

Population Geography: An Introduction

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FOR MOST OF humanity's history, the global population was small and grew at a slow pace. Estimates of the world's population at the start of the seventeenth century, on the eve of a faster population growth regime, are about 500 million. Since then, advances in medicine, sanitation, and nutrition have allowed the world's population to grow at a faster rate. By 1900, the world's population was approximately 2 billion, growing to over 6.8 billion in 2009,¹ with the last billion people added in just fourteen years. Most of that growth has occurred in the developing world²—Africa, large parts of Asia, and South and Central America. Moreover, much of the future growth of the world's population is expected to occur in the developing world, fueled by comparably high birth rates, reduced death rates, and young populations.

To view population processes, including fertility, mortality, and population movement, at work across the globe is to begin to understand many of the underlying issues in today's society, including conflict, resource use, environmental degradation, and relations between countries and their peoples. Societies around the world are characterized by or shaped by their population processes and characteristics. We may characterize, for example, populations and regions by differences in mortality and fertility processes. For instance, the infant mortality rate (IMR), which measures the number of deaths to infants less than one year of age per one thousand births, was six in developed coun-

tries, compared to a world average of forty-six in 2009. Life expectancy at birth, which measures the number of years an individual is expected to live, averaged seventy-seven years in developed countries, but only sixty-seven in developing countries. In many cases, the poor life expectancy outcomes and high death rates reflect poor or inadequate health care, the failure of governments to provide basic necessities, or educational differences. In sub-Saharan Africa, the HIV/AIDS epidemic has reshaped population profiles and reduced life expectancies.

Countries or regions are also tied together by population movement. War, refugee movements, and simple geographic interaction across space perpetuate poor health and disease. Population movement includes local residential changes as housing needs change; domestic migration associated with, for example, employment opportunities or amenities; or international migration. While local or domestic migration is rarely controlled, most countries, including many in the developing world, tightly control international movements, often restricting entry to those who qualify under specific programs. With population mobility and migration typically selecting the young and those with skills, who moves is just as important as the origins and destinations of migrants. Most developed countries actively promote the entry of individuals who are able to invest in the host country or embody the education or skills that are demanded by developed countries.

While the movement of legal immigrants is not inconsequential, illegal immigrants and refugees dominate the international movement of people. For those seeking a better life elsewhere, illegal immigration may be a desperate, but the only, option. Exemplified by the sagas of Mariel Cubans and Indo-chinese boat people and recent events in Afghanistan, Darfur, and Congo, refugees and displaced populations have become an increasingly visible issue. Defined by the United Nations, refugees are persons who are outside their country of nationality and are unable to return owing to fear of persecution for reason of race, religion, nationality, or association in a social or political group.³ Major refugee-producing countries by mid-2008 included Sudan (Darfur), Iraq, Afghanistan, and Somalia. Overall, the United Nations High Commissioner on Refugees (UNHCR) estimated that there were more than 67 million individuals of concern worldwide in 2007, including some 9.6 million refugees.⁴

The importance of considering fertility, mortality, and population movement is realizing the multiple interconnections with population, such that population underlies many of the issues facing the world today, including resource and environmental issues. Packaged with understanding population processes is the ability to understand and interpret their measurement. The primary motivation of this text is to provide the reader with a set of functional tools—measuring or

describing population processes, data, and population composition—for studying population geography, while linking to population issues such as fertility, mortality, and immigration. Although the study of population is interdisciplinary in its scope, the geographical perspective is valued through its emphasis on the role of space and place, location, regional differences, and diffusion and its ability to provide insight and bridge disparate issues. Second, the book is motivated by the need to understand population processes. In other words, in addition to introducing population studies, it also makes available to readers an overview of current and future issues related to population by drawing linkages to economic, political, and resource issues.

WHAT IS POPULATION GEOGRAPHY AND WHY STUDY IT?

