continue to be large amounts of heterogeneity that will not be picked up by the model. A model focused on the individual level, such as information available to women, would be another possibility. However, the necessary panel data at the individual level for the fertility transition period that we want to analyse is not available. For this reason, we specify and fit the aggregate model at the micro-region level.

The 1970 to 2000 Brazilian censuses provide reliable information for these smaller areas. The data used here are those utilized by Potter *et al.* (2010) for analysing the Brazilian fertility transition.[14] The variables selected for this analysis were TFR, per cent urban (Urb), women's completed years of education (Educ), female labour force participation (Flabour Force), and the probability of dying by age 5 (Q5). Annex A provides a number of descriptive statistics for these selected variables. It is important to mention that the data relative to those proximate determinants of fertility that have been most significant in Brazil's fertility reduction are available at the level of small areas and that the proportion of women currently in unions varies little at that level. For this reason, the variables relating to proximate determinants are not included in this model.

Figure 9 presents the correlation graph for TFR according to per cent urban in a pooled sample for all four censuses. It shows a strong linear relation among these variables, -0.80, significant at the 0.01 level (2-tailed test). Figure 10 shows the same data grouped by census years. The graph reveals that the relationship underwent change over time. The Pearson correlation between TFR and per cent urban is stronger in the first three decades than in 2000 (-0.72. -0.75, -0.76, -0.69, respectively for each census year), mainly because TFRs are becoming more concentrated at lower levels,

14. For more details about the data, refer to Potter *et al.* (2010).

Figure 9: Distribution of Total Fertility Rates by per cent urban in micro-regions, Brazil, 1970 to 2000

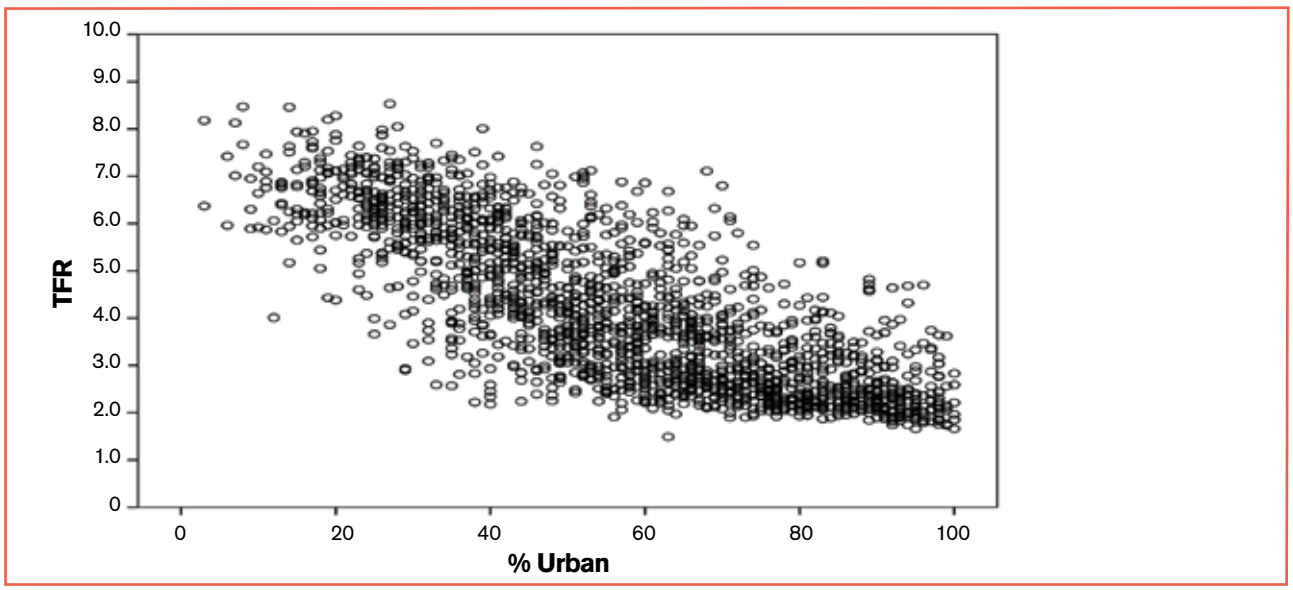
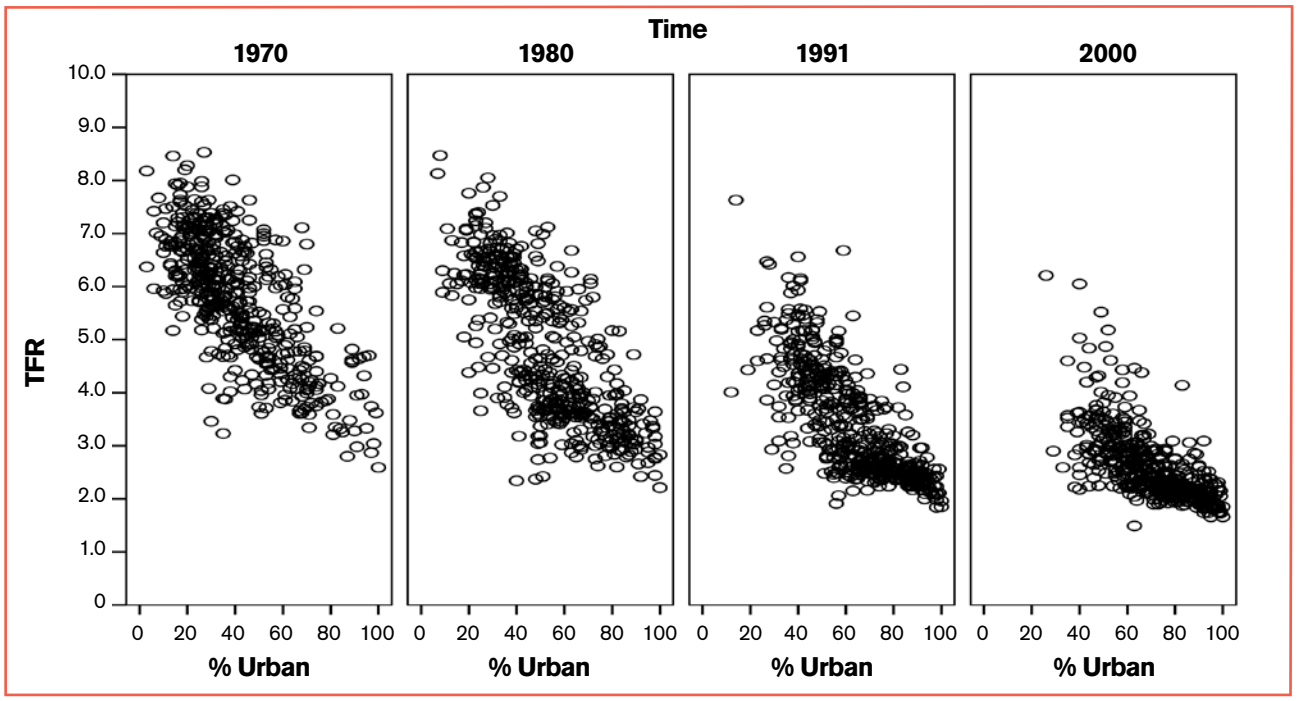


