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The Urban Transition in Developing Countries: Demography Meets Geography

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As urban populations continue to grow, poor countries and international aid agencies are likely to face mounting pressure to rethink their development strategies and set priorities with both rural and urban interests in mind. To engage effectively with the emerging trends, countries and agencies will need to base their decisions on demographic estimates that are scientifically sound. To plan for future growth, they will require informative forecasts of city size that are free from systematic bias. Unfortunately, demographic researchers are not yet in a position to deliver these scientific inputs.

In this chapter, we consider the current state of urban demographic research and argue that as the developing world continues to urbanize, and both local and national planners struggle to anticipate and adapt to city growth, they will increasingly need to draw upon spatially disaggregated demographic data. Although the urban transition has been in the making for decades, demographers are only belatedly coming to understand how much remains to be done to construct the kind of research infrastructure that will provide policymakers with scientific guidance (Panel on Urban Population Dynamics 2003; Bocquier 2005). As explained in the chapter's second and third sections, with the increasing availability of urban demographic and boundary data for small geographic units—including districts within cities—there are now good prospects for bringing spatial content to demographic research. The combination of spatial and population data will help to resolve some of the measurement issues that have long bedeviled demographers and will likely inject new energy into the field of city population estimation and forecasting.

<A>Data Needs for the Urban Century Ahead

Needs for better urban data are especially pressing in Asia, which now contains the largest total number of urban dwellers among the major regions of developing countries, and will continue to do so. By 2025, Africa will likely have overtaken Latin America in terms of urban totals. Urban growth rates in developing countries in force before 2000 are substantially higher than the rates that were seen during comparable historical periods in the West, with the difference being due to lower urban mortality in present-day populations and stubbornly high urban fertility in some cases (Panel on Urban Population Dynamics 2003). Nevertheless, decade-to-decade changes in urban percentages—sometimes termed the pace of urbanization—in the developing world are not especially great by historical standards (Panel on Urban Population Dynamics 2003, table 3-5). The most prominent, unparalleled feature of today's urban transition is the emergence of hundreds of large cities. Even so, only 12 percent of developing-country urban dwellers live in cities of 10 million or more (the so-called megacities), whereas more than half live in cities smaller than 100,000 persons. In addition to their demographic importance, these smaller cities are relatively disadvantaged in terms of access to information and both technical and managerial expertise.

Much of what is known about urban populations of poor countries stems from the work of the United Nations Population Division (UNPD), which has been the sole source of internationally comparable city and urban estimates and projections. Much of its work has been carried out in-house, and the challenges that the UNPD faces are not well understood by the larger research and policy communities. In preparing its urban materials, the UN has had little alternative but to rely on data supplied by the national statistical offices of its member countries. The basic data are thus bound to the definitions of urban areas adopted by national authorities, which vary a great deal from one country to the next. Working with these disparate raw materials and refining them where possible to improve comparability, the UNPD develops estimates of both total urban and city-specific population sizes, compiling records from the 1950s to the present. For the city-specific population counts, the UN gives special attention to national capitals and to larger cities—those with 750,000 or more residents. Although entries for smaller cities are registered in the UN's city database, they have not generally been given the rigorous review that is routinely applied to larger cities. To accurately estimate city and urban populations is an enormous undertaking in itself, but the UN is also obliged to develop medium-term forecasts of city and urban growth and to monitor the performance of the forecasts. The results are issued on a biennial basis in the series *World Urbanization Prospects*, and upon publication, the UN's urban figures make their way into numerous international databases.

