

CHAPTER 1

Introduction

Does growth hurt or help the urban environment? The answer, in a nutshell, is “both.” Rapid growth in Asia has caused ambient particulate levels in at least twenty-five cities to rise above three times the World Health Organization’s standard of 90 micrograms per cubic meter, and the mountains of refuse skirting Mexico City have become notorious worldwide. But in other parts of the world, many cities have made a dramatic quality of life comeback while continuing to grow.

In nineteenth-century New York, to take a striking example, many urbanites contended daily with fouled water, soot-darkened air, and deafening noise—to say nothing of the dead and dying horses abandoned on the streets.¹ Yet in 2004 the city’s bid to host the 2012 Olympics highlighted its commitment to protecting the environment and touted New York as “a city of green.”² During the nineteenth and early twentieth centuries, the skies above such major cities as Chicago and Pittsburgh were dark with smoke from steel smelters and other heavy industrial plants. Today, Chicago and Pittsburgh are much cleaner than they were forty years ago, and even Los Angeles has experienced a dramatic reduction in smog levels despite rapid growth in population and

1. Melosi (1982); Melosi (2001).

2. “Theme 5—Environment and Meteorology,” *NYC2012 Bid Book*, p. 77 (www.greenorder.com/pdf/news/NYC2012_Bid_Ch5.pdf [April 2006]).

vehicle mileage. In 1880 the average urbanite in the United States had a life expectancy ten years lower than the average rural resident.³ By 1940 this urban mortality premium had vanished.

Why do some growing cities suffer environmental degradation while others are able to preserve or even enhance their environmental quality? In recent years much work in environmental economics has focused on this question. This book draws extensively on this literature to convey what is and is not known about the environmental consequences of urban growth. While economics is called the “dismal science,” economists tend to be optimistic about the consequences of economic growth.⁴ Most economists have a fair amount of faith in humanity’s ability to respond to incentives to economize on polluting activities. In contrast, many ecologists and environmentalists remain wary of capitalism’s impact on the environment. This book does not seek to settle this dispute. Instead, its goal is to convey the excitement of an ongoing debate over the environmental consequences of market-driven growth.

Understanding the relationship between economic development and urban environmental quality is no mere academic exercise. In 2000, 80 percent of the U.S population lived in a metropolitan area, and urban growth is taking place around the world. In 1950, 30 percent of the world’s population lived in cities. In 2000 this fraction grew to 47 percent, and it is predicted to rise to 60 percent by 2030.⁵ Most of these cities are located in capitalist economies. With the demise of communism and China’s economic transition, most urbanites live, work, and shop in free-market economies. Thus the future of urban environmental quality depends on how pollution evolves in conjunction with free-market growth.

3. Haines (2001).

4. However, the most optimistic recent book about environmental trends was written not by an economist but by political scientist Bjørn Lomborg, who generated headlines by arguing in *The Skeptical Environmentalist* that most environmental problems are getting better, not worse (Lomborg 2001). This punch line was backed up by 173 figures and 2,930 footnotes. Lomborg’s provocative book provided detailed evidence on long-run trends, but it did not explain why some environmental indices, such as urban smog, are getting better in many cities while other sustainability indicators, such as carbon dioxide production, are getting worse.

5. United Nations, “World Population Prospects: The 2004 Revision Population Database” (esa.un.org/unpp [October 2005]).

The economists' main contribution to analysis of this issue is the concept of the environmental Kuznets curve (EKC).⁶ Put succinctly, this hypothesis posits that economic development is both a *foe* and a *friend* of urban environmental quality. Economic development—especially in poorer cities—often leads environmental quality to decline, but continued development can help middle-income and richer cities solve many pollution-related problems. Why? Because as income grows, consumption and production patterns become increasingly “green” while the prospects for greener governance improve. Many studies have identified environmental indicators that fit the EKC pattern in the fifteen years since it was introduced.