Figure 10: Distribution of Total Fertility Rates by per cent urban in micro-regions according to censuses years, Brazil, 1970 to 2000



and because some micro regions still present low levels of urbanization.

The multivariate relationships among TFR and the selected variables for Brazilian micro-regions were defined as a path analysis model, as shown in Figure 11, following the same logic presented in the modelling for the 131 countries earlier. It is worth mentioning that contraceptive use is not available for these units of analysis; however, the model for TFR prediction fits very well on the basis of only the selected variables. The first model takes into account a pooled sample (2008 units) but considers the time of the census as a control variable. The equations that describe this model are as follows:

$$Educ = a + b_{13}*Urb + b_{23}*time + e_3 \quad (5)$$

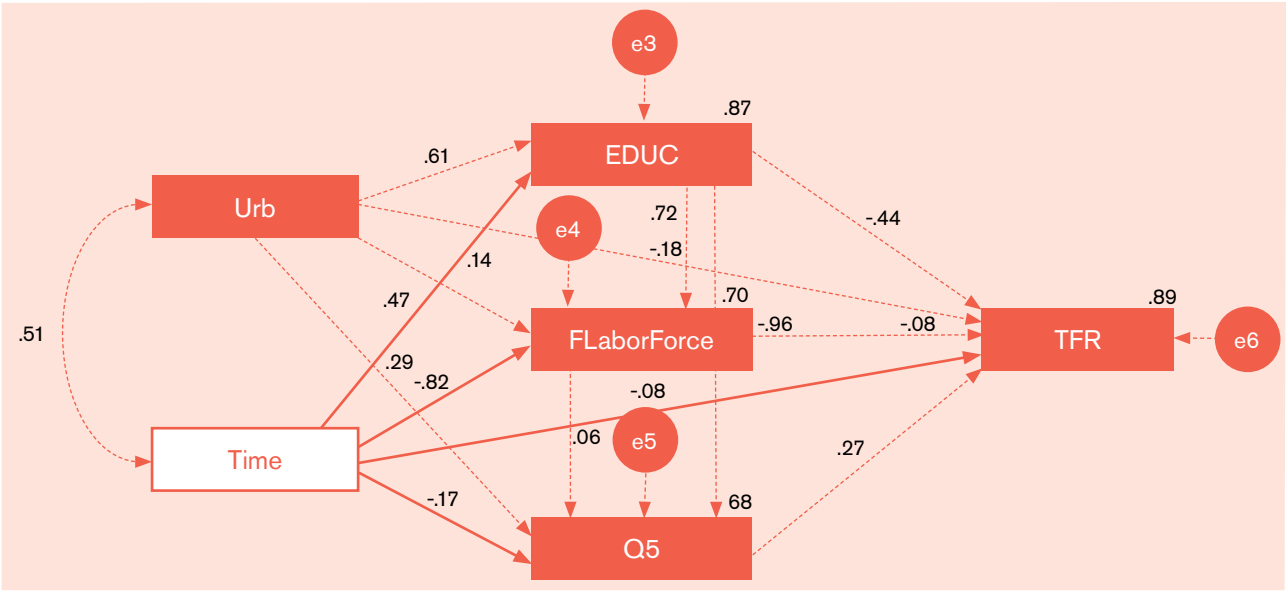
$$FlabourForce = b + b_{14}*Urb + b_{24}*time + b_{34}*Educ + e4 \quad (6)$$

$$Q5 = c + b_{15}*Urb + b_{25}*time + b_{35}*Educ + b_{45}*FlabourForce + e_5 \quad (7)$$

$$TFR = d + b_{16}*Urb + b_{26}*time + b_{36}*Educ + b_{46}*FlabourForce + b_{56}*IMR + e_6 \quad (8)$$

The results of this model, which is solved simultaneously for equations (5) to (8), are presented in Table 6. All coefficients for this model are statistically significant except for the effect of time in female labour force participation. The Squared Multiple Correlations show that the data fit well for TFR (89 per cent of the variance

Figure 11: Path diagram for modelling the effects of selected variables on Total Fertility Rate at the micro-region level (panel data controlling for time), Brazil, 1970–2000



Note: Standardized estimates in the diagram are defined in equations 5–8 and available in Table 6.

is explained) and for education (87 per cent). Female labour force participation and child mortality rate would need other variables to explain their respective variations (70 per cent and 68 per cent respectively for each variable).

The unstandardized estimates provide information on how much change would occur in TFR (or any variable in the far left column) with one unit of change in the covariate (indicated in the third column). Directing attention to the TFR relationships, the results in panel A of Table 6 (marked in bold) show that an increase in 1 per cent of urbanization in the Brazilian micro-regions would decrease fertility by 0.01 children. The same holds true for female labour force participation. A decrease of 1 death per thousand children born results in a decrease in the TFR of 0.07 children. Finally, an increase in the average female years of schooling of one year results in a decrease in the TFR of 0.37 children. However, it is critically important to note that to increase urbanization by 1 per cent could be much easier than to increase female education by one year of schooling on average (stochastic variable).

Since these variables have very different units of measurement, the standardized coefficients can provide a better comparison if we wish to discover which variables have larger effects on fertility decline. These coefficients reaffirm the importance of education and child mortality rates on fertility decline, -0.44 and .027 respectively, compared to other variables included in the model. Nonetheless, the effect of urbanization grows in importance for these standardized coefficients – an effect of -0.18. All of these are the direct effects of the covariate on TFR. However, another important feature of this model is that it allows us to measure also the indirect effects urbanization would have on fertility in the Brazilian micro-regions due to its influence on education, child mortality rate, and female labour force participation. Panel B of Table 6 shows these direct and indirect effects, which together give the total effect of the covariates on TFR. Again, it can be observed that the total effect of urbanization on fertility is -0.04 (compared to the direct effect, which is only -0.01), since there is an extra indirect effect of -0.03 children as a result of the effect of urbanization on other variables in the model. On the other hand, education shows a much larger direct (-0.37) than indirect effect (-0.26).

The standardized effects show even more interesting results. As before, the total effect of education in explaining the variance in TFR is the most important (-0.74), but per cent urban is the second largest effect (-0.56). Moreover, the standardized direct and indirect effects between these two variables are inverted. Education has the largest standard direct effect while per cent urban has the largest indirect effect, that is -0.44 versus -0.18, and -0.30 versus -0.38, respectively, for TFR and per cent urban, for direct and indirect effects.

