Cities and Development

Not for Quotation
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Urbanization and economic development are closely intertwined. While urbanization per se does not cause development, sustained economic development does not occur without urbanization. This paper starts with a "primer" on what we know about the conceptual and empirical links between development and urbanization. Empirical evidence is partly based on historical experience in developed countries such as the USA, but I try to draw more from the experience in some countries in Latin America and East Asia, which have gone through the urbanization process and proceeded towards middle income status as countries. We then turn an agenda that discusses key issues for which there is a very limited body of research and for which more research would inform the problems and policy issues facing today's rapidly urbanizing countries: the giants of China and India, and more generally South and South-East Asian counties, as well as those in sub-Saharan Africa.

In thinking about historical experience of today's developed countries versus developing countries, a feature that distinguishes past urbanization in today's developed countries from that in today's developing countries is the role that policy plays. Today's developing countries have either explicit national urbanization policies or policies governing resource allocation that are motivated by controlling and directing urbanization. Part of this is motivated by the fact that full urbanization—moving a country from a situation where 10-20% of the population is urbanized to one where 60-85% is urbanized-- can occur now in a span of about 30 years, as opposed to the more leisurely pace of urbanization in today's developed countries which played out over 100-150 years. Rapid urbanization is traumatic, requiring massive movement of population, replacement of traditional institutional and social structures with modern ones centered in a formal legal apparatus, and massive local and inter-city infrastructure investments with the required financing mechanisms, all in a short time span of time.

Before turning to a partial review of the literature on urbanization and development, we outline the issues in the research agenda discussed in the second half of the paper, so that one can see how the points discussed in the first half set the stage for the second. In the second half we focus on two issues. First concerns the spatial form of development. How spatially concentrated should urbanization be—how much development should be focused in mega-cities, or huge urban clusters, as opposed to spatially dispersed. This is critical question. The more concentrated the development the more rural populations have to up-root themselves and migrate longer distances to focal points of urbanization. A related question concerns regional development. For countries like China and especially India with huge non-coastal populations, how much should populations be re-concentrated along the coast? Whatever an optimal pattern might be, how costly are deviations, even significant ones from that optimal pattern? How do we conceptualize and measure both the benefits and costs of increased urban concentration; and how are they linked to a country's evolving national industrial composition? Within large clusters, or mega-cities, what are the best forms of spatial development and types and spatial forms of infrastructure investments?

Second, what are the determinants of spatial income inequality and what is the evolution of such inequality under massive rural-urban migration? While underlying this question is the Kuznets -Williamson hypothesis of rising and then declining inequality, the question raises two sets of underlying issues. First, what is the "natural" evolution inherent in development that creates a transitional urban-rural divide, versus what is exacerbated by government policies? Are there national government policies concerning infrastructure investments and spatially focused investments which "favor" certain cities and regions; and do these affect spatial inequality and its evolution? Does such national government favoritism lead to local government policies in favored areas that try to restrain directly or indirectly in-migration. If so, that leads to a second set of issues. Do such restraining policies affect inequality and the form of urban development? Are the "favela" or slum style development of Latin America cities repeating in today's urbanizing countries; and, if so, why? Is slum development an inevitable part of the urbanization process, due to say strain on undeveloped and evolving local fiscal and land market institutions in the face of rapid urban development? Or is it, in part, driven by

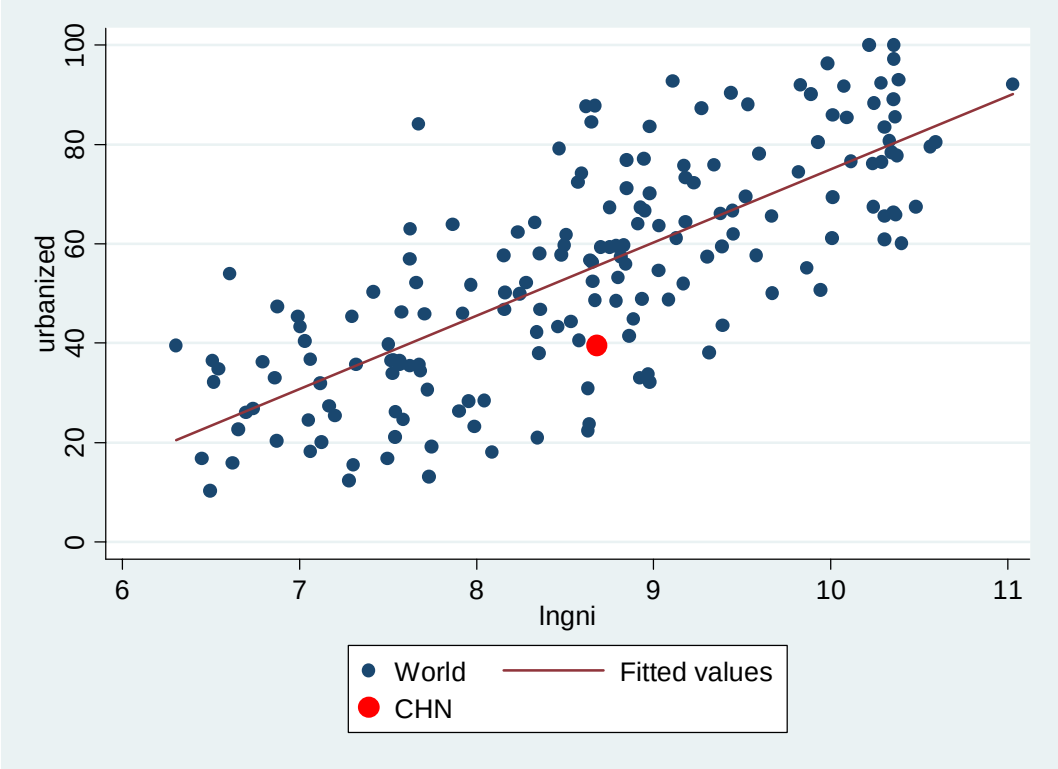
local public policies which intend to restrain in-migration through offering very poor living conditions for migrants? For these issues, I will illustrate with on-going policy debates in China and India today, as both formulate their next five year plans.

1. What we know about urbanization and development

1.1 The urbanization-growth link

Figure 1 illustrates the relationship, which is well understood: higher levels of urbanization as measured by the percent of the national population that lives in urban areas, is associated with increased income per capita. Figure 1 plots the percent urbanized in 2004 for countries around the world against PPP GNI p.c. (purchasing power parity GNI per capita). T he level of urbanization and income per capita are highly correlated [R^2 = .57], and much of the variation around the regression line in the graph is explained by differences in definitions of urban across countries. China is noted separately for later reference.

Figure 1. % Urbanized vs. Log (PPP GNI per Capita): Countries of the World 2004



Data Source; WDI, 2006.

The connection between income levels and urbanization arises from two facts and reflected in two types of models. There are the Harris-Todaro (1970) and new economic geography models (Krugman, 2001, Fujita, Krugman, and Venables, 1999) which stress the idea of either a technology change or productivity differential which leads to a shift of resources out of agriculture or a hinterland region into an urban sector or core region. The there is the urban growth version, such as in Henderson and Wang (2005) where in an endogenous economic growth context, a country can start off as agriculture, hit a tipping point at which urbanization starts and, then as urbanization proceeds, develop a system of cities. These models have as an underlying premise that development involves improving national technology such that labor is released from agriculture to work in manufacturing and service sectors. That release occurs for two reasons. One is a demand shift towards manufacturing spurred by technological improvements in manufacturing and world demand patterns where investors are always looking for new low cost countries to house standardized, labor-intensive production of parts and components. The other is labor saving improvements in technology in agriculture. Second, manufacturing and services enjoy economies of agglomeration discussed below, which requires efficient production to be in high density locations, or cities.

While there is this association between urbanization and development, it is an equilibrium not causal relationship. There are examples of rapid urbanization, such as in sub-Saharan countries from 1970-2000 (World Development Report, 2000), where urbanization occurs in the face of little or no per capita income growth. Correspondingly, econometric studies indicate that, while the form of urbanization causally affects growth, urbanization per se does not (e.g., Henderson, 2003).

1.2 Agglomeration and development

There are two inter-related conceptual issues as to why development is linked to industrial agglomeration in cities. First is the vast conceptual and empirical literature on localized external economies of scale, as reviewed in Duranton and Puga (2004) and Rosenthal and Strange (2004). Duranton and Puga review some of the micro-foundations underlying localized scale externalities, although the basic Marshallian notion (1890) of “mysteries…in the air”, or very localized information spillovers (Fujita and Ogawa, 1982; Lucas and Rossi-Hansberg, 2002) remains a dominant consideration. Rosenthal

and Strange suggest that, for a typical industry, doubling local own industry size leads to a 2-10 % increase in productivity of worker; in addition, doubling city size for the same local industry size may also lead to increased productivity, especially for higher technology industries. Work on China, Brazil and Korea suggests such scale economies are also crucial in developing countries. For example for Korea, Henderson, Lee and Lee (2001) find that increases in own industry size generate big productivity gains in heavy industry and the more modern manufacturing sector such as transport equipment and high tech, while magnitudes of scale externalities are smaller in traditional industries such as textiles and foods processing found in smaller towns and cities. With the exception of high tech industries, there is limited evidence that these manufacturing industries benefit from greater city size per se; rather they benefit from being in greater clusters of like, or inter-related activities. These are a powerful incentive to cluster, or agglomerate like industry activity together, as a country industrializes and develops.

In addition to this body of somewhat received knowledge, there is recent work, examining focusing on particular specific, important issues. First is recent evidence that, at least certain components dissipate rapidly over space, sometimes with in a matter of a few blocks (Arzaghi and Henderson, 2008 and Bayer, Ross and Topa, 2008), emphasizing the benefits of close clustering. Second, the traditional literature has struggled to separate out scale economy benefits to firms from unobserved attributes of the local environment that are correlated with agglomeration and may also affect productivity. But there is also a selection issue: are bigger cluster really more productive or is it also that they attractive more productive firms. Combes, Duranton, Gobillon, Puga, and Roux. (2009) examine this question using plant level data over time in France and find in favor of the basic idea that it really is bigger clusters offering a more productive environment.

The second strand of literature has a more dynamic focus. In economic growth models cities are viewed as the engines of growth for an economy— dense interactive locations where knowledge is exchanged, innovations spurred and sophisticated skills developed (Lucas 1988 and Black and Henderson 1999). In modeling and empirical work this is often summarized by the notion of localized knowledge accumulation, where such accumulation is measured by the educational level of the population in a city. In a

careful, although controversial study[1], using panel data on plant productivity, Moretti (2004) suggests that, for manufacturing plants in the USA, a 1 percentage point increase in the percent college educated in a city leads plant productivity [TFP] to rise by 0.6 %. Work on R&D (Carlino, Chatterjee and Hunt, 2006) and advertising (Arzaghi and Henderson, 2008) which, as we will note below, are industries which are important components of big city economic bases suggests high density is a key factor in promoting localized external economies of scale and knowledge spillovers. In developing countries bigger cities are also typically the point of technology importation and adaptation.

Theory and empirical evidence suggest scale and knowledge externalities may interact, so that scale benefits are enhanced by knowledge accumulation— information spillovers are more beneficial the more educated the population. There is no work yet that looks at this interaction directly; Unfortunately, researchers tend to look at scale externalities or knowledge effects separately. Some indirect evidence is in Henderson and Wang (2007). There the assumption is that knowledge enhanced scale externalities will lead to increased city sizes as the scale benefits of cities are enhanced relative to urban diseconomies, discussed below. Based on a panel data set of metropolitan areas worldwide, Henderson and Wang find as a causal effect that a 1 standard deviation increase in the percent high school educated leads to a 9% increase in metropolitan are population at city sizes of 1 million. They also find that this effect increases with city size, suggesting that knowledge effects are important the bigger the city, perhaps due to differing economic compositions of bigger versus smaller cities and the benefits of knowledge externalities for different types of production. This finding suggests that cities increase in size over time with knowledge accumulation. The authors show that, in the right tail of the size distribution—metro areas over 100,000 -- metro area sizes over the last 40 years have doubled, most predominantly in countries with rapid human capital accumulation.

This discussion presumes two notions—city sizes are limited and cities have different industrial compositions and, related different sizes. These notions arise from our modeling and knowledge of aspects of the urban hierarchy.

[1] Using wage data, Ciccone and Peri, 2006 find little evidence of knowledge accumulation, compared to basic scale externalities.

1.3 The Urban Hierarchy

1.3.1 Limited city sizes and specialization

Scale economies explain why industrial activity agglomerates in cities. On the other side are urban diseconomies and other factors which dissipate the benefits of agglomeration, which are why cities are limited in size. Following traditional systems of cities analysis (Henderson, 1974; see Duranton and Puga, 2004 for a review), real output per worker is postulated to be an inverted U-shape function of local scale, as measured by total urban employment. At low levels of employment, there are the high scale economies from clustering firms together because of information sharing and spillovers across firms as explained above and exploitation of pecuniary economies in reducing transport costs of shipping intermediate inputs among firms and to consumers. However, in order have limited city sizes (rather than one giant city in the economy), at some point as cities get big, these economies may dissipate, costs of commuting and urban diseconomies will escalate, and the extent of a city's market will be stretched, so real income per worker peaks and then declines with further increases in city size. The new economic geography literature stresses the regional size of the market as a limiting factor to an city's size as well.

On the diseconomy side, United Nations data (UNCHS) suggests that, typically around the world, moving from a city of 250,000 to one of 2.5 million is associated empirically with a 80% increase in commuting times and housing rental prices (Henderson, 2002). Richardson (1987) argues from data for four developing countries that moving from a small city to a mega city raises per capita investment costs per family (in urban infrastructure) by threefold. But in contrast to the vast literature on scale externalities, good econometric evidence on urban diseconomies is lacking.

The idea of a scale economy-diseconomy trade-off leads to the notion of urban specialization. Small and medium size cities in the USA, Korea, Japan, and other countries are highly specialized. For example if one looks at the USA in 1950 or 1970, based on work by Alexandersson (1959), Bergsman et al.(1972), Henderson (1988), and Black and Henderson (2003), one can classify USA metro areas into steel, textile, auto, shipbuilding, aircraft, pulp and paper, petrochemical, and the like cities. This has two features. In a context where 60-70% of local employment is in non-traded goods and

services (e.g., wholesale, retail and personal services, construction, non-metallic materials, utilities, etc.), cities have 10- 35% of their employment in just one sub-industry that produces traded goods for export beyond the city. In small cities, much of remaining employment is in supporting or complementary sub-industries to the main export one. Second, most cities have zero (or almost zero) employment in most manufacturing activities. Looking back at a more industrialized USA to be compared with industrializing developing countries, in 1970 for steel mills, metal stamping, engines and turbines, farm machinery, electronic computing, household appliances, photo equipment, knitting mills and so on, over 80% of metro areas had under 250 workers in any of these sectors and many of those had absolutely zero employment (Henderson, 1988). Ellison and Glaeser (1999) have a nice treatment of specialization and industrial concentration in the USA today, as do Duranton and Overman (2005) for the UK. Lee (1998) finds similar patterns for Korea.

Why is there specialization? As noted above, the empirical literature suggests that general standardized manufacturing activity benefits from agglomeration of the own industry, not so much from the general level of local agglomeration. If only the level of own industry activity matters for productivity improvements, industries won't want to locate in large metro areas with their high wage and rent costs. They will want to locate in small specialized cities where own industry economies of scale are maximized, relative to urban size diseconomies. High tech industries where the overall level of local agglomeration also contributes to productivity may gravitate towards larger, more diverse metro areas consistent with our earlier discussion of why industries that are undergoing rapid technological progress tend to be found in larger cities. Examples include the aircraft industry in Los Angeles or the R&D portion of electronics in Tokyo (Fujita and Ishii, 1994),

1.3.2 Larger Metro Areas and the overall hierarchy

At the other extreme to smaller specialized manufacturing cities, and now in countries like the USA, smaller cities specialized in specific consumer service activities, like retirement services, health services, and insurance are huge metro areas that are truly global financial and service oriented cities such as New York or London. Such cities produce almost everything including small scale personal order manufactured products,

but overall a very small share of their employment is in manufacturing, and an enormous share is in key business and financial activities. That employment also accounts for a significant portion of the nation's employment in key business and financial activities. Table 1 illustrates New York City's dominance nationally in financial and business services, especially security brokers and advertising. Note that New York City has a low concentration of headquarters generally, except for financial headquarters. Banking, investment, security, advertising, legal and accounting services alone make-up 25% of Manhattan's employment. These activities are in the largest cities because they benefit the most from overall agglomeration economies and the diverse economic environments of large cities.

Cities like New York and London have an economic-legal environment conducive to development of global services: a free standing, transparent legal system to enforce contracts, a transparent, competitive financial sector including open securities markets, transparent accounting practices and credit rating systems, and the like. Without these strong institutions, it is difficult to compete for international business. Such cities also serve as cultural centers, with a large uninhibited culture industry, with thousands of often young people engaged in fashion design, architecture, art, and theater. Some global cities such as Tokyo also have a strong high tech and R&D sector as noted above. All these industries are characterized by a strong degree of creativity and enjoy the type of urbanization economies envisioned by Jane Jacobs (1969).

Table 1. New York County (Manhattan): 1997

	All industries	**Head-quarters**	**Financial headquarters**	**Financial services**	**Security brokers**	**Business services**	**Advertising**
Share of nation's private employment	1.8%	3.0	11.7	12	25	7.5	15

Data source: Economic Census of USA

The presumption is that New York and London have high concentrations of business and financial services because (1) these industries benefit the most in terms of within and cross-industry localized scale externalities and (2) in particular in the realization of these scale effects benefit the most from the high density buildings and employment found in these cities. We are only in the early stages of the empirical examination of scale externalities in services. Arzaghi and Henderson (2008) examine the benefits of clustering of advertising agencies in New York City and Carlino, Chatterjee and Hunt (2006) explore the role of city size and density for innovation.

In between global cities and small and medium size specialized cities are an array of large metro areas which tend to also relatively specialize, but still have fairly diverse industrial bases. In these cities the share of service activity tends to increases as metro area sizes increase. We still have a long way to go in understanding these patterns and how they change over time, as we will discuss below. But we have made some progress in overall empirical and theoretical modeling of these general notions.

For example, Au and Henderson (2006a, 2006b) try to put together the notions: (1) cities are limited in size with inverted-U shape real income per capita curves against city sizes and (2) the idea of an urban hierarchy where the share of manufacturing declines as city size increases in an urban hierarchy. They estimate city production functions for value added, or GDP per worker and the shape of the inverted-U for prefecture level (or above) cities in China.[2] They structurally try to disentangle scale economies and diseconomies underlying the net scale effects embodied in an inverted-U, focusing on per person commuting costs as the source of urban diseconomies, but allowing for limited market potential for cities. The urban hierarchy is represented by the

[2] Au and Henderson (2006a, 2006b) use 1996-1997 data on 212 prefecture level cities for China to follow this more aggregative approach looking at cities as a whole. They estimate city production functions and the shape of the inverted-U for 212 prefecture level (or above) cities, examining how value-added per worker in the non-agricultural sector of the city proper varies with total non-agricultural employment. Determinants include the capital stock to labor ratio, share of accumulated FDI in capital stock, distance to the coast, education and scale measures. These city level figures on GDP, investment, and other economic data are considered to be reliable up through 1997, and consistent in collection and accounting methods across cities. Interestingly, on an international level, China is the only country with reliable GDP numbers at the metro area level definitions. To capture the notion of hierarchy, they postulate that the inverted U-shape shifts right as the secondary (mostly manufacturing) to tertiary (service) sector ratio [MS] drops. As motivation, they specify a model in which the manufacturing to service ratio represents a parameter of a structural model, in which greater uses of local services by local manufacturers indicates more 'sophisticated' types of production, with greater out-sourcing of local business services of producers.

manufacturing to service ratio, which they postulate increases in bigger cities, as one moves up the urban hierarchy. They find inverted U-shape curves, which shift out as cities become increasingly service oriented. Relative to the peak of the inverted-U where real income per capita is maximized, they find an asymmetry: for a given loss in population, there is a sharp per capita income loss from having an under-sized city, but an equal size increase in population generates a much smaller loss. We will return to this point in the second section.