Related research by the UNPD, based on a sample of countries with two or more national censuses, has provided important insights into the demographic sources of urban population growth. As the UN has shown, urban population growth rates can be divided into a natural urban growth component—this is the difference between urban birth and death rates—and a residual that combines net migration with spatial expansion (Chen et al. 1998). The details are complicated—see Panel on Urban Population Dynamics (2003) for discussion of the method—and one could wish for a larger sample of countries in the analysis. Nevertheless, the results are strikingly at odds with the usual perception of the sources of urban growth. In developing countries, according to the UN findings, about 60 percent of the urban growth rate is due to natural growth; the remaining 40 percent is due to migration and spatial expansion. Recently, a very similar rule was established for India over the four decades from 1961 to 2001, with urban natural growth again accounting for about 60 percent of the total (Sivaramakrishnan et al. 2005). China, however, presents something of an exception to the rule. Given its low fertility levels, the tight bureaucratic controls that kept migration in check until the 1980s, and the subsequent unleashing of migration, the UN's estimate for China puts the contribution of natural urban growth at about 40 percent of the growth rate total, with migration and spatial expansion taking 60 percent. Even for China, however, natural growth is responsible for a large portion of urban growth overall.

As discussed in the recent *State of the World's Population* volume (UNFPA 2007), many policymakers in developing countries have been apprehensive about the rates of city growth in their countries, and they have not infrequently acted upon these concerns with aggressive interventions aiming to expel slum residents and repel rural-to-urban migrants. These policies have shown themselves to be ineffective as well as brutal. More enlightened regional development policies have the potential to redirect urban growth, but these policies seldom generate the rapid changes in its pace and spatial distribution that policymakers hope to achieve.

It is therefore surprising how little attention has been paid to an urban growth policy of a very different character: voluntary urban family planning programs. Over the past half century, such programs have compiled an impressive record across the developing world in facilitating fertility declines and reducing unwanted fertility. As will be shown in the next section, an empirical analysis of developing-country city growth and fertility suggests that when national total fertility rates decline by one child, this is associated with a decline of nearly one percentage point in the city population growth rates for that country. There is good reason to believe that urban-specific family planning measures would be even more tightly linked to city growth rates. Hence, even if the health benefits of voluntary family planning programs are set to the side by policymakers fixated on the need to slow population growth, these programs clearly deserve more attention than they have received.

<A>Repairing the Demographic Record

As urban scholars and demographers well know, the scientific basis for cross-country urban estimates and projections is generally adequate for identifying broad features and dominant trends. But an inspection of the detail that underlies the estimates shows that the state of the science is far from satisfactory. As urbanization proceeds, it is precisely the finer details of the process—that is, the spatially disaggregated estimates and forecasts—that become urgently needed by policymakers. In view of the wealth of new data for developing countries that has entered the public domain in recent years, there now exists considerable potential for improvement in city population estimates and projections. Two developments are especially notable. Urban data from a very large number of demographic surveys have greatly strengthened the basis for estimating the demographic components of urban growth and will continue to do so as these survey programs proceed. In addition, recent methodological advances have suggested new ways by which satellite imagery can be used to detect the spatial extent of urban areas, enabling the spatial dimensions of city growth to be quantified at relatively low cost (Angel et al. 2005; Balk et al. 2005; Small 2005).

Although to date its cities database has not incorporated a spatial component, and its forecasting methods have essentially ignored urban fertility and mortality rates, the UNPD is now considering whether to thoroughly rework its database and set it upon a firm spatial footing. In the discussion that follows, we first describe the nature of the problems that vex the current version of the cities database, and then evaluate the proposals for improving it and enhancing its spatial features.

<A>The United Nations' Cities Database

The UN cities data take the form of a panel dataset, containing city population counts for individual cities over time, generally recorded at irregular intervals. (Occasionally, for countries that do not regularly conduct censuses, or that seldom tabulate population at the level of cities, the city population figures can refer to counts made more than a decade apart.) The UN monitors all cities with populations of 100,000 and above; when a given city crosses this threshold, the Population Division endeavors to reconstruct its history.

Figure 6.1 summarizes the number of observations available on a per-city basis for the cities of developing countries. As can be seen, outside Asia there are relatively few cities whose populations are recorded only once. Among cities in Africa, for example, over 20 percent are observed three times and over 70 percent of these cities appear anywhere from three to six times in the database. Likewise, in Latin America, almost 60 percent of cities contribute seven or eight records to the database.