A second approach to modelling this data was carried out fitting the model separately for each census year. This can help confirm the results of the previous model and also reveal any changes in the relationship among TFR and per cent urban that might have occurred over the years, as observed above in the correlation graph in Figure 10. The diagram for this model is presented in Figure 12.

Table 6: Parameter estimates of Structural Analysis model on TFR according to selected variables on Brazilian micro-regions (panel data controlling for time), 1970–2000

PANEL A

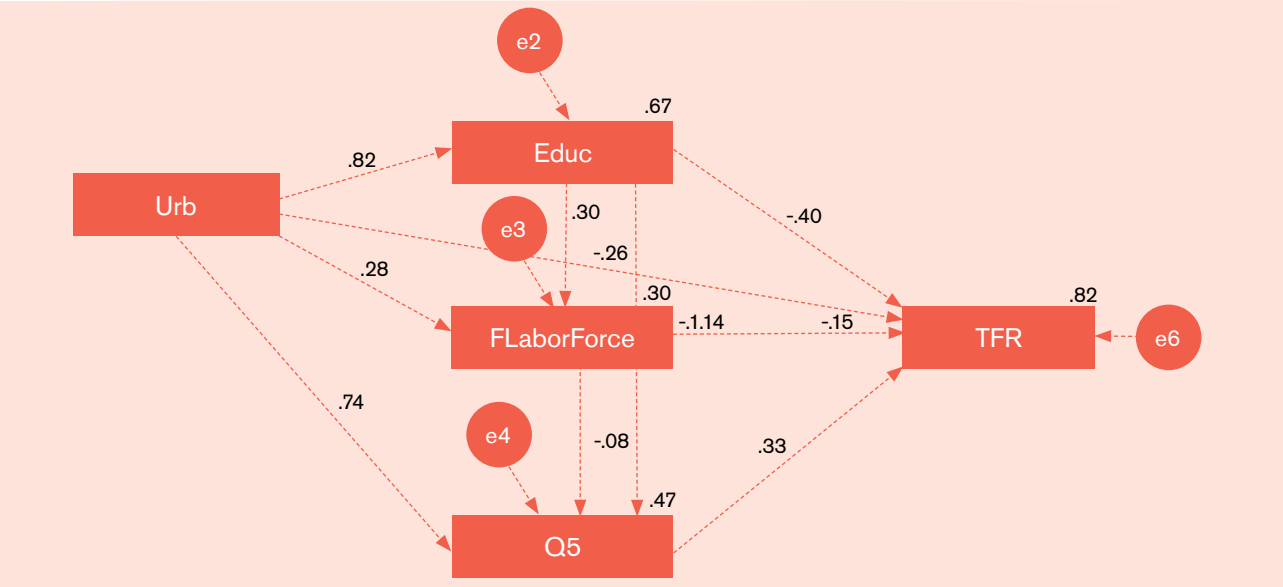
Variables		Coefficient label	Unstandardized Estimate	Standardized Estimate	S.E.	C.R.	P
Educ	<--- Urb	b13	0.05	0.61	0.00	66.00	***
FLabourForce	<--- Urb	b14	0.07	0.14	0.01	5.65	***
FLabourForce	<--- Educ	b34	4.11	0.72	0.20	20.91	***
Q5	<--- FLabourForce	b45	0.00	0.06	0.00	2.81	0.01
Q5	<--- Educ	b35	-0.03	-0.96	0.00	-24.42	***
Q5	<--- Urb	b15	0.00	0.29	0.00	10.98	***
TFR	<--- Educ	b36	**-0.37**	**-0.44**	0.02	-16.32	***
TFR	<--- Urb	b16	**-0.01**	**-0.18**	0.00	-11.12	***
TFR	<--- FLabourForce	b46	**-0.01**	**-0.08**	0.00	-5.65	***
TFR	<--- Q5	b56	**0.07**	**0.27**	0.00	20.28	***
Intercept		Coefficient label	Estimate	S.E.	C.R	. P	Squared Multiple Correlations
Educ		a	-157.88	3.12	-50.62	***	**0.87**
FLabourForce		b	42.40	41.48	1.02	0.31	**0.70**
Q5		c	2200.66	262.46	8.39	***	**0.68**
TFR		d	28.14	3.88	7.26	***	**0.89**