1.4 Changing Industrial Composition with Development

Our discussion of the largest cities focused on New York and London, the largest cities in two developed regions. While these are now service oriented cities, that was not always the case; and, in developing countries at lower income levels, the largest cities in a country may be heavily manufacturing oriented and are also the places where the country's limited public infrastructure and high skill labor are concentrated. The concentration of manufacturing has in part to do with 'learning', and the fact that a development path may emphasize growth to development of export oriented manufacturing. The largest cities, which are the most accessible to foreign investors, are the entry point for foreign technologies, which local firms are learning to adopt. They are incubators for new firms trying to discover the best product lines and production methods as modeled in Duranton and Puga (2001) and studied for Korea and Colombia by Lee (1989), Lee and Choe (1990) and Mohan (1994).

As a country develops economically, the largest cities become inefficient locations for standardized manufacturing locations for several reasons. First firms, and industries as a whole, have accomplished much learning and adoption of foreign technologies and no longer benefit so much from the learning environment of the largest cities. These cities become very expensive locations with high rents and labor costs. Infrastructure and skilled labor is in greater relative abundance in other locations. And finally the business service sector is expanding, demanding the large city locations and outbidding manufacturing for central city lands in those cities.

The first step is that manufacturing decentralizes to peri-urban and suburban locations of the largest cities, where rents and wages are cheaper, but firms still have access to the infrastructure of the largest cities and often government offices to deal with

red tape. This suburbanization process has been analyzed extensively for the USA historically, as well as Colombia, Indonesia, Japan, and Korea in recent decades. There is a nice discussion of some of the evidence in Mohan (1994). The final step is de-industrialization of the largest metro areas, with manufacturing moving to smaller cities and rural areas.

Table 2 shows the current spatial allocation of manufacturing and business services today versus in 1910 for the USA. In 1910, manufacturing was more heavily concentrated in the largest cities. But as discussed above, today there is a distinct increase in manufacturing share of local employment as we move down the urban hierarchy with rural areas being the most manufacturing intense. In 1910 business services were a small part of the USA economy; today they are an enormous part and there is a distinct increase in their share of local employment as we move up the urban hierarchy.

Table 3 shows the decentralization process for Korea. From 1970 on in Part (a), Seoul metropolitan area's share of manufacturing in the national capital region (Kyonggi province) declined steadily, with a huge decline in the late 1970s and early 1980s. Since the early 1980s, industry has further decentralized. In Part (b), excluding the satellite cities of the three major metropolitan areas, the share in national manufacturing employment of rural areas and smaller cities rose from 25% in 1983 to 42% 10 years later, at a time when those areas were actually losing population.

For Japan, Table 4 shows a similar process. The share of the big 3—Tokyo, Nagoya, and Osaka—in national manufacturing peaked in 1970 and then has declined steadily, with manufacturing moving to ex-urban, small city and rural areas. There is also considerable information on Japan on how the structure of manufacturing has changed in cities. Not only has manufacturing decentralized, the manufacturing activities remaining in large cities are distinctive in terms of function within the firm. Fujita and Ishii (1994) illustrate this using the 9 major electronic firms in Japan, indicating whether different types of units are found in central business districts of metro areas (CBDs), suburbs, or non-metropolitan areas. Headquarter units of firms are found mostly in city central business districts, where business and financial services locate. R&D and trial production facilities are found disproportionately in suburban areas of the largest metro areas, where these experimental facilities still benefit from being in large metro areas. But mass

production plants are disproportionately in non-metropolitan areas. This gives some idea of the likely breakdown for USA cities 1995 in Table 1 of what types of manufacturing activities are left in the largest cities, compared to rural areas. Experimental activities remain in large metro areas, but standardized manufacturing moved decades ago to smaller cities and rural areas.

Table 2. Manufacturing versus Business Services in the USA Urban Hierarchy

Metro area Population 1995	**Share of manu. in local employ. 1995**	**Share of business services in local employ. 1995**		**Metro area Size 1910**	**Share: manu. in local employ. 1910**	**Share: business services in local employ. 1910**
Over 2.5m.	**.14**	**.21**		**4 largest**	**.35**	.062
1 - 2.5m	.15	.19		**.1m - .6m employ.**	.35	.051
.5m – 1m	.16	.18		**Under .1m employ**	.31	.046
.25m - .5m	.19	.16				
Under .25m	.19	.13				
Non-metro	**.27**	**.09**		**Non-metro**	.25	.044
nation	.17	.18		**nation**	**.30**	.050

Source: Kolko (1999)

Table 3. Manufacturing Decentralization in Korea

Part a. Share of Seoul Metropolitan Area in Kyonggi Province*

	1970	**1980**	**1983**	**1993**
Population	62%	63	67	61
Manufacturing employment	76%	61	45	30

***Excludes Inchon metro area. Source Lee (1998) and author's calculations from Korean Census data.

Part b. Share of National Manufacturing Employment

	1983	**1993**
Seoul	21%	14
Pusan and Taegu	23	14
Satellite metro areas of Seoul, Pusan, and Taegu	30	30
Other cities, rural areas of satellite city provinces	26	42

Source: Lee (1998)

Table 4. Manufacturing Decentralization in Japan

	1955	**1965**	**1970**	**1995**
Share of Tokyo, Nagoya, and Osaka in national manufacturing GDP	39%	43	39	27
Share of big 3 in total national GDP	26%	33	34	31

Source: Based on Figure 7 in Fujita et al. (2004).

1.5 Churning and Stable Size Distributions

For developing countries, this evolution of the location of manufacturing activities raises two related but distinctly different points. First is the notion of churning modeled in Duranton (2007). Individual cities, even in developed countries change industrial activity over time. In Duranton, industries innovate in a Helpman quality ladder model, but there can be cross-industry innovation. If industry A in city A discovers an innovation that yields the dominant technology for industry B, then industry B producers need to move to city A to access that technology, because this knowledge availability is assumed to be very localized. So with innovation industries tend to move around.