<<INSERT FIGURE 6-1 NEAR HERE>>

Unfortunately, the units in which city populations are expressed can vary across all of the relevant dimensions: across countries, within countries, and over time for a given city. To organize its records, the UN has maintained three "statistical concepts" that serve to define city boundaries. The term *city proper* refers to the formal administrative boundaries of a city as set out by local authorities. The term *urban agglomeration* includes the city proper, but also incorporates contiguous areas lying outside that boundary that are populated at urban levels of density. A number of countries (especially, but not exclusively, in Latin America) have adopted a more spatially elastic definition, categorizing their populations in terms of *metropolitan* *regions*—the UN's third category—that include rural dwellers who fall within the sphere of influence of large urban places. Many countries have devised further variations on these boundary definitions, and the UN endeavors to fit them all within its three-category framework.

Member countries of the UN are asked by the UNPD to provide city population data for urban agglomeration boundaries; however, they may respond with data coded in terms of city proper or metropolitan region, or may provide population counts without any accompanying explanation of units. Where possible, these data are adjusted by UN staff to conform to the agglomeration concept—but of course this is not always possible. Indeed, in only a small percentage of cases recorded by the UN are all of the city's records expressed in terms of urban agglomerations. The city proper is by far the more common concept in these data (for 40 percent of cities); about one-third of cities report different units over time; and nearly one-quarter provide the UN with no clear account of the units.

The difficulties stemming from such mixed time series are illustrated by two cities. In the case of Luanda, Angola, the units in which the city's population was recorded are unknown for the 1950, 1960, and 1970 entries, whereas in 1982 population counts were provided for both the city proper and the urban agglomeration concepts. The next entry in the series is again of unknown type; it is followed by one report on the agglomeration and a final record whose defining concept is not specified. The series for Chittagong, Bangladesh, begins with two entries expressed in terms of the city proper, followed by one of unknown type and a final three records couched in terms of metropolitan region. In mixed cases such as these, it is certainly not obvious how to define a rate of population growth for spells of time that begin with one boundary concept but end with another. Neither is it obvious whether growth rates for agglomerations or metropolitan regions are strictly comparable with each other or with the rates for cities proper. In each new revision of *World Urbanization Prospects*, UN researchers succeed in eliminating some of the anomalous cases. Nevertheless, there is an irreducible minimum of boundary-related variation in these data, and far more heterogeneity remains in the city time-series than is commonly realized.

<A>Forecasting City Growth

As part of the research summarized in *World Urbanization Prospects*, the UN Population Division provides medium-term forecasts of both total urban and city-specific population growth. These forecasts extrapolate the city population time series that we have been discussing, with all their attendant heterogeneity. Boundary variations alone would not be expected to inject any systematic bias into these forecasts, although the possibility deserves investigation. It seems more likely that “baseline errors” of this type would mainly reduce forecast precision and widen confidence bands without necessarily causing growth rates or projected populations to be either too high or too low on any consistent basis.

It is therefore disconcerting to realize that the UN urban and city forecasts have, in fact, exhibited considerable systematic bias: they have consistently projected growth rates (and thus population sizes) that are too high. The tendency to overproject is not evident in the UN’s forecasts of total population at the national level, but it persists despite the insertion of an algorithm in the city forecasting model that is designed to slow projected growth rates as city size increases. The Panel on Urban Population Dynamics (2003) explains the forecasting method and provides a critical review of the issues, as does Bocquier (2005). The tendency for overprojection that is exhibited by the UN forecasts raises doubt about the scale and pace of urban change (if not the direction) that has been forecast for the twenty-first century. Understanding the sources of these forecast errors is a research priority of some urgency.

Given the uncertainties and measurement errors that plague the city population series, there are limits on how ambitious any forecast should strive to be. The UNPD has long couched its efforts in the most cautious of terms and has made plain its reservations about the proper scope of the forecasts. United Nations (1980, 45) warned that "projection of city populations is fraught with hazards. . . . There are more than 1,600 cities in the data set, and it is obviously impossible to predict precisely the demographic future of most of them . . . In most cases, national and local planners will have access to more detailed information about a particular place and could supply more reliable information about its prospects."