PANEL B

		Total Effects	Standardized Total Effects	Direct Effects	Standardized Direct Effects	Indirect Effects	Standardized Indirect Effects
Educ	<--- Urb	0.05	0.61	0.05	0.61	0.00	0.00
FLabourForce	<--- Urb	0.29	0.58	0.07	0.14	0.22	0.44
FLabourForce	<--- Educ	4.11	0.72	4.11	0.72	0.00	0.00
Q5	<--- FLabourForce	0.40	0.06	0.40	0.06	0.00	0.00
Q5	<--- Educ	-31.91	-0.91	-33.54	-0.96	1.63	0.05
Q5	<--- Urb	-0.77	-0.26	0.87	0.29	-1.65	-0.54
TFR	<--- Educ	-0.63	**-0.74**	**-0.37**	**-0.44**	**-0.26**	**-0.30**
TFR	<--- Urb	**-0.04**	**-0.56**	**-0.01**	**-0.18**	**-0.03**	**-0.38**
TFR	<---FLabourForce	-0.01	**-0.06**	-0.01	**-0.08**	0.00	**0.02**
TFR	<---Q5	0.01	**0.27**	0.01	**0.27**	0.00	**0.00**

Note: 1) *** means the parameter is significantly different from zero at the 0.001 level (two-tailed). 2) The time effects are not shown in the table since time was only a controlling variable.

Figure 12: Path diagram for modelling the effects of selected variables on Total Fertility Rate at the micro-region level for each census data, Brazil, 1970–2000



Note: Some standardized estimates of 1970 model shown in the diagram are available in Table 7.

Table 7: Effects estimates of a Structural Equation model on TFR of selected variables for Brazilian micro-regions by census date 1970, 1980, 1991 and 2000

		Total Effects	Standardized Total Effects	Direct Effects	Standardized Direct Effects	Indirect Effects	Standardized Indirect Effects
			1970				
TFR	<--- Educ	-0.961	-0.813	-0.467	-0.395	-0.494	-0.418
TFR	<--- Urb	**-0.042**	-0.724	**-0.015**	-0.261	**-0.027**	-0.463
TFR	<--- FLabourForce	-0.025	-0.153	-0.025	-0.148	-0.001	-0.005
TFR	<--- Q5	0.007	0.327	0.007	0.327	0.000	0.000
			1980				
TFR	<--- Educ	-0.957	-0.906	-0.712	-0.675	-0.245	-0.232
TFR	<--- Urb	**-0.048**	-0.748	**-0.005**	-0.080	**-0.043**	-0.668
TFR	<--- FLabourForce	-0.004	-0.022	-0.010	-0.061	0.006	0.039
TFR	<--- Q5	0.005	0.205	0.005	0.205	0.000	0.000
			1991				
TFR	<--- Educ	-0.632	-0.791	-0.433	-0.541	-0.199	-0.249
TFR	<--- Urb	**-0.042**	-0.762	**-0.006**	-0.108	**-0.036**	-0.654
TFR	<--- FLaborForce	-0.019	-0.172	-0.020	-0.173	0.000	0.002
TFR	<--- Q5	0.004	0.150	0.004	0.150	0.000	0.000
			2000				
TFR	<--- Educ	-0.400	-0.782	-0.311	-0.607	-0.089	-0.175
TFR	<--- Urb	**-0.027**	-0.692	**0.002**	0.040	**-0.029**	-0.733
TFR	<--- FLabourForce	-0.025	-0.351	-0.026	-0.368	0.001	0.017
TFR	<--- Q5	-0.004	-0.122	-0.004	-0.122	0.000	0.000

The estimates for these four models are not presented here but they show that the results for the pooled data are consistent with the models for each of the four census years, including the degree of importance of each variable in the model. The size of the effects for per cent urban in each year is important to mention. Table 7 presents the results of the total, direct and indirect effects (standardized in grey background) for TFR and its covariates.

As was indicated in the correlation graphics, the relationship between per cent urban and TFR changes as Brazil becomes more urbanized and fertility advances in the transition to very low levels. It is worth noting that the total effect of per cent urban in TFR decline is around the same size for the three first censuses (about -0.040) but it declines for 2000 (-0.027). Moreover, from the size of the direct effect, shown in the table, it is clear that, during the 1970s, increases in urbanization caused bigger direct drops in TFR than it did in the following years; however, the indirect effects in 1980 and 1991 compensated for the drop in the direct effect. Hence, although the total effects of urbanization on fertility for these three decades were about the same, their composition varied considerably, with the direct effect becoming smaller (-0.015 to -0.005 to -006) and the indirect effect becoming larger (from-0.027 to -0.043 to -0.046). In 2000, the trends become more accentuated and the direct effect even shows a positive signal, though the effect is almost zero (0.002), and the indirect effect also becomes smaller (-0.029).