Table 5 Churning

category	**Mean first passage time** in a 1st order Markov process **from the top state to bottom state—(**Expected time for a city or industry in the top state to first revisit bottom state in first) in decades
USA Metro areas (1900-1990 data)	545
High tech goods (1963-1992 data) (communications, instruments, computers)	9
Capital goods (machinery)	15

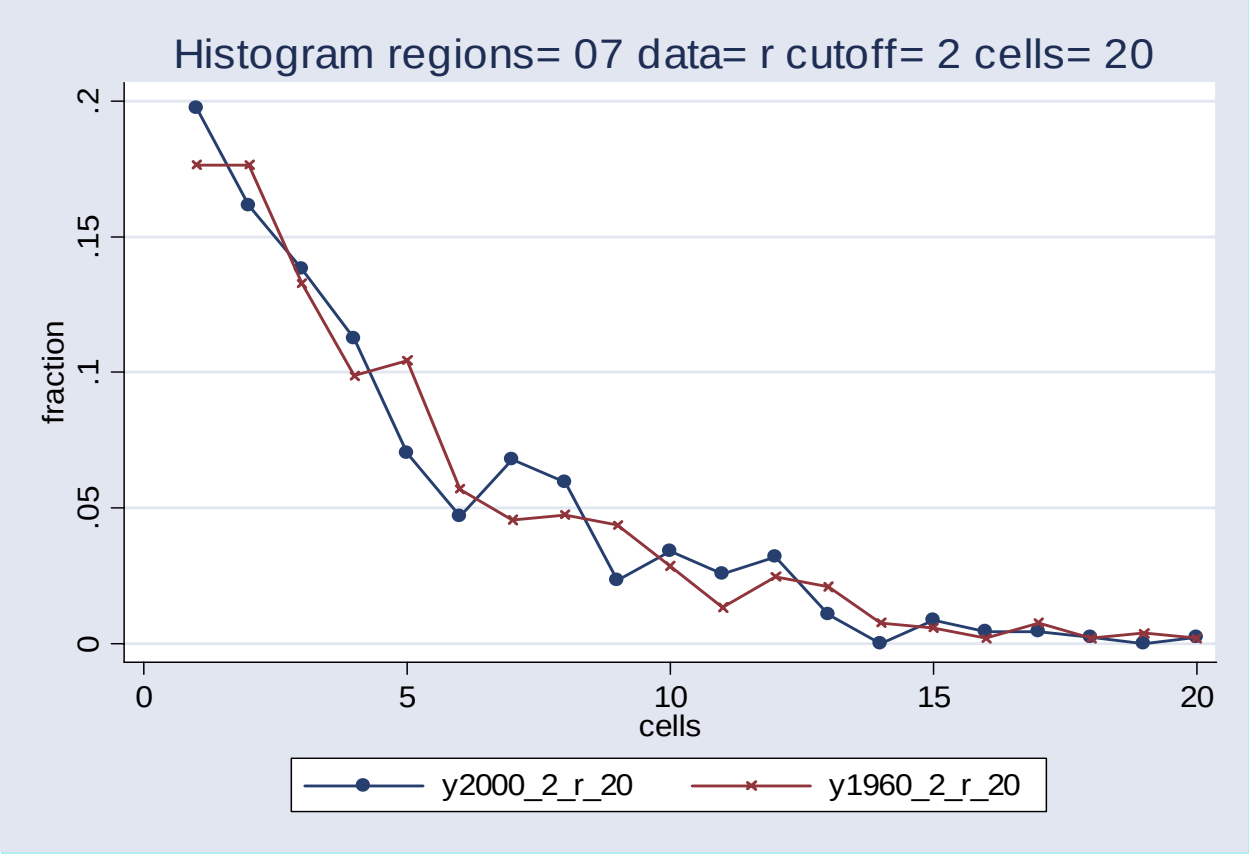
Source: Black and Henderson, 1999b, 2003. Metro area calculations are based on a 5 state process, while industries are based on a 4 state, where the bottom state has a large share of cities, mostly with zero employment in the city-industry.

Table 5 for the USA shows mean first passage times in a Markov process modeling of the data. USA metro areas are divided into 4-5 cells by overall employment and then by individual industries. For individual industries, the bottom cell typically consists of cities with little or no employment in that industry. Then as we move up cells, cities have larger and larger shares of national employment, until the top cell has the 5% of cities with the highest concentrations of employment in that industry. For city employment overall, cells are cities at different parts of the city size distribution. The table tells us that largest cities in the top cell basically never lose their rank, as documented for Japan and France by Eaton and Eckstein and (1997). Cities that were relatively the largest 100 years ago retain that distinction today. In contrast, cities are much more likely to lose a top ranked industry and even to have that industry basically disappear from that city. What a city specialized in 100 years ago is unlikely to be what it specializes in today.

Despite both this churning and the deconcentration of manufacturing from the largest cities which occurs with economic development and despite the incredible technological revolutions of the last century, there is a remarkable feature about cities.

The relative size distribution of cities—the share of cities which are relatively large versus small— within large countries and across countries has remained rock stable. Figure 2 illustrates the raw data for the world for 1960 versus 2000 (Henderson and Wang, 2007).

Figure 2. Stable size distribution of cities



Source: Henderson and Wang, 2007

Figure 2 divides world cities into 20 cells, where across each cell there is approximately an equal percentage increase in mean city size of the cell. The graph shows the fraction of metro areas worldwide in each cell. The graph is normalized in two ways: (1) city sizes for each year are divided by average city size in the decade, recognizing that sizes of all city cities are growing absolutely over time with knowledge accumulation; and (2) the graph represents the right tail of the size distribution of human settlements, with the 1960 minimum size being 100,000 people, and the sample chosen to

represent the same size cut of the overall distribution in any decade. Note the complete overlap of these size distributions in 1960 and 2000. A similar exercise for the USA for 1900 versus 1990 shows the same thing (Black and Henderson, 2003). Whysuch stability?.

This question has sparked the Zipf's Law literature (Gabaix, 1999a and 1999b) which argues that again the right tail of this overall distribution, overtime and across countries, always follows a Pareto distribution, arguably with a constant exponent of one. Gabaix's argument is simple. Cities experience shocks to individual production or consumption amenities which induce population inflows or outflows. If the upshot of these stochastic events is that individual city growth rates follow Gibrat's Law (the growth rate at any instant is independent of size), then Zipf's Law will emerge. Rossi-Hansberg and Wright (2007) adapt the Black and Henderson (1999) model to generate Zipf's Law and Duranton's (2007) churning paper generates an approximation to Zipf's Law. All these papers have one catch: to generate the result there must be an exogenous lower bound to which city sizes can fall in the event of a series of bad shocks; otherwise typically a lognormal distribution emerges.

Armed with this partial review of a large literature, we now turn to a research agenda, driven by a set of very basic questions.

2. An Agenda for an urbanizing world

We discuss research related to two issues. Most of this research is new and there is a long way to go in to establish solid findings to properly inform policy debate about urbanization in developing countries. The first concerns how spatially concentrated the urban population should be in a country, which has strong policy implications in terms of location of and investment in public facilities and managing urban populations

2.1 Spatial concentration

2.1.1 The literature

There is a literature which examines the determinants of spatial concentration across countries. Researcher have utilized Gini measures of concentration, Pareto parameters and Hirschman- Herfindahl measures to describe spatial concentration. However in the past such measures were not available for a large sample of countries,

since they require population data for all metropolitan areas over a certain size in a country. Instead researchers have relied on a measure of urban primacy, typically the share of the largest metropolitan area in the national urban population.

Central to Ades and Glaeser (1995) and Davis and Henderson (2003) is the idea that national governments tend to favor certain regions or cities of a country, typically the national capital region with a variety of advantages—better access to capital markets, better access to import and export licenses, better fiscal conditions, and disproportionately better provision of public goods, Aspects of this favoritism for Brazil, Indonesia, Korea, and China are discussed in Henderson (1988), Henderson and Kuncoro (1996) and Lee and Choe (1990), Jefferson and Singhe (1999) for example. Foremost is some type of rent-seeking behavior: bureaucrats who are the only suppliers of license earn more rents than they decentralize provision, creating competitors in the rent seeking-allocation business. And government officials like to improve living conditions in the places where they live. But amongst informed policy makers there can also be a belief that the national capital region is more efficient place to locate production. Policy makers may tend to see the scale economies benefits of cities reflected in rising nominal wages, and less the diseconomies and rising costs that limit real income increases.

Favoritism induces firms to locate in favored locations, drawing in workers seeking jobs. As a result, in Ades and Glaeser and Davis and Henderson favored cities tend to much larger than non-favored ones. Henderson and Wang (2007) also show that institutions matter—the greater fiscal decentralization the more decentralized the population. Fiscal decentralization whether through greater federalism or as part of democratization allows hinterland regions to be more fiscally independent and to set more of their own regulations, allowing them to better compete with, say the national capital region.

All this leads to two questions. First if favoritism leads to excessive concentration, what are the costs of that? Second what is at the root of such costs and how does that play out in terms of urban living conditions and income inequality across regions. We turn to the second question in the next section. For the first question, in an initial attempt to tackle the problem, Henderson (2003) examines the effect of urban primacy on national

economic growth. The paper finds that, for each national size and income level, there is an "optimal degree" of urban primacy, reflecting the agglomeration benefit-urban diseconomy trade-off as it plays out in terms of economic growth. Deviations from that optimal degree—up or down—are costly. A one standard deviation increase above the optimal level leads to a drop in annual growth rate by 1.4%, in a standard econometric cross-country-panel-data growth approach. This analysis is limited by the fact that most data points are small countries, where in fact urban primacy is a reasonable measure of concentration. For large countries with potentially a number of major metro areas, the approach is more limited, both because primacy really describes the role of only the biggest city, in a context with many regions and many important cities, and because the sample of large countries is very limited.

2.1.2 Policy Debates

Unfortunately this issue of concentration, especially in large counties is very pressing, with countries like China and India contemplating pursuing a strategy of massive increases in urban concentration nationally. Before turning to proposals for these countries, we note what we do see today in large countries, or large regions. We take the USA as the example but note the same patterns play out in Brazil, Indonesia, and the EU for example.. The USA has one huge "supercity", the New York metropolitan region which if one extends it over roughly contiguous urbanized areas into New Jersey, Pennsylvania and Connecticut has a population of 23 million (the Combined Statistical Area [CSA] which adds together various metropolitan areas linked by some degree cross-commuting). The next region, Los Angeles which might be described as the west coast supercity is 18m, but after that things drop off with the next 13 regions ranging in population from 3.5m to 9.7m, with most in the 5-6m range. While the EU follows a similar pattern, its supercity, the London region, is maybe 15m.

China and India are contemplating very different urbanization patterns where urbanization occurs mostly in a limited set of giant metropolitan regions. For example in the McKinsey Global Institute Report (2008) [http://www.mckinsey.com/mgi/publications/china_urban_summary_of_findings.asp] on China supports one of two scenarios, arguing they would better maximize real income per capita, relative to the current dispersed urbanization patterns where mainland China

supports two supercities, the region for the largest of which supports 17 million people. If current policies are pursued the report sees China developing in terms on urban concentration along the lines of the USA. Instead, the report argues for one of two alternative, similar scenarios. One is a widespread supercity approach where China would develop about 15 supercities, each with an average population of around 25m. Another is more of a "hub and spoke" system of 11 giant urban network regions averaging 60m each. The latter is a more in the vein of looking at the northeast corridor within 150 miles of New York City. These proposals are reportedly receiving close attention in China. For India, a similar report is in the early preparation stages. Here early discussion is focused on a notion similar to the hub and spoke one, but one more based on notions of an urban cluster of economic activity in different contiguous and inter-connected cities around a major metropolitan region, covering up to a radius of about 150 miles. One proposal under consideration is that India would have over 60% of the projected urban population of 500-600m living in 12 such regions, each averaging 25-30m, with the largest ranging up to 70-80m.

Whether constructed as supercities or as a little more dispersed (but then much larger) urban clusters, we know little about the efficacy of such size urban regions. The Tokyo region at 35m is the largest such region in the world and it is in a highly developed country with a very specific geography. A New York, London, or Tokyo supports itself by specializing in financial and business services, as well as specialized activities such as fashion apparel, high profile publishing and theater and the arts. There is a limited demand for such specialized activities nationally; and the USA, the EU and Japan each support only one such size region, although maybe Los Angeles is a second for the USA. Most other manufacturing and services activities seem to thrive in much smaller environments, with degrees of scale externalities that can only support limited agglomeration. So the proposed scenarios for India and China seem to advocate something that is counter to what we believe may be sustainable. They involve favoritism of not just one region, but a set of regions, at the expense of the rest of the country.

In principle, there are three ways to approach the overall issue and to try to evaluate such proposals. One is to try to compare national economic growth rates under one regime versus another -- more spatially dispersed development versus development

that emphasizes huge urban regions. But we have no sample of the latter. Second, as in Au and Henderson we can try to estimate the inverted-U that marks real income per capita against supercity or cluster size. For China, Au and Henderson (2006a, 2006b) find that such inverted-U's peak well before super-city sizes, but then we don't have estimates for cities which are highly business, IT, and financial service oriented. They don't yet exist in China; and as we already saw for countries like the USA the sample is 1 or at most 2. That leaves the third way-- trying to pull the pieces together so as o assess the impacts. What are the pieces?

