



CHAPTER 5

Spatial Inequality and Economic Development: Theories, Facts, and Policies

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Although systematic evidence on the extent of spatial inequality in developing countries is still relatively scarce, a growing body of work documents the existence of such inequalities in countries in Africa, Asia, Europe, and Latin America (Kanbur and Venables 2005a, 2005b; Kanbur, Venables, and Wan 2006). Little consensus has emerged, however, on the causes of spatial inequality or the ways in which policy makers should respond to it.

From the standpoint of economic efficiency, spatial inequality may be beneficial or harmful. If it results from regional specialization based on comparative advantage or returns to scale in production, it may be beneficial, because productivity increases. If, however, it is caused by external economies that are not internalized, the level of inequality may not be optimal. Spatial inequality in the form of the excessive concentration of urban population in large primate cities may impose a variety of social ills in society. From the standpoint of equity, it may be socially undesirable if it contributes to social inequality across regions. It may also be socially destabilizing if the regional divergence in economic welfare and political interests contributes to social instability.

What are the causes of spatial inequality? What is the nature of the evidence on its causes? What is the optimal level of spatial inequality? Does

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rapid growth accelerate spatial inequality? Is the rise of spatial inequality necessary for development? To what extent is its rise a short-run or a long-run phenomenon? Do globalization and international trade increase spatial inequality within countries? What can governments do to promote or reduce spatial inequality?

This chapter sheds light on these important questions by reviewing the current state of knowledge on the theories on, empirical evidence about, and policies concerning spatial inequality and development. Although research on spatial inequality in developing countries remains in a nascent stage, there has been an explosion of both theoretical and empirical research on the general causes of spatial agglomeration (Henderson and Thisse 2004). Significant advances have been made in establishing the theoretical micro-foundations of spatial agglomerations; the growth in computing power and advances in empirical methods have greatly expanded the quality of empirical evidence on agglomeration economies.

Innovations in theory continue to dictate scholarly discourse in economics; empirical studies rarely have a decisive impact on policy or theory. Although the amount of empirical evidence has increased substantially in recent years, policy directives are likely to be influenced by a scholar's theoretical perspective and a subjective weighing of the evidence rather than solely by the accumulation of systematic empirical evidence. Because theories that have little proven empirical track record can quickly enter the realm of policy discourse, policy makers must recognize the inherent theory bias in economics. To be able to evaluate the merits of policies proposed by scholars, they must acquire a basic knowledge of developments in the theory of economic geography

Policy makers also need to recognize the interdependent nature of regional and urban spatial inequality. Because the fields of regional and urban economics developed separately, the literature on spatial inequality treats regional inequality and urban inequality as two separate phenomena. The most important reason for this dichotomy is that it is extremely difficult to develop a unified theory of regions and cities in a satisfactory manner (see Fujita, Krugman, and Venables 1999). Only in the extreme case, in which cities are uniform in size and uniformly distributed across regions, is urban inequality expected to have limited impact on regional inequality. In reality both city sizes and their geographic distribution are very uneven.

To the extent that industrial revolution and urbanization go hand in hand, the rise of North–South regional cores and peripheries is likely to be intimately related to urban development. North–South divergence in incomes and industrial structures in the United States in the late 19th and early 20th centuries coincided with more rapid urban development in the North than in the South. At a more regional level, it is impossible to imagine that the city of Chicago would have become the mercantile center of the Midwest in the late 19th century had it not had access to a rich rural hinterland (Cronon 1991). Conversely, for a given population the extent of urban scale economies is likely to influence the number of cities and their

geographic distribution across regions. In the United States it probably is not a coincidence that urban densities rose significantly when regional inequality rose and fell considerably when regional inequality fell (Kim 1995, 1998, 2007a).

Policy makers face a bewildering array of empirical evidence on spatial inequality that is difficult, if not impossible, to evaluate. Studies vary greatly in terms of both focus and in their methods of measurement of spatial inequality, which often are not comparable. The problem is most severe for studies of developing countries, where scholars must resort to survey rather than government census data. Although it is extremely challenging to summarize this literature, some important themes emerge. Policy makers need to take into account the dynamic nature of spatial inequality; they must be able to evaluate the impact of foreign trade on spatial inequality; and, perhaps most important, they must understand the role of political institutions on spatial inequality.

This chapter is organized as follows. The next section reviews recent advances in theories of regional and urban spatial inequality. In addition to examining the standard theories of spatial agglomeration, it looks at the impact of trade and political institutions on spatial inequality. The second section reviews the evidence on spatial inequality for developing and developed countries from both regional and urban perspectives. The third section outlines the policy implications and lessons that emerge from the literature on spatial inequality. The last section summarizes the findings and provides suggestions for future research.

Theories of Spatial Inequality

From the perspective of theory, spatial inequality is determined by the location decisions of firms and households. Firms choose locations to maximize profits; households choose locations to maximize job market outcomes and utility. While firms and households generally care about the quality of both their regional and urban environments, there is no widely accepted general theory of spatial location that seems to incorporate regional and urban location decisions in a unified manner (see Fujita, Krugman, and Venables 1999; Fujita and Thisse 2002; Berliant 2007). Rather, the field of economic geography is divided into two fields, regional economics and urban economics (Kim and Margo 2004).

The traditional regional science models based on the central-place theory take a regional-urban perspective, but these models have been discredited for lacking a rigorous theoretical foundation.¹ To the extent that they exist, regional models are based largely on models of international or

1 The central-place theory of Christaller (1933) and Losch (1954) seeks to explain the hierarchy of cities and towns (central places) that serve rural markets. It is not an economic model based on optimization and the equilibrium behavior of firms and households but rather a useful descriptive classification scheme, as Fujita, Krugman, and Venables (1999) note.

interregional trade. Although it is impossible to imagine interregional (international) trade in the absence of cities, perusal of standard texts in international trade reveals a complete absence of discussion of cities.² Conversely, urban models are devoid of regional location decisions. In the classic Henderson (1974) model, cities are islands that differ only in scale. Study of the size distribution of cities without reference to their locations forms an important research agenda for urban economists.

The various theories of economic geography provide different causal explanations for spatial inequality and elicit different policy responses to combat inequality. Recent theoretical innovations in modeling increasing returns have led to the formalization of many traditional concepts, such as Marshallian externalities (technological spillovers, labor-market pooling, access to nontraded intermediate inputs) and nonpecuniary externalities (forward and backward linkages and market size). This in turn has clarified the forces of spatial agglomeration and dispersion.

In general, spatial inequality is the net result of the balance of forces of concentration and dispersion. From a regional perspective, the centripetal forces of geographic concentration are natural advantages, Marshallian externalities, and nonpecuniary externalities; the centrifugal forces of dispersion are immobility in factors and goods caused by high transportation and communications costs. An urban perspective also considers new costs of concentration in the form of congestion costs that result from the fixed supply of land. Concentration leads to increased housing and commuting costs as well as the costs caused by greater crime, pollution, and exposure to disease.

In addition to presenting the theories of regional inequality, this section explores the impact of globalization and trade on spatial inequality, the influence of institutions on spatial inequality, and the relation between household inequality and spatial inequality. It addresses three important issues. First, while the forces that determine the location of firms and households caused by foreign and domestic trade are identical, citizens rarely view the economic impact of foreign and domestic trade in similar ways. Second, regional differences in institutions may affect regional inequality. The distribution of political and fiscal power among the federal, state, and local governments is also likely to have an impact on urban inequality. Third, household income inequality is an important concern for policy makers. It is therefore important to understand whether spatial inequality contributes to household income inequality.

Theories of Regional Inequality

Two classes of regional economics models yield very different policy implications for dealing with regional inequality. In the first class of models, based on the standard neoclassical assumptions of constant returns to scale

2 International and interregional trade models usually do not address cities, because neoclassical models based on comparative advantage cannot be easily adapted to incorporate city formation. Starrett's (1974) theorem demonstrates that regional specialization, cities, and trade cannot be equilibrium outcomes under the standard neoclassical assumptions (see Fujita and Thisse 2002).

and perfect competition, the role of government is limited to infrastructural investments that affect the mobility of goods, labor, and other factors.³ Governments may have little ability to influence centripetal forces that are based on comparative advantage stemming from technology or resources, but they may be able to increase regional specialization or inequality by reducing the mobility of goods or decrease inequality by lowering the mobility of factors.

In the second class of models—the “new models of economic geography,” based on imperfect competition and increasing returns—the potential role for government intervention is significantly higher, for three main reasons.⁴ First, as a result of the potential for “cumulative causation” forces, small subsidies can potentially have significant first-order effects.⁵ Second, infrastructural investments that increase the mobility of goods, labor, and capital may have significant impact on spatial inequality because of the self-enforcing nature of increasing returns. Third, because the equilibrium market allocations are inefficient in these models, markets will not reach the optimal level of spatial inequality without government intervention.

3 The two important neoclassical models of trade, the Ricardian and the Heckscher-Ohlin models, present two different theories of regional inequality based on comparative advantage. In the Ricardian model the source of regional comparative advantage is differences in technologies; in the Heckscher-Ohlin model the source is differences in resource endowments. If goods are mobile but factors immobile, both theories predict a rise in regional spatial inequality based on comparative advantage. In the Ricardian model, if a region possesses absolute advantage in technology, its workers will earn higher wages before or after economic integration; in the Heckscher-Ohlin model, the factor price equalization theorem implies that regional differences in incomes can result only from differences in regional industrial structures. If factors are mobile, all workers will migrate to the region with absolute advantages, leading to interregional convergence.

4 These models, commonly associated with Paul Krugman, contain five essential ingredients: increasing returns to scale that are internal to the firm; imperfect competition (usually Spence-Dixit-Stiglitz monopolistic competition); trade costs (Samuelson’s “iceberg form,” in which goods melt away by distance); endogenous firm location; and, most important, the endogenous location of demand (Spence 1976; Dixit and Stiglitz 1977; Samuelson 1952). As Head and Mayer (2004) note, the first four ingredients give rise to the agglomeration economies of home market effects; the last ingredient, the endogenous location of demand, creates the well-known process of circular causation that causes core-periphery regions to arise from initially symmetric regions. Krugman’s (1991a, 1991b) model includes two regions (North and South) and two goods (agricultural and manufacturing). Agricultural goods are homogenous goods produced under constant returns and perfect competition; manufacturing goods are differentiated goods produced under scale economies and monopolistic competition. The only input to production is labor; agricultural workers are immobile, whereas manufacturing workers are mobile. The transportation costs of agricultural goods are costless and those of manufacturing goods costly. When transportation costs of manufacturing goods are high, regions are symmetric and manufacturing is dispersed in both regions. As transportation costs fall, manufacturing becomes concentrated in one region (the North) and the other region (the South) becomes an agricultural periphery. The intuition is simple: the concentration of manufacturing workers in the North creates larger markets, which in turn reduces the costs of production as a result of economies of scale.