Referring to Mexico City, whose population was to rise to 31 million by the turn of the century according to the 1980 projection, the United Nations (1980, 57) cautioned: "Whether such size can actually be attained is, of course, questionable. It has been noted, for example, that population growth at Mexico City threatens to destroy tree cover that is necessary to prevent erosion and flooding. Water-supply also appears to be a potentially constraining factor in this case. Natural or social limits to growth could be encountered well before a size of 31 million is reached, or of 26 million for São Paulo, and so on down the line."

These concerns were not misplaced—the 2000 population of Mexico City was recorded at 18 million and that of São Paulo at 17 million, well below what was projected—and similar reservations would no doubt apply with much the same force today. Even so, to an extent that probably could not have been foreseen in the early 1980s, several streams of new data—on demographic behavior as well as land cover, water supply, and environment—have emerged over the past decades. These new materials may well support more informed and credible city population estimates and projections than the experts of 1980 could have envisioned.

<A>Exploiting New Demographic Data

Although the United Nations operates a separate research program in which it estimates and projects fertility and mortality rates at the national level, its city and urban projection methods have not incorporated fertility or mortality in any direct way, despite the UN's own finding that 60 percent of urban growth is due to natural increase. The approach taken to city and urban projection thus ignores a large body of accumulated information on urban fertility and mortality rates, as well as some useful data on migration. Beginning with the World Fertility Surveys (WFS) fielded in the late 1970s, well over 200 nationally representative demographic surveys of developing countries have made their way into the public domain via the WFS and its two ongoing successor programs, the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS). Although the sample sizes of these surveys are too small to permit informative estimation of demographic rates at the city level, they are generally large enough to allow the rates to be estimated for the urban populations of the subnational geographic region within which a city is located. With the aid of statistical methods, it is possible to further refine the estimates to take some city-specific characteristics (e.g., coastal location) into account.

Because the cities database is a cross-section, time-series dataset, there is scope for including a great range of explanatory factors in city growth rate specifications. Urban total fertility rates and mortality rates would be of prime interest, as would migration rates; these demographic variables are linked to city population growth via basic demographic accounting identities. It is at least possible that the inclusion of urban fertility rates, in particular, would resolve the problem of overprojection that has plagued the UN forecasts, given the rapid declines in urban fertility that are underway in a number of developing countries. The growth rate specifications could be further enriched by the addition of multiple city-specific demographic and nondemographic variables. An additional benefit is that when forecasts are based on statistical models, the results can be expressed in probabilistic terms with confidence bands indicating the uncertainty that surrounds a point forecast. Taken together, these considerations make for an inviting research agenda.

Table 6.1, based on data from the earlier (2003) revision of *World Urbanization Prospects*, may give an idea of the returns that can be secured from linking data on fertility and mortality rates to data on city growth. We use here the time series of national total fertility and child mortality rates (provided by the UN) rather than rates calculated from survey data for urban subnational regions, which would be preferred. Nevertheless, the regression results suggest a close connection. The most interesting results are those shown for the fixed-effects estimates (the third column of the table), which introduce the equivalent of a control for all influences on a given city's growth rate that are constant over time. Even having controlled for such important sources of variation, we see that (with a coefficient of 0.887 on the total fertility rate) a decline in national fertility of one child is associated with a decline of nearly one percentage point in city growth rates. In addition to being demographically important, this association is highly significant in statistical terms. Although they are also statistically significant, and point in the expected direction, the effects of child mortality are much weaker. The ordinary least squares (OLS) and random-effects (RE) fertility results are similarly significant, although the coefficients on fertility are somewhat smaller than the fixed-effects estimate. Taken as a whole, these results provide further confirmation, if any is still needed, of the important role that natural increase plays in city growth.