For different types of industries, what are the scale benefits of different clusters and when do scale economies peter out? It seems from existing evidence reviewed in section 1 that if growth is manufacturing driven, manufacturing has historically not thrived in huge clusters. That's where special types of service activity thrive. But we know little about magnitudes of scale externalities for a whole range of business and IT services and high tech manufacturing activities, some of which a country like India could gravitate towards. Knowing more about scale externalities for such industries and how they interact with local knowledge accumulation would help inform policy formulation.

Another piece concerns urban diseconomies, about which we know even less. How do infrastructure costs and commuting or environmental degradation vary with supercity and urban cluster size? Richardson's work based on four case studies suggests very high infrastructure investment costs of servicing large urban areas. But such an evaluation is mixed with the a long standing issue with next to no economic research on it. What transport infrastructure works best in huge regions: roads versus mass transit, circumferential versus radial highways, toll-roads with what technology or not, etc.

More generally, evaluation of urban diseconomies is made more complicated by the high public policy component. Tokyo is very expensive but arguably works well, so that its increase in size from 25m to 35m may have had little impact on the cost side. Large, but still smaller urban regions in developing countries (similar to the Mexico City region of over 20m) have a poor quality of life, which is presumably due to having poor institutions and less human capital in urban administration. We could conceive of trying to estimate the rise in time commuting costs, the rise in per capita infrastructure costs or the decline in environmental regulation at different levels of development, and under

different institutional regimes. But apart from the conceptual issue of cause and effect (institutions and development are affected by urban form) there is a data issue. While the UN and World Bank have worked to try to develop some data bases, we simply do not have good measures of relevant variables for a large sample of large urban regions (let alone the sizes which have been proposed for India and China). But then data availability is also driven by the demand for use of such data, in this case very limited to date.

2.2 Spatial Income Inequality

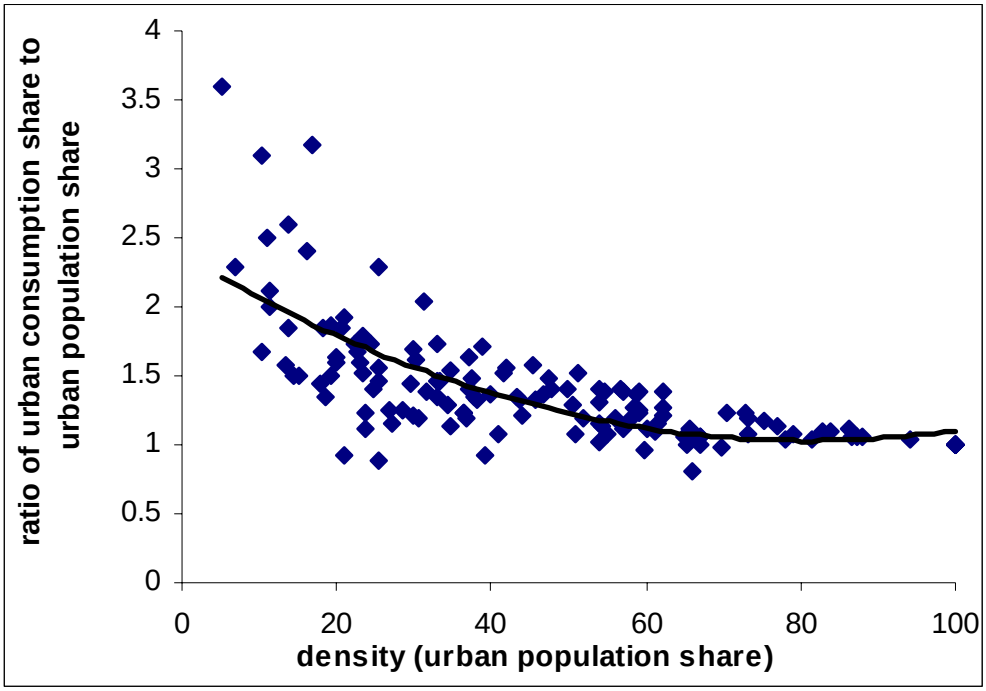
2.2.1 The literature

There is a vast literature documenting changes in spatial inequality for different countries in the development process (e.g., Kanbur, Venables, and Wan, 2006). Underlying this literature is the Williamson-Kuznets (1965) hypothesis is that as a country starts to develop inter-regional income inequality starts to rise, peaks and then declines, with the 2009 WDR reviewing historical evidence for today's developed countries. The notion is that this is part of the development transition. The technological and trade or other policy shocks that may start a country off on a growth path emphasizing manufacturing growth and development lead to rural-urban migration and urban agglomeration in particular regions But that is not an instantaneous process. Urban labor market opportunities are enhanced relative to rural but the migration response to close real wage gaps between the urban and rural sector takes time. The more the urbanization process is completed, the smaller the gap. It is not just because population movement have closed the gap per se. The rural sector itself develops and farming technology is transformed from labor to capital and high skill intensive. Barro and Sala-i-Martin (1992) argue that regional income gaps in Japan were closed by backward regions modernizing. This is also consistent with the earlier discussion which noted the deconcentration of manufacturing (but not population) into hinterland areas which occurs with development.

This idea is also supported by data from the 2009 WDR. Following a common approach today, the WDR focuses on the urban-rural real income gap. Figure 4 shows how per capita urban to rural consumption varies with the degree of urbanization in a country. Note the sharp decline to almost equality at high levels of urbanization. Unfortunately this likely mixes two items: declines in wage gaps for the same skill people