5 Because the models typically contain multiple equilibria, a slight perturbation caused by an industrial subsidy to an industry in a given region may increase spatial inequality dramatically. Even if two regions are initially identical, a slight advantage given to one region through tax subsidies may trigger a sharp rise in spatial inequality between the regions. Because increasing returns create a momentum of their own, in theory cumulative causation should lead to the rise of core-periphery regions (Krugman (1991a, 1991b)). There is little empirical support for such a hypothesis.

When the sources of increasing returns are forward and backward linkages rather than market size and internal scale economies in production, it is possible to derive an inverted-*U* pattern of geographic concentration in which regional inequality first rises and then falls.⁶ Forward linkages exist when increased production by upstream firms provides positive pecuniary externalities to downstream firms. Backward linkages exist when increased production by downstream firms provides positive pecuniary externalities to upstream firms. When labor is immobile, an initial decline in the transportation costs of final goods leads to geographic concentration and regional inequality; when transportation costs fall further, regional inequality declines and the location of manufacturing firms becomes more dispersed.⁷ Thus at least in principle, a policy that significantly lowers the transportation costs of final goods may, under certain conditions, lead to a long-run reduction in regional inequality.

For policy makers in developing countries these standard models of geography may prove inadequate guides for understanding regional inequality in developing countries. Most of these models are static and do not contain elements of a structural shift in economic activities from agriculture to manufacturing and services, one of the hallmarks of development. Puga (1999) shows that the extent of regional inequality may be limited by manufacturing firms' ability to recruit workers from the agricultural sector. Thus the potential for agglomeration depends critically on the labor mobility of workers between the two sectors. Murata (2002, forthcoming) shows that the level of regional inequality may be constrained by consumer expenditure patterns.⁸ Regional inequality generally rises as an economy shifts from agriculture to manufacturing; the degree of the shift may depend on

6 See Krugman and Venables (1995), Venables (1996), and Puga (1999). Puga (1999) presents the most general version of the model; Krugman and Venables (1995) and Venables (1996) are derived as special cases. Puga's model is similar to that of Krugman (1991b) in that it has two regions and two goods (agricultural and manufacturing). The agricultural good is homogenous and is produced using labor and land under constant returns to scale in a perfectly competitive market; land is immobile; agricultural goods are freely mobile; consumers have Spence-Dixit-Stiglitz preferences for varieties; and goods are produced with scale economies and can be used both as final consumption goods or intermediate goods for use in the same industry, as in Ethier (1982). This specification captures the idea of forward and backward linkages in the sense of Hirschman (1958).

7 As Puga (1999, p. 324) notes, "At high trade costs firms want to be where final demand is, so they split between regions. At intermediate levels of trade costs firms cluster to exploit cost and demand linkages. However, without interregional labour mobility, agglomeration opens wage differences. At low levels of trade costs, firms want to be where immobile factors are cheaper, so they spread across regions again."

8 Murata models the structural shift from agriculture to manufacturing by introducing nonhomothetic preferences, which, by invoking Engel's law, shift consumer demand from agricultural to manufacturing goods. In this model the preindustrial economy is defined by prohibitive interregional transportation costs. As transportation costs fall with development, the extent of the market increases for manufactured goods and consumers' purchasing power rises as prices fall. Initially, at low demand for manufactures (as a result of low agglomeration economies) manufacturing remains dispersed. As transportation costs continue to fall further, however, the increase in expenditure shares in manufacturing leads to agglomeration forces sufficient enough to create a pattern of core and periphery.

the rapidity with which consumers increase their expenditure shares in manufacturing.

Theories of Urban Inequality

Urban inequality and regional inequality are highly interdependent. Although few models of urban inequality do not address regional inequality, urban inequality affects regional inequality in a variety of ways. First, the well-known urban–rural wage gap leads to regional inequality if there are regional differences in the rates of urbanization; this increase may contribute to growing regional inequality. Second, urban specialization in different industries may contribute to regional inequality if regions possess different types of cities. Third, the size distribution of cities influences regional inequality. If cities are uniformly small, urbanization is likely to have limited impact on regional inequality. However, if cities differ in size, as they usually do, urban inequality may have a major impact on regional inequality. For example, urban primacy or the concentration of a significant share of the urban population in a few central cities will cause regional inequality. Thus policies that reduce the importance of urban primacy are likely to contribute to greater regional equality.

Theories of urban inequality differ from those of regional inequality in one important respect: the treatment of land. Whereas the regional immobility of factors constrains regional inequality by limiting agglomeration economies, the most important limiting factor for urban scale or inequality is the cost of congestion associated with land. As firms and workers concentrate in one urban location to take advantage of agglomeration economies, they bid up land rents.⁹ The optimal city size is determined by the balance between agglomeration economies and congestion costs.

In Henderson's (1974) classic model of the systems of cities, the balance of centripetal forces of Marshallian externalities and centrifugal forces of land rents and commuting costs determine the size distribution of cities. Because externalities are assumed to be industry specific (localization economies), a city specializes in a single industry and its size is determined by the strength of its Marshallian externalities. From this theoretical perspective, urban inequality is likely to rise if localization economies are particularly strong in a few industries and likely to fall if congestion costs are more significant relative to agglomeration forces.

In more recent model of cities, Abdel-Rahman and Fujita (1990) show that if the centripetal force is changed from Marshallian externalities to the Spence-Dixit-Stiglitz-Ethier type of pecuniary externalities, similar results in terms of the size distribution of cities arise. In their model city sizes and

⁹ Duranton and Puga (2004) provide a useful list of categories of urban agglomeration economies based on economies of sharing, matching, and learning. The sharing category includes sharing of indivisibilities in the provision of public goods and facilities, the gains from variety, and the gains from individual specialization and risk. The matching category includes improving quality and the chances of matches. The learning category includes knowledge generation, diffusion, and accumulation.

wages are positively related to a variety of intermediate inputs. Unlike in Henderson's (1988) model, however, cities are not of optimal sizes. Urban inequality may rise if the strength of spillovers from forward and backward linkages is significant and concentrated in a few industries.

These two models provide different motivations for why cities specialize or diversify in different industries. In the Henderson (1974) type of model, the nature of Marshallian externalities determines the types of cities. If externalities are of the localization type (specific to industries), cities are likely to be specialized; if externalities are of the urbanization type (specific to cities), cities are likely to be diverse.

In the urban models based on the Spence-Dixit-Stiglitz-Ethier type of pecuniary externalities, Abdel-Rahman (1996) shows that the extent of urban specialization or diversification may be a function of intercity transportation costs. When intercity transportation costs are low, cities specialize, in order to take advantage of the agglomeration economies from a greater variety of nontraded inputs; when intercity transportation costs are high, cities become diversified, in order to economize on transportation costs. Thus like regional specialization, urban specialization may be limited by intercity transportation and local congestion costs.

Like the standard models of regional inequality, these models of urban inequality are likely to prove inadequate guides to policy makers for understanding urban inequality in developing countries. Except in the model of Puga (1998), there is no rural-urban interaction or consideration of a structural shift in economic activities from agriculture in rural areas to manufacturing and services in cities. These urban models thus seem disconnected from the classic urban models of development, such as Lewis (1954) and Harris and Todaro (1970). In Lewis (1954) the assumption of an elastic supply of unskilled labor from rural areas fuels industrial development in cities. In Harris and Todaro (1970) rural-urban migration is caused by a politically determined minimum wage in cities. It may result in ex post poor outcomes for migrants if they do not obtain jobs in the formal sector but become unemployed in the informal sector.

In the standard models discussed above, the urban-rural wage gap is determined by the forces of agglomeration economies and diseconomies and transportation costs. Building on the basics of the Harris-Todaro (1970) model, Rauch (1993) provides a different rationale for why urban-rural wage gaps arise. In his model there are two urban sectors (formal and informal) and one rural sector. Wages are highest in the formal urban sector and lowest in the informal urban sector. Ex ante a rural worker will migrate to the city if the expected income is higher in the city; ex post the rural worker will be better off only if he or she lands a job in the former sector. Uncertainties in labor search may thus contribute to the urban-rural wage gap.

Rauch shows that urban inequality may follow an inverted-*U* pattern, in the spirit of Kuznets (1955). In the early phase of development, when the population is mostly rural, rural incomes are relatively low. Consequently, rural agents are willing to risk underemployment in the informal sector in

the hope of landing a higher wage in the formal urban sector job. Because income inequality between the formal and informal urban jobs is higher than inequality between the formal urban and rural sectors, the initial rise in urbanization increases income inequality. However, as the rural population decreases with urbanization, urban–rural wage differentials decline and urbanization rates fall. Rural agents are less willing to incur the risks of underemployment in the informal sector, and income inequality declines.

Trade and Spatial Inequality

Globalization may increase or decrease spatial inequality. In principle, its impact on spatial inequality is the same as that of domestic trade, as discussed above. To the extent that some regions may benefit more from external trade than others, international trade may increase regional spatial inequality. From a neoclassical perspective, unless regions and their cities have identical exposure to trade and similar comparative advantage, foreign trade is likely to increase spatial inequality. Regions and cities that have natural resources for exports or natural advantages, such as proximity to rivers, coasts, and transportation networks, are likely to benefit from external trade, whereas those in remote areas are not.

From an increasing returns perspective, spatial inequality is likely to rise because some regions may capture the benefits of increasing returns from foreign trade while others remain more reliant on domestic trade. Puga and Venables (1999) suggest that under certain circumstances, however, trade liberalization may reduce regional and urban spatial inequality over time in sequential regional waves.¹⁰ Initially, industries concentrate in one region. When the wage gap widens between this region and poorer regions, industry migrates toward one of the poor regions. As a result of agglomeration economies, the migration will be concentrated in only one of these regions. Over time, as the process continues, more poor regions will join the group. Puga and Venables find that both import-substitution policies (increases in tariffs) and trade liberalization (decreases in tariffs) can be used to attract industries for underdeveloped regions but that welfare levels are higher under the trade liberalization scenario.