Population geography is the study of the human population with respect to size, composition, spatial distribution, and changes in the population that occur over time. Populations are altered by three basic processes: fertility (births), mortality (deaths), and migration (movement of people across space), topics that this book explores in greater detail in subsequent chapters. Population geographers, like others interested in population, seek to understand the society around them, the structure of a population, and how it changes through births, deaths, and migrations. This interest is reflected in a number of professional organizations, including the Association of American Geographers (AAG) and its Population Geography Specialty Group, the Canadian Association of Geographers (CAG), and the United Kingdom's Royal Geographical Society—Institute of British Geographers. Outside of geography, the Population Association of America (PAA) is also an important venue for population geographers (table I.1).

Population research draws on many disciplines and research traditions, a multidisciplinary that is reflected in its various titles. For instance, economists, geographers, sociologists, planners, and anthropologists regularly contribute to population studies, and their methods, perspectives, and findings crossfertilize other disciplinary perspectives. More formally, *demography*, with its roots in the analysis of mortality and fertility statistics, is the statistical analysis of population, while *population studies* is often used to describe other approaches to looking at population issues, including non-statistical approaches. *Population geography* is the geographical study of population, with an emphasis on location and spatial processes.

While population geography as a formal field of study only dates from the 1950s and is therefore relatively new,⁵ this work has assumed an important

Table I.1. Professional Geographical Organizations and Leading Journals in Geography and Related Disciplines

<i>Group name</i>	<i>Journal(s)</i>	<i>Web resources</i>
Academic groups		
Association of American Geographers (AAG)	<i>The Professional Geographer</i> <i>Annals of the AAG</i>	www.aag.org www.pop.psu.edu/aag/ psg.html
Canadian Association of Geographers (CAG)	<i>The Canadian Geographer</i>	www.cag-acg.ca
Royal Geographical Society–Institute of British Geographers (RGS-IBG)	<i>Area</i> <i>Transactions</i> <i>The Geographical Journal</i>	www.rgs.org/HomePage .htm
Other groups		
Population Association of America (PAA)	<i>Demography</i>	www.popassoc.org
Population Reference Bureau (PRB)	<i>Population Bulletin</i>	www.prb.org
UN Population Division		www.un.org/esa/ population/

For a more complete list of web resources, including data sources, please refer to the websites section at the back of the book.

role within the discipline of geography. Interestingly, although there are some geographers that consider fertility and mortality differences across space, migration and the study of population mobility have assumed prominence amongst geographers. Perhaps it is the very nature and outcome of population movement, which has an ability to rapidly alter the population structure and characteristics of a region, that has focused geographer's attention. That is, population mobility is inherently spatial, connecting places both local and international. For instance, interest in movement between cities in the United States has demonstrated the impact of out-migration from the northeastern Rust Belt and the astonishing growth of the South and Southwest over the past few decades as people move in search of both employment opportunities and amenities. Complementing this movement has been that of retirees heading southward as well.

More recently, population geographers have turned their attention to international migrations. Geographers have, for instance, analyzed the economic, social, and political effects associated with international movement into the United States and other countries. Others have focused on the movement of labor between countries in the developing world. In both cases, various theoret-

ical approaches, including gendered studies, political-economic theory, Marxist theories, and/or utility-maximizing theories, have been brought to bear on the questions and issues, all highlighting the diversity of the field and its research.

Populations are governed by various natural laws—we are all born, age, and must ultimately die. On that journey from birth to death, we may go to university, be married, have children, change jobs and occupations, and move. Understanding the population around us and the transitions that are occurring within it is key. All levels of governments, for example, are interested in the structure of their populations: What percentage is over sixty-five? What proportion can vote? What proportion is less than fifteen years old? How many move and who moves or changes residential location or moves nationally or internationally in a year? What is the ethnic or racial composition of an area? From this information, governments can direct program delivery to ensure that the needs of their constituents are met. Consequently, an understanding of the composition of a population, its distribution, and how it changes over time is important and needed for planning purposes as well as the private and public sectors. For example, school boards and universities will wish to be able to project enrollment or participation in schooling. Service organizations will want to know about the elderly or immigrant populations—their size, age structure, and location—so that the appropriate services may be delivered. Likewise, retailers will wish to know similar information about the population so that they can target specific segments with their products or learn more about the buying power or retail needs of a particular group.

At an international scale, governments and other international bodies such as the United Nations and the UNHCR are interested in issues, including population growth, fertility, and the movement of people. Encompassing legal and illegal immigration, refugees, and internally displaced people, interest focuses on where people are moving from and to, the reasons for movement, and the implications for the individual, the receiving community, and the sending community. Much international immigration is prompted by economic issues and the dream of a better life.

WHAT IS THE GEOGRAPHICAL PERSPECTIVE?

As Gober and Tyner note in *Geography in America at the Dawn of the Twenty-First Century*, “geographic issues loom large.”⁶ Legal and illegal immigration; assimilation and adjustment of new arrivals to the host country; economic, social, and political responses to population movement; and population aging are among the relevant topics that are addressed by population geographers.

Moreover, these are not just “American” issues, but ones that are faced throughout the developed and developing world. Although the study of population is interdisciplinary in scope, with contributions by sociologists, economists, and anthropologists, the geographic perspective is especially valuable. Geography, by its nature, offers an integrative framework through which to view population (or other) issues. The disciplinary concerns of geography—space, regional variations, diffusion, and place, and their role in human and natural processes—provide this unique framework for looking at population issues. Space is not a unique concern to geography, and geographers do not deal exclusively with space, but it is the understanding of spatial processes, such as the diffusion of ideas associated with small families or birth control techniques, which is of interest. Whether we are interested in population issues related to fertility or immigration, spatial processes are implied as states and their governments alter the demographic makeup of nations through policies related to, for example, immigration or families. Similarly, economic systems will determine fertility behavior, and the mortality of populations and environmental crises related to pollution, deforestation, and water scarcity provide examples of the linkage between regions. These are also dynamic processes, changing over time and across the landscape, and a geographical approach enables the explanation of past, present, and future relationships and patterns.

Population geography first rose to prominence as a field of study in geography with Glenn T. Trewartha’s call for its increased study at the 1953 AAG annual meeting.⁷ Trewartha envisioned population geography as a separate sub-discipline, along with physical geography and cultural geography. Since then, geography has more commonly been divided into physical and human geography, with population geography a component of the latter.⁸

Population geography initially dealt with the geographic character of places, content to describe the location of a population and its characteristics and to explain the spatial configuration of these numbers. Wilbur Zelinsky’s 1966 book on population geography⁹ helped to further cement the field of population geography, including the description of populations, explanation for the spatial configuration of populations, and the geographical analysis of population phenomena. Reflecting population geography’s close ties to formal demography, many population geographers relied on logical positivism (combining empirical study with mathematics and scientific inquiry), quantitative methods, and the analysis of large data sources through the 1970s and 1980s. Moreover, there was a corresponding increase in computational abilities. The emergence of desktop computing and statistical software packages greatly increased the flexibility and tools at the disposal of researchers, including the ability to test hypotheses through inferential techniques and apply more complex multivariate statistical analysis.

Since Trewartha, population geography has grown in importance and scope, and many geographers have made important contributions to the field, with the field growing to draw upon a multiplicity of methods and theoretical approaches. Qualitative approaches offer detailed insights, and geographic information systems (GIS) and spatial analytical techniques offer newer insights into population processes. Most writers and researchers now place population within a broader context, recognizing the importance of place and drawing upon the diverse insights provided by geography and related social science disciplines. The diversity of conceptual approaches provided by geography provides a framework through which to view complex phenomena. Economic and cultural geography provide insights into fertility choices, which may reflect the economic needs of the family, including a trade-off between children as labor or “pension plans” and the ability to provide an education or the larger cultural expectations of society. Similarly, political, social, and cultural geography provide insight into the potential for conflict by bridging disparate issues, enabling the recognition of the interrelationships between resources, environment, politics, and policy within the realm of population geography.

CURRENT RESEARCH THEMES AND CONTRIBUTIONS OF POPULATION GEOGRAPHERS

We cannot hope to completely enumerate the variety of research subjects (or researchers!) that are included within the fold of population geography, particularly when, as Ogden notes,¹⁰ some geographers who do population-related work do not call themselves population geographers. Instead, they may describe their work through cultural, ethnic, or rural geography. The 2005 publication *Geography in America at the Dawn of the Twenty-First Century*¹¹ identified six research themes in population geography: (1) internal migration and residential mobility, (2) international migration and transnationalism, (3) immigrant assimilation and adjustment and the emergence of ethnic enclaves, (4) regional demographic variation, (5) social theory and population processes, and (6) public policy.

Amongst these, internal migration and residential mobility has largely defined population geography, and includes the work of geographers such as Plane, Brown, Moore, Rogerson, Long, Clark, and Cushing. Research themes include the relationship between migration and economic cycles and restructuring, the effects of demographic cycles (i.e., population aging and the baby boom cohort) on migration, life course perspectives on population mobility, and ethnographic approaches to migration.

Research associated with international migration, transnationalism, immigrant assimilation, adjustment, and ethnic enclaves remains important for population geographers. Edited volumes such as *EthniCity*¹² and *Migration and Restructuring in the US*¹³ highlight the varied contributions of geographers to this area. Other individual researchers have explored the evolution of immigrant settlements and enclaves over time,¹⁴ residential dispersion,¹⁵ circular migration,¹⁶ and the economic integration of new arrivals.¹⁷ David Ley¹⁸ has explored concepts of transnationalism, particularly in the context of Canada. In a similar way, Crush and McDonald¹⁹ have explored the role of transnationalism in Africa.

Research evaluating regional demographic variation highlights such questions as differential population aging, fertility rates, and migration propensities. Geographers have long noted significant variations in migration rates between US states, particularly with respect to retirement migration, aging in place, and poverty migration.²⁰ Other population processes have not escaped geography's attention, with, for example, Franklin²¹ exploring regional variations in Italian fertility levels, while many "health geographers" study mortality and morbidity patterns within populations.

Social theorists, including Blue,²² Findlay,²³ McHugh,²⁴ Silvey,²⁵ and others, have sought to incorporate issues such as gender and race into alternative approaches to the study of population geography. This approach has often included greater emphasis on ethnographic and qualitative methods. Finally, public policy has been engaged by researchers including Morrill²⁶ and Clark and Morison,²⁷ who explore the intersection between population structure (i.e., race, ethnicity), legislative redistricting, and voting.

The use of diverse quantitative and qualitative techniques including GIS and spatial analysis techniques builds upon the tradition of spatial population geography.²⁸ This has meant that population geographers have applied themselves and their work outside the traditional domains of population research, engaging in health, transportation, and economic analyses. Concurrently, newly emergent themes and research directions include more active links to environmental geography. Although population issues frequently lie at the heart of environmental issues, as with the relationship between human migration and environmental degradation, social and ethnic unrest, or food security,²⁹ there has been relatively little attention to the shared research agendas, although this is now changing.³⁰ Arguably, nongeographers, including Homer-Dixon,³¹ have been quicker to realize population-environment linkages, while other nongeographers have noted the relationships between population and health³² and population and economic growth.³³ This is not to say geographers have not contributed to these debates, but rather that there is much room for additional geographical insight. Similarly, population geographers need to further address the relationship between population and economic develop-

ment.³⁴ Additionally, increased ties are emerging between population geography, GIS, and spatial analysis, reflecting the increased integration of these tools into geography in general.

