The New Palgrave Dictionary of Economics Online

geography of regional development

Jeffrey D. Sachs and Gordon C. McCord

From *The New Palgrave Dictionary of Economics*, Second Edition, 2008
Edited by Steven N. Durlauf and Lawrence E. Blume

Abstract

New theoretical work on spatial concentration of industry – particularly the 'new economic geography' – has significantly helped us understanding why some regions develop more than others, why cities arise and where they are located. However, this work rarely incorporates Adam Smith's observation that spatial differences in economic activity also reflect variations in physical geography, which make some places more productive than others at particular times; nor has it accommodated regional development policy – the use of economic incentives to attract industry to particular locations. A full theory of regional development would integrate theories of agglomeration economies with physical geography and with public economics.

Article

Differences in economic activity across regions have interested economists since Adam Smith, who argued that high overland transport costs in the interior of Africa and Asia 'seem in all ages' to have had hindered economic development. However, economists' attraction to the study of spatial variations in economic activity has fluctuated over time. Standard trade theory based on comparative advantage helps to explain how the location of economic activity is affected by the spatial distribution of primary resources (such as land, labour, and water), but standard trade theory says little about the interdependence of location decisions by economic agents, nor does it consider in any depth the more detailed aspects of physical geography (climate, soils, topography, disease epidemiology).

Neoclassical growth models focus on the accumulation of physical, human, and technological capital, which individually or together complement raw labour and land as factors of production, but only recent theory (particularly in the work dubbed the 'new economic geography') has begun to grapple with location choices and the spatial concentration of industry (Henderson, 1988; Krugman, 1991; Fujita, Krugman and Venables, 1999). While these newer theories have contributed importantly to our understanding of why some regions develop more than others, and why cities arise and where they are located, they rarely incorporate Smith's observation that spatial differences in economic activity are also related to variations in physical geography, which intrinsically make some places more productive than others at particular points in

time. Nor do they yet go into depth on regional development policy, that is, the use of economic incentives to attract industry to one location or another. A full theory of regional development will integrate theories of agglomeration economies with physical geography and with public economics.

Theories of agglomeration

Economic activity and population around the globe are concentrated in highly dense metropolitan areas, which suggest that there is an important economic benefit of economic agglomeration (spatial co-location of economic agents). Alfred Marshall (1920) suggested that spatial concentration happens because of knowledge spillovers, larger markets for specialized skills, and backward and forward linkages associated with large local markets.

The initial literature to tackle the intractability of modelling economic geography grew from the von Thünen model (1826), which begins with the existence of a city and derives characteristics about land rents and land use surrounding the city; the resulting unplanned, efficient outcome is a concentric ring pattern of production referred to as 'von Thünen cones'. The model doesn't, however, attempt to explain the *raison d'être* of the city itself.

Later models aimed to explain why population and economic activity tend to agglomerate in the first place. Spatial concentