

I BACKGROUND AND OBJECTIVES

1. The magnitude of global urban expansion

The population in developing-country cities is expected to double in the next thirty years: from some 2 billion in 2000 to almost 4 billion in 2030.¹ According to our own preliminary estimates, cities with populations in excess of 100,000 contained 1.7 billion people in 2000, and their total built-up area—at average densities of some 8,000 persons per square kilometer²—was of the order of 200,000 square kilometers at that time. If average densities continue to decline at the annual rate of 1.7%—as they have during the past decade—the built-up area of developing-country cities will increase to more than 600,000 square kilometers by 2030. In other words, by 2030 these cities can be expected to triple their land area, with every new resident converting, on average, some 160 square meters of non-urban to urban land during the coming years.

In parallel, the urban population of industrialized countries is now expected to grow by 11% in the next thirty years: from some 0.9 billion to 1 billion.³ According to our own provisional estimates, cities with population in excess of 100,000 contained some 600 million people in 2000, and their total built-up area—at average densities of almost 3,000 persons per square kilometer⁴—was of the order of 200,000 square kilometers at that time. If average densities continue to decline at the annual rate of 2.2%—as they have during the past decade—the built-up area of industrialized-country cities will increase to some 500,000 square kilometers by 2030. In other words, by 2030 these cities can be expected to increase their populations by 20% and their land areas by 2.5 times, with every new resident converting, on average, some 500 square meters of non-urban to urban land.

In total, urban built-up areas in the world consumed some 400,000 square kilometers in 2000, or 0.3% of the total land area of countries, estimated at some 130 million square kilometers.⁵ The land taken up by cities amounted to some 3% of arable land, estimated

¹ See United Nations, 2004, *World Urbanization Prospects—The 2003 Revision*, New York: United Nations, table 1, 14. The urban population in developing countries is expected to grow from 1.93 billion in 2000 to 3.97 billion in 2030.

² The weighted average built-up area density for developing-country cities in our provisional sample of 90 in 2000 was found to be 8,049 persons per square kilometer (see table IV-2, Chapter 4).

³ United Nations, 2004, table 1, 14. The urban population in industrialized countries is expected to grow from 0.88 billion in 2000 to 1.01 billion in 2030.

⁴ The weighted average built-up area density for industrialized-country cities in our provisional sample of 90 in 2000 was found to be 2,824 persons per square kilometer (see table IV-2, Chapter 4).

⁵ This estimate is considerably lower than previously published estimates. The Earth Institute at Columbia University, for example, recently announced that “GRUMP [Global urban Rural Mapping Project] data indicate that roughly 3% of the Earth’s land surface is occupied by

at 14 million square kilometers in 2000.⁶ Cities are now expected to grow 2.5 times in area by 2030, consuming some 1 million square kilometers, or 1.1% of the total land area of countries. They may possibly consume as much as 5–7% of total arable land, depending on the future rate of expansion of arable land, which is currently 2% per annum.

2. The implications of urban expansion

What are the implications of the accelerated rate of global urban expansion and what can or should be done about it?

The basic dimensions of the policy debate on the expansion of cities are certainly not new. The age-old question underlying this debate is still whether expansion should be resisted, accepted, or welcomed. At one extreme, there have been those who fought to limit the growth of cities by any and all means. At the other, there were those who welcomed it and actively prepared cities for absorbing the oncoming waves of new migrants. Two historical examples—one from London and one from New York—can serve to frame this debate.

In 1580, under pressure from the influential guilds, which were fearful of competition from recently arrived craftsmen, Queen Elisabeth issued a proclamation restricting development near and within the city. Enacted by Parliament in 1592, her decree had three major provisions: to prohibit “any new building of any house or tenement within three miles of any of the gates of the said city of London; to restrict the construction of habitations ‘where no former house has been known to have been’; and to forbid in any house “any more families than one only to be placed”.... [B]etween 1602 and 1630, no fewer than fourteen such proclamations were enacted in attempts to limit London’s growth.⁷

In contrast, in 1811, when New York City had only 100,000 people crowded into the southern tip of the island of Manhattan, three Commissioners—Morris, de Witt Clinton and Rutherford—drafted a plan to expand its street grid so as to prepare for more than a *tenfold* increase in the city’s population. In presenting their now-famous plan, the Commissioners remarked:

urban areas, an increase of at least 50% over previous estimates that urban areas occupied 1-2% of the Earth’s total land area”; see *Earth Institute News*, posted on 8 March 2005 at www.earthinstitute.columbia.edu/news/2005/story03-07-05.html. The GRUMP estimates are based mostly on night light data, as against the *Landsat* data used in our estimates. These and other differences in defining and measuring urban built-up areas will be discussed at length in Chapter IV.