OVERVIEW OF THE BOOK

The primary motivation of this text is to identify and discuss population issues such as fertility, mortality, and immigration, while also providing the reader with a set of functional tools—measuring or describing population processes, data, and population composition—for studying population geography. The book is structured into substantive chapters that focus on particular population processes and related issues. Each of the substantive chapters also have “Focus” and “Methods, Measures, and Tools” boxes embedded in the text. The intent is to weave the overall discussion of each chapter into more specific examples, including issues or areas of particular interest as well as a discussion of how population geography research is performed. While measures and tools that population geographers frequently use are presented in the text, the intent is not necessarily to provide full explanation and descriptions—existing software programs, basic statistical analysis packages, and the increased use of the World Wide Web essentially mean that many of the tools are easily and quickly automated. Instead, the intent is to provide an understanding of the tools and link their use to issues. As such, “Focus” boxes will present “real-world” examples to illustrate the concepts discussed in each chapter, including their use and interpretation. Methods, Measures, and Tools boxes will illustrate methods and measures commonly used by population geographers (i.e., population projection techniques).

FOCUS: THE IMPORTANCE OF SPATIAL SCALE

It is important to realize that spatial phenomena, such as population movement, do not occur at just one geographic scale. The phenomena of interest for the geographer may occur at a variety of spatial scales ranging from the individual to the international. For instance, people may move between houses within their immediate neighborhood, within the same city, across the country, or internationally, with each move potentially explained by a different set of

factors. For the household moving locally, for example, the move may be driven by the need for more (or less) space as the family size changes, while they want to remain in the same area where friendships have been established. For the household moving across the country, the move may reflect starting a new job or going to school, the search for employment, or retirement to a location with greater amenities or that is closer to family. Similarly, at one scale fer-

tility choices may reflect the particulars of that place—its ethnic or religious makeup, for example, details which may be “washed out” at larger scales as larger populations are averaged together.

For this reason, we must be aware of the implications that our choice of spatial scale has on the outcome and its interpretation. First, changing the scale of analysis often implies that a different set of questions (and potentially methods) must be applied to the problem. For the researcher interested in local issues, questions may focus more on neighborhood and household/family effects, while economic and amenity effects may dominate larger-scale analyses.

Second, changing spatial scale often changes what we can physically observe. For the migration analyst, this is particularly acute, given the well-known fact that people are more likely to move over short distances than they are over longer ones, a conclusion that dates back to the writings of Ravenstein in the 1800s.¹ More generally, the number of observed migrants depends on the size, shape, population distribution, and characteristics of the population (i.e., older populations are less likely to move than younger populations) within the study area.²

Third, the so-called modifiable areal unit problem (MAUP) has been an issue that has

