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Editorial Offices
350 Main Street, Malden, MA 02148-5020, USA

9600 Garsington Road, Oxford, OX4 2DQ, UK

The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

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Clusters and Regional Development

Sanjoy Chakravorty

Temple University, Philadelphia

Introduction

Clustering describes a phenomenon in which objects are not randomly distributed, but are spatially ordered: that is, organized into geographically proximate groups. According to Michael Porter (1998:197–8): "Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions [. . .] in particular fields that compete but also cooperate." Industrial clusters have been known to exist from the beginnings of industrialization. Think of the cotton mills of Lancashire and automobile manufacturing in Detroit; the textile mills of Ahmadabad and Mumbai; the tanneries of Calcutta and Arcot; the computer and computer peripherals manufacturing units of Shenzhen. It is just as common to observe clustering processes in the service sector as in manufacturing. The financial services centers in London (in the City and Canary Wharf) and lower Manhattan in New York are well known examples. The concentrations of information technology firms in Silicon Valley (south of San Francisco), Route 128 near Boston, and Bangalore in India are just as famous. Even casual observers cannot fail to have noticed automobile malls and jewelry rows and gold souks in various parts of the world.

It is possible to think of clustering in limited terms, as relevant only to manufacturing industry, for instance; but it is also possible to think of clustering as a larger phenomenon that is intensifying over time and is applicable to a wide range of phenomena: hence we not only have clustering of industrial and service sector firms (as shown above), but clustering of housing by income and/or ethnicity (a process well known as "segregation" or "ghettoization" in many developed countries, whose barely studied counterparts in developing countries can now be seen in residential enclaves like Gurgaon near Delhi), and clustering of poverty in "spatial poverty traps" in persistently low-output agricultural regions (Ravallion and Jalan 1997). It is easy to see that the markets or bazaars of old and the malls of today are also clusters, as are slums, downtowns, cantonments, and hill stations and tourist beaches, and, in fact, all cities.

To provide a complete picture of clustering, one must also consider its absence. If manufacturing and service clusters are associated with regional economic growth, the absence of productive clusters suggests the absence of growth and lagging regions. The latest *World Development Report*, which, incidentally, focuses on economic geography, has a chapter on policies for lagging regions (World Bank 2009: ch. 8) that begins with a comment reportedly made by Hafeez Shaikh, ex-Minister for Investment and Privatization in Pakistan, that "the last time we had a lagging region, Pakistan split into two countries" (referring, of course, to the birth of Bangladesh, which had once been East Pakistan). Hence, any well-rounded discussion of clusters and development will have to refer to clusters and regional inequality.

The focus of this essay is on the relationship between clusters and economic growth and comparative regional development. It attempts to look at two sets of relationships – between markets and clusters, and between states and clusters. The remainder of this essay is, therefore, divided into two major sections. The first section considers the theory or causes underlying clustering processes, especially in the industrial or manufacturing sector. The second section looks at the political economy of clustering, giving special attention to comparative regional development.

To provide more background, let us consider why clusters exist. The primary reason comes from the fact (or perception) that competing firms in the same industry derive some benefit from locating in proximity to each other. These benefits are external to the firm – that is, they have nothing to do with internal scale economies – and accrue to similar firms in proximity. These are called *economies of localization*. Now, these typically are not the only firms in the immediate region. There are usually other manufacturing firms – in the same industry and in other industries – and they share financial, legal, and other *producer services* provided by firms which specialize in these activities. These manufacturing and producer service firms, and their employees, and the *consumer service* workers who provide food, education, transportation, and healthcare for all these employees and their families, comprise, typically an urban area. All the firms that benefit from being in the urban area, regardless of whether or not there are other similar firms in the area, derive *economies of urbanization* from their location choice.

Consider this scenario in another way. At the firm level, it is expected that the presence of firms in the same industry which are located in proximity (in the same region) will increase internal productivity. This firm-level productivity increase arising from the local presence of similar firms may not be quantifiable at the firm level. At the industry level, however, it is possible to see quantifiable localized benefits of clustering which accrue to all firms in a given industry or in a set of interrelated industries. The sources of this productivity increase (from economies of localization) in regions where an industry is more spatially concentrated are: knowledge spillovers, dense buyer–supplier networks, access to a specialized labor pool, and opportunities for efficient subcontracting. These factors will be discussed in detail below. Moreover, at the metropolitan area level, productivity increases result not from the size of a specific industry or market but from access to specialized financial and professional services, availability of a large labor pool with multiple specializations, inter-industry information transfers, and the availability of less costly general infrastructure (see Parr 2002). At the interregional scale, these gains are expected to lead to industry concentration in metropolitan and other leading urban regions (as a result of urbanization economies); at the metropolitan scale, the gains from localization economies are expected to lead to the creation of local industrial clusters.

It is very possible that firms do not explicitly quantify the positive effects of these agglomeration economies when they make location decisions. But there are other significant factors that a firm facing a location decision must consider explicitly. The two most important of these additional factors (especially in developing countries) are the availability of infrastructure and the regulatory framework, both arenas where the state is the key player. The state not only sets the rules of market entry and participation, but is also the primary, often the sole provider of physical and social infrastructure, and is often directly active in the production process. At the local level, the state's regulatory role goes beyond setting the rules of market participation; by being the single largest owner of land, by having the police and taking powers to acquire necessary land, and by being the final arbitrator on land use decisions, the state has a very strong influence on industrial location decisions within metropolitan areas.

This review of the major issues is organized as follows. The first section reviews the micro-foundations of economic geography and the main findings and predictions from recent analytic and empirical work in the "new economic geography" literature as well as the more traditional regional science literature. The second section reviews the principal strands of the literature on the political economy of regional development by examining the relationship between markets and states as manifested in spatial terms and specific policy actions that are taken.

Markets and Clustering

The relevant literature on how market forces lead to clustering is reviewed here. This review is not exhaustive, but is aimed at identifying the key issues that emerge from the existing analytic and empirical work. Research on location and concentration of economic activity has long been of interest to economists, geographers, planners, and regional scientists (Hotelling 1929; Weber 1929; Isard 1956; Lösch 1956; Von Thunen 1966; Greenhut and Greenhut 1975). However, analytic difficulties in modeling increasing returns to scale marginalized the analysis of geographic aspects in mainstream economic analysis (Krugman 1991a). Recent research on externalities, increasing returns to scale, and imperfect spatial competition (Dixit and Stiglitz 1977; Krugman 1991b; Fujita et al. 1999) has led to a renewed interest in analyzing the spatial organization of economic activity. This is especially true in the case of geographic concentration or clustering. These models in the "New Economic Geography" (NEG) literature move us from the question "Where will industry concentrate (if it does)?" to the question "What industry will concentrate where?" The main findings from the literature show how clustering reduces transportation and transaction costs, and are organized around: (a) market access; (b) localization economies; (c) inter-industry linkages, (d) urbanization economies, and (e) innovations. All these factors are reviewed in this section, which is partly based on material in Chakravorty and Lall (2007: ch. 1).

Market Access

In traditional location models, production is assumed to take place under conditions of constant or diminishing returns to scale, and transportation (to move inputs to plant and goods to market) has costs associated with it. One implication, the so-called "folk theorem" of spatial economics (Fujita and Thisse 1996), suggests that under conditions of constant or diminishing returns to scale there will be many spatially dispersed small plants supplying local markets. However, in the presence of increasing returns to scale, firms are able to concentrate production in relatively few locations, and have the choice of where to operate (Henderson et al. 2001). These models of location choice with increasing returns and imperfectly competitive market structures are developed in the NEG literature.