⁶ World Bank, *World Development Indicators—2005*, Washington DC: World Bank.

⁷ Lai, Richard Tseng-Yu, 1988, *Law in Urban Design and Planning*, New York: Von Nostrand, 27–33.

To some it may be a matter of surprise that the whole island has not been laid out as a city. To others it may be a subject of merriment that the commissioners have provided space for any population that is collected at any spot on this side of China.⁸

Four hundred years have passed since the Queen's proclamation and two hundred years since the Commissioners' plan. Still, the fundamental question of whether urban expansion should be resisted, accepted or welcomed is still with us today and is still largely unresolved. While many will readily agree that urban expansion is an issue of serious concern, there is no consensus among scholars, policy makers or urban residents themselves about whether further development should be restricted or encouraged. In the US, for example, respondents to a survey in 2000 by the Pew Center for Civic Journalism "were almost evenly split between those wanting local government to limit further development to the infilling of already built-up areas and those wanting local government to also plan for and encourage new development on previously undeveloped areas".⁹

In industrialized countries, where rural-urban migration is now minimal and where most population movements are now inter-urban or intra-urban, there have been recent attempts to provide answers to this question that are particularly relevant to their present level of urbanization and development. Concerns for unwieldy urban expansion—typically castigated as "sprawl"—have recaptured the attention of both policy makers, academics and, more recently, voters during the last decade. In contrast, we note, virtually no attention has been paid to this issue in developing countries, where levels of urbanization and development are typically lower, where rural-urban migration has by no means ebbed, and where most urban population growth is about to take place.

The central objective of the Urban Growth Management Initiative is to examine the available policy options for confronting the projected urban expansion in the cities of developing countries. In other words, it seeks an answer to the question of what can and should be done about it. This demands gaining a better understanding of the key dimensions of this expansion as well as of the forces that are driving it globally, regionally and locally, so as to be able to consider carefully the kinds of policies that are likely to be effective, efficient, equitable and sustainable, while keeping in mind that such policies may be quite different from those available or of interest in industrialized-country cities.

Why should we concern ourselves with the projected spatial expansion of developing-country cities? Does urban expansion take place in substantially different forms, or is it essentially identical everywhere? Does it really matter in what form it takes place? What are the forces that are now shaping urban expansion? How can we

⁸ Morris, de Witt Clinton and Rutherford, quote in Mackay, Donald A., 1987, *The Building of Manhattan*, New York: Harper and Row, 20.

⁹ Burchfield, Marcy, Henry G. Overman, Diego Puga and Mathew E. Turner, 2004, "The Determinants of Urban Sprawl: Portrait from Space", unpublished manuscript, 7 October, 1.

measure urban expansion in meaningful ways that address our concerns? What are the key policy areas that have a bearing on shaping urban expansion? At this early stage, the Urban Growth Management Initiative seeks to begin to provide meaningful answers to these questions and to lay the foundations for fruitful research on and effective action to manage urban expansion in developing-country cities.

3. Concerns about urban expansion

Why should we concern ourselves with the projected spatial expansion of developing-country cities, and why now?