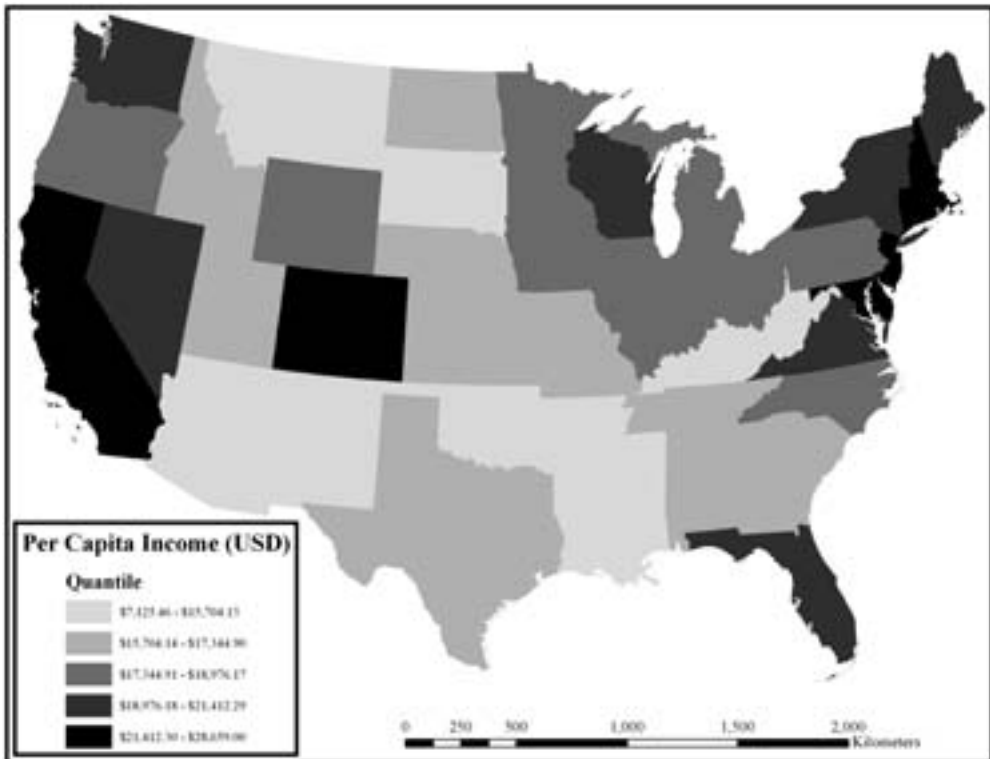


Figure IF.1 Per-capita Income by State, 1999.

Compare this figure with that in 1MMT.1b, which maps the same data at the county scale. The detail in the latter map is missing in this one.

Source: Author.

concerned geographers and cartographers alike. MAUP is a potential source of error that can affect studies that utilize aggregate data sources and is closely related to ecological fallacy, or the errors in allowing inferences about individual behavior when the analysis is based on group or area statistics. In order to present results, geographical data are often aggregated and mapped to spatial objects such as census tracts, providing an illustration of the spatial phenomena. However, these zones and their boundaries are often arbitrary in nature, defined by statistical organizations such as the Census Bureau. While changing the geographical scale (i.e., moving from the census tract to an enumeration area) can be just as meaningful for the presentation of the data, the revisualization may also provide a different representation of the information. For instance, the appearance of spatial clustering at one scale may not be visible at another. Moreover, differ-

ent processes may be responsible for the outcome of interest.

Clearly, these issues of spatial scale are not mutually exclusive. However, the choice of the spatial zones that are to be used must be given careful consideration, with a preference to use the smallest, and most meaningful, spatial scale possible. However, it should also be noted that this preference only holds when the data at that scale is reliable and when any processes at smaller scales are stable. Failing either of these, the analyst should turn to the geographic scale that does meet these requirements. This is not to say that the impact of spatial scale should be avoided and that comparisons across spatial scales are inappropriate. In fact, complementary results based on analyses at different scales are often noted, and comparisons yield important insights into underlying spatial processes, with an understanding of the process at one scale aiding the analysis at another scale.

METHODS, MEASURES, AND TOOLS: TOOLS OF THE POPULATION GEOGRAPHER

Population geography, like demography in general, has traditionally been strongly rooted in empiricism and statistical analysis. As a field of study, population geography does not have its own set of analytical tools that define the field of research, although geographic information systems come close. Instead, the tools of the population geographer reflect those of related disciplines, including cartography, demography, economics, anthropology, and sociology. As such, population geographers rely on a variety of tools and methods that are

shared across disciplinary fields. These tools can be broadly summarized under data, methods, and presentation.

DATA

Clearly, any analysis or insight into population processes is dependent on data. If, for example, we wish to gauge the fertility of a population, we need to know such things as the number of children born to each woman, the age of the mother at the time of the child's birth, and the total population of

women eligible to give birth. In considering these population counts, we do not want to attribute births to males or to individuals who are either too young or too old to conceive, although we also need to make some assumptions, including that most births occur to women between the ages of 15 and 49. While births can (and do) happen to either younger or older women, these are a numerically small proportion of all births, and are not typically included in formal measures.