In short, the Brazilian data show that fertility has declined rapidly at all geographical levels and units, both at the urban and the rural level. The patterns suggest both forward and backward linkages; urbanization reconfigures life in the cities and the new urban style of life influences rural life. The rhythm of diffusion to rural areas varies in accordance with the manner in which cities grow.

Taken as a whole, these data on the Brazilian case suggest that there is an inverse relation between urbanization and fertility but the weight of direct and indirect contributions varies over time. That is, urbanization would appear to be a more important direct factor during the early fertility decline, and especially during the stage of rapid decline; but when fertility reaches lower levels, urbanization's influence is more indirect. Should this same pattern prevail in other countries as well, it would help explain why correlations between these two variables spanning a large number of countries, such as in Figure 2, are not clear-cut. Evidently, the 181 countries that are analysed in that graph present a wide variety of paths and stages in both their urban and fertility transitions. Better analyses thus need to focus on specific transitions and on the concrete factors at play therein.

6

Concluding comments

A large number of field studies and aggregated data on world level urbanization and fertility trends presented in this paper reiterate that, as the earlier demography studies had insisted, fertility decline occurs first and quickest in cities. This is succinctly summarized in our finding that rural fertility higher than urban fertility in each of the 83 developing countries for which DHS data are available, with the average difference between rural and urban TFRs being 1.5 children per woman.

Nevertheless, perceptions as to the precise strength and manner of the influence that urbanization exerts on fertility decline have wavered considerably among different analysts over time. On the one hand, correlations between urbanization and fertility trends are not immediately clear or impressive when a broad sweep of countries is examined. Thus, no thresholds of urbanization – or of development – can be directly associated with fertility decline, whether in the history of the European fertility transition or in that of today's developing countries. This gap apparently lends substance to the sceptics' arguments concerning the purported role that urbanization exercises in fertility decline. Yet this discrepancy in outlook is also explained, at least in part, by ideological differences. The desire of the population establishment – and others in the development community – to focus on more 'practical' interventions aimed at accelerating fertility decline in the developing world – rather than waiting for structural shifts to bring down fertility have coloured both research and policy orientations.

The absence of clear thresholds notwithstanding, the strength and universality of rural–urban differences, as well as the evidence from careful field studies that show how migrants' fertility behaviour adjusts to that of their destination areas, need to be taken into account. In the light of such evidence, the lack of strong correlations between the urban and fertility transitions in aggregate analyses speaks to the great variety of situations that govern the interactions between these two variables, rather than to an outright lack of interrelations.

Global correlations lump together countries that are at widely differing stages of their urban and fertility transitions, and that are following different paths to urban growth and fertility decline. Moreover, the mix of factors that stimulate fertility decline in specific urban contexts may vary considerably. Thus, even with the help of powerful complex models, it is difficult to show clear-cut relations, given the widely disparate historical backgrounds, cultures, relevant factors, definitions, timing and trajectories of fertility decline when a large number of countries are analysed at once. Case studies focused on the fertility and urban transitions in relatively homogeneous countries provide greater insights into the factors at play.

In this paper, two such case studies, using very different methodologies were highlighted. First, the careful field work on migration and fertility in Ghana provided convincing evidence of migrant fertility adaptation in urban settings. Second, the multivariate analysis of the main factors at work in the Brazilian fertility transition at the level of 502 micro-regions underscored the apparent influence of Brazil's speedy urban transition in the rapid decline of the country's fertility levels.

From a policy standpoint, the implication that urbanization's indirect contribution to fertility decline is ultimately more important than its *prima facie* robust direct effect is of particular significance. Even a cursory examination of urbanization processes in different regions and countries suggests that some urban transitions are more conducive to the promotion of social inclusion and to the exercise of citizenship than others. Put simply, there may be 'good' urban transitions that speed up the process of human development and provide people with real choices. But one thing seems eminently clear: when policymakers try to prevent urbanization and adopt specific attitudes that hinder insertion into the urban context, the fulfilment of the urban promise is delayed or obstructed (UNFPA 2007).

More inclusive urban policies, whether or not they actually increase the rate of urbanization, are likely to encourage the sort of urbanization that reduces fertility. Exclusive urban policies (i.e. policies that try to exclude certain groups, particularly low-income migrants, from coming or integrating themselves into the city fabric) are quite likely to contribute to the maintenance of high fertility levels in a country, whether or not they are effective in preventing people from settling in cities. A focus on family planning clearly lends support to the implementation of lower fertility goals, but it does not support other policies that could contribute to reduced fertility, and are also likely to be beneficial to sustainable development generally.