Krugman's (1991b) seminal paper showed that production activities that rely on increasing returns are pulled disproportionately toward locations with good market access. The principle of median location (also known as the "home market effect") is well known in marketing (see O'Sullivan 2000) and arises from the benefit of having low-transport-cost access to a large market in comparison to more expensive access to other markets. This directly creates a force for agglomeration of activity.

The extent to which market access enters into the location decision depends on the level of transport costs. If transport costs are very high, then activity is dispersed. In the extreme case, under autarky, every location must have its own industry to meet

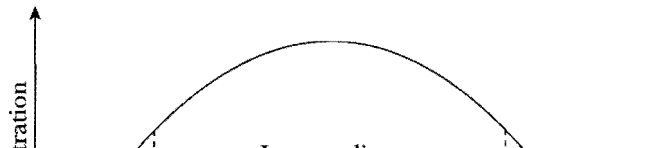

Figure 1 Transport costs and concentration of economic activity
Source: adapted from Fujita et al. (1999)

final demand. On the other hand, if transport costs are negligible, firms may be randomly distributed, as proximity to markets or intermediate suppliers will not matter. It is only at *intermediate levels of transport costs* that agglomeration would occur, especially when the spatial mobility of labor is low (Fujita and Thisse 1996). We can therefore expect a bell-shaped (or inverted U-shaped) relationship between the extent of spatial concentration and transport costs (see Figure 1). In principle, improved access to consumer markets and intermediate buyers and suppliers will increase the demand for a firm's products, thereby providing an incentive to increase scale and to concentrate production in a few locations to reduce fixed costs. Transport costs can be reduced by locating in areas with good access to input and output markets. Thus, access to markets is a strong driver of agglomeration and industrial concentration.

Localization Economies

In addition to market access, firms tend to concentrate production to benefit from localization economies, which, as outlined above, are externalities that enhance productivity of all firms in that industry. At the industry level, localization economies accrue to firms due to the size of the industry in a particular location. These economies are external to the firm but internal to the industry. There is considerable theorizing on localization economies in the works of Alfred Marshall (1890), Kenneth Arrow (1962), and Paul Romer (1986); these are often called MAR externalities (from the initials of the primary contributors). They argue that cost-saving externalities are maximized when a local industry is specialized and these predominantly occur within the same industry. Therefore, if an industry can realize MAR externalities, firms are likely to locate in a few cities where producers of that industry are already concentrated. Michael Porter (1990) has emphasized the importance of dynamic externalities created in specialized and geographically concentrated industries. Further, collective action to lobby regulators or bid down prices of intermediate products becomes possible when there is a disproportionately high concentration of firms within the same industry (Lall, Shalizi, and Deichmann 2004).

In addition to the supply-side linkages discussed above, localization economies are also possible on the demand side. These include reduction of information asymmetries for consumers as well as the ability to attract price and quality comparison shoppers (recall the earlier reference to auto malls, jewelers' rows, and gold souks in urban areas). These "thick-market externalities" benefit all firms in an industry located in close geographic proximity and can occur in relative isolation from other industries

(Henderson 1988; Ciccone and Hall 1996). The benefits of own industry concentration can, however, be offset by costs such as increased competition between firms for labor and land, causing wages and rents to rise, as well as increased transport costs due to congestion effects (discussed later). Firms in industry sectors which use standardized technologies and low-skilled workers for production may not benefit enough from intra-industry externalities to offset costs from increased own-industry concentration. Nonetheless, one can speculate that decision-makers inside firms in these industries (such as leather or computing equipment) are more likely to be guided by the perceived costs associated with isolated locations, whatever the outcome of cost–benefit calculations is, if they are undertaken at all.

Evidence from a number of settings seems to suggest that, whether or not there are true localization benefits, there are common pulls and pushes that affect decision-makers, and that this is more true in some sectors than others. For instance, Lall and Mengistae (2005) use firm survey data from India and find that own industry concentration has a significant bearing on firm location decisions across cities, and this effect is the highest for technology-intensive sectors. Similarly, Deichmann et al. (2005) find evidence in Indonesia that localization economies are higher for high-technology and natural-resource-based industries and lower for footloose industries such as garments and textiles.

Inter-industry Linkages

Another agglomeration advantage arises from inter-industry linkages – specifically, the combination of own industry concentration with the production of intermediate goods. Demand in manufacturing industry comes not just from final consumers or the final product but also from intermediate demand or inter-industry linkages. Therefore, a location with a high share of firms will generate a high demand for intermediates, which further increases its attractiveness for manufacturing firms. In addition to these demand effects there are cost benefits; as a large number of intermediate suppliers are attracted into the location, firms using intermediate goods can save on transport costs, and thereby make the location still more attractive.

The importance of inter-industry linkages as a major agglomerative force was first recognized by Marshall (1890; 1919). Venables (1996) showed that agglomeration could occur through the combination of firm location decisions and buyer–supplier linkages even without high factor mobility, because the presence of local suppliers can reduce transaction costs and therefore increase productivity. Inter-industry linkages can also serve as a channel for vital information transfers. Firms that are linked through stable buyer–supplier chains often exchange ideas on how to improve the quality of their products and/or to save production costs. It is such ongoing interactions that make the dynamics of inter-industry externalities so vibrant. Therefore, if the performance of an industry is highly dependent upon the supply of high-quality intermediate goods (for example, in automobile or computer manufacturing), firms are likely to locate in regions with a strong presence of local suppliers.

The empirical evidence from developing countries on the importance of intermediate suppliers or inter-industry linkages in influencing location decisions and industrial performance is still scarce. Amiti and Cameron (2007) show that externalities that arise from inter-industry linkages are highly localized and have significant impacts on manufacturing performance (measured by wages) in Indonesia. Deichmann et al. (2005) find that access to suppliers influences location decisions of firms in several industry sectors (food and beverages, garments, chemicals, rubber). However, firm profit models estimated in Lall, Funderburg, and Yepes (2004) for Brazil do not find significant gains from supplier access, when they control for market access and other sources of agglomeration economies.

Urbanization Economies

Next we consider the potential of urbanization economies, which arise from the overall size and diversity of the urban agglomeration. For a firm, benefits from urbanization include access to specialized financial and professional services, inter-industry information transfers, and the availability of general infrastructure such as telecommunications and transportation hubs. Urban or metropolitan size is usually correlated with diversity, as larger urban areas can support a wider range of activities. Small cities typically specialize in a few manufacturing activities, or are either administrative centers or agricultural market centers providing services for farmers.

Therefore, firms in large cities have relatively better access to business services, such as banking, advertising, and legal services. On the consumption side, the utility level of consumers is enhanced by increasing the range of goods that are available locally. At the same time, on the production side, the output variety in the local economy can affect the level of output (Abdel-Rahman 1988; Fujita 1988; Rivera-Batiz 1988). That is, urban diversity can yield external scale economies through the provision of a variety of consumer and producer goods. Recent empirical studies by Lall and Chakravorty (2005), Bostic (1997), and Garcia-Mila and McGuire (1993) show that diversity in economic activity has measurable and positive effects on the levels of regional economic growth.

There is considerable empirical work which examines the contribution of urbanization economies on productivity. Sveikauskas (1975) found that a doubling of city size increased labor productivity by 6 percent in US manufacturing at the two-digit SIC level. Tabuchi (1986) found that a doubling of population density increased labor productivity by 4.3 percent in Japan. The results from empirical studies on the relative importance of specialization and diversity are mixed. In the USA, Glaeser et al. (1992) find evidence in favor of diversity but Miracky (1995) does not. For Indonesia, Henderson et al. (1995) show that the significance of diversity is different for different industrial sectors – findings that are consistent with the product cycle theory (Vernon 1966), which predicts that new industries tend to prosper in large and diverse urban areas, but that, with maturity, their production facilities move to smaller and more specialized cities.

Innovations

Finally, we must consider the idea that large cities, especially the industrial clusters they house, are centers of innovation. This argument is specially relevant to more developed economies where productivity and economic growth are tied to innovations, but is increasingly relevant to selected sectors and locations in less developed nations – such as information technology in India and computer and peripherals manufacturing in China.

Chinitz (1961) and Jacobs (1969) were the first to emphasize the importance of knowledge spillovers in dense settings, especially in the presence of industrial diversity. They argued that important knowledge transfers primarily occur across industries, and the diversity of the local industry mix is important for these externality benefits; therefore cities are breeding grounds for new ideas and innovations due to the diversity of knowledge sources concentrated and shared in cities. The diversity of cities facilitates innovative experiments with an array of processes, and therefore new products are more likely to be developed in diversified cities. Consequently, industries with Jacobs-type externalities tend to cluster in more diverse and larger metro areas.

More recent work on innovation has focused on the nature of "tacit" or "codified" knowledge. Iammarino and McCann (2006) write: "The main reason for knowledge to be confined to certain geographical contexts is assumed to be its inherent

complexity – particularly with regard to technical knowledge – that may make it difficult to share among different interacting actors or organisations." The authors add this argument to some well-known assumptions – that the contemporary geography of innovation is essentially: (a) a result of spatial differences in the phases of product or profit cycles; (b) the outcome of variations in the characteristics between different places which lead to differences in the geography of creativity and entrepreneurship; and (c) a result of the fact that innovation is most likely to occur in small and medium-sized enterprises, whose spatial patterns are uneven and concentrated.

A typology of Iammarino and McCann's cluster analysis is shown in Table 1. They argue that in recent decades, innovative clusters form at least as much for sociological reasons (based on embeddedness arguments identified with Granovetter 1985) as economic. That is, innovativeness inside clusters arises not from vague "knowledge spillover" processes but from more specific social network processes, especially in mixed "new industrial districts," which are less sectorally integrated than traditional clusters that are based on agglomeration economies. These are interesting arguments but difficult to quantify or confirm. It may be impossible to prove that good new ideas arise in one geographical setting more frequently or effectively than in another. Nevertheless, the typology in Table 1 is informative, and the interested reader can follow up with recent work by scholars of what is being called "regional innovation systems," primarily in European contexts.

The Political Economy of Clustering

Are clusters "natural" phenomena that arise without policy action? Of course not. The presence of the state is hinted at in the idealized account presented above. Who builds the roads and rail lines and ports that form the transportation networks that are so critical in reducing costs? With rare exceptions, it is the state. It is also the state that creates the currency, trade, and labor policies that have a direct bearing on the cost of production and distribution. Hence, cluster formation and evolution has to be understood in the context of state action. This section focuses on that relationship. First, a minimal summary of regional development theory is outlined, because clustering and growth has to be understood within an overall framework of comparative regional development. Second, specific policies undertaken by selected developing nations are discussed – both to enable clustering and to enable spatially balanced development.

The fundamental paradox facing the spatial policy-makers will be obvious from the previous sentence. It is clear that clusters are dense nodes of economic activity, which, if successful, lead to high levels of growth at local or regional scales. This leads to unbalanced regional development and higher levels of regional inequality. Since growth is arguably the most desired objective of policy-makers everywhere, the state is almost invariably interested in promoting growth, and therefore clusters, and this inevitably leads to some form of spatial inequality. However, the political and ethical demands for lower spatial inequality always remain, and the state is simultaneously interested in spreading or de-concentrating industrial development. Let us look at how this paradox has been theorized and what actions different states have taken to deal with it.

Theories of Regional Development

Questions on regional development have usually been framed around the institutions of the state and the market. A significant set of questions has revolved around the market: What are the possible outcomes for comparative regional development under

Table 1 Typology of clusters and innovation

Characteristics	*Pure agglomeration*	*Industrial complex*	*Social network*
General			
Firm size	Atomistic	Some firms are large	Variable
Characteristics of relations	Non-identifiable Fragmented Unstable frequent trading	Identifiable Stable and frequent trading	Trust, loyalty Joint lobbying Joint ventures Non-opportunistic
Membership	Open	Closed	Partially open
Access to cluster	Rental payments Location necessary	Internal investment Location necessary	History Experience Location necessary but not sufficient
Example of cluster	Competitive urban economy	Steel or chemicals production complex	New industrial areas
Analytical approaches	Models of pure agglomeration	Location-production theory Input–output analysis	Social network theory
Technical			
Nature of technical knowledge	Codified, explicit and mobile Transmitted by way of information	Mixed, systemic, routinized, R&D-intensive Specific, based on non-transferable experience	Tacit, new, generic, non-systemic, sticky and leaky Transmitted within cognitive networks
Technological trajectory	Oriented to processes, problem-solving	Oriented to complex products, cost cutting	Oriented to radically new products
Dynamics	Stochastic	Strategic	Mixed
Sources of innovation	External to the firm	Internal to the firm	Mixed
Appropriability of innovation returns	Low, perfect or monopolistic competition	High, private creation of new knowledge, oligopolistic competition	Mixed, public–private creation of new knowledge
Knowledge base	Diversified	Specialized	Research based
Modes of governance	Market	Hierarchies	Relational and cognitive networks
Examples of industrial specialization	Finance, banking, insurance, business services, retailing	Steel, chemicals, automobile, pharmaceuticals, machine tools, medical instruments, ICT hardware	Small and medium enterprises, high-tech clusters in general purpose technologies
Example of cluster	"Silicon Valley" (California)	"Silicon Glen" (Scottish electronics industry)	"Silicon Fen" (Cambridge, UK)

Source: adapted from Iammarino and McCann (2006)

free market conditions (with unrestricted factor mobility)? One group of scholars has concluded that, left to market forces alone, regions may diverge initially (i.e., regional inequality will increase) but will converge over the long run. This is a distinguished group of scholars, economists by and large, including prominent figures like Jeffrey Williamson (1965), Douglass North (1975), William Alonso (1980), and Barro and Sala-i-Martin (1992). Their arguments follow the implications of the Solow growth model, where due to constant returns to scale and diminishing returns to capital in the leading regions, convergence is the expected outcome. In other words, a region

with low initial per capita income can be expected, sooner or later, to grow faster than a region with higher initial average income.

Many urban economists argue for the existence of urban contradictions between the economies of scale and agglomeration on the one hand (which imply increasing returns) and size-related congestion diseconomies or diminishing returns on the other (Richardson 1973; Wheaton and Shishido 1981; Petrakos 1992). In Krugman's (1996) language, there is tension between the "centripetal" forces of higher productivity (discussed above) and the "centrifugal" forces of higher land rents, commuting costs, congestion and pollution, all leading to higher wages and taxes. Hence, for indeterminately long periods of time after industrial development begins, large cities offer increasing returns to capital and labor, and this increasingly causes divergence. Eventually, though, the costs of size-related congestion may rise to the extent that higher returns become possible in smaller urban centers. This line of reasoning also leads to a rising–falling (or bell-shaped) regional inequality curve.