Data are therefore an important part of the population geographer's toolbox. Researchers often turn to large, publicly available data sources such as those collected by the US Census Bureau or other statistical agencies. These large surveys are typically representative of the total population, are geographically extensive, and include demographic, economic, and social data pertaining to a specific time on all persons in a country. Alternatively, researchers may conduct their own surveys and data collection. These are typically associated with more specialized research questions or geographic areas, may include a qualitative component, and capture information that may not be available in larger surveys.

Data can be divided into two main types: qualitative and quantitative. *Qualitative data* consists of nonnumerical information such as text, images, or verbal descriptions. Qualitative data may be obtained through case studies, open-ended interviews, focus groups, participant observation, or diary methods. *Quantitative data* is numerical and includes counts, rates, or scales reflecting experimental outcomes or data collected from questionnaires. Quantitative data provide information to which statistical analysis can be applied, including population projection methods such as the cohort component model, life tables from demography, and other multivariate meth-

ods including regression analysis. These methods commonly provide an indication of statistical significance and therefore either prove or disprove hypotheses.

METHODS

Methodology is also important, with methods often reflecting data sources and how data is collected. Both qualitative and quantitative data have different assumptions and reflect different theoretical approaches to the analysis and questions that are brought to bear on population issues. How population processes are defined and measured may alter the empirical measurement and the derived conclusions. How, for example, are the data operationalized and interpreted? What analytical methods are to be used?

Echoing the two broad types of data, *qualitative methods* are concerned with describing meaning rather than with drawing statistical inferences. While qualitative methods (e.g., case studies and interviews) lose generalizability and reliability, they provide greater depth of analysis along with typically rich descriptions of the process being studied. Qualitative analysis is aided by computer programs, including Nvivo (www.qsrinternational.com/). *Quantitative methods*, on the other hand, are those methods that focus on numbers and frequencies rather than on meaning and experience. Methods including descriptive, inferential, and multivariate statistical techniques such as regression analysis allow the researcher to understand and model the outcome of interest, and are aided by the many statistical packages that are available. Common packages include SAS (www.sas.com), STATA (www.stata.com), and SPSS (www.spss.com). Quantitative methods are associated with the scientific and

experimental approach and are criticized for not providing an in-depth description. The use of large data files such as those generated by the US Census Bureau has often been accompanied by positivistic theoretical approaches, the goal of which is to verify (or falsify) empirical observations and to construct laws that can be generalized to a wide variety of models and theories.¹

Population geographers also have at their disposal a series of other measures that can be used to describe population composition, fertility, mortality, and movement. For instance, the total fertility rate provides a numerical representation of the number of children born to a woman over her reproductive life, migration rates capture the propensity to move or likelihood of moving relative to some geographic area within a population, and mortality rates define death processes within a society. Such measures are defined in greater detail elsewhere in this book.

The wealth of data sources, including census products, has enabled population geographers and other social scientists to understand population trends and their spatial consequences. Their widespread use, and the use of related data files, is due in large part to their validity and the detail found in data sources such as the census.

At the same time, increasing emphasis has been placed on the use of qualitative methods within population geography.² The ongoing reliance on empirical analyses has led some researchers to charge that too much emphasis has been placed on empirical data, with the data influencing the choice of methods and approaches while missing or failing to give adequate attention to questions of theoretical development and relationships. In other words, research questions have been limited by and, in many cases, defined by the availability of data such as the census.³

PRESENTATION

Presentation of the data and final results is also important. While tabular or written (report) formats are common, the amount of data and its geographical nature means that maps are frequently used to easily and conveniently display information. The emergence and availability of mapping tools and geographic information systems (GIS) over the past two decades have enabled the storage, presentation, and analysis of large amounts of geographical data. The Methods, Measures, and Tools discussion in chapter 1 covers this material in greater depth.