Considering that research and policy interests are often subject to fashion and that such fashions originate in the metropolitan centers of industrialized countries, we should suspect that the recent concerns with “sprawl” would be diffused globally, and sooner rather than later. These concerns have now become paramount, especially in the United States:

In 1998, New Jersey voters approved a plan to buy one million acres of undeveloped land (20% of the state’s total land area) using state funding, to ensure that this land is never developed. Between 1998 and 2002, another 620 ballot measures allocating \$25 billion in public funds for land conservation measures were approved by voters across the United States. Sprawl, and urban land development more generally, have become central topics in election campaigns, the main concerns of some of the most prominent environmental groups, and a constant subject of media attention. In fact, sprawl and land development tied with crime and violence as the most important local issue for Americans in a recent survey by the Pew Center for civic Journalism.¹⁰

Given the attention to “sprawl” in the centers of opinion-making, and given that most data on “sprawl”—on both its causes and its consequences—is only available in industrialized countries, there is a danger that our understanding of urban expansion and the actions chosen to confront it will be unduly influenced by established concerns or by tested policies that are largely irrelevant to developing-country cities. In these cities, public and private resources, development priorities, and modes of governance—to name a few—are quite different from those prevailing in the industrialized countries and, as such, merit different analyses and different policy responses. This study seeks to generate new data for the dimensions of urban expansion in developing-country cities and the forces shaping it, so that they can be compared to those in industrialized-country cities, and so that the commonalities and differences between them can be better understood.

¹⁰ Burchfield et al, 2004, 1. The information in the quote was obtained from Trust for Public Land and Land Trust Alliance, 2002, 2003; and from the Pew Center for Civic Journalism, 2000.

4. The form of urban expansion

Does urban expansion take place in substantially different forms, or is it essentially identical everywhere?

Urban expansion takes places in substantially different forms. In any given city, new urban expansion can take place with the same densities (persons per square kilometer) as those prevailing in existing built-up areas, with increased densities, or with reduced densities. It can take place through the redevelopment of built-up areas at higher densities, through infill of the remaining open spaces in already built-up areas, or through new “greenfield” development in areas previously in non-urban use. New greenfield development can either be contiguous with existing built-up areas or can “leapfrog” away from them, leaving swaths of undeveloped land that separate it from existing built-up areas. It can encroach upon wetlands, watersheds, forests, and other sensitive environments that need to be protected, as well as upon farms, fields, and orchards surrounding the city. And it can thus reduce, maintain or increase open space in and around the city.

New expansion can contain a higher, equal, or lower percentage of residential areas vis-à-vis employment opportunities. New employment opportunities, as well as new residences, can be centralized in a small number of locations or spread out over entire newly urbanized areas. Expansion may take place along corridors, resulting in a star-shaped or elongated city, or in areas closest to the city center, resulting in a more-or-less circular city. It can be orderly—properly laid out in simple geometric forms—and it can be disorderly. It may leave adequate rights-of-way for roads and other necessary infrastructure, or it may leave too little or too much land for roads. The infrastructure accompanying urban expansion may be of varying quality, reflecting very different levels of investment, maintenance and repair. New land development can be largely legally sanctioned, conforming to strict zoning for separate land uses or to mixed zoning for mixed land uses. It can also be largely illegal, entailing either squatter invasions, informal land subdivisions, non-compliance with zoning and building codes, or construction both on steep slopes and in flood plains, which can be subject to mudslides and inundation, respectively.

One of the aims of the study is to examine the different forms that urban expansion takes by looking at the size and shape of built-up areas in a global sample of 120 cities and associating them with their populations. This is done, as we shall detail in the next chapter, by first classifying satellite images of these cities in two time periods—approximately a decade apart—into built-up and non-built-up areas; by then associating these built-up areas with the populations residing in them in the two time periods, using available census data for the appropriate administrative districts comprising the urban area; and finally by deriving, for each city in the sample, a number of metrics associated with urban extent and expansion.

These metrics make it possible to examine the extent to which different cities fall into different urban expansion “regimes” or cohorts. Comparative research on economic growth and convergence among different countries, for example, has found such division of countries into groups, based on initial conditions, to be important in

understanding why economic growth proceeds at persistently different rates in different countries.¹¹ Using similar techniques, we identify the variables that distinguish groups of cities that display a similar within-group structure of urban expansion. This provides a useful scientific insight into the structure of urban expansion and its sensitivity to initial conditions, as well as a superior foundation for policy recommendations tailored to the individual characteristics of each metropolitan area.

5. The consequences of urban expansion

Does it really matter in what form urban expansion takes?