<<**INSERT TABLE 6.1 NEAR HERE**>>

To pursue this line of inquiry and connect urban demographic data to city growth rates, we need to establish a direct link between the UN cities database and the demographic surveys. Surprisingly, this proves to be no easy task. The problem is that the WFS, DHS, and MICS contain very little information on the location of their respondents. As conducted in the 1970s and early 1980s, the WFS somehow neglected to specify the city in which a sampling cluster was located (unless it happened to be the national capital or the only large city of an identified region), and for a number of years the DHS program did not rectify this error. (Since the late 1990s, however, the DHS has collected latitude and longitude coordinates for its sampling clusters in about half of its surveys. The MICS program, however, collects no spatially detailed data.) A further problem is that only the crudest summaries of migration histories are collected in these survey programs and the data available do not include the names (or even the regions) of former places of residence for migrants. This forecloses the possibility of making origin-to-destination estimates of migration rates. In short, the general neglect of space and geography in the major demographic survey programs makes it far more difficult than it should be to link survey data on urban fertility, mortality, and migration to city-specific and other geographically coded information. This is a longstanding and serious flaw in the urban demographic record—although it is a flaw that could be fixed at negligible cost in future survey efforts.

<A>Constructing a Spatial Framework

In its current configuration, the UN's cities database provides a city's population but does not show how that population is distributed over space. When the first versions of the database were being assembled in the 1970s, this was a forgivable simplification. The UN experts of the time were well aware of boundary problems and recognized that cities evolve in their spatial extents over time, but simply lacked the data to engage with these issues in any comprehensive way. They were also aware that the practice of declaring some places to be definitively urban and others rural is simplistic and at times unhelpful—and this view is coming to predominate among urban researchers today, as evidence grows of the multiple linkages and flows across space of people, goods, and information. Although the conventional, binary, urban-rural distinction has not entirely lost its value, a consensus is emerging that to be most useful in the future, classification schemes will need to make a place for third categories, gray areas, indeterminacies, and degrees of urban-ness as well as the rural and urban ends of the spectrum (McGee 1991; Champion and Hugo 2004; Champion 2006).

A first step in this direction is to organize population data according to the smallest geographic units ("building blocks") that are available. When population data are arrayed over space in reasonably fine detail, this enables a closer scrutiny of the areas lying on the peripheries of large cities where much urban population growth is believed to take place, and gives planners and policymakers a view of the communities situated between large cities that are likely to fuse with their neighbors. Geo-coded data also provide a window on the smaller cities and towns, where, as we have seen, a large percentage of urban residents live.

The case of Beijing shows what can be learned by coupling spatial data on administrative unit boundaries with population counts. Like other developing countries, China has made frequent changes in its administrative boundaries and accompanying urban definitions, a practice that has sown confusion among the experts struggling to understand this country's urban trends (Chan and Hu 2003). Even at one point in time, it can be difficult to grasp how boundaries are implicated in Chinese city definitions. To show how spatial data help to clarify matters, we present in table 6.2 the basic population counts for the administrative units that make up Beijing Province, and accompany these conventional tabular data with the maps shown in figure 6.2.

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In 2000, according to the urban definitions most recently adopted by the Chinese government, the population of Beijing was reported to be 11.5 million persons. But to whom, precisely, does the label "Beijing resident" apply? The 11.5 million total (shown as subtotal B in table 6.2) was derived by adding the populations of the administrative districts in the city proper (the 8.5 million people of subtotal A, who live in the districts depicted with the darkest shading in panel 1 of figure 6.2) to the full populations of neighboring "city districts" (another 3.0 million persons, in the areas surrounding the city proper, whose outer boundaries are depicted in the black-and-white border). However, these city districts include a substantial number of rural residents. If we were to depart from the official definition and count only the urban residents of the city districts toward the total, this redefinition would reduce the population of Beijing from 11.5 million to about 9.9 million (subtotal C of the table). Going further afield, the entity of Beijing might be defined so as to take in those urban localities situated in the outlying counties of the province (counties are depicted in light shading in the figure), on the theory that the smaller cities participate in networks of transport, communication, and services that link them to Beijing proper and to other parts of the city. These adjustments would produce an estimated total population for Beijing of 10.5 million persons (subtotal E of the table). Clearly it would be difficult even to weigh the merits of these alternative definitions without reference to maps and other spatially coded data.