Using a simple three-location model (two domestic cities and the rest of the world), Krugman and Livas Elizondo (1996) show that foreign trade may also reduce urban inequality. In their model the forces of urban inequality—the centripetal forces of backward and forward linkages—are counterbalanced by the centrifugal forces of commuting costs and land rents. When tariff rates are prohibitively high, the stable equilibrium is the concentration of manufacturing in one primate city. Under this setting the concentration of domestic firms and workers in one city produces sufficiently strong forward and backward linkages to offset the costs of urban congestion. When trade is liberalized, centripetal forces decline, causing

¹⁰ Puga and Venables's (1999) model is based on the increasing returns model of Krugman and Venables (1995) and Puga (1999).

manufacturing to disperse to the other city. Trade liberalization thus causes the primate city to decline, increasing urban equality.

Institutions and Spatial Inequality

Institutions matter not just for growth and development but also for spatial inequality. Most recent studies focus on understanding the impact of institutions on national development and growth (Engerman and Sokoloff 1997; Acemoglu, Johnson, and Robinson (2001, 2002, 2004), but regional differences in the quality of institutions may also affect economic development within countries, as Banerjee and Iyer (2005), Kapur and Kim (2006), Bruhn and Gallego (2007), and Kim (2007b) show. Political institutions that determine the distribution of power and fiscal resources across federal, state, and local governments can also play major roles in determining spatial inequality (Henderson 2002; Kim 2008).

Scholars have proposed a variety of explanations for why countries or regions possess different institutions. They include accidents of history (North 1990); factor endowments (Engerman and Sokoloff 1997); and climate and native population density (Acemoglu, Johnson, and Robinson 2001, 2002). While differences in the institutions of regions within a country may be more difficult to sustain than those at the international level, regional differences persist even after these differences have been removed.

Especially in developing countries, political institutions are likely to contribute to urban inequality if property rights are easier to establish and defend in cities, where one has access to the legal system. Political corruption and instability may also contribute to urban inequality in the form of urban primacy if proximity to a primate city makes it easier to shield oneself from the threat of violence, to make illegal bribes easier to conceal, or to gain access to information and communication. In a simplified model, Ades and Glaeser (1995) show that the benefits of political primacy are likely to be higher under dictatorships than democracies.

Federalism (the balance of political power among the federal, state, and local jurisdictions) is also likely to matter greatly for spatial inequality. Until the second half of the 20th century, the United States had a weak federal government that gave significant political power to the states and local governments. This American-style federalism is likely to have contributed to spatial equality over time (Kim 2008).¹¹ In contrast, many countries in Latin America emerged from colonialism with strong federal but weak local governments (Sokoloff and Zolt 2006). Latin American-style federalism is likely to have contributed significantly to spatial inequality over time.

¹¹ With the signing of the Constitution, the United States emerged with a relatively weak federal government but strong state governments and an emphasis on states' rights. Between 1850 and 1900, local municipal governments came to dominate government expenditures. In the 20th century the state and federal government became increasingly important over time. American-style federalism still gives significant political and economic power to local and state governments (Kim 2008).

Effect of Household Income Inequality on Spatial Inequality

One of the most important topics of interest in development economics is income inequality, but there is little discussion of the potential relation between spatial inequality and household income inequality. In theory, household income inequality can increase without an increase in spatial inequality if the rise in inequality is solely intraregional. In practice, an increase in spatial inequality is likely to contribute to an increase in household income inequality. Indeed, Kuznets's (1955) argument for the existence of the inverted-*U* pattern of household income inequality contained a strong geographic component and inspired Williamson's (1965) inverted-*U* pattern of regional inequality.

For Kuznets the rise in household income inequality with development is caused by a structural shift in the economy from agriculture to manufacturing industries. Kuznets identifies two forces increasing household inequality. First, savings inequality rises, raising increasing income inequality. Second, because household income inequality is higher in urban manufacturing than in rural agriculture, by the logic of industry decomposition identity, the industrial shift leads to higher income inequality. Kuznets argues that as economies mature, the dynamics of the growing economy worked against these forces of household inequality. These dynamics include efforts by governments to reduce the accumulation of the savings of the very wealthy; demographic factors, such as immigration, which reduce the size of the top income bracket; the democratic nature of capitalism, which favors the widening of the entrepreneurial class; and the gradual shift into services, which compresses incomes.

Lindert and Williamson (1985) discuss a number of forces that may be correlated with long-run income equality. Among the most interesting is the following demographic theory. In the early phase of the industrial revolution, there is an elastic supply of agrarian workers (Lewis 1954), who suppress the wages of unskilled industrial workers. Higher fertility, lower infant mortality, and immigration may also lower the wages of unskilled workers during the early industrial period. As the incomes of skilled workers rise, income inequality increases. Later, as the industrial revolution matures and the level of skills per member of the labor force rises, the wages of skilled and unskilled workers converge, causing a decline in income inequality.

Evidence on Spatial Inequality

What does the evidence on regional and urban spatial inequality show? This section begins by briefly describing the measurement of regional and urban spatial inequality. It then presents evidence on regional spatial inequality in developing and developed countries, urban spatial inequality, the relation between regional and urban spatial inequality, and long-run trends. The last three subsections examine empirical evidence on the impact

of trade and institutions on spatial inequality and on the relation between household income inequality and spatial inequality.

Measuring Spatial Inequality

The location Gini coefficient is the simplest and most widely used measure for measuring regional inequality (Krugman 1991a). As in the Gini coefficient used to measure household income inequality, its locational counterpart measures the extent to which geographic activity is concentrated.¹²

In recent years several important alternative measures have been proposed. Because an industry may be geographically concentrated for random reasons if it contains a small number of very large firms, Ellison and Glaeser (1997) propose an alternative measure that corrects for an industry's scale economy (also see Maurel and Sédillot 1999). Because regional units are geographically coarse units of observation, Duranton and Overman (2005) develop a distance-based measure that uses the Euclidian distance between every pair of establishments. Brühlhart and Traeger (2005) suggest using entropy indices, which are decomposable into within- and between-region components.

To measure urban inequality, scholars have focused on urban productivity and the size distribution of cities. Because wages and productivity are generally positively correlated with city sizes, differences in wages and productivity measure urban inequality. Urban inequality is also often measured using the rank-size distribution of cities. In particular, urban primacy or the concentration of the urban population in the largest cities is often used as a measure of urban inequality. Unfortunately, no measure relates urban inequality with regional inequality.

Evidence on Regional Spatial Inequality

Studies on regional inequality are challenging to summarize, because they differ across many dimensions, such as indices of geographic concentration and geographic units of observation, as well as in their theoretical motivation and empirical specification. In addition, given the difficulty of constructing regional inequality measures that are comparable across many countries, there is no international cross-sectional or panel analysis similar to that used in the urban inequality literature (see below) or the household income literature. As a result, the literature on regional inequality is dominated by country-specific studies.

Because of the scarcity of reliable census data, the evidence for developing countries is often based on survey data. Perhaps because of poor data quality or greater variance in the economic circumstances of developing countries, the evidence on spatial inequality varies widely across countries. In contrast, although there are important variations in the level of spatial inequality, the industrial patterns of spatial localization are fairly similar across many developed countries.

¹² For a detailed discussion on the properties of the Gini coefficient in the context of household income inequality, see Ray (1998).

Regional inequality in developing countries.

The most striking pattern that emerges from the data on the spatial inequality of developing countries is its varied nature. Country-specific geographic and political factors may play a disproportionately large role in shaping the patterns of spatial inequality in developing countries.¹³

In countries as diverse as China and Mexico, trends in spatial inequality seem to have fluctuated over time until the late 20th century, when inequality rose sharply in both countries. In China inequality rose markedly during the period of the Great Leap Forward and the Great Famine (1952–60), fell during the recovery period, rose during the Cultural Revolution period (1967–76), and fell again during the period of rural reform. Inequality rose substantially with decentralization and the sharp rise in international trade in the 1984–2000 period (Kanbur and Zhang 2005), during which time intraprovince inequality in household incomes and wages rose (Knight, Shi, and Renwei 2006).

In Mexico north-south regional disparities were fairly high in 1970, fell between 1970 and 1985, and rose substantially between 1985 and 1990 (Rodriguez-Pose and Sanchez-Reaza 2005). When Mexico's government imposed high trade barriers as part of its import-substitution industrialization strategy, industrial employment was concentrated in Mexico City. As trade liberalized, industrial activity shifted to the U.S.-Mexico border (Hanson 1997). Hanson (2007) finds that globalization in the 1990s increased geographic labor income inequalities as incomes in states with high exposure to trade benefited relative to those in states with low exposure to trade.

Inequality within regions appears to be as significant as inequality across regions in many countries. Regional inequality rose in the Czech Republic, Hungary, Poland, and the Russian Federation in the 1990s; it was highest in Russia and lowest in Poland (Forster, Jesuit, and Smeeding 2005). The data suggest that the main source of inequality was intraregional rather than interregional variation. In Ecuador, Madagascar, and Mozambique, within-community or intraregional inequality was just as important as between-community or interregional inequality. Elbers and others (2005) find that in all these countries there are considerable variations in inequality across communities and that geographic location is a good predictor of local-level inequality even after controlling for some basic demographic and economic characteristics.

In some countries, such as Brazil, regional spatial inequality was significant but declined between 1981 and 1997 (Azzoni, Menezes-Filho, and Menezes 2005); in other countries regional inequality was stable at relatively low levels. In Peru regional inequality measured using expenditure

13 The World Institute for Development Economics Research Project of the United Nations University entitled "Spatial Disparities in Human Development," directed by Ravi Kanbur and Anthony Venables, presents evidence on the extent of spatial inequality in more than 50 developing countries (Kanbur and Venables, 2005a, 2005b). That evidence suggests that spatial inequality increased in many developing countries in recent years.

and literacy was low and remained relatively low between 1972 and 1993 (Escobal and Torero 2005). Regional spatial inequality appears to have declined in the Philippines between 1985 and 2000 (Balisacan and Fuwa 2006), in Indonesia between 1984 and 1999 (Friedman 2005), and in South Africa between 1990 and 2000 (Naude and Krugell 2003).

Regional inequality in developed countries.

The cross-country evidence on regional spatial inequality is much more robust and consistent in developed countries, where the main source of spatial inequality seems to be geographic differences in industrial concentration. Because some industries, such as textiles, are much more geographically concentrated than industries such as food or electrical machinery, spatial inequality is caused by the spatial variations in concentrated industries. Other industries, such as agriculture and mining, tend to contribute to spatial inequality (because natural resources are distributed unequally). In contrast, most services, especially those that serve local markets, tend to reduce spatial inequality.