The available evidence—although spotty, controversial, and not necessarily applicable to developing-country cities—suggests that the above-mentioned differences in the growth and expansion of cities are associated with both positive and adverse outcomes that affect the welfare and wellbeing of their citizens. Some outcomes associated with urban expansion—e.g. the increased production of greenhouse gases associated with increased car travel in low-density cities—may even transcend urban boundaries.

In most cases, however, it is difficult to speak of the “consequences” of different forms of urban expansion, because the cause-and-effect relationships between different phenomena are all too often hard to ascertain. To take one example, say lower-density cities are found to be associated with higher level of car use. Does that imply that lower-density cities require higher levels of car use or that the ready availability of cars makes lower-density cities possible? Or, to take another example, say lower-density cities are associated with lower house prices and hence with larger houses. Can we conclude that larger houses are the consequence of lower urban densities or are the preferences for larger houses driving densities down?

Leaving aside the issue of causality for the moment, the available literature is rife with blame for inappropriate—and therefore unnecessarily costly—urban expansion. Most blame is directed at expansive, leapfrogging “greenfield” development. It is claimed that such development reduces both access and view of open space; it encroaches on sensitive environments and on prized farmland; it requires longer journeys to work; it leads to higher levels of car use and therefore to higher levels of air pollution, energy use, and the production of greenhouse gases; it increases dependence on cars; it is careless about the carless; it makes public transport less attractive and less efficient; it requires longer and more costly extensions of public infrastructure networks; it imposes additional costs (externalities) on sitting residents; it diverts construction away from central areas that need to be redeveloped; it reduces social interaction and

¹¹ See, for example, Durlauf, S. and P. Johnson, [1995], “Multiple Regimes and Cross Country Growth Behavior”, *Journal of Applied Econometrics*, 10(4): 365-384. Using a sample of a similar size to that collected for this research, they employ regression trees to identify groups of countries that display similar within-group—but different between-group—growth behavior.

makes for a less exciting urban lifestyle; and it increases alienation, social fragmentation, and both economic and racial segregation.

Some of these claims are disputed: despite massive urban expansion, the amount of land in farm use, in the US for example, has not been reduced; journeys to work are found to be shorter when jobs decentralize together with residences; leapfrogging is temporary and the open spaces left by leapfrogging are soon filled with new development; segregation is, in fact, reduced in low-density cities; lower densities reflect the preferences of homeowners and businesses for bigger homes and low-rise living and working environments, respectively; and it is cheaper transport technology—affordable private cars, for the most part—that has driven low-density urban expansion, and not the other way around.¹²

Some of the claims of the critics of “sprawl” are not disputed, but it is argued that its adverse effects can be remedied without changing its basic character: air pollution, excessive energy use, and the production of greenhouse gases can be and are being ameliorated with the adoption of new automobile technology; congestion can be effectively reduced with appropriate road pricing; sensitive environments and open space can be protected by public acquisition of development rights through conservancies; externalities associated with new development can be internalized by imposing appropriate taxes; and, at least in some cities, central areas can and are being revitalized as suburban residents return to the city seeking a more fulfilling urban lifestyle.

Finally, there are claims that low-density “sprawl” may in fact lead to more efficient and more rapid economic development; to more rapid job creation; to more affordable and thus larger housing, and to lower levels of shelter deprivation; to higher rates of home ownership; to cheaper and better public services; to satisfactory levels of social interaction; and to a better and higher quality of life.

One of the principal aims of this study is to shed light on some of the more important associations between different measures of urban expansion and different aspects of welfare, particularly as they pertain to developing-country cities. At this stage of the study, however, it will not be possible to examine many of the claims outlined here in a rigorous manner. Some—but certainly not all—of this work is left to the second stage of the study, already under way, when local consultants in each city will collect more detailed data on the ground.

¹² Most of these arguments are presented forcefully in Glaeser, Edward L. and Matthew E. Kahn, 2003, “Sprawl and Urban Growth, Harvard Institute of Economic research (HIER), Discussion Paper No. 2004, May, Cambridge, Mass.: Harvard University.

6. The forces shaping urban expansion

What are the forces that are currently shaping urban expansion?