But environmentalists have raised a number of important objections to the optimism implicit in the EKC. For example, some argue that even if the EKC is correct, it provides little hope to poor cities that may be trapped for a long time on the wrong side of the curve. The EKC may also have little relevance in many important areas, such as pollution problems that involve externalities on a global scale. Moreover, by focusing on changes in income, the EKC gives an incomplete picture of urban growth and its impact on environmental quality. These issues will all be taken up in this book.

What Is a Green City?

Before proceeding further, some terms should be defined. First, although I frequently highlight specific challenges facing central cities, the term *city* generally refers to a broader metropolitan area. For example, “Chicago” represents the greater metropolitan area surrounding the city of Chicago. A *metropolitan area* is a core area containing a substantial population nucleus, together with adjacent communities having a high degree of social and economic integration with that core. Metropolitan areas can comprise one or more entire counties.⁷ Focusing on metropoli-

6. Simon Kuznets won the Nobel Prize in Economics in 1971. He studied the cross-national relationship between national per capita income and national income inequality and found evidence of a nonlinear pattern. Gene Grossman and Alan Krueger later identified a similar relationship between per capita income and pollution, as discussed in chapter 3 (Grossman and Krueger 1995).

7. See U.S. Census Bureau, “Metropolitan and Micropolitan Statistical Areas” (www.census.gov/population/www/estimates/metroarea.html [October 2005]).

tan areas makes sense because in the United States at least, a majority of people and jobs are now located within metropolitan areas but outside center cities.

Defining greenness is a tougher task. Many of us have an intuitive sense of what sets a *green* city, such as Portland, Oregon, apart from *brown* urban centers, like Mexico City. Green cities have clean air and water and pleasant streets and parks. Green cities are resilient in the face of natural disasters, and the risk of major infectious disease outbreaks in such cities is low. Green cities also encourage green behavior, such as the use of public transit, and their ecological impact is relatively small.

Can this subjective definition of a green city be translated into objective indicators of urban environmental quality? Chapter 2 examines efforts in three different fields to do just that. Ecologists emphasize the importance of tracking the size of a city's ecological footprint. This approach focuses on how much people consume and how much carbon dioxide is produced as a byproduct of urban consumption and production. Public health experts focus on the health consequences of exposure to local air pollutants, dirty water, and other environmental factors that promote disease. Based on this approach, a city is considered green if the incidence of environmentally linked diseases is relatively low. Finally, many economists evaluate the urban environment by examining differences in real estate prices across cities at a point in time or for the same city over time. If home prices are much higher in San Francisco than in Detroit, this suggests that people prefer to live in San Francisco—in part because of its superior environmental quality. Otherwise, mobile households could enjoy a “free lunch”—a cheap house with no sacrifice of quality of life—by moving from San Francisco to Detroit.

Each approach has advantages and disadvantages. Equally important, the three approaches can lead to different conclusions about urban environmental quality. For example, some cities boast low local pollution levels and a high quality of life but generate relatively high levels of greenhouse gases. Are these green cities? The answer to this question depends on how one prioritizes local urban challenges, such as smog, versus longer-run global challenges, such as climate change. Chapter 2 addresses this problem by suggesting how various indicators can be combined to create a “green city” index. Although we currently lack the data necessary to construct such an index, this exercise helps clarify what we mean when we say that a city is green. My own view is that a green city should score high marks when graded on both a local and a

global scale. In other words, in addition to enjoying the benefits of clean air and water, its residents should avoid imposing negative externalities on people who live beyond the city's borders.

The Two Faces of Growth

How does growth affect a city's prospects for becoming more—or less—green? Chapter 3 takes a first cut at this problem by providing an overview of the environmental Kuznets curve, including a discussion of its history and some examples of environmental indicators that follow the EKC pattern—that is, first deteriorating and then improving as per capita income grows. This chapter briefly describes the main channels through which income growth affects environmental quality, as well as several key factors that can alter the shape of the EKC. In addition, it presents several limitations to the hypothesis, including concerns raised by environmentalists.