There is considerable evidence for a long-run inverted-*U* pattern of regional inequality in the United States, especially in the manufacturing sector. Kim (1995) finds that U.S. regions became more specialized or unequal between the mid-19th and the turn of the 20th century before becoming significantly despecialized in the second half of the 20th century. Similar results are obtained from industrial localization patterns over time. Based on the locational Gini coefficient at the two- and three-digit industry level, Kim (1995) finds that manufacturing industries became more localized between 1890 and the turn of the 20th century but then became significantly more dispersed during the second half of the 20th century.¹⁴ At every point in time, traditional low-tech industries, such as textiles, apparel, and tobacco, were much more localized than medium- to high-tech industries, such as electricity and transportation. Consequently, the gradual shift in manufacturing from low-tech to high-tech industries contributed to the general dispersal of manufacturing over time.

For the aggregate economy, there is some evidence for an inverted-*U* pattern that peaked a little earlier. Kim (1998) investigates the patterns of regional specialization in all sectors (agriculture, manufacturing, and services). Regional specialization by crops in agriculture rose over time, but the shift in economic activity from agriculture to manufacturing and then to services contributed to a significant convergence in regional industrial structures. The divergence in industrial structures between the north, which specialized in manufacturing, and the south, which specialized in agriculture, accounts for about half of the regional divergence in wages. Regional convergence in wages was significantly correlated with regional convergence in industrial structures.

¹⁴ Kim (1995) points out that as one moves from two- to four-digit industries, the finer classification of industries is likely to contribute to an apparent rise in localization of industries as a result of simply defining industries more narrowly.

For a more recent period, Ellison and Glaeser (1997) show that even after controlling for the size distribution of plants and the size distribution of geographic areas, industry localization is prevalent for a large majority of industries. At the four-digit industry level, they find that industries such as tobacco, textiles, and leather are most localized and that industries such as furniture and fixtures; paper, printing, and publishing; petroleum and coal; rubber and plastics; stone, clay, and glass; industrial machinery; and instruments are dispersed. Although Ellison and Glaeser use a different index, the patterns of industry localization they find are similar to those found by Kim (1995). At a more aggregate level, Holmes and Stevens (2004) show that mining industries are most localized, followed by construction and manufacturing; services, such as wholesale trade, retail trade, finance, insurance, and real estate, are least localized. The growth of services is thus likely to lead to greater convergence in incomes across regions.

The apparent stable empirical relation in the localization patterns across industries and over time masks the dynamic nature of the spatial economy. New firms are born, old firms die, and existing firms expand/open new plants or contract/close old plants. Dumais, Ellison, and Glaeser (2002) show that geographic concentration (measured by the Ellison-Glaeser index) fell from 0.039 in 1972 to 0.034 in 1992. The variations in the plant life cycle contributed significantly to the variations in the geographic concentration of U.S. manufacturing industries over this period. New firm births accounted for three-fourths of the geographic deconcentration over the 20-year period, as more firms established themselves away from centers of industry. In contrast, firm deaths increased geographic concentration, because the rate of firm closure was higher in the periphery.

Duranton and Overman (2005) show that the level of localization in the United Kingdom depends on the way localization is measured. Using the Ellison-Glaeser index, they find that 94 percent of U.K. industries are localized; using a distance measure, they find that 51 percent of industries are localized, 26 percent are dispersed, and 23 percent do not deviate significantly from randomness. Industry localization patterns at the four-digit industry level in the United Kingdom differ slightly from those in the United States. Textiles, publishing, instruments, and appliances are most localized, whereas food and beverages, wood, petroleum, and minerals are most dispersed. Crafts and Mulatu (2006) find that industry localization and regional specialization in the United Kingdom remained relatively stable over a surprisingly long period (1841–1911).¹⁵

Maurel and Sédillot (1999) use a slight variation of the Ellison-Glaeser index to investigate geographic concentration in France in 1993. They find that 27 percent of industries at the four-digit industry level were very localized, 23 percent were moderately localized, and about half displayed a low degree of concentration. The most localized industries were extractive industries (such as iron ore, coal, and shipbuilding) and traditional indus-

¹⁵ Tirado, Paluzie, and Pons (2002) find that the geographic concentration of industries in Spain rose markedly during its industrial period (1856–93), causing a sharp rise in regional inequality.

tries (such as leather, textiles, and printing and publishing). The least localized industries were motor vehicles, sound recording and reproducing apparatus, farm machinery, electronic components, rubber products, metal work for construction, and nonferrous metals. Surprisingly, Maurel and Sédillot find a correlation between the U.S. and French industry localization of 0.60. The main outliers were furniture and transportation, which were significantly more localized in the United States, and printing and publishing, which were more localized in France.

Midelfart-Knarvik and others (2000) provide a useful summary of the patterns of regional inequality and industry localization for Europe as a whole for the period 1970–95. Europe reveals less regional specialization or inequality than the United States, and European industries are generally more dispersed. Surprisingly, however, regional inequality in per capita income is higher in Europe (Puga 2002), for reasons that are not clear.

The trends in European regional industrial inequality seem to differ from those in regional income inequality as well. In most European countries, the industrial structure converged during the 1970s, reversed the trend in the early 1980s, and then diverged significantly in the 1990s. European regional per capita income converged between 1950 and 1980 and then stopped converging between 1980 and 1995. When the regional incomes are decomposed in greater detail, however, the evidence shows that regional inequalities widened significantly between 1980 and 1995 but that the divergence was counterbalanced by a substantial convergence in inequalities across countries (Puga 2002).

Midelfart-Knarvik and others (2000) find that the location of many industries changed significantly between 1970 and 1995. Many slow-growing, labor-intensive industries were initially dispersed but became more concentrated over time in peripheral low-wage regions. About half of the geographically concentrated industries remained concentrated over time, but many medium- to high-tech industries in high-growth sectors became more dispersed across Europe. As in the United States, services were generally more dispersed than manufacturing, so that the shift from manufacturing to services contributed to the general decrease in regional inequality in Europe.

Evidence on Urban Spatial Inequality

One of the most basic measures of urban inequality is the urban–rural wage gap. Because urban wages are typically higher than rural wages, urbanization introduces spatial inequality in wages and incomes between cities and rural areas as well as across cities of different sizes. Summarizing the evidence from numerous studies that estimate the level of urbanization economies, Rosenthal and Strange (2004) conclude that productivity increases about 3–8 percent as a city’s size doubles. Glaeser and Maré (2001) find that U.S. workers in cities earn one-third more than those in rural areas. Wheeler (2004) and Kim (2006), among others, also find an urban wage premium.

Given these findings, the recent urban experience in Africa presents a puzzle. Because cities are associated with higher wages and productivity,

urbanization is usually correlated with income growth.¹⁶ However, between 1970 and 1995 Africa's per capita GDP fell 0.66 percent a year while its urban population grew 5.3 percent a year (Fay and Opal 2000). Is Africa's urbanization caused by noneconomic factors, such as war, ethnic conflict, or bright lights, rather than by urban agglomeration economies and higher productivity?

Fay and Opal (2000) argue that Africa's level of urbanization is not altogether different from countries with similar levels of income and economic structure. They suggest that because Africa was underurbanized during the colonial period, the recent surge in urbanization without growth may be accounted for by a catching-up hypothesis. Kessides (2005) also argues that urbanization in Africa is not excessive or imbalanced but that urbanization in the region—as well as in Latin America and the Caribbean, the Middle East and North Africa, and South Asia—seems only weakly correlated with industrialization. Urbanization in these regions seems to be fueled by growth in the informal service sector.

Barrios, Bertinelli, and Strobl (2006) find that rural migrants to cities were not pulled by these jobs but rather were pushed out of their rural locations. The lack of rainfall between 1960 and 1990 significantly dampened agricultural productivity in rural Sub-Saharan Africa, pushing farmers into cities. McCormick and Wahba (2003) find that returning international migrants bring greater savings into Egypt's urban areas than to its rural areas, further widening spatial inequalities.

The distribution of city sizes by population provides another important alternative measure for urban spatial inequality.¹⁷ Urban inequality is greater when the urban population is concentrated in a few of the country's largest cities; it is much lower if the population is evenly distributed across cities large and small. While the estimates are often sensitive to the definition of a city, Rosen and Resnick (1980) find that a large majority of countries possess city-size distributions that favor smaller cities; urban inequality seems moderate for a majority of countries. There seems to be some evidence that urban inequality is greater in developing countries, however. Soo (2005) finds that size distribution is significantly skewed toward larger cities in Colombia, Ecuador, Guatemala, Jordan, Kenya, the Republic of Korea, Malaysia, Morocco, Mozambique, and Saudi Arabia; it is skewed toward smaller cities in most developed countries, including Belgium, Canada, Denmark, the United Kingdom, and the United States.

16 Henderson (2002) finds that variations in GDP per capita explain 70 percent of the cross-country variation in urbanization (also see Fay and Opal 2000).

17 There are two standard measures of urban spatial inequality: rank-size distribution (or Zipf's Law) and urban primacy. The most common distribution is the Pareto distribution: $R = \alpha C^{-\beta}$, where R is the rank of an urban area or the number of urban areas with population C or more; C is the population of the urban area; and α and β are constants. The distribution is typically estimated in the following log form: $\log(R) = \log(\alpha) - \beta \log(C)$. If β equals 1, city sizes are deemed to be evenly distributed; if β is greater (less) than 1, city sizes are skewed toward smaller (larger) cities. Urban primacy is calculated using the share of the urban population in the largest city or cities or the ratio of the largest city to the sum of the top 5 or top 50 cities.

Urban inequality measured using primacy may also be higher in developing countries, and its relation may not be linear. Using metropolitan areas that account for 70 percent of the total urban population, Wheaton and Shishido (1981) examine urban concentration in 38 countries at varying levels of development, based on two different measures, a Hirfindel index and urban primacy. They find that as per capita GNP initially rose across countries, urban inequality rose until income passed \$2,000 per capita, after which it declined. Rosen and Resnick (1980) show that urban inequality can be consistently measured using both the size distribution of cities and a variety of measures of primacy.

Comparisons of Regional and Urban Economic Structures

Considerable evidence supports the view that urban development is fundamentally linked to regional development. Cities are highly specialized in a few identifiable industries that form their export base (Alexandersson 1959; Bergsman, Greenston, and Healy 1975). Based on cluster analysis using 229 U.S. industries in 1970, Henderson (1988) finds evidence for specialized cities in the automobile, textiles, food-processing, aircraft, apparel, steel, leather, industrial machinery, and other industries. Black and Henderson (2003) classify city specialization by two-digit industry in 1992. They find that while about 65 percent of the local labor force is typically engaged in “nontraded” good activity, the remaining labor force is specialized into 55 distinct clusters. Large cities that form market centers are more diverse.