Again, leaving aside issues of determining actual causality—endogeneity issues, as they are referred to in statistical analyses—a number of hypotheses have been advanced to explain the volume, the characteristics, and the dynamics of urban expansion. Some of these hypotheses have, in fact, been tested using large bodies of data from industrialized-country cities. Differences in the form of urban expansion have been attributed to six different types of effects: the effects of the natural environment; the effects of demographics; the effects of the economy; the effects of the transport system; the effects of consumer preferences for proximity; and the effects of governance.

More specifically, aspects of the natural environment that may affect urban expansion include those of climate, slope, insurmountable barriers, and the existence of drillable water aquifers. Demographic effects may include rural-migration and natural population growth in the city, the level of urbanization in the country, and the rank of the city in the country's urban hierarchy. Aspects of the economy that can affect urban expansion include the level of economic development, differences in household incomes, exposure to globalization, the level of foreign direct investment, the degree of employment decentralization, the level of development of real estate finance markets, the level and effectiveness of property taxation, and the presence of cycles of high inflation.

Aspects of the transport system that affect urban expansion may include the introduction of new transport technologies and most notably the private automobile, transportation costs vis-à-vis household incomes, the level of government investment in roads, the existence of city centers that were already developed before the advent of the automobile, and the existence of a viable public transport system. Consumer preferences that may affect the form of urban expansion include: preferences for proximity to open space, for single-family dwellings, or for home ownership; preferences for urbanism as a way of life, for proximity to other people and to urban amenities, or for proximity to one's place of work; and preferences for "flight from blight" or its converse, the appeal of gentrified neighborhoods in the inner city.

Variations in the form of governance that may affect the form of urban expansion may include the country's legal origin as well as its more recent totalitarian as against democratic past; the number of independent municipal governments in the metropolitan area; the share of the metropolitan area not incorporated into towns; the share of land in the metropolitan area in public ownership; the existence of an effective metropolitan planning agency; and the type, strictness, and quality of enforcement of various urban development controls.

One of the cardinal objectives of this study is to test these hypotheses as they pertain to a global sample of 120 cities. In the first stage of the study, now complete, we focus on testing a number of these hypotheses using the urban expansion data generated by the study and the available data on causal factors that does not necessitate data collection in each individual city. In the second stage of the study, now already under

way, an additional number of hypotheses will be tested using data collected on the ground by local consultants in each city in the sample.

7. Measuring urban expansion

How can we measure urban expansion in meaningful ways that address our concerns?

Clearly, it will not be possible to test any hypotheses regarding the form and shape of urban expansion unless they can be properly measured. Until recently, however, when it came to measuring urban expansion in a rigorous comparative framework, there were no reliable data available for deriving even the simplest of measures.

The average density of population in the city, for example, could provide a ready and robust measure of whether a city were more compact and less sprawling than another city. But if the average urban density could only be derived by dividing the population of the metropolitan area by the administrative area contained within its official boundaries, it would be a highly unreliable measure, simply because it would vary with the definition of the metropolitan boundaries. The absence of good data on the built-up areas of cities has led some analysts to reject average urban density altogether, as an imprecise—and therefore a less-than-useful—measure, even though the change in that measure is arguably the most robust measure of urban expansion.¹³

One of the aims of this study is to resurrect the use of the average density by using the actual built-up area of the city (rather than its administrative area) in the denominator, so that average density measures the population per square kilometer of built-up area in the city. Conversely, we can measure its reciprocal: the average number of square meters of land consumed by every resident in the city. Both average density and average built-up area per person have now been derived using the classification of built-up and non-built up areas in *Landsat* images for two time periods—approximately a decade apart—and combined with district-level population data for a global sample of 120 cities.