A second group of scholars – basing their arguments on "increasing returns," especially in concentrated or clustered spatial settings – has argued that interregional divergence is possible for very long periods. Much of the literature surveyed earlier belongs in this second group; many of these scholars have explicitly or implicitly supported a regional divergence thesis. The regional data in a number of developed countries (the USA, Japan, Europe, Canada, Australia) and a small number of developing nations (such as Colombia) appear to support the convergence hypothesis (see Sala-i-Martin 1996 for a survey). But the experience in almost all developing and socialist nations provides ample evidence to the contrary (Chakravorty 2006).

A number of pragmatic questions arise. What types of policy can promote industrial growth? In leading regions? In lagging regions? What kinds of intervention are possible and/or necessary for achieving balanced growth? What are the effects of state intervention on comparative regional development (the equity issue), and on the nation's development prospects (the efficiency issue)? However, these pragmatic questions have often been overwhelmed by the key question of political economy: what does the state *really* do to influence interregional outcomes?

The first political-economic perspectives on regional development came from pioneers in development economics. Gunnar Myrdal (1957) and Albert Hirschman (1958) suggested the *core–periphery* and *cumulative causation models* based on similar ideas about "polarization" or "backwash" (concentration of growth and resources in leading regions) and "trickle down" or "spread" (diffusion of growth and resources to lagging regions). Their ideas were influenced by the work of the French economist Francois Perroux (1950), and in turn influenced the work of Friedmann (1966, 1973), Boudeville (1966), and a generation of regional planners and economists. These scholars argued that regional imbalances are likely to widen in the absence of state intervention because of a number of interrelated factors – mainly that industry is more productive than agriculture and can only locate where there is sufficient physical and social infrastructure: that is, in the leading regions, a nation's leading city or cities, where industry clusters already exist. Hence the infrastructure advantage of the leading region attracts more capital, which creates even greater advantages, and initiates a process of cumulative or circular causation.

Since regional divergence cannot easily be mitigated by market forces, which, according to the Myrdal–Hirschman school, contribute to increasing divergence, state intervention is politically necessary and inevitable, and improves the distribution of welfare. Hirschman was hopeful that expanding markets and urbanization, the spatial diffusion of innovations and culture, and political demands from the periphery (mediated by state actions) would eventually lead to some narrowing of the core–periphery gap. Myrdal was less sanguine about the prospects of the lagging regions. He argued that growth in one region would have negative or "backwash" effects on other lagging

regions. He wrote: "the movements of labour, capital, goods, and services do not by themselves counteract the natural tendency to regional inequality. By themselves, migration, capital movements, and trade are rather the media through which the cumulative process evolves – upwards in the lucky regions and downwards in the unlucky ones" (quoted in Higgins and Savoie 1995:86). These ideas became very important in regional development practice, as is evident in the very large scholarship on and real investments in growth poles and growth centers (see Darwent 1975).

The idea that a benevolent state, primarily concerned with the welfare of its citizens, enacts "good" regional policy has been severely criticized. Public choice theorists have argued that the state is a self-interested entity and takes actions to perpetuate its own existence, seeks rent where possible, and thereby distorts the market and resource allocation process. The best-known regional/spatial manifestation of this approach is Michael Lipton's "urban bias" thesis (Lipton 1977; Bradshaw 1987). Lipton argues that the natural advantages of metropolitan regions are heightened by a series of policies on the exchange rate (which makes the import of industrial machinery cheaper while making the export of agricultural commodities dearer), trade, food pricing, etc., creating urban and metropolitan bias. This results in lagging agricultural regions falling even further behind. For instance, Bates' (1983) work on agricultural development in sub-Saharan Africa shows that the state machinery was actively engaged in transferring the rural surplus to the leading urban regions, using a complex array of producer price supports, purchasing and storage monopolies, and urban price subsidies.

The strongest criticisms of the bourgeois state have been presented in neomarxist models of regional development led by the Latin school dependency theorists (such as Baran 1957; Frank 1967; Timberlake 1987), for whom intra-national uneven development is less important than (and merely an element in the spectrum of) uneven development between nations. Here, the dependent-periphery state elite assist capital owners from the developed core to extract surplus, and the underdevelopment of the regional and international periphery is a necessary condition for the development of the core. Several theorists relate regional change to the periodic crises of capitalism, whereby every period of low growth is likely to be followed by a search for new technologies and new places/regions for investment (see Harvey 1982). As a result, regional inequality will not follow any single, simple model, but is likely to be cyclical or episodic – convergence during low growth periods, divergence during capitalist expansion.

Many of these arguments have been discussed within the rubrics of "post-Fordism" or "flexible accumulation" (see Piore and Sabel 1984; Scott 1988; Storper 1997), where the emphasis is on "the character of technological change, the form and organization of firms and industries, [and] the creation and transformation of labor markets" in influencing regional change (Schoenberger 1989:133). There are several strands of this analytical approach, which broadly focuses on institutions, territorial organization, social norms and networks, and economies of "scope" rather than "scale." The "California school," led by Allen Scott and Michael Storper, and the "Third Italy school" of European scholars, who emphasize small firm size, are well known. See the section on "innovations" earlier in this essay for more detail on the latter.

Hence, regional theory offers three distinct possibilities for the long term. One group of economists argues, relying on the principles of diminishing returns and factor mobility, that convergence is the inevitable outcome; divergence is at most a temporary phenomenon. Many geographers and sociologists, on the other hand, argue that economic principles are less important than the political and ideological conditions under which the economic actions are undertaken; as a result, divergence (regionally and internationally) is the likely outcome. In the middle is a mix of beliefs and ideologies where, to begin with, divergence is to be expected, followed perhaps, depending on state action, by some convergence.

Policies

The spatial policy regimes of most developing nation-states tend to be bipolar, not unlike their overall policy regimes. Both sets of policies are meant to generate growth, typically by concentrating resources in selected spatial units. The polarity arises in the choice of spatial units that receive attention – whether they target the leading industrial regions or, conversely, the lagging industrial regions. That is, whether or not it is stated explicitly, spatial policies are usually designed to foster clustering, in regions that already have industrial clusters and in regions that do not. Let us call the first type "concentrated clustering" and the second "de-concentrated clustering." The first is typically used to increase aggregate production, the second to reduce spatial inequalities. These policies broadly use one or both of the following types of action: (a) public expenditures on physical infrastructure, and (b) fiscal incentives to attract firms.

There may not be much to be gained from discussing the names and labels that are attached to the many initiatives. Many of the better-known policies from earlier decades (especially the 1960s and 1970s) were designed for de-concentrated clustering, primarily to direct growth away from existing metropolitan regions; hence they are associated with labels like "growth poles," "growth centers," "counter-magnets," and "secondary cities." More recently, the term "special economic zone" (SEZ) and its variants "export promotion zone," "free trade zone," "enterprise zone," etc. have gained favor, partly because of the spectacular success of China's SEZs, and partly because these terms cleverly stay clear of the idea that clusters need to be promoted only in lagging regions. Hence SEZs can be seen anywhere: inside urban centers, on the edge of urban centers, or some distance from urban centers. There are special terms used to refer to clusters of high-technology firms, such as "technopoles," "technology zones," and "technology parks." Again, the emphasis should be less on the name and more on what actually is done to promote the concept.

It is important to begin by noting that there are clear differences and contradictions between state action specifically geared to the mitigation of regional differences ("explicit" regional policy) and macroeconomic policies (on development path, subsidies to industry relative to agriculture, monetary issues, exchange rate, trade, transportation) that apparently have no regional dimension but in reality have significant spatial implications ("implicit" regional policy; see Henderson 1982; Mills 1987). It may be possible to argue, and the discussion below strengthens the argument, that explicit regional policies have been mere palliatives which have been drowned by implicit regional policies geared toward enhancing aggregate growth.

Infrastructure

The direct motivation behind large-scale infrastructure investments is the view that infrastructure is an intermediate public good with an active role in the production process. Thus, increasing the stock of infrastructure, like increasing any other stock of capital, should improve the productivity of existing firms and attract new firms (Puga 2002). There are three basic ways in which this can happen. First, infrastructure has a direct effect on regional employment as infrastructure development itself increases employment. Second, infrastructure influences business and industrial location decisions as it reduces costs of production and distribution. Third, it improves welfare and quality of life in the region by enhancing its amenity value.

But big questions remain. What is the impact of infrastructure investments on productivity? To what extent does infrastructure improvement attract new economic activity and private capital? In short: there is significant empirical evidence that infrastructure raises productivity. However, the evidence on the effects of infrastructure

development on stimulating new economic activity is mixed. There are good reasons to think that infrastructure investments should help make regions more attractive to investors; but these investments by themselves are not enough to compensate a firm for profit differentials from locating in an already established region. So they tend to work in leading regions, and much less so in lagging ones.

Let us consider the infrastructure–productivity relationship in some detail. In the more developed world there has been a fair amount of research on the relationship, especially following Aschauer's (1989) work on the United States and Biehl's (1986) work on the European Community using aggregate production functions. Other similar empirical studies on the USA and Germany include Morrison and Schwartz (1996), Nadiri and Mamuneas (1994), Seitz and Licht (1992), and Conrad and Seitz (1992). Data from Spanish regions show that public capital has a significant positive effect on value added but that the effects of infrastructure on growth have reduced over time (Mas et al. 1995). Developing country evidence using the aggregate production function approach is limited because reliable data on public capital stocks are typically unavailable.

The micro or firm-level evidence also suggests that infrastructure investments raise productivity, primarily as a result of improved transport linkages, which in turn can reduce geographic barriers to interaction, increase specialized labor supply, and facilitate information exchange, technology diffusion, and other beneficial spillovers that have self-reinforcing effects. There are studies for India that show that market accessibility is associated with higher total factor productivity and labor productivity (Lall and Mengistae 2005). Similarly, for Brazil, changes in transport costs to the nation's largest market (São Paulo) have had statistically significant impacts on firm-level costs (Lall, Shalizi, and Deichmann 2004).

The empirical evidence on the impacts of infrastructure improvements in stimulating industrial activity is weak at best, both in more and in less developed nations. For example, see aggregate studies of regional convergence in the work of Aberle and Towara (1987) on Italy and de la Fuente and Vives (1995) on Spain. Detailed firm-level work on this question has been done by several scholars at the World Bank, including Deichmann et al. (2005) in Indonesia. They find sector-specific outcomes: for instance, that port access is highly significant in the apparel, wood, and paper products sectors, all of which have a strong export orientation, and that the effects of road density are positive and statistically significant for seven industry sectors, with large elasticities in the textiles, wearing apparel, and furniture sectors.

Incentives

Let us now turn to the widespread use of regulations in the form of incentives and subsidies to stimulate economic growth in lagging regions and create disincentives in leading regions (the latter may be a dying practice). The rationale behind providing fiscal incentives is to offset some costs of firm location, such as the transport and transaction costs discussed earlier. Table 2 provides some examples of typical incentive programs used in various countries. These include interest rate subsidies, tax holidays, industrial estate development, and business licensing regulations.

The evidence on the impacts of regional incentives is mixed. While incentives have been used in many developed as well as developing countries, as noted above, there is no firm evidence to suggest that these policies have succeeded in attracting industrial capital to lagging subnational regions. From the instruments listed in Table 2, let us now look more closely at the following programs to get an insight into the design and effectiveness of these programs: investment subsidies in Brazil; tax and import duty exemptions in Mexico; tax holidays in Thailand; and revenue sharing in Korea. (Details of this material are in Chakravorty and Lall 2007: ch. 6.)

Table 2 Examples of regional incentives

Instrument	*Examples*		
Investment subsidies	Brazil: interest rate subsidies – FNE, FNO – constitutional funds	India: concessional finance (Fifth Five-Year Plan)	Thailand: subsidized credit for locating in secondary cities
Tax holidays	Brazil: corporate tax exemption granted to enterprises during the first 10–15 years of operation	Korea: corporate income taxes exemption for 3 years to locate in regional industrial estates	Thailand: income tax exemptions; sales tax reductions for firm locating in industrial processing zones (IPZs)
Reductions in import duties	Mexico: import duty exemption for locating outside of the three largest metro areas	Thailand: reduction in import duties on raw materials	
Industrial estates	Brazil: provision of industrial land and infrastructure	Japan: industrial estate development (industrial relocation policy 1975–80)	Thailand: development of industrial estates
Regulation	India: preference to backward areas in industry licensing (Fifth Five-Year Plan)	Korea: controls on new industrial development in Seoul	
Other programs	Japan: wage subsidies for companies creating new employment opportunities by constructing or expanding their manufacturing facilities	Korea: sharing of tax revenues to support programs in underdeveloped regions	Mexico: technical assistance in the form of pre-investment studies, market research, and assistance in obtaining credit

Source: Chakravorty and Lall (2007)

The government of Brazil has made significant outlays through tax breaks and associated regional development programs, to the tune of USD3–4 billion per annum in recent years (Ferreira 2004). Tax credits directed to the Manaus Free Trade Zone are estimated to be USD1.2 billion in 2003 alone. Investment incentive programs for the north and the northeast, funded by income tax deductions, averaged more than USD600 million a year between 1995 and 2000. This money has been made available using three sets of instruments: (a) fiscal incentive programs; (b) subsidized credit; and (c) regional development banks. These policies have had some success in inducing firms to locate in Brazil's lagging regions but not to the extent that self-perpetuating hubs or clusters could arise.

The Mexican government has used fiscal incentives to promote industrial development outside the three largest urban agglomerations: the Mexico City Metropolitan Area (MCMA), Guadalajara, and Monterrey. Between 1970 and 1980 an elaborate tax and duty exemption system was set up. Fiscal incentives were provided to industries to locate outside these urban centers, where industries were eligible for 50 to 100 percent reduction in import duties, income, sales, and capital gains taxes, as well as accelerated depreciation and lower interest rates. In addition, in 1994 the Mexican economy was further opened to foreign trade and investment with the North Atlantic Free Trade Association (NAFTA). Now we see a pattern of re-concentration of manufacturing away from Mexico City to northern cities such as Ciudad Juarez, Monterrey, and Tijuana, which are physically close to the USA (Hanson 1998). It is not clear, however, that the fiscal incentives led to this de-concentrated clustering.

The Thai Board of Investment (BOI) tried to increase the growth rate of regions outside Bangkok in the 1970s and 1980s by offering tax holidays to new firms. There were general incentives available everywhere outside Bangkok, and additional incentives for industries establishing in four special industrial processing zones, and even more generous incentives in Khon Kaen and Songkhla. These fiscal incentives did not, however, result in a large shift of investment from Bangkok as producers in regional cities faced persistent cost disadvantages. Thus, initial tax holidays in this case were not much of an inducement.

Industrial development in Korea is concentrated in and around the agglomerations of Seoul and Pusan. In an attempt to promote balanced regional growth and divert growth away from Seoul, the Korean government initiated large-scale programs in the 1960s and 1970s, and redistributed considerable resources to less developed provinces in the form of block grants and other transfers. As a consequence of these policies, the dominance of Seoul and Pusan declined in the 1970s and 1980s, but growth continued to reinforce the already developed Seoul–Pusan axis – most growth occurred either just outside the boundaries of Seoul and Pusan, or in a range of small and medium-sized cities strung along the development axis (World Bank 1986).

Special Economic Zones

Let us conclude with a discussion of the policy *du jour*, Special Economic Zones or SEZs, as they are implemented in China and India. SEZs are important as they represent the state of policy thinking on clusters in developing nations and post-Soviet economies. They have become globally ubiquitous as a result of China's success with them, and are being implemented in a range of countries – from Pakistan and Iran, to Brazil and Peru, Russia and Poland and Ukraine, and North Korea and the Philippines. China and India have been chosen here not only because they are exemplars of high growth performance in the last two to three decades but also to represent two ends of the political economy of SEZ implementation – the strong state in China and the so-called soft state in India.

The SEZ policy in China started soon after the beginning of reforms in 1978. Four SEZs were started in 1979, three in Guangdong province (Shenzhen, Shantou, and Zuhai) adjacent to Hong Kong, and one at Xiamen in Fujian. These SEZs were designed to realize an export-led growth strategy and to take advantage of agglomeration economies. They were also marked by large government investments in infrastructure. Each SEZ was allowed to create its own regulations on investment, approvals, and taxes, and perhaps more to the point, was allowed to retain, for local use, a significant proportion of the taxes collected (Fan 1995). In 1984, the SEZ policy was extended to 14 coastal open cities, where Economic and Technology Development Zones and High Tech and New Technology Industry Development Zones were also encouraged. In 1985, three development triangles – the Pearl River Delta (in Guangdong), the Yangtze River Delta (around Shanghai) and Minum Delta (around Xiamen) – were designated as coastal open areas. Hainan Island was declared as the fifth SEZ in 1988 and since then 52 cities (including all provincial capitals) have become open cities.

The economic success of China's SEZs is already legendary. Shenzhen, an anonymous town of 200,000, has grown in 20 years into a metropolis of over 10 million (spread over 350 square kilometers). The Pearl River Delta, which is centered on Shenzhen, is now the global hub of computer and computer peripherals manufacturing (Fallows 2007). By 2005, exports from Shenzhen had risen to over USD100 billion, close to 15 percent of China's total exports. At a smaller scale, the Beijing Economic-Technological Development Area (BDA), which was established in 1993 on 46.8 square kilometers, had by 2004 become home to over 1600 companies from 30 countries

offering direct employment for about 100,000 persons, with a total investment of USD8.1 billion, of which USD3.2 billion was FDI. Of the original 47 square kilometers, only 23 square kilometers had been developed (Mukhopadhyay 2008).

India's attempts at creating a spatial development policy started with Export Processing Zones (EPZs), the first in Kandla in 1965, followed by SEEPZ in 1972 (both in the Mumbai metropolitan area). Later EPZs were created in Cochin, Falta (near Kolkata), Chennai, and NOIDA (adjacent to Delhi) in 1984 and Vizag in 1989. These EPZs had very limited impact. They employed only 0.01 percent of the formal labor force and accounted for less than 4 percent of exports. In 2000, a new SEZ policy was initiated which permitted them to be set up in the public, private, or joint sector or by state governments; a minimum size of 1,000 hectares was specified and procedures were simplified and more fiscal incentives granted. By the early 2000s there were 11 functioning SEZs and an additional 40 had been approved. In 2005 a new Special Economic Zones Act was passed and this was implemented in the following year. The new Act is a comprehensive law providing larger tax incentives and covering various regulations on the establishment of zones, their operation and fiscal management.

As of August 2008, the government of India had formally approved 513 SEZ applications (remember that China had five): 95 SEZs have been approved in Maharashtra, 94 in Andhra Pradesh, 92 in Tamil Nadu, and more than 40 each in Gujarat and Haryana. Following serious violence in a proposed SEZ in Nandigram in West Bengal in early 2007, the maximum size has been limited to 5 square kilometers (remember that Shenzhen covers 350 square kilometers). The problems with land acquisition have not been limited to West Bengal; there has been significant resistance to specific projects in the states of Goa, Orissa, and Haryana. The issue is constantly in the media and has become the rallying point for various non-governmental organizations (NGOs) ideologically opposed to markets and/or globalization. The government's own estimates on SEZ effectiveness are meager at best: USD17 billion in total investments, USD15.5 billion in total exports, and 100,000 people employed. All this, recall, is spread over hundreds of SEZs, many housing no more than a handful of small-scale manufacturers.

Conclusion

There is no doubt that clustering is a global phenomenon and that industry clusters have been in existence for decades, even centuries. There is a symbiotic relationship between cities and clusters. One feeds the growth of the other; whether it is because there is a large market to sell the product locally, or transportation infrastructure to sell the product elsewhere, or external economies arising from thick markets for labor, buyer–supplier, and producer services, or innovation economies, or enabling social norms and networks, or some combination of these factors, or simply a perception that there is some advantage – clusters tend to arise and do well in existing urban centers, which in turn makes these urban centers even larger and possibly even more advantageous. This creates the core regional problem of unbalanced development and interregional divergence, and leads to state efforts to mitigate conditions by creating clusters in lagging regions.

Future research on clusters is likely to follow the questions suggested by these issues: namely, "why and to what extent do clusters foster productivity advantages?", "why and to what extent do clusters foster innovations?", and "how should policy be used to form clusters?" First, we are likely to see a continuation of research into the productivity question (discussed in detail earlier), in more and more settings as more and more data become available and the analytical tools become more sophisticated. Secondly, within the productivity question, we will see a continuing emphasis on

understanding innovation and competitiveness (this is particularly true of the more developed world). Thirdly, there will be a continuing search for methods to create clusters and to attract them to lagging regions. In terms of sheer volume of output, the first track can be expected to remain dominant. This is the mainstream approach and is used in both more developed and less developed settings.

Interest in the second and third approaches varies by development level. The balance of current research efforts is firmly in favor of the innovation question. This is not surprising given the importance of innovation to the economies of more developed countries and the dominance of research outlets in those same nations. At the same time, it is also true that good structural and spatial explanations for the origins of innovations do not exist. In general, the New Economic Geography literature treats innovation as a "black box" phenomenon, and the focus of analysts using this approach is to estimate the "size" or "effect" of that black box. Scholars who take an institutional approach, on the other hand, are keen on looking inside the black box, to understand how social norms and networks create the appropriate conditions for innovation. This bifurcation is likely to continue, because of the methodological (and ideological) differences in the two approaches, more econometric in the former and more sociological in the latter.

Research on innovation in clusters is not unknown in less developed nation contexts. Analysts have noted the rise of Bangalore and Hyderabad in India as centers of ICT innovations and the contributions of several Chinese industrial clusters to process innovations. But there is little doubt that the preponderance of research in development contexts continues, perhaps justifiably, to focus on policy questions. Few policymakers or analysts doubt that clusters are growth augmenting, but they remain puzzled about how to make clusters form in lagging regions or non-urban regions. The SEZ instrument has aroused much interest, and is likely to be seriously studied, perhaps with an emphasis on infrastructure needs, cost effectiveness, and land/property rights of displaced persons. In general, it may be fruitful to examine the role of the state in cluster formation as it recedes from some arenas (most SEZs are private or private–public partnerships) and not others (land acquisition, infrastructure provision). These questions are likely, for good reasons, to remain at the forefront of development questions in economic geography.

References

Abdel-Rahman, H. (1988) Product Differentiation, Monopolistic Competition, and City Size. *Regional Science and Urban Economics* 18, 69–86.