Cities within a region are more likely to be specialized in the same set of industries. All 12 of the automobile cities Henderson (1988) studies were located in the East-North-Central region, and all six of the textile cities were located in the South. Using data for the earlier industrial period in the United States (1880–1920), Kim (2000) finds that industrial cities within a particular region were specialized in the same set of industries, suggesting strong regional geographic ties for cities. In any given region, however, the largest cities were more diversified and seemed to possess a disproportionate share of employment in transaction services, indicating their role as regional (and national) centers of markets for financial services and trade.

Long-Run Trends in Regional and Urban Spatial Inequality

How does the level of spatial inequality evolve over time with economic development? While the information is based on small cross-national samples, there seems to be some evidence of a spatial Kuznets curve: regional and urban spatial inequalities increase as economies develop, then diminish as they grow and mature. Williamson (1965) finds that middle-income countries have higher regional income inequality than low- and high-income countries. Wheaton and Shishido (1981) show that urban concentration peaks at a population of about 20 million as annual per capita income rises to \$2,000 (in 1976 dollars) but that urban deconcentration begins as income rises beyond that level. Using a much larger panel data of countries, Henderson (2002) estimates that urban primacy increases up to \$5,300, the approximate mean in world per capita GDP for 1990, before declining thereafter.

Studies based on the size distribution of cities seem to suggest that growth and development often occur with little change in urban inequality (Gabaix and Ioannides 2004). Eaton and Eckstein (1997) study the size distribution of cities in France and Japan in the period during which each country experienced its industrial revolution. Despite the great increase in urbanization during industrialization, the rank-size distribution of cities in both countries remained surprisingly stable. Eaton and Eckstein argue that because cities of all sizes seem to grow in parallel, the driving forces of industrialization seem to be present in cities in proportion to their initial populations. Dobkins and Ioannides (2000) report similar findings for the United States for the 1900–90 period (also see Black and Henderson 2003). Similar studies for developing countries do not appear to have been conducted.

Evidence on Trade and Spatial Inequality

The evidence on the impact of foreign trade on domestic regional and urban inequality is mixed. While much more evidence is needed, there seems to be some evidence that trade openness contributes to increasing regional inequality. Kanbur and Zhang (2005) find that the recent sharp increase in inequality in China may partly reflect growth in trade; Rodriquez-Pose and Sanchez-Reaza (2005) find similar evidence for Mexico.

Based on their survey of the evidence for more than 50 developing countries, Kanbur and Venables (2005a, 2005b) argue that the uneven spatial impact of trade and globalization played a major role in the increase in regional and urban spatial inequalities in developing countries in recent years. They argue that in addition to geographic remoteness, backward regions and rural areas suffer from an inequitable distribution of infrastructure, public services, and policies that constrains the free migration of people from backward places.

Numerous scholars believe that development in Africa is significantly held back by geographic remoteness. The fact that many African countries are landlocked and isolated, possess rugged terrain, and face high transportation costs hinders trade and productive activities.¹⁸

Some evidence seems to suggest that openness to trade reduces urban inequality, at least as measured by urban primacy. Based on a cross-section of 85 countries and 5 case studies, Ades and Glaeser (1995) find that a shift in a nation's workforce away from agriculture to industry increases urban primacy, but openness to trade and development of transportation networks reduces primacy, as Krugman and Livas Elizondo (1996) also claim. Using a panel data of 85 countries for 1960–90, Henderson (2002) also finds that primacy is negatively correlated with openness to trade and to transportation and communication infrastructure networks (waterway, road, and telephone densities).

18 Nunn and Puga (2007) suggest an important historical reason why populations may have concentrated in remote and rugged areas in Africa. According to them, such areas provided protection against slave raids. This short-term benefit may have increased the long-term costs of development in Africa by encouraging population concentration in rugged areas.

Evidence on Institutions and Spatial Inequality

The empirical evidence on the importance of institutions for regional and urban inequality is limited but growing. In the United States spatial inequalities, especially between the North and the South, rose between 1840 and 1920 and then declined significantly between 1920 and 2000 (Kim and Margo 2004). While the rise of the North–South core-periphery regions is often seen as a consequence of economic factors (Krugman 1991a, 1991b), many scholars believe that institutional factors played a major role in the divergence and later convergence of the North and the South in the United States (Acemoglu, Johnson, and Robinson 2004). Although the roots of regional divergence date back to the colonial period (Kim 2007b), Mitchener and McLean (2003) find that institutional impediments in states associated with slavery had a persistent pernicious effect on productivity well into the 20th century. The convergence of political institutions following the Civil War and major federal interventions also likely contributed to the economic convergence between the two regions.

Institutions from the colonial era seem to continue to exert considerable influence within regions in developing countries. Banerjee and Iyer (2005) argue that British colonial institutions played a major role in the divergence of agricultural productivity between the historically landlord (*zamindari*) and nonlandlord (*ryotwari*) areas in India between 1960 and 1990.¹⁹ Kapur and Kim (2006) suggest that the British land tax institutions may have contributed to the divergence of India's regional economies during the British colonial period as well. For a sample of eight countries in the Americas, Bruhn and Gallego (2007) find that regions that possessed colonial extractive industries and sugar cultivation have 18 percent lower per capita GDP today as a result.

There is some evidence that decentralized federalism promotes regional and urban equality. Developed countries are more likely than developing countries to have a decentralized federalist system. Henderson (2002) finds that developed countries are more politically decentralized than developing countries. Fiscal decentralization is also positively correlated with population size and land area; it is negatively correlated with the share of the population that is Muslim (Oats 1985; Epple and Nechyba 2004). The nature of the federalist system is likely to depend greatly on the nature of the tax system. Sokoloff and Zolt (2006) show that developing countries are much

19 When the British colonized and annexed various parts of India during the eighteenth and nineteenth centuries, they implemented two major land tax systems: *zamindari* (landlord) and *ryotwari* (nonlandlord). In the *zamindari* areas of Bengal, Bihar, Central Province, Orissa, and some parts of Madras, land taxes and property rights were assigned to landlords. In these areas non-resident landlords often owned rights to numerous villages and developed extensive bureaucratic organizations and policing forces to employ and manage local villagers to farm the land under sharecropping or wage contracts. By contrast, in the *ryotwari* areas, land taxes and property rights were assigned to individual villagers in Assam, Bombay, and most of Madras or to an entire village under the *mahalwari* system in parts of the Punjab. In these areas local resident landowners either farmed their own land or employed low-caste village laborers under sharecropping or wage contracts.

more likely than developed countries to impose taxes at the national rather than the state and local level.

In China the strong political power at the provincial level may have contributed to excessive spatial equality. China's politics of localism, strong provincial governments, severe migration restrictions (the *hukou* system), and administrative spatial hierarchy played a major role in determining regional and urban spatial inequality (Henderson 1988; Fujita and others 2004). Because of these political institutions, most economists believe that China's spatial inequality suffers from too little rather than too much inequality. Moreover, policies that restrict urban growth, such as immigration restrictions and national urban planning, have kept cities in China too small. Relative to most developing and developed countries, cities in China are small and are more equally distributed (Fujita and others 2004). A decentralized federalist system may have increased spatial and urban equality in the United States, but it did so to a much lesser extent than such policies did in China (Kim 2008). In Latin America generally strong federal and weak local governments may have contributed to excessive regional and urban inequality.

The empirical evidence on urban primacy suggests that political factors may be the dominant cause of primacy. Ales and Glaeser (1995) find that dictatorships and political instability cause a significant increase in the concentration of population in the primate city. Henderson (2002) finds that primacy is positively correlated with capital city status and central government consumption. He also finds that countries in Asia, Latin America, and Sub-Saharan Africa had significantly higher shares of population in primate cities than countries in other regions, suggesting the important impact of political institutions on urban concentration.

Household Income Inequality and Spatial Inequality

Although income inequality is a major focus of development economics, there is little systematic evidence on the relation between household income inequality and spatial inequality (Ray 1998). Superficially, Kuznets's (1955) inverted-*U* pattern of household income inequality seems to be related to Williamson's (1965) inverted-*U* pattern of regional income inequality. However, with the construction of Deininger and Squire's (1996) large cross-country data set on income inequality, the existence of the Kuznets curve has come into question.²⁰ Indeed, some scholars, such as Persson and Tabellini

²⁰ Banerjee and Duflo (2003) present a cautionary critique of the literature on income inequality and development that may also be relevant for research on spatial inequality. While most cross-sectional ordinary least squares (OLS) estimates using cross-country data typically show a negative correlation between household income inequality and growth, those using panel data with fixed-effects show a positive correlation. In addition, most studies on inequality assume a linear structure. Banerjee and Duflo find that the relation between inequality and growth is likely to be nonlinear and that the reason for the variations in the results of OLS, fixed-effects, and random-effects models may be caused by the differing structural explanations of the reduced-form results.

(1994) and Alesina and Rodrik (1994), believe that the causality is reversed: inequality is likely to hamper economic growth as a result of political economy considerations (Ferreira 1999). Further research is needed to clarify the relation between income inequality and spatial inequality.

Policy Lessons

The literature does not provide specific policy recommendations for reducing “excessive” spatial inequality or increasing “beneficial” spatial inequality. It does provide some general guidelines and lessons.

Industry Localization

It may be possible to identify the proximate causes of spatial inequality by studying trends in the regional industrial economy. One of the most consistent empirical findings is the industrial patterns of localization and dispersion, especially in developed countries, where there seems to be a fairly robust and consistent industrial pattern of spatial agglomerations and inequality. Consistent with this finding is the idea that industry localization economies (within-industry spillovers) are generally more important than urbanization economies (across-industry spillovers). Thus at least in principle, policy makers may be able to affect spatial inequality by targeting industry-specific subsidies or infrastructure investments.

From the broad sectoral perspective, the most geographically concentrated industries tend to be extractive industries (agriculture and mining), followed by manufacturing and then services, which tends to be most dispersed. Within the manufacturing sector, studies on industry localization in the European Union, France, the United Kingdom, the United States, and many developing countries suggest that traditional industries, such as textiles and apparel, are much more likely to be spatially localized. In contrast, medium- to high-tech industries are much more likely to be dispersed. Numerous studies also find that localization rather than urbanization economies seem more significant for both developed and developing countries (Henderson 1988, 2003; Wheaton and Lewis 2002; Rosenthal and Strange 2003).²¹

However, as there is little consensus on which source of agglomeration economies is most important (see Rosenthal and Strange 2004; Overman

21 Evidence for localization economies is presented by Henderson (1988) for most two-digit industries in Brazil; by Chen (1996) for the machinery and food industries in China; by Henderson and Kuncoro (1996) for the apparel (including textiles), nonmetallic minerals, and machinery industries in Indonesia; by Henderson, Lee, and Lee (2001) for traditional, heavy, transport, and machinery industries in Korea; and by Lee and Zang (1998) for 19 industries in Korea. Evidence of urbanization economies is presented by Mitra (2000) for 11 of 17 industries in India; by Lall and Chakravorty (2005) for the food-processing, textiles, leather, paper, chemical, basic metals, mechanical machinery, and electrical machinery industries in India; and by Henderson, Lee, and Lee (2001) for high-tech industries in Korea. See Rosenthal and Strange (2004) and Overman and Venables (2005) for excellent summaries of the literature.

and Venables 2005), the literature provides no guide to policy makers as to which policies might be most effective in fostering or reducing spatial inequality.²² If technological spillovers or labor-matching economies are important, policy makers may pursue policies that encourage information exchanges in ideas or jobs. If market size is important, it may be more effective to implement policies that foster the growth of markets.