Still, while average built-up area density and land consumption per person do provide two meaningful measures of urban expansion, they may still fall short of describing “sprawl”, for example, in a meaningful way that corresponds to our intuitive perception of sprawl. The leapfrogging aspect of urban sprawl, for example, cannot be picked up by these measures. Thus, if the built-up pixels in an urban district are found to be all contiguously aggregated in one single location or spread out thinly throughout

¹³ See, for example, Malpezzi, Stephen and Alain Bertaud, 2002, “The Spatial Distribution of Population in 48 World Cities: Implications for Economies in Transition,” draft, Center for Urban Land Economics Research, University of Wisconsin, Madison. See also, Galster, George, Royce Hanson, Hal Wolman, Jason Freihage, and Steven Coleman, 2000. “Wrestling Sprawl to the Ground: Defining and Measuring an Elusive concept,” unpublished manuscript; Malpezzi, Stephen and Wen-Kai Guo, 2001. “Measuring ‘Sprawl’: Alternative Measures of Urban form in US Metropolitan Areas, unpublished manuscript, The Center for Urban Land Economics Research, The University of Wisconsin, Madison.

the district, the average density of such a district as measured in this study will be the same in both cases. Similarly, if the built-up area of the city is a fully-built compact circle or a star-shaped form with arms extending in several directions, the average built-up area density of the city in both cases will be the same.

Burchfield, Overman, Puga and Turner make the following observation about US cities:

We find that only 0.3% of the 1992 residential development is more than one kilometer away from other residential development. On the other hand, if we consider a finer spatial scale, we find that 43% of the square kilometer surrounding an average residential development is undeveloped. Thus while there is no large-scale leapfrogging, residential development is not particularly compact.

The authors suggest that “a natural city-level measure of sprawl is the average percentage of undeveloped land within one kilometer of new residential development in each metropolitan area.”¹⁴ They use this measure to compare levels of sprawl in UN cities as well as to explain variations in these levels among cities. This measure is particularly sensitive to micro levels of leapfrogging. It is an important dimension of urban sprawl because, as noted earlier, this type of leapfrogging may remove more peripheral land than necessary from rural uses, and because it may extend urban infrastructure networks further than the minimum necessary at present to connect new urban areas to existing ones. Conversely, it is an important measure of openness—the access and visibility of open space—that people seek when they leave the inner city in favor of the urban periphery. In this study, we adopt a similar procedure to that proposed by Burchfield et al. to construct an Openness Index that measures the average percentage of non-built up area in a 1-km.-diameter circle surrounding each built-up pixel in the city.

Although both average built-up area density and the Openness Index discussed above are meaningful measures of the form of urban expansion, they leave important aspects of this form unexplored. Some authors have attempted to measure the compactness of cities as the extent to which the footprint of the *urban area* corresponds to a circular disk. Several such measures have been discussed in the literature, mostly in association with the compactness of election districts in the United States.¹⁵ In this study

¹⁴ Burchfield et al, 2.

¹⁵ See, for example, Crumplin, William W., 1992, “Compactness and Electoral Boundary Adjustment: An Assessment of Alternative Measures,” *Canadian Geographer* 36, 159-171; Horn, David L., Charles R. Hampton, and Anthony J. Vandenberg, 1993, “Practical Application of District Compactness,” *Political Geography* 12, 103-120; MacEachren, Alan M., 1985, “Compactness of Geographic Shape: Comparison and Evaluation of Measures,” *Geografiska Analer* 67B, 53-67. Many of compactness measures are summarized and thoroughly discussed in Malpezzi, Stephen and Wen-Kai Guo. Measuring “Sprawl: Alternative Measures of Urban Form in US Metropolitan Areas.” Center for Urban Land Economics, University of Wisconsin, Research Working Paper, [2001].

we explore a Compactness Index that measures the extent to which the *built-up area* of the city resembles a circular disk.

If access or proximity to open space at the urban periphery is an important amenity, then urban residents will have an incentive to build at the periphery. This may give rise to market failure because new construction will not internalize the loss of the value of open space to sitting residents.¹⁶ In some circumstances, this external cost can be reduced by developing peripheral land in “fingers” that extend out, reducing its compactness and thus increasing the total perimeter of the urban area and making available a larger number of residential sites with access or proximity to open space. These considerations suggest that there are several complementary measures of urban expansion, each one of them meaningful in its own way.

One of the principal aims of this study is to test different measures of urban extent and expansion, to develop new measures, to compare these measures in a global sample of cities, and to explain variations in these measures among cities using a variety of econometric models. The better we understand the how and why of urban expansion, the more effective our employment will be of any policies designed to modify and shape it to our liking, and the more intelligently we can deliberate on those aspects of urban expansion that need to be managed and those aspects that need to be left alone. In this phase of the study, we report on a number of key measures and proceed to describe several new measures that are presently being tested before applying them to the sample as a whole.