Income Growth and the Urban Environment

Chapters 4 and 5 explore the mechanisms behind the EKC in greater detail. Chapter 4 examines how income growth can enhance urban sustainability—even in the absence of government intervention—by promoting changes in urban consumption and production patterns. Richer urbanites, for example, are more likely to purchase green products and amenities, such as newer vehicles that pollute less per mile. In addition, as wages and education rise, a city's industrial composition often changes. Heavy manufacturing tends to be priced out of richer cities, giving way to relatively low-pollution industries, such as services and finance. These sectors rely on access to a well-educated workforce, which gives them a financial incentive to participate in efforts to preserve a city's quality of life.

Chapter 5 moves beyond the market to investigate how income growth affects the prospects for greener urban governance. Economic development can potentially increase both the demand for and supply of environmental regulation. As residents become wealthier, they have an increased desire to live in a high quality of life area. As a result politicians have stronger incentives to invest in green policies. They also have greater access to policy resources as a city's income grows. Chapter 5 addresses these issues by examining recent efforts to confront major

urban environmental challenges in the United States. It also highlights regulation's intended and unintended effects.

Population Growth and the Urban Environment

By focusing on growth in income, the environmental Kuznets curve hypothesis neglects other key aspects of urban growth. Chapters 6 and 7 remedy this oversight by exploring the relationships among population growth, population density, and spatial growth in cities in the developing world and the United States.

Chapter 6 focuses on the relationship between urban population growth and environmental quality. In many developing nations, cities act as magnets, drawing people out of the countryside to urban jobs. Inevitably, a growing urban population consumes more resources and generates increased waste. In the absence of effective policies to counteract these effects, fast-growing cities in developing countries experience sharp increases in all types of pollution. Ongoing research attempts to measure the quantitative size of these effects.

Population growth can also contribute to urban environmental problems in other ways. Growth often increases urban income inequality and ethnic heterogeneity. In a highly diverse city, different interest groups may disagree over what is “good public policy” and who should pay for these policies. Chapter 6 investigates some of the effects this dynamic can have on the urban environment.

Spatial Growth and the Urban Environment

While many cities in developing countries suffer environmental problems due to high population density, in the United States, the fastest growth is taking place in low-density, car-friendly metropolitan areas. According to U.S. census data, in 2000, across all metropolitan areas in the United States, 53 percent of employed heads of households lived in detached homes and commuted to work in private vehicles. Environmentalists argue that this suburban sprawl is socially costly. They claim that the pursuit of the “American Dream”—often defined as owning two cars and a large suburban house—translates, in aggregate, into an enormous ecological footprint. Chapter 7 presents new evidence on how suburbanization affects household resource consumption and urban sustainability.

Beyond City Limits

While continuing to grapple with local environmental problems, many cities also expect to face new challenges as a result of climate change. For example, coastal cities, especially those closer to the equator, will face a greater risk of flooding and extreme heat. Does Hurricane Katrina's blow to New Orleans foreshadow future urban impacts? If climate change increases the frequency and severity of natural disasters, the answer may be yes.

In theory cities could help head off these problems. After all, cities are leading centers of idea generation. Urban centers may incubate new technologies that could weaken the link between economic activity and greenhouse gas production. But cities also play a major role in increasing the risk of climate change by generating greenhouse gases, such as carbon dioxide. Since reducing emissions is costly, and the benefits of doing so are shared with the rest of the world, each city has few incentives to limit greenhouse gas production on its own. This is a classic example of the free-rider problem.

Will urban growth simply exacerbate the problem of climate change, or can it help address this challenge? In the short term, it seems likely to make the problem worse. Urban growth fosters economic development by encouraging trade and specialization. As incomes rise, households consume more energy at home, at work, and on the road. However, urban growth can also have potentially offsetting effects. For example, urbanization can reduce population growth at the national level and facilitate emission-reducing technological advance. Does this suggest that greenhouse gas production is likely to follow the pattern of the EKC? Chapter 8 reviews the evidence on this question and concludes by asking what climate change is likely to mean for cities around the world.