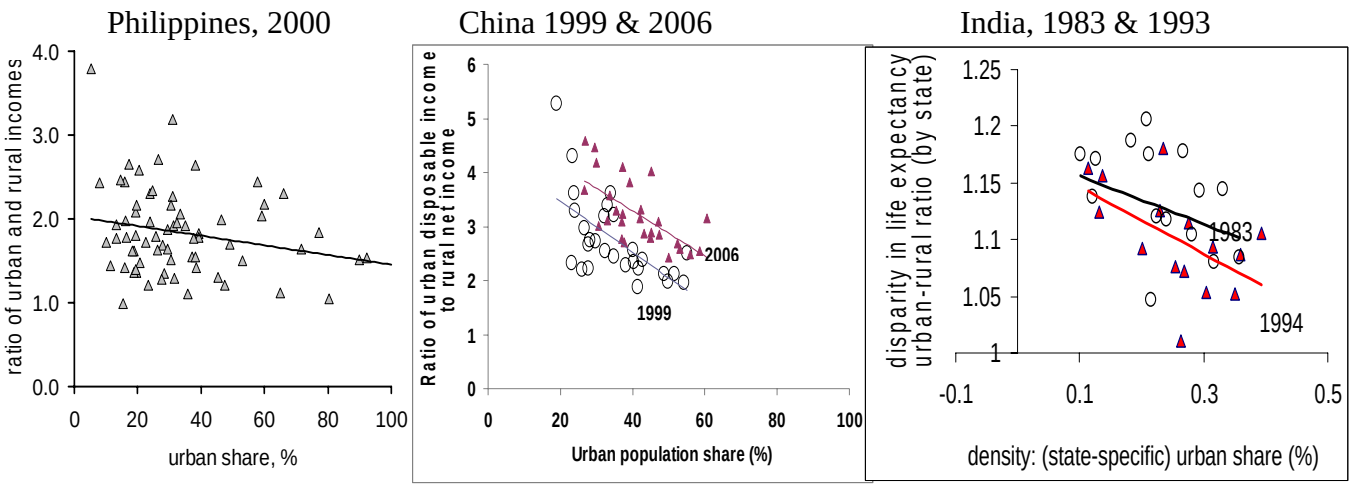
and changes in skill mix where rural regions relatively upgrade. Figure 3 repeats this analysis looking with regions of three countries. Each point is a region (province/state) of a country where the vertical axis is the ratio of urban to rural income for the region and the horizontal is the degree of urbanization of the region. Again there is a sharp decline in rural-urban gaps. For India and China two time periods are shown, where for India inequality also declined over time. What stands out in the graph is China. First China's urban-rural gaps are huge in comparison to other countries (in a country of almost universal literacy and completion today of at least middle school). Second those gaps have increased over time.

Figure 3. Urban-rural consumption gaps decline with urbanization and development



Source: Figure 1.11 in Grey Cover Draft of 2009 WDR, March 2008

Figure 4. Sub-national urban-rural income disparities



Source: Figure 1.12 in Grey Cover Draft of 2009 WDR, March 2008

2.2.2 The rural-urban divide

The concern of the literature and of policy is that, for some countries, the high rural-urban income gaps are not just a part of some transition process, as rural labor moves to cities and the rural sector is upgraded. First is the direct evidence noted earlier of policies that are biased in favor in one or two cities or regions of a country relative to others. Second are a set of *local* policies in favored regions which try to counteract the negative aspects of national favoritism, by inhibiting the flow of people into the favored area. The latter is accomplished by making living conditions for migrants into favored cities very unpleasant, as a deterrent to in-migration with a consequence of creating a divide within cities between long-term residents and migrants. Third are national policies that directly regulate try to labor flows and conditions of rural versus urban residents. The last apply mostly to some former "planned" economies, most notably China; but their efficacy has diminished under market reforms.

We use China as an extreme example of the issues and then turn to a discussion of the pressing research agenda. China used its household registration (hukou) system to control initial rural-urban migration through much of the last 30 years. Control involved two facets: First is "leave the land, not the village", meaning to allow rural

industrialization ("town and village enterprises) and to hold people in villages by having non-agricultural jobs there rather than having migration to urban industrial agglomerations. Second, for the urbanization that inevitably occurred with the need for urban labor in a rapidly industrializing country where capital was disproportionately allocated to cities Jefferson and Singhe (1999), to have urbanization be localized and diffuse, spread across many cities. These planning intentions were enforced or implemented to some extent through the hukou system which regulated what locations people could move to, either temporarily or permanently. The consequences of such policies have been written about extensively (e.g., Chan 2003 and Fujita, Henderson, Kanemoto and Mori (2004). First is that China is probably under-urbanized; note in Figure 1 China is well below the "trend" line. Second, many Chinese cities are under-sized, as analyzed in Au and Henderson (2006a, 2006b). Third there are the huge urban-rural income gaps illustrated in Figure 4. Such income gaps for China correspond to both consumption gaps (Knight, Shi and Song, 2004) and gaps in marginal productivity of labor in the urban versus rural sector, controlling for skill differences (Au and Henderson, 2006a).

Today in China the ability of the hukou system to directly limit migration has been weakened. Instead China has adopted an explicit policy similar to what may be implicit policies else, to limit migration to certain key cities, especially the very largest and most favored cities, by making living conditions for migrants there unpleasant. This results in what is called the "double divide"—urban-rural and within cities. Migrants to the largest cities (those who are registered as citizen of a rural area) in China generally are cannot obtain housing in the formal sector; they can't rent in the formal sector and can't obtain a mortgage to purchase. They are forced to rent in "urban villages" which are pockets of crowded housing in slum-like conditions, where land is still under rural governance. Usually such land is at the city fringes, although in cites like Beijing such villages are scattered throughout the city. Second their children have limited, expensive or no access to state schools; and are forced into quasi-legal under-ground schools, with poorly educated teachers, with the schools subject to closures (Kwong, 2004). Finally such migrants are generally excluded from health insurance, social security, job-training programs and the like. They are rather like illegal aliens in the USA, except at least such

migrants in the USA do not have proscribed areas where they must live and their children can go to public schools (Wu and Rosenbaum, 2007).

While we know all this about China we know less about the long-term consequences. Will urban villages morph fully into favela-style communities not under city governance which become havens for illegal activities and social unrest? More generally when we turn to other countries, with enormous slum developments such as India and countries in sub-Saharan Africa is the question of whether slum development is a natural part of development. Does the rush of migrants into cities overburden existing and not fully developed land market institutions and urban management and capabilities, so that formal sector housing and land markets can't respond with adequate supply in the intermediate run. The result is the development and acceptance of a large informal sector, with lack of public facility servicing and public services. Then as the country develops, gradually the informal sector starts to be cleaned up and serviced, and converted to the formal sector.

However it may be that the lack of servicing is intentional, or a strategic implicit policy choice. Residents of favored cities do not want to see the benefits of favoritism dissipated through migrants crowding into the city. For Brazil, Feler and Henderson (2009) argue that under-servicing of housing and neighborhoods in which migrants were likely to live was a policy adopted by local districts within metro areas in the 1980's before democratization to try to deflect migrants away from their districts. Such policies were successful in retarding the rate of locality population growth; and localities in a metro area chose such policies strategically in reaction to policies of other districts nearby.

This inter-play where cities being favored by national governments in terms of capital market allocations and licensing and then they try to deter the crowding that occurs as migrants come seeking the resulting jobs seems like (a) a key aspect of urban development and (b) is something we have only started to study. This inter-play also seems related to the sub-Saharan paradox of the 1970-2000 time period (WDR, 2000) — rapid urbanization in the face of low or no national per capita income growth, along with the development of huge urban slums. In this case urbanization may have been driven by bias—under-investment in rural infrastructure and spending of government resource

revenues in national capital regions. And while slums may be partly the result of overburdened institutions and urban management capabilities, they could also have a strategic component, to try to discourage in-migration. How much does this double-divide contribute to national income inequality and what are the consequences for economic growth? We simply have no answers to those questions.

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