It is not obvious from the tabular data alone where in Beijing's mainly rural counties the smaller cities are located—only the total number of urban dwellers in each county is reported in table 6.2. The cross-hatched areas seen in panel 2 of figure 6.2, derived from satellite imagery to be discussed below, depict the locations of a number of the urban concentrations in these counties. Here and in other parts of China, remote-sensing methods can detect new urban settlements that are not yet known to the country's statistical authorities, or whose growth has not been fully appreciated. In such cases, the satellite imagery could prompt further on-the-ground investigation and in this way bring about revisions in the urban population counts. For planners and policymakers grappling with the needs of smaller cities in the areas of water supply, transport, and the like, it will rarely be enough to know that the number of urban residents in a county is growing; they will usually need spatially explicit information on which small cities in the area require the most urgent attention.

Spatial data can also shed light on the over-time dimension of city growth. Figure 6.3 presents a short spatially disaggregated time series for the São Paulo municipio, showing how rates of population growth have varied over administrative units from 1970 to 1996. This is a case in which growth rates plummeted in the core of the region while changing very little in its peripheries; had the boundaries of São Paulo been defined to encompass the core alone, a very different picture of the region's population growth would have emerged. Figure 6.4 situates São Paulo in relation to Rio de Janeiro, Belo Horizonte, and Campinas as well as a myriad of smaller urban places. One can imagine—and conceivably measure—the multiple networks that connect all these places and which may induce correlations (whether positive or negative) in their population growth rates.

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Geographers have compiled a number of such special-case datasets like those for Beijing and southern Brazil, but clearly a more systematic and thorough effort is needed to create geo-coded data at this level of detail for all developing countries. Although most developing countries conduct national censuses, and an increasing number of them are beginning to map the results, the spatial display of census data is not yet widespread. Relatively few countries process their census data at the small-area level and fewer still make any sustained effort to place the disaggregated population data in the hands of local planners and policymakers, many of whom must operate with rudimentary data that lack spatial content. While geographic information systems are being constructed at the national level, there will be an important interim role to be played by international geographic datasets that are organized on spatial lines.

One model for such a database is provided by CIESIN's Gridded Urban-Rural Mapping Project (GRUMP), described in detail in Balk et al. (2005). The GRUMP approach draws upon nighttime lights satellite data to approximate the spatial outlines of urban areas (Elvidge et al. 1997; Balk et al. 2005; Balk, 2006) and then links the spatial imagery to rural and urban population data for administrative areas. As we have seen for the mainly rural counties of Beijing Province, administrative unit boundaries are sometimes too large to pinpoint the location of the urban settlements within the unit. When no finer boundary data are available, remote-sensing methods are helpful in locating and separating out these smaller cities and towns.

Another payoff to the spatial approach is evident in the global analysis conducted by McGranahan et al. (2007), who calculate the number of urban coastal inhabitants who live within ten meters of sea level, where they are likely to face rising risks from the storm surges and related phenomena that are expected to accompany global warming. Much of southern Vietnam lies in the zone of risk, whose northeastern boundary cuts through Ho Chi Minh city, leaving the lower-lying quarters of the city in the risk zone and the more elevated quarters sitting above it. This application requires four types of data to be merged: population counts, administrative boundaries, night-lights satellite data, and data on elevation, also derived from remotely sensed sources.

This last example underscores a point that is sometimes overlooked by remote-sensing enthusiasts: relatively little of demographic interest can be gleaned from imagery alone. Administrative boundary data need to be overlaid upon satellite imagery if the images are to be linked to place-names and thereby to population. Furthermore, the difficulties entailed in making these linkages should not be underestimated. In the case of Nigeria, the country's national statistical office defines any place of 40,000 persons or more to be urban (United Nations 2005). However, its smaller cities and towns are not always detected by the night-lights satellite sensor—possibly because they are incompletely electrified. There are quite a number of settlements listed in the records of the country's statistical office for which no light emissions can be detected (the inset shows the details for the heart of Yorubaland). Conversely, of all the light sources that are detected by the satellite, approximately half emanate from locations in which the statistical office has no record of a settlement.