Aberle, G., and Towara, M. (1987) Transport Infrastructure and Regional Development in the South of Italy: A Macroeconomic Approach. *Journal of Regional Policy* 7, 421–30.

Alonso, W. (1980) Five Bell Shapes in Development. *Papers of the Regional Science Association* 45, 5–16.

Amity, M. and L. Cameron (2007) Economic geography and wages. *Review of Economics and Statistics* 89:15–29.

Arrow, K.J. (1962) The Economic Implications of Learning by Doing. *Review of Economic Studies* 29, 155–73.

Aschauer, D.A. (1989) Is Public Expenditure Productive? *Journal of Monetary Economics* 23, 177–200.

Baran, P. (1957) *The Political Economy of Growth.* New York: Monthly Review Press.

Barro, R.J., and Sala-i-Martin, X. (1992) Convergence. *Journal of Political Economy* 100, 223–51.

Bates, R.H. (1983) *The Regulation of Rural Markets in Africa.* Washington, DC: US Agency for International Development.

Biehl, D. (1986) The Contribution of Infrastructure to Regional Development. Mimeo. Brussels: Regional Policy Division, European Communities.

Bostic, R. (1997) Urban Productivity and Factor Growth in the Late 19th Century. *Journal of Urban Economics* 4, 38–55.
Boudeville, J.-R. (1966) *Problems of Regional Economic Planning.* Edinburgh: Edinburgh University Press.
Bradshaw, Y.W. (1987) Urbanization and Underdevelopment: A Global Study of Modernization, Urban Bias and Economic Dependency. *American Sociological Review* 52, 224–39.
Chakravorty, S. (2006) *Fragments of Inequality: Social, Spatial, and Evolutionary Analyses of Income Distribution.* New York: Routledge.
Chakravorty, S., and Lall, S.V. (2007) *Made in India: The Economic Geography and Political Economy of Industrialization.* New Delhi: Oxford University Press.
Chinitz, B. (1961) Contrasts in Agglomeration: New York and Pittsburgh. *American Economic Review* 51, 279–89.
Ciccone, A., and Hall, R. (1996) Productivity and the Density of Economic Activity. *American Economic Review* 86, 54–70.
Conrad, K., and Seitz, H. (1992) The "Public Capital Hypothesis": The Case of Germany. *Recherches Economiques de Louvain* 58, 309–27.
Darwent, D.F. (1975) Growth Poles and Growth Centers in Regional Planning: A Review. In J. Friedmann and W. Alonso (eds.) *Regional Policy: Readings in Theory and Applications,* Cambridge: MIT Press, pp. 539–65.
de la Fuente, A., and Vives, X. (1995) Infrastructure and Education as Instruments of Regional Policy: Evidence from Spain. *Economic Policy: A European Forum* 20, 11–54.
Deichmann, U., Kaiser, K., Lall, S.V., and Shalizi, Z. (2005) Agglomeration, Transport and Regional Development in Indonesia. World Bank Policy Research Working Paper no. 3477.
Dixit, A.K., and Stiglitz, J.E. (1977) Monopolistic Competition and Optimum Product Diversity. *American Economic Review* 67, 297–308.
Fallows, J. (2007) China Makes, the World Takes. *Atlantic Monthly* 300 (1), 48–72.
Fan, C.C. (1995) Of Belts and Ladders: State Policy and Uneven Regional Development in Post-Mao China. *Annals of the Association of American Geographers* 85, 421–49.
Ferreira, P.C. (2004) *Regional Policy in Brazil: A Review.* Mimeo.
Frank, A.G. (1967) *Capitalism and Underdevelopment in Latin America.* New York: Monthly Review Press.
Friedmann, J. (1966) *Regional Development Policy: A Case Study of Venezuela.* Cambridge: MIT Press.
Friedmann, J. (1973) A Theory of Polarized Development. In J. Friedmann (ed.) *Urbanization, Planning and National Development.* Beverly Hills: Sage, pp. 41–64.
Fujita, M. (1988) A Monopolistic Competition Model of Spatial Agglomeration: Differentiated Product Approach. *Regional Science and Urban Economics* 18, 87–124.
Fujita, M., and Thisse, J.-F. (1996) Economics of Agglomeration. *Journal of the Japanese and International Economies* 10, 339–78.
Fujita, M., Krugman, P., and Venables, A.J. (1999) *The Spatial Economy: Cities, Regions, and International Trade.* Cambridge: MIT Press.
Garcia-Mila, T., and McGuire, T. (1993) Industrial Mix as a Factor in the Growth and Variability of States' Economies. *Regional Science and Urban Economics* 23, 731–48.
Glaeser, E.L., Kallal, H.D., Scheinkman, J.A., and Shleifer, A. (1992) Growth in Cities. *Journal of Political Economy* 100, 1126–52.
Granovetter, M. (1985) Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology* 91, 481–510.
Greenhut, J., and Greenhut, M.L. (1975) Spatial Price Discrimination, Competition and Locational Effects. *Economica* 42, 401–19.
Hanson, G.H. (1998) Market Potential, Increasing Returns and Geographic Concentration. NBER Working Paper no. 6429. Cambridge: National Bureau of Economic Research.
Harvey, D. (1982) *Limits to Capital.* Oxford: Blackwell.
Henderson, J.V. (1982) The Impact of Government Policies on Urban Concentration. *Journal of Urban Economics* 9, 64–71.
Henderson, J.V. (1988) *Urban Development: Theory, Fact, and Illusion.* New York: Oxford University Press.
Henderson, J.V., Kuncoro, A., and Turner, M. (1995) Industrial Development in Cities. *Journal of Political Economy* 103, 1067–90.