While the nature of the evidence varies somewhat, there seems to be strong reason to believe that agglomeration economies are temporally persistent and dynamic. If successful, policies may therefore have persistent influences over time. Glaeser and Maré (2001) find that the urban wage premium in the United States is higher for long-time urban residents. Henderson (2003) finds that U.S. high-tech firms benefit from the scale of past activity. Dekle (2002) finds evidence of dynamic externalities measured using total factor productivity growth at the prefecture level for the finance, services, and wholesale and retail trade industries but not for manufacturing in Japan between 1975 and 1995.

Long-Run Perspective

The patterns of spatial inequality are likely to change over time. While not substantial, there is some evidence of an inverted-*U* pattern of regional and urban inequality: spatial inequality seems to rise and then fall with development. The data on industrial localization suggest a partial explanation. In the early phase of development, countries tend to specialize in extractive and low-skilled industries, such as textiles and apparel, which are geographically concentrated. With development the economy shifts toward high-tech manufacturing and services, which are geographically more dispersed. There is, however, no generally accepted theory of the inverted-*U* pattern of spatial inequality. The explanations proposed by Kuznets (1955), Williamson (1965), and Kim (1995) are ad hoc. While Krugman and Venable's (1995) theory based on declining transportation costs is elegant, there is no evidence that the long-run trends in spatial inequality are consistent with their model.

22 Empirical advances have come at many levels, both intensive and extensive. Numerous studies have moved beyond the analysis of aggregate industry and city-, county-, state-, regional-level data to firm- or plant-level data using finer geographic locations such as zip (postal) codes. At the same time, the number of studies has mushroomed to include an ever-increasing number of countries around the world. Indeed, from studies dominated by U.S. regions and cities, there has been a major shift to studying not only Europe and Japan but also numerous developing countries. Despite these major advances, scholars have not narrowed in on the causes of spatial inequality. Evidence covers natural advantage (Kim 1995, 1999; Ellison and Glaeser 1997); technological spillovers (Jaffe, Trajtenberg, and Henderson 1993); labor-market pooling (Dumais, Ellison, and Glaeser 2002); input linkages (Holmes 1999; Amiti and Cameron 2007); market size (Hanson 1997, 2005); amenities (Tabuchi and Yoshida 2000); and rent seeking (Ades and Glaeser 1995). Because agglomeration economies seem to attenuate rapidly by distance, the influence of policies is likely to be geographically localized (Rosenthal and Strange 2003). In addition, because agglomeration economies seem to vary by firm births and deaths, industry plant sizes, and the level of competition, policy makers also need to consider the industrial organization of industries (Dumais, Ellison, and Glaeser 2002; Rosenthal and Strange 2003).

Globalization and Trade

Globalization and foreign trade can significantly affect domestic regional and urban inequality. However, neither theory nor empirics provides a good guide to the direction of impact. From a theoretical perspective, foreign trade, like domestic trade, can increase or reduce spatial inequality; the empirical evidence presented above finds instances of both. Because openness to trade is likely to be an important component of development for many developing countries, careful analysis of the impact of foreign trade on domestic inequality is necessary.

Institutions

Political institutions can play a significant role in determining regional and urban inequality. Differences in regional institutions may cause divergence in regional economies. Dictatorship, political weakness, and centralized power seem to contribute to a centralized urban population. In general, the distribution of political and fiscal power across federal, state, and local governments can significantly influence regional as well as urban spatial inequality. Different jurisdictions of government have different political incentives and are likely to prefer different levels of public goods, which affect spatial inequality. The empirical evidence suggests that countries with strong state and local governments may have greater spatial equality than countries with relatively strong federal governments.

Infrastructure

Some evidence suggests that investments in transportation and communications infrastructure are associated with a decline in spatial inequality. Several studies find that interregional infrastructure investments may contribute to the reduction of urban concentration. Investments in national navigable waterways (Gallup, Sachs, and Mellinger 1999); railways (Rosen and Resnick 1980); and national roads and highways (Henderson 2002; Baum-Snow 2007) all seem to have contributed to reducing spatial inequality.

Cautionary Tales

Few policy efforts to reduce spatial inequality have been successful. Indeed, efforts to reduce spatial inequality within EU countries—where policies sought to promote the development of lagging regions, support areas facing structural difficulties, and develop systems of education, training, and employment—present a cautionary tale (Puga 2002). To meet these objectives, the European Union devoted €195 billion (in 1999 prices) between 2000 and 2006—more than 30 percent of total EU spending. The Cohesion Fund, designed to reduce economic and social disparities, added another €18 billion. Despite this massive allocation of resources, regional inequalities have not narrowed and by some accounts have even widened.

Korea's policy of deconcentration has been seen as a rare success story in combating the ills of excessive concentration. As Korea began to industrialize in the 1960s, its population became increasingly concentrated in Seoul,

which was home to 41 percent of Korea's urban population by 1970. Between 1970 and 1990, the trend reversed, as Seoul's share fell to 33 percent (Lee 1997). The deconcentration of the population in Seoul was caused partly by the massive dispersal of manufacturing industries from Seoul to outlying areas. Henderson, Lee, and Lee (2001) and Henderson (2002) argue that the deconcentration was caused by two major factors: economic liberalization, which reduced the importance of locating in Seoul for access to the political bureaucracy (Kwon 1985), and massive investments in roads and communications, which blanketed Korea and provided important transportation and communications infrastructure. Despite these changes, however, Seoul remains one of the densest cities in the world, denser than Tokyo and twice as dense as New York. Deconcentration to satellite cities was mainly in manufacturing branch plants.

Conclusion

Why do spatial inequalities arise? This survey of the literature highlights two classes of explanations based on first and second natures of geography. The neoclassical model emphasizes the role of the first nature, such as resource endowments and proximity to rivers and ports. The increasing returns model emphasizes the role of the second nature, created by the density of human interactions. Because economic development allows regions to take advantage of the first and second natures of geography, an increase in spatial inequality may be beneficial as productivity is increased. However, because congestion costs may not be internalized by individuals, spatial inequality in the form of excessive urban concentration or urban primacy may be harmful. Theory thus suggests that there is an optimal level of spatial inequality.

Spatial inequality is a concern for policy makers for a variety of reasons. First, from an efficiency standpoint, they want to obtain the optimal level of spatial inequality. Because most of the second-nature explanations imply market imperfections and inefficient levels of agglomeration, policy makers may want to adopt policies to correct these failures. Second, even when spatial inequality is beneficial, they may want to reduce the effects of uneven spatial development for equity reasons. Third, policy makers may be concerned that wide regional divergence in the economic fortunes of different regions may contribute to deep political divisions that may impose significant social costs.

Implementing policies that foster or reduce spatial inequality is likely to be much more challenging than suggested by the standard literature. Economic development often involves major shifts in the economic and social structures of societies. A successful shift from a traditional agricultural-based society to a modern manufacturing- and service-based society is likely to involve a transition from a traditional society based on personal exchanges to a modern society based on impersonal exchanges. Because

the developmental transition tears at the fabric of society held together by traditional family and inheritance institutions as well as traditional gender roles, making a successful transition is significantly more challenging than suggested by the models surveyed here.

More important, political elites in many developing countries may not face the incentives to treat problems associated with too little or too much spatial inequality. Local political elites in China have little incentive to remove restrictions on the mobility of workers. Political elites in Asia and Latin America have little incentive to reduce problems associated with urban primacy if they benefit from politics of corruption and patronage. If spatial disparity is fundamentally driven by political institutions, implementing difficult political reforms may be a necessary first step toward addressing problems associated with spatial inequality.

What do researchers need to do? Despite the enormous advances in the understanding of the determinants of economic geography in recent years, knowledge is still inadequate in many respects, especially for understanding the nature of spatial inequality in developing countries.

From an empirical standpoint, more empirical evidence is needed on regional and urban inequalities in developing countries, as Overman and Venables (2005) note. While evidence from developed countries may be useful, the patterns of development of many developing countries seem to differ from those of developed countries. In many developing countries, for example, the informal service sector accounts for a significant share of urban activity, yet there is little evidence on the nature of their agglomeration economies. In addition, while most models predict market failure in cities, it has been extremely difficult to estimate optimal city sizes. The estimates for China obtained by Au and Henderson (2004) are useful, but it remains to be seen whether these estimates can be generalized to other developing countries.

The causes of the long-run inverted-*U* pattern of spatial inequality, to the extent that it exists, are still not well understood. With the exception of Krugman and Venables (1995), most theories of the inverted-*U* pattern of spatial inequality are ad hoc, and most models of economic geography are not closely linked to the long-run process of development.

Better understanding is also needed of the link between household income inequality and spatial income inequality and on the interactions among regions and cities. Regions may affect their local urban development because of their resources or the size of their markets; cities may also affect their regional development, because they provide financial and transaction services that reduce regional costs of capital and trade. An understanding of these interactions is likely to provide a more coherent approach to reducing costs associated with spatial inequality.

Better understanding is also needed of the institutional and political histories of developing countries. As Benabou (2000) notes, economic inequality and policies may be jointly determined, suggesting that policy instruments cannot be treated as completely exogenous. If a society chooses an equilib-

rium path along which high inequality and low redistribution are mutually reinforcing, attempts to introduce policies of equality may be futile. Policy constraints may be even more important in nondemocratic societies. Economic development and growth may depend on some general factors that affect all countries. But every country possesses different geographic, institutional, and political conditions, which may ultimately determine the set of policies available for solving problems associated with spatial inequality.