As the McGranahan et al. (2007) study demonstrates, measurement of urban spatial extents and population often requires multiple views of urban areas derived from a range of sources and sensors, including the night-lights satellite, radar, and Landsat (Angel et al. 2005). At the moment, the field of human settlement detection and classification is in a period of creative ferment, with several recent conferences specifically devoted to remote-sensing methods for urban classification. The sensors being considered differ significantly in their abilities to detect urban change and in their potential to be applied globally. Some of them do not provide temporally consistent, global data series at the intervals (such as mid-decade) that best complement the collection of population data. Others produce data that cannot be processed according to programmable rules, requiring interventions and the exercise of judgment at key junctures in the analysis, which can make replication difficult (Small 2006). Some sensors are better at detecting the fine-grained intracity details and others (such as the night-lights satellite) at delineating the broad outlines of urban settlements. As a rule, the sensors that excel at capturing fine detail tend not to be applicable globally. To sum up, there is at present no general agreement on how best to assemble a comprehensive spatial database for urban areas around the globe. The competition among methods now under way presents demographers and other social scientists with an opportunity to join physical scientists in a stimulating interdisciplinary conversation.

<A>Conclusions

The urban demographic transition is unfolding amid three fundamental and related trends in economic development. The process of globalization is evolving in a way that binds cities to each other through international networks of production and communication, exposing more cities to the benefits and risks of the international markets. New decision-making roles are being thrust upon cities as national governments begin to decentralize and off-load responsibilities in service delivery (and revenue raising) to state and municipal governments (Panel on Urban Population Dynamics 2003). The decade of the 1990s saw an increasing quantification of development objectives taking place under the rubric of the Millennium Development Goals. This refocusing of development thinking is bringing international prominence to issues that are already core concerns in the cities of poor countries, both explicitly (in target 11 on slum dwellers) and implicitly (in targets focused on water supply, sanitation, and health). Together with the pressures being exerted by demographic change, these trends will likely force upon decision makers and researchers a new recognition of the central roles of urban populations, economies, and governments in economic development.

As we have argued, a substantial workload awaits the demographic research community in assembling the data and methods needed for the upcoming urban era. Considerable effort will be required to clean the city population time series of its errors and inconsistencies. The performance of the UN forecasts of city and urban growth has been heavily criticized in recent years, and there is now general agreement on the need for a thorough critical review of forecast errors and the development of new methods (Panel on Urban Population Dynamics 2003; Bocquier 2005).

Further effort will be needed to bring spatial specificity to the city population estimates in the form of geo-coded databases. We would join Champion and Hugo (2004) in calling for a reorientation of international population databases to highlight space and geography, exploiting the most detailed available spatial units as containers for population data. These spatial "building blocks" must be defined in terms of a time series of boundary data and accompanied by demographic data at roughly the same level of detail. Remote-sensing methods will serve as increasingly valuable supplementary tools, providing easily updated information on urban spatial extents if not on population as such.

If the current level of effort continues, it may be possible in the not-too-distant future to define urban areas around the globe according to user-specified criteria for population density, contiguity, and distance. The GRUMP project shows that this is an attainable ideal. To achieve it, the city data for developing countries will need to be scrutinized by a wider set of local, country-level, and international experts than has been the case to date. For the past forty years, far too much of the urban demographic research burden has rested with the United Nations Population Division. In view of the challenges lying ahead, it is time for the burden to be more widely shared.

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Figure 6.1. <AUTHOR: PLEASE SUPPLY TITLE and SOURCE>
Figure 6.2. Beijing Administrative Units and Urban Allocation
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Figure 6.3. <AUTHOR: PLEASE SUPPLY TITLE and SOURCE>
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