8. Urban expansion policies

What are the key policy areas that have a bearing on the shape of urban expansion?

There are three groups of policy areas that have a bearing on shaping urban expansion:

- a. Policies that affect or seek to affect rural–urban (or international) migration, both directly and indirectly;
- b. Policies that affect or seek to affect the distribution of urban populations among cities; and
- c. Policies that affect or seek to affect the process of urban development in individual cities and metropolitan areas.

The motivations for pursuing policies of the first type are many—from concerns that cities are already too big and bursting at their seams, to the romantic longings for a wholesome village lifestyle, and to the need to focus development on rural areas, where the majority of poor people live and work. Policy prescriptions have ranged from increasing agricultural productivity and improving rural education to restricting the

¹⁶ See Brueckner, Jan, 2001, “Urban Sprawl: Lessons From Urban Economics”, *Brookings-Wharton Papers on Urban Affairs*, 65-97.

movement to cities by requiring residence permits. All in all, even though many governments have attempted to control rural–urban migration flows, most, if not all, of these have ended in utter failure—not only in democratic countries that guarantee freedom of movement, but also in non-democratic countries such as the former USSR. In China, one of the very few places where people are still required to have residence permits (*Hukou*) to live in cities, a floating population of some 80–120 million resided in cities illegally in 2000.¹⁷

Davis and Henderson, for example, conclude that alternative policy regimes have little impact on the rate of urbanization.¹⁸ They do find, however, that public sector investment policies and political structures have significant impact on the second set of policies defined above, that is, on the system of cities that develops, and on the extent to which the urban population is concentrated in a smaller or larger number of urban places. They also find that urban concentration or “primacy” can have significant implications for the rate of economic growth.¹⁹ Still, effective population distribution policies of both types defined above are few and far between, and while most governments have attempted to employ them in form or another in the past, very few of them can claim success. Again, the former USSR may be a case in point: the repeated attempts to limit the size of Moscow to two million and to redirect the urban population to development regions has failed miserably as Moscow has grown to four times its planned size.

For the most part, the growth of population of a typical city is predicated on its own natural birth and death rates and on its attractiveness to those who see opportunity and promise there. Successful cities, where economic growth is robust, employment is plentiful, urban services are adequate, and the quality of life is high attract people. These cities naturally grow faster than other cities in the country where economic opportunities are few and the promise of a better life is less than convincing. It is hard to imagine, therefore, that the residents or the policy makers of a successful city will agree to curtail its economic growth or to reduce either its level of urban services or its quality of life so as to prevent people or firms from moving in.

The central focus of this study is therefore on the third set of policies mentioned above—those that aim at managing the urban development process in individual cities and metropolitan areas in one form or another.

This study seeks to explore the effects of various policy regimes on various measures of urban expansion. It seeks to determine whether, other things being equal, urban

¹⁷ BBC News, 2000, “China Begins Massive Census”, 31 October, online at news.bbc.co.uk/1/hi/world/asia-pacific/1000357.stm.

¹⁸ Davis, J.C. and Henderson, J.V., 2003, “Evidence on the Political Economy of the Urbanization Process”, *Journal of Urban Economics* 53: 98-125.

¹⁹ Reported in Henderson, J.V., 2003, “The Urbanization Process and Economic Growth: the So-What Question”, *Journal of Economic Growth*, 8, 47-71. Henderson finds that one standard deviation departure from the optimal degree of primacy is associated with reductions in annual growth rates of 1.41 percentage points.

expansion in cities pursuing different policy regimes take different shapes and forms. This cannot be determined without seeking information on the policy regime guiding urban development in each individual city in our sample. Collecting such information is one of the key objectives of the second stage of this study, supported by a grant from the US National Science foundation (NSF). In this second phase of the study, now already under way, local consultants are collecting data in municipal offices and in real estate agencies on the policy regimes guiding the urban development process. Once the data is obtained and analyzed, key dimensions of the policy regime governing urban expansion will be quantified and entered into the econometric models seeking to explain variations in different measures of urban expansion in our global sample of 120 cities.

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