References

- Abdel-Rahman, Hesham M. 1996. "When Do Cities Specialize in Production?" *Regional Science and Urban Economics* 26 (1): 1–22.
- Abdel-Rahman, Hesham M., and Masahisa Fujita. 1990. "Product Variety, Marshallian Externalities and City Sizes." *Journal of Regional Science* 30 (2): 165–83.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91 (5): 1369–401.
- . 2002. "Reversal of Fortunes: Geography and Institutions in the Making of the Modern World Income Distribution." *Quarterly Journal of Economics* 117 (4): 1231–94.
- . 2004. "Institutions as the Fundamental Cause of Long-Run Growth." Department of Economics, Massachusetts Institute of Technology, Cambridge, MA.
- Ades, Alberto F., and Edward L. Glaeser. 1995. "Trade and Circuses: Explaining Urban Giants." *Quarterly Journal of Economics* 110 (1): 195–227.
- Alesina, Alberto, and Dani Rodrik. 1994. "Distributive Politics and Economic Growth." *Quarterly Journal of Economics* 109 (2): 465–89.
- Alexandersson, Gunnar. 1959. *The Industrial Structure of American Cities*. Lincoln: University of Nebraska Press.
- Amiti, Mary, and Lisa Cameron. 2007. "Economic Geography and Wages." *Review of Economics and Statistics* 89 (1): 15–29.
- Au, Chung-Chung, and Vernon J. Henderson. 2004. "How Migration Restrictions Limit Agglomeration and Productivity in China." Department of Economics, Brown University, Providence, RI.
- Azzoni, Carlos, Naercio Menezes-Filho, and Taitane Menezes. 2005. "Opening the Convergence Black Box: Measurement Problems and Demographic Aspects." In *Spatial Inequality and Development*, ed. Ravi Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Balisacan, Arsenio M., and Nobuhiko Fuwa. 2006. "Changes in Spatial Income Inequality in the Philippines: An Exploratory Analysis." In *Spatial Disparities in Human Development: Perspectives from Asia*, ed. Ravi Kanbur, Anthony J. Venables, and Guanghua Wan. New York: United Nations.
- Banerjee, Abhijit V., and Esther Duflo. 2003. "Inequality and Growth: What Can the Data Say?" *Journal of Economic Growth* 8 (3): 267–99.

- Banerjee, Abhijit V., and Lakshmi Iyer. 2005. "History, Institutions and Economic Performance: The Legacy of Colonial Land Tenure Systems in India." *American Economic Review* 95 (4): 1190–213.
- Barrios, Salvador, Luisito Bertinelli, and Eric Strobl. 2006. "Climatic Change and Rural-Urban Migration: The Case of Sub-Saharan Africa." *Journal of Urban Economics* 60 (3): 357–71.
- Baum-Snow, Nathaniel. 2007. "Did Highways Cause Suburbanization?" *Quarterly Journal of Economics* 122 (2): 775–805.
- Benabou, Roland. 2000. "Unequal Societies: Income Distribution and the Social Contract." *American Economic Review* 90 (1): 96–129.
- Bergsman, Joel, Peter Greenston, and Robert Healy. 1975. "A Classification of Economic Activities Based on Location Patterns." *Journal of Urban Economics* 2 (1): 1–28.
- Berliant, Marcus. 2007. "Prospects for a Unified Urban General Equilibrium Theory." *Regional Science and Urban Economics* 37 (4): 466–71.
- Black, Duncan, and J. Vernon Henderson. 2003. "Urban Evolution in the USA." *Journal of Economic Geography* 3 (4): 343–72.
- Brühlhart, Marius, and Rolf Traeger. 2005. "An Account of Geographic Concentration Patterns in Europe." *Regional Science and Urban Economics* 35 (6): 597–624.
- Bruhn, Miriam, and Francisco A. Gallego. 2007. "Good, Bad, and Ugly Colonial Activities: Studying Development across the Americas." Instituto de Economía, Pontificia Universidad Católica de Chile.
- Chen, Yimin. 1996. "Impact of Regional Factors on Productivity in China." *Journal of Regional Science* 36 (3): 417–36.
- Christaller, Walter. 1933 (reprinted 1966). *Central Places in Southern Germany*. Englewood Cliffs, NJ : Prentice-Hall.
- Crafts, Nicholas, and Abay Mulatu. 2006. "How Did the Location of Industry Respond to Falling Transportation Costs in Britain before World War I?" *Journal of Economic History* 66 (3): 575–606.
- Cronon, William. 1991. *Nature's Metropolis*. New York: W.W. Norton.
- Dekle, Robert. 2002. "Industrial Concentration and Regional Growth: Evidence from Prefectures." *Review of Economics and Statistics* 84 (2): 310–15.
- Deiningner, Klaus, and Lyn Squire. 1996. "A New Data Set Measuring Income Inequality." *World Bank Economic Review* 10 (3): 565–91.
- Dixit, Avinash K., and Joseph E. Stiglitz. 1977. "Monopolistic Competition and Optimum Product Diversity." *American Economic Review* 67 (3): 297–308.
- Dobkins, Linda H., and Yannis M. Ioannides. 2000. "Dynamic Evolution of the Size Distribution of U.S. Cities." In *Economics of Cities*, ed. Jean-Marie Juriot and Jacques-François Thisse. New York: Cambridge University Press.
- Dumais, Guy, Glenn Ellison, and Edward L. Glaeser. 2002. "Geographic Concentration as a Dynamic Process." *Review of Economics and Statistics* 84 (2): 193–204.
- Durantón, Gilles, and Henry G. Overman. 2005. "Testing for Localisation Using Micro-Geographic Data." *Review of Economic Studies* 72 (4): 1077–106.

- Durantón, Gilles, and Diego Puga. 2001. "Nursery Cities: Urban Diversity, Process Innovation, and the Life Cycle of Products." *American Economic Review* 91: 1454–77.
- . 2004. "Micro-Foundations of Urban Agglomeration Economies." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse, 2063–17. Amsterdam: North-Holland.
- Eaton, Jonathan, and Zvi Eckstein. 1997. "Cities and Growth: Theory and Evidence from France and Japan." *Regional Science and Urban Economics* 27 (4–5): 443–74.
- Elbers, Chris, Peter Lanjouw, Johan Mistiaen, Berk Özler, and Kenneth R. Simler. 2005. "Are Neighbours Equal? Estimating Local Inequality in Three Developing Countries." In *Spatial Inequality and Development*, ed. Ravi Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Ellison, Glenn, and Edward Glaeser. 1997. "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach." *Journal of Political Economy* 105 (October): 889–927.
- Engerman, Stanley L., and Kenneth L. Sokoloff. 1997. "Factor Endowments, Institutions, and Differential Paths of Growth among New World Economies: A View From Economic Historians of the United States." In *How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico 1800–1914*, ed. Stephen Haber. Stanford, CA: Stanford University Press.
- Escobal, Javier, and Maximo Torero. 2005. "Adverse Geography and Differences in Welfare in Peru." In *Spatial Inequality and Development*, ed. R. Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Epple, Dennis, and Thomas Nechyba. 2004. "Fiscal Decentralization." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Ethier, Wilfred J. 1982. "National and International Returns to Scale in the Modern Theory of International Trade." *American Economic Review* 72 (3): 389–405.
- Fay, Marianne, and Charlotte Opal. 2000. "Urbanization without Growth: A Not So Uncommon Phenomenon." Policy Research Working Paper 2412, World Bank, Washington, DC.
- Ferreira, Francisco H. G. 1999. "Inequality and Economic Performance." World Bank, Washington, DC.
- Forster, Michael, David Jesuit, and Timothy Smeeding. 2005. "Regional Poverty and Income Inequality in Central and Eastern Europe: Evidence from the Luxembourg Income Study." In *Spatial Inequality and Development*, ed. R. Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Friedman, Jed. 2005. "How Responsive Is Poverty to Growth? A Regional Analysis of Poverty, Inequality, and Growth in Indonesia 1984–99." In *Spatial Inequality and Development*, ed. R. Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Fujita, Masahisa, Paul Krugman, and Anthony J. Venables. 1999. *The Spatial Economy: Cities, Regions, and International Trade*. Cambridge, MA: MIT Press.

- Fujita, Masahisa, Tomoya Mori, J. Vernon Henderson, and Yoshitsugu Kanemoto. 2004. "Spatial Distribution of Economic Activities in Japan and China." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Fujita, Masahisa, and Jacques-François Thisse. 2002. *Economics of Agglomeration: Cities, Industrial Location, and Regional Growth*. Cambridge: Cambridge University Press.
- Gabaix, Xavier, and Yannis M. Ioannides. 2004. "The Evolution of City Size Distributions." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Gallup, John L., Jeffrey D. Sachs, and Andrew D. Mellinger. 1999. "Geography and Economic Development." *International Regional Science Review* 22 (2): 179–232.
- Glaeser, Edward L., and David C. Maré. 2001. "Cities and Skills." *Journal of Labor Economics* 19 (2): 316–42.
- Hanson, Gordon H. 1997. "Increasing Returns, Trade and the Regional Structure of Wages." *Economic Journal* 107 (1): 113–33.
- . 2005. "Market Potential, Increasing Returns, and Geographic Concentration." *Journal of International Economics* 67 (1): 1–24.
- . 2007. "Globalization, Labor Income and Poverty in Mexico." In *Globalization and Poverty*, ed. Ann Harrison. Chicago: University of Chicago Press.
- Harris, John R., and Michael P. Todaro. 1970. "Migration, Unemployment and Development: Two-Sector Analysis." *American Economic Review* 60 (1): 126–42.
- Head, Keith, and Thierry Mayer. 2004. "The Empirics of Agglomeration and Trade." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Henderson, J. Vernon. 1974. "The Sizes and Types of Cities." *American Economic Review* 64 (4): 640–56.
- . 1988. *Urban Development: Theory, Fact and Illusion*. Oxford: Oxford University Press.
- . 2002. "Urbanization in Developing Countries." *World Bank Research Observer* 17(1): 89–112.
- . 2003. "The Urbanization Process and Economic Growth: The So-What Question." *Journal of Economic Growth* 8 (1): 47–71.
- Henderson, J. Vernon, and A. Kuncoro. 1996. "Industrial Centralization in Indonesia." *World Bank Economic Review* 10 (3): 513–40.
- Henderson, J. Vernon, and Jacques-François Thisse, eds. 2004. *Handbook of Regional and Urban Economics*, vol. 4. Amsterdam: North-Holland.
- Henderson, J. Vernon, Todd Lee, and Yung Joon Lee. 2001. "Scale Externalities in Korea." *Journal of Urban Economics* 49 (3): 479–504.
- Hirschman, Albert O. 1958. *Strategies of Economic Development*. New Haven, CT: Yale University Press.
- Holmes, Thomas J. 1999. "Localization of Industry and Vertical Disintegration." *Review of Economics and Statistics* 81 (2): 314–25.