Unfortunately, an increasing number of policymakers view urban growth as problematic and try to prevent it. The latest United Nations data found that 64 per cent of developing countries would like a major change in the spatial distribution of their population, and 82 per cent have implemented policies to curb rural–urban migration (United Nations 2013). Such attitudes only intensify the difficulties that large contingents of poor people will encounter in looking for suitable housing and decent work opportunities, as well as accessing basic services of all sorts, including those in the reproductive health domain.

Paradoxically, such negative policies are at the root of unchecked slum expansion and of many of the difficulties that affect poor people, who constitute the largest social contingent in the urban areas of most developing countries. This has important implications for the persistence of poverty and for the improvement of people's lives. Inadequate policies inhibit the poor's right to the city and prevent them from benefiting from everything that urban localities have to offer in terms of services, amenities and quality of life. According to UN Habitat, one third of the world's urban population (and three quarters of Africa's) resides in slums. As noted by Weeks *et al.* (2008) slum residence leads to higher fertility and the 'slumness' of a neighbourhood has an effect on fertility levels that is independent of other socio-demographic characteristics of the neighbourhood and of individuals.

Hence, urban growth, under present policy arrangements, often fails to fulfil its promises of inclusion and of the full exercise of citizenship. Specifically, the route to reproductive health and lower fertility would be easier if policies were designed to take advantage of urban opportunities to increase employment, extend education, improve sanitation and provide quality low-cost health services (including reproductive health services); but it will be hindered if measures are imposed to impede rural–urban migration or urban growth. Indeed, recent experiences highlight the fact that policies treating urbanization and urban growth as an ally greatly benefit development prospects while anti-urban measures delay it. Coincidentally, family planning programmes in rural areas and the poorest urban slums that suffer from the lack of proactive policies to urban growth tend to be least effective. The perspective developed in this paper is thus that 'the exercise of citizenship is the best contraceptive', whether in urban or rural areas, but that urbanization enhances this positive effect. Hence, positive and proactive approaches to inevitable processes of urban concentration would go a long way towards fomenting the social inclusion that would improve people's lives.

This paper thus argues that the insistence of the population establishment on discarding the role of development and urbanization in fertility decline in order to bolster the importance of family planning has been counterproductive. In that sense, the paper aligns itself with the paradigm shift that seeks to move away from methodological individualism to a more balanced conceptual approach that includes a renewed focus on structural effects (Cockerham, 2013:199). It is true that the influence of structural factors such as urbanization on fertility decline are not immediate, but much the same could be said of family planning programmes that are implemented in the absence of social change. That is, the historical experience of family planning programmes is that, unless some form of unacceptable coercion has been exerted, they have often had relatively little impact in poor and predominantly rural countries.

Consequently, more effective policies are needed with regards to reproductive health, but also with respect to the process of urbanization. Within the broader reproductive health framework, the provision of better information and quality reproductive services can evidently ensure that reproductive decisions are made in accordance with people's preferences. This should somewhat accelerate fertility reduction, since it is estimated that 215 million women, out of a total of 1.8 billion of all women in reproductive age groups worldwide, do not have access to contraception. However, the fact that the majority of these women without access to contraception are poor rural African women, whose motivation to regulate fertility is unlikely to be high at this time, makes provision of RH services more important from a rights standpoint than from its probable immediate effect on worldwide fertility.

Family planning allows people to regulate their fertility in accordance with their preferences, but aspirations themselves to reduced fertility stem from other sources than the availability of contraception. Without at least some progress towards socioeconomic development that increases people's aspirations and thus their motivation to regulate their family size, the influence of family planning programmes is reduced, unless coercive measures are applied. Urbanization can help to speed up the development of direct and indirect influences on human well-being and on reproductive health, particularly if properly managed.

It is therefore crucial for policymakers who are concerned with human development generally – or with the exercise of reproductive rights, or even with population stabilization – to examine the potential contribution of those structural processes that have a catalytic effect on improving people's lives, including all those factors that raise their motivation and capacity to regulate their fertility effectively. The effect of urbanization on fertility goes beyond composition effects. It can be likened to a locomotive that pulls various freight cars, each one of them representing a fertility determinant such as better education, higher income, improved health, greater participation in the labour force, and in social movements by women, gender equality and so forth. Better information through modern communication channels as well as new social networks raises both social aspirations and the means to achieve them. The more inclusive the process of urbanization, the more the poor can exercise their right to the city, and the more fulfilling the exercise of citizenship, the lower the level of fertility. Urbanization can be the prime agent for escaping the poverty trap and for creating a virtuous cycle that will improve living conditions, create new opportunities and, in the process, accelerate the stabilization of world population.