Henderson, J.V., Shalizi, Z., and Venables, A. (2001) Geography and Development. *Journal of Economic Geography* 1, 81–105.
Higgins, B. and Savoie, D.J. (1995) *Regional Development Theories and their Application.* New Brunswick: Transaction.
Hirschman, A.O. (1958) *The Strategy of Economic Development.* New Haven: Yale University Press.
Hotelling, H. (1929) Stability in Competition. *Economic Journal* 39, 41–57.
Iammarino, S., and McCann, P. (2006) The Structure and Evolution of Industrial Clusters: Transactions, Technology and Knowledge. *Research Policy* 35, 1018–36.
Isard, W. (1956) *Location and Space-Economy.* Cambridge: MIT Press.
Jacobs, J. (1969) *The Economy of Cities.* New York: Vintage.
Krugman, P. (1991a) *Geography and Trade.* Cambridge: MIT Press.
Krugman, P. (1991b) Increasing Returns and Economic Geography. *Journal of Political Economy* 99, 483–99.
Krugman, P. (1996) Urban Concentration: The Role of Increasing Returns and Transport Costs. *International Regional Science Review* 19, 5–30.
Lall, S.V., and Chakravorty, S. (2005) Industrial Location and Spatial Inequality: Theory and Evidence from India. *Review of Development Economics* 9, 47–68.
Lall, S.V., and Mengistae, T. (2005) Business Environment and Location of Industry in India. Mimeo.
Lall, S.V., Funderburg, R., and Yepes, T. (2004) Location, Concentration, and Performance of Economic Activity in Brazil. World Bank Policy Research Working Paper no. 3268.
Lall, S.V., Shalizi, Z., and Deichmann, U. (2004) Agglomeration Economies and Productivity in Indian Industry. *Journal of Development Economics* 73, 643–73.
Lipton, M. (1977) *Why Poor People Stay Poor: A Study of Urban Bias in World Development.* Cambridge: Harvard University Press.
Lösch, A. (1954) *The Economics of Location,* trans. by W.H. Woglom and W.F. Stolper. New Haven: Yale University Press. Originally published 1938.
Marshall, A. (1890) *Principles of Economics.* London: Macmillan.
Marshall, A. (1919) *Industry and Trade.* London: Macmillan.
Mas, M., Maudos, J., Perez, F., and Uriel, E. (1995) Infrastructures and Productivity in the Spanish Regions. *Regional Studies* 30, 641–9.
Mills, E.S. (1987) Non-urban Policies as Urban Policies. *Urban Studies* 24, 245–54.
Miracky, W. (1995) Cities and the Product Cycle. Unpublished PhD dissertation. Cambridge: MIT.
Morrison, C., and Schwartz, A.E. (1996) Public Infrastructure, Private Input Demand and Economic Performance in New England Manufacturing. *Journal of Business and Economic Statistics* 14, 91–102.
Mukhopadhyay, P. (2008) The Promised Land of SEZs. *India Seminar.* Available at www.indiaseminar.com/2008/581/581_partha_mukhopadhyay.htm accessed June 16, 2009.
Myrdal, G. (1957) *Economic Theory and Underdeveloped Regions.* London: Duckworth.
Nadiri, M.I., and Mamuneas, T.P. (1994) The Effects of Public Infrastructure and R&D Capital on the Cost Structure and Performance of US Manufacturing Industries. *Review of Economics and Statistics* 76, 22–37.
North, D.C. (1975) Location Theory and Regional Economic Growth. In J. Friedmann and W. Alonso (eds.) *Regional Policy: Readings in Theory and Application.* Cambridge: MIT Press, pp. 332–47.
O'Sullivan, A. (2000) *Urban Economics.* Boston: McGraw Hill-Irwin.
Parr, J.B. (2002) Agglomeration Economies: Ambiguities and Confusions. *Environment and Planning A* 34, 717–31.
Perroux, F. (1950) Economic Space: Theory and Applications. *Quarterly Journal of Economics* 64, 89–104.
Petrakos, G.C. (1992) Urban Concentration and Agglomeration: Re-examining the Relationship. *Urban Studies* 29, 1219–30.
Piore, M.J., and Sabel, C.F. (1984) *The Second Industrial Divide: Possibilities for Prosperity.* New York: Basic Books.
Porter, M. (1990) *The Competitive Advantage of Nations.* London: Macmillan.
Porter, M.E. (1998) Clusters and the New Economics of Competition. *Harvard Business Review,* Nov.–Dec., 77–90.

Puga, D. (2002) European Regional Policies in Light of Recent Location Theories. *Journal of Economic Geography* 2, 373–406.
Ravallion, M., and Jalan, J. (1997) *Spatial Poverty Traps?* World Bank Policy Research Working Paper no. 1862.
Richardson, H.W. (1973) *Regional Growth Theory.* London: Macmillan.
Rivera-Batiz, F. (1988) Increasing Returns, Monopolistic Competition, and Agglomeration Economies in Consumption and Production. *Regional Science and Urban Economics* 18, 125–54.
Romer, P. (1986) Increasing Returns and Long Run Growth. *Journal of Political Economy* 98, 71–102.
Sala-i-Martin, X. (1996) Regional Cohesion: Evidence and Theories of Regional Growth and Convergence. *European Economic Review* 40, 1325–52.
Schoenberger, E. (1989) New Models of Regional Change. In R. Peet and N. Thrift (eds.) *New Models in Geography: The Political-Economy Perspective.* London: Unwin Hyman, pp. 115–41.
Scott, A. (1988) Flexible Production Systems and Regional Development: The Rise of New Industrial Spaces in North America and Western Europe. *International Journal of Urban and Regional Research* 12, 171–85.
Seitz, H., and Licht, G. (1992) The Impact of the Provision of Public Infrastructures on Regional Development in Germany. Zentrum for Europaische Wirtschaftsforschung GmbH, Discussion Paper no. 93–13.
Storper, M. (1997) *The Regional World: Territorial Development in a Global Economy.* New York: Guilford Press.
Sveikauskas, L. (1975) The Productivity of Cities. *Quarterly Journal of Economics* 89, 393–413.
Tabuchi, T. (1986) Urban Agglomeration, Capital Augmenting Technology, and Labor Market Equilibrium. *Journal of Urban Economics* 20, 211–28.
Timberlake, M. (1987) World-System Theory and the Study of Comparative Urbanization. In M.P. Smith and J.R. Feagin (eds.) *The Capitalist City: Global Restructuring and Community Politics.* London: Blackwell, pp. 37–65.
Venables, A. (1996) Equilibrium Locations of Vertically Linked Industries. *International Economic Review* 49, 341–59.
Vernon, R. (1966) International Investment and International Trade in the Product Cycle. *Quarterly Journal of Economics* 80, 180–207.
Von Thunen, J.H. (1966) The Isolated State. Oxford: Pergamon.
Weber, A. (1929) *Theory of the Location of Industries.* Chicago: University of Chicago Press.
Wheaton, W.C., and Shishido, H. (1981) Urban Concentration, Agglomeration Economies and the Levels of Economic Development. *Economic Development and Cultural Change* 30, 17–30.
Williamson, J.G. (1965) Regional Inequality and the Process of National Development. *Economic Development and Cultural Change* 13, 3–45.
World Bank (1986) *Korea Spatial Strategy Review.* World Bank Report 5868-KO, September.
World Bank (2009) *World Development Report: Reshaping Economic Geography.* Washington, DC: World Bank.

Online Resources

Institute for Strategy and Business Competitiveness, Harvard Business School. At www.isc.hbs.edu/econ-clusters.htm; accessed Nov. 2009. Focuses primarily on the cluster-related work of Michael Porter and his ideas on competitive advantage. Includes journal papers, working papers, multimedia, a cluster mapping project using US data, and links to international resources on clustering.

World Bank research on clusters and export processing zones. At http://go.worldbank.org/Z19WSUM2H0; accessed Nov. 2009. Includes dozens of journal quality analytical papers and case studies examining theoretical and empirical issues from around the world, including material on Africa (rarely found elsewhere).

Center for Strategy and Competitiveness, Stockholm School of Economics. At www.clusterobservatory.eu/; accessed Nov. 2009. Website funded in part by the European Union; includes papers, case studies, country reports, maps, etc. with a strong emphasis on European conditions.

Spatial Disparities in Human Development Unit, World Institute for Development Economics Research (WIDER), United Nations University. At www.wider.unu.edu/research/projects-by-theme/poverty-inequality/en_GB/spatial-disparities-in-human-development/; accessed Nov. 2009. Includes a large number of papers and case studies on regional development and inequality, with wide geographical coverage. Other parts of the WIDER website include relevant material on trade and finance and politics and development, and the most comprehensive dataset on income inequality.

About the Author

Sanjoy Chakravorty is Professor and Chair of Geography and Urban Studies at Temple University in Philadelphia. He has recently authored *Made in India* (2007, with S. Lall): an examination of the economic geography and political economy of Indian industrialization; and *Fragments of Inequality* (2006): a theoretical analysis of inequality and income distribution. He has also authored or co-authored around 50 journal papers, book chapters, and reports. The papers have been widely published in geography, development economics, planning, and urban journals. His research has been funded by the US National Science Foundation, the US National Institute of Justice, the American Institute of Indian Studies, and the World Bank. More information on his work (including some current papers) can be found at www.temple.edu/gus/chakravorty.