- Holmes, Thomas J., and John J. Stevens. 2004. "Spatial Distribution of Economic Activities in North America." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Jaffe, Adam B., Manuel Trajtenberg, and Rebecca Henderson. 1993. "Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations." *Quarterly Journal of Economics* 108 (3): 577–98.
- Kanbur, Ravi, and Anthony J. Venables. 2005a. "Spatial Inequality and Development." In *Spatial Inequality and Development*, ed. Ravi Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- . 2005b. "Spatial Inequality and Development: Overview of UNU-WIDER Project." Department of Economics, Cornell University, Ithaca, NY.
- Kanbur, Ravi, Anthony J. Venables, and Guanghua Wan. 2006. *Spatial Disparities in Human Development: Perspectives from Asia*. New York: United Nations.
- Kanbur, Ravi, and Xiaobo Zhang. 2005. "Fifty Years of Regional Inequality in China: A Journey through Central Planning, Reform and Openness." *Review of Development Economics* 9 (1): 87–106.
- Kapur, Shilpi, and Sukkoo Kim. 2006. "British Colonial Institutions and Economic Development in India." NBER Working Paper 12613, National Bureau of Economic Research, Cambridge, MA.
- Kessides, Christine. 2005. "The Urban Transition in Sub-Saharan Africa: Implications for Economic Growth and Poverty Reduction." Working Paper 97, World Bank, Africa Region, Washington, DC.
- Kim, Sukkoo. 1995. "Expansion of Markets and the Geographic Distribution of Economic Activities: The Trends in U.S. Regional Manufacturing Structure, 1860–1987." *Quarterly Journal of Economics* 110 (4): 881–908.
- . 1998. "Economic Integration and Convergence: U.S. Regions, 1840–1990." *Journal of Economic History* 58 (2): 659–83.
- . 1999. "Regions, Resources and Economic Geography: The Sources of U.S. Regional Comparative Advantage, 1880–1987." *Regional Science and Urban Economics* 29: 1–32.
- . 2000. "Urban Development in the United States, 1690–1990." *Southern Economic Journal* 66 (4): 855–80.
- . 2006. "Division of Labor and the Rise of Cities: Evidence from U.S. Industrialization, 1850–1880." *Journal of Economic Geography* 6 (4): 469–91.
- . 2007a. "Changes in the Nature of Urban Spatial Structures in the United States, 1890–2000." *Journal of Regional Science* 47 (2): 273–87.
- . 2007b. "Institutions and U.S. Regional Development: A Study of Massachusetts and Virginia." NBER Working Paper 13431, National Bureau of Economic Research, Cambridge, MA.
- . 2008. "Political Institutions, Federalism and U.S. Urban Development: The Case of American Exceptionalism." Washington University, St. Louis, MO.
- Kim, Sukkoo, and Robert Margo. 2004. "Historical Perspectives on U.S. Economic Geography." In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.

- Knight, John, Li Shi, and Zhao Renwei. 2006. "Divergent Means and Convergent Inequality of Incomes among the Provinces and Cities of Urban China." In *Spatial Disparities in Human Development: Perspectives from Asia*, ed. Ravi Kanbur, Anthony J. Venables, and Guanghua Wan. New York: United Nations.
- Krugman, Paul. 1991a. *Geography and Trade*. Cambridge, MA: MIT Press.
- . 1991b. "Increasing Returns and Economic Geography." *Journal of Political Economy* 99 (3): 483–99.
- Krugman, Paul, and Raul. E. Livas Elizondo. 1996. "Trade Policy and the Third World Metropolis." *Journal of Development Economics* 49 (1): 137–50.
- Krugman, Paul, and Anthony J. Venables. 1995. "Globalization and the Inequality of Income." *Quarterly Journal of Economics* 110 (4): 857–80.
- Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *American Economic Review* 45 (1): 1–28.
- Kwon, W. G. 1985. "Issues and Problems in Planning and Implementing Industrial Location Policies in Korea." Discussion Paper, World Bank, Washington, DC.
- Lall, Somik Vinay, and Sanjoy Chakravorty. 2005. "Industrial Location and Spatial Inequality: Theory and Evidence from India." *Review of Development Economics* 9 (1): 47–68.
- Lee, T. C. 1997. "Industry Deconcentration and Regional Specialization in Korean Manufacturing." Ph.D. diss., Department of Economics, Brown University, Providence, RI.
- Lee, Yung Joon, and Hyoungsoo Zang. 1998. "Urbanization and Regional Productivity in Korean Manufacturing." *Urban Studies* 35 (11): 2085–99.
- Lewis, Arthur. 1954. "Economic Development with Unlimited Supply of Labor." *Manchester School of Economic and Social Studies* 22 (2): 139–91.
- Lindert, Peter, and Jeffrey Williamson. 1985. "Growth, Equality and History." *Explorations in Economic History* 22 (October): 341–77.
- Losch, August. 1954. *The Economics of Location*. Oxford: Oxford University Press.
- Maurel, Françoise, and Béatrice Sédillot. 1999. "A Measure of Geographic Concentration in French Manufacturing Industries." *Regional Science and Urban Economics* 29 (5): 575–604.
- McCormick, Barry, and Jacqueline Wahba. 2003. "Return International Migration and Geographical Inequality: The Case of Egypt." *Journal of African Economies* 12 (4): 500–32.
- Midelfart-Knarvik, Karen Helene, Henry G. Overman, Stephen J. Redding, and Anthony J. Venables. 2000. "The Location of European Industry." Report prepared for the European Commission, Brussels.
- Mitchener, Kris, and Ian McLean. 2003. "The Productivity of U.S. States since 1880." *Journal of Economic Growth* 8 (1): 73–114.
- Mitra, Arup. 2000. "Total Factor Productivity Growth and Urbanization Economics: A Case of Indian Industries." *Review of Urban and Regional Development Studies* 12 (2): 97–108.
- Murata, Yasusada. 2002. "Rural-Urban Interdependence and Industrialization." *Journal of Development Economics* 68 (1): 1–34.

- . Forthcoming. “Engel’s Law, Petty’s Law, and Agglomeration.” *Journal of Development Economics*.
- Naude, Willem, and Waldo Krugell. 2003. “An Inquiry into Cities and Their Role in Subnational Economic Growth in South Africa.” *Journal of African Economies* 12 (4): 473–75.
- North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.
- Nunn, Nathan, and Diego Puga. 2007. “Ruggedness: The Blessing of Bad Geography in Africa.” Harvard University, Cambridge, MA.
- Oats, Wallace E. 1985. “Searching for Leviathan: An Empirical Study.” *American Economic Review* 75 (September): 748–57.
- Overman, Henry G., and Anthony J. Venables. 2005. “Cities in the Developing World.” Department of Geography, London School of Economics and Political Science.
- Persson, Torsten, and Guido Tabellini. 1994. “Is Inequality Harmful for Growth? Theory and Evidence.” *American Economic Review* 84 (3): 600–21.
- Puga, Diego. 1998. “Urbanization Patterns: European vs. Less Developed Countries.” *Journal of Regional Science* 38 (2): 231–52.
- . 1999. “The Rise and Fall of Regional Inequalities.” *European Economic Review* 43 (2): 303–34.
- . 2002. “European Regional Policies in Light of Recent Location Theories.” *Journal of Economic Geography* 2 (4): 372–406.
- Puga, Diego, and Anthony J. Venables. 1999. “Agglomeration and Economic Development: Import Substitution vs. Trade Liberalisation.” *Economic Journal* 109 (455): 292–311.
- Rauch, James E. 1993. “Economic Development, Urban Underemployment, and Income Inequality.” *Canadian Journal of Economics* 26 (4): 901–18.
- Ray, Debraj. 1998. *Development Economics*. Princeton, NJ: Princeton University Press.
- Rodriguez-Pose, Andres, and Javier Sanchez-Reaza. 2005. “Economic Polarization through Trade: Trade Liberalization and Regional Growth in Mexico.” In *Spatial Inequality and Development*, ed. Ravi Kanbur and Anthony J. Venables. Oxford: Oxford University Press.
- Rosen, Kenneth T., and Mitchell Resnick. 1980. “The Size Distribution of Cities: An Examination of the Pareto Law and Primacy.” *Journal of Urban Economics* 8 (2): 165–86.
- Rosenthal, Stuart S., and William C. Strange. 2003. “Geography, Industrial Organization, and Agglomeration.” *Review of Economics and Statistics* 85 (2): 377–93.
- . 2004. “Evidence on the Nature and Sources of Agglomeration Economies.” In *Handbook of Regional and Urban Economics*, vol. 4, ed. J. Vernon Henderson and Jacques-François Thisse. Amsterdam: North-Holland.
- Samuelson, Paul. 1952. “The Transfer Problem and Transport Cost: The Terms of Trade When Impediments Are Absent.” *Economic Journal* 64 (246): 278–304.

- Sokoloff, Kenneth L., and Eric M. Zolt. 2006. "Inequality and the Evolution of Institution of Taxation: Evidence from the Economic History of the Americas." University of California, Los Angeles..
- Soo, Kwok Tong. 2005. "Zipf's Law for Cities: A Cross-Country Investigation." *Regional Science and Urban Economics* 35 (3): 239–63.
- Spence, Michael. 1976. "Product Selection, Fixed Costs, and Monopolistic Competition." *Review of Economic Studies* 43 (2): 217–35.
- Starrett, David. 1974. "Principles of Optimal Location in a Large Homogenous Area." *Journal of Economic Theory* 9 (4): 418–48.
- Tabuchi, Takatoshi, and Atsushi Yoshida. 2000. "Separating Urban Agglomeration Economies in Consumption and Production." *Journal of Urban Economics* 48 (1): 70–84.
- Tirado, Daniel A., Elisenda Paluzie, and Jordi Pons. 2002. "Economic Integration and Industrial Location: The Case of Spain before World War I." *Journal of Economic Geography* 2 (3): 343–63.
- Venables, Anthony J. 1996. "Equilibrium Locations of Vertically Linked Industries." *International Economic Review* 37 (2): 341–59.
- Wheaton, William C., and Hisanobu Shishido. 1981. "Urban Concentration, Agglomeration Economies and the Level of Economic Development." *Economic Development and Cultural Change* 30 (1): 17–30.
- Wheaton, William C., and Mark J. Lewis. 2002. "Urban Wages and Labor Market Agglomeration." *Journal of Urban Economics* 51 (3): 542–62.
- Wheeler, Christopher. 2004. "Wage Inequality and Urban Density." *Journal of Economic Geography* 4 (4): 421–37.
- Williamson, Jeffrey. 1965. "Regional Inequality and the Process of National Development: A Description of the Patterns." *Economic Development and Cultural Change* 13 (4): 3–84.