The population establishment has in the past focused almost exclusively on the intermediate variables in fertility, on the assumption that these were the only ones that were amenable to direct intervention aimed at fertility reduction. But, in fact, urbanization is not necessarily an autonomous and self-regulating process, and hence it is also amenable to policy intervention. The world level of urbanization is expected to rise from the current 51 per cent to some 70 per cent by mid-century. It will involve an increase of some 2.8 billion new urbanites. The dimensions of the ongoing urban transition offer an immense opportunity to accelerate the promotion of human development and to make it the most significant structural component of fertility reduction. Well-oriented urbanization can bring together all of the important factors that contribute to improvements in people's lives, to changes in people's aspirations and, *inter alia*, to changes in reproductive behaviour as well as better access to family planning. The concept of the 'right to the city' has to be fused with other more inclusive rights in order for reproductive health rights to be exercised more broadly in the near future.

Proactive policies that will transform inevitable massive urban growth into a positive force for development and for the exercise of human rights at all levels are urgently needed (UNFPA, 2007). In this vein, the current anti-urbanization ethos that stamps population distribution policy in the majority of developing countries today is hampering social and economic progress and, as one of many negative corollaries, delaying improvements in reproductive health. The persistence of such negative attitudes could result in enormous and unnecessary suffering, with the multiplication of slums, poverty, inequality, poor health and social strife.

As noted above, varying perspectives on the role of urbanization in fertility may reflect the strong and persistent ideological and political undertones of a passé debate on development versus contraception. As concerns the specific role of urbanization in fertility decline, such a debate is not particularly useful. Few people would now fail to recognize the importance of providing people with reproductive health information and other services. By the same token, dismissing the importance of structural factors that can speed up the improvement of people's access to these and many other benefits through urbanization would be unfortunate, particularly if it helps to perpetuate negative or laissez-faire attitudes towards the massive urban growth that developing countries are experiencing. The advantages of scale and proximity in urban areas help spread services and the social benefits of economic growth at lower per capita costs. One of the widely acknowledged contributions urbanization makes to development (i.e. in the micro-foundations of the high positive returns to agglomeration) is that ideas and innovative practices spread more quickly in urban areas. In this perspective, the basic notion of the diffusion theory itself benefits from urbanization.

Some 40 years ago, a huge debate emerged on whether 'development' rather than 'contraception' was the best contraceptive. This paper suggests a third alternative – that social inclusion and the exercise of citizenship is the best contraceptive; properly oriented, the urban transition can be a key vehicle for the fuller exercise of human rights, including access to reproductive health services. Cashing in on this structural determinant of social transformation makes good sense.

Annex A: Descriptive statistics: selected variables by micro-regions, Brazil, 1970–2000

POOLED SAMPLE	N	RANGE	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION	SKEWNESS
TFR	2008	7.0	1.5	8.5	4.1	1.7	.45
Urb	2008	97.0	3.0	100.0	57.2	22.5	-.04
Educ	2008	9.4	.1	9.6	4.1	1.9	.16
	2008	72.6	3.8	76.3	28.4	11.0	.29
Q5	2008	379	1	380	98.4	68.0	.95
				1970			
TFR	502	5.9	2.6	8.5	5.8	1.2	-.29
Urb	502	97.0	3.0	100.0	40.9	20.4	.77
Educ	502	5.1	.1	5.3	2.0	1.0	.50
	502	58.6	3.8	62.4	17.8	7.1	1.28
Q5	502	345	35	380	165.2	59.3	.87
				1980			
TFR	502	6.3	2.2	8.5	4.8	1.4	.21
Urb	502	93.0	7.0	100.0	52.8	21.2	.22
Educ	502	6.3	.8	7.1	3.4	1.3	.19
	502	72.5	3.9	76.3	26.4	8.4	.62
Q5	502	306	11	317	123.6	56.5	.98
				1991			
TFR	502	5.8	1.8	7.6	3.4	1.0	.87
Urb	502	88.0	12.0	100.0	63.8	19.0	-.07
Educ	502	7.5	1.1	8.6	4.7	1.3	.02
	502	57.4	10.1	67.5	34.3	9.2	.39
Q5	502	210	7	216	67.5	39.6	.91
				2000			
TFR	502	4.7	1.5	6.2	2.6	.7	1.80
Urb	502	74.0	26.0	100.0	71.3	16.6	-.26
Educ	502	7.3	2.2	9.6	6.1	1.3	-.14
	502	47.7	13.4	61.2	35.3	9.2	-.03
Q5	502	139	1	139	37.3	21.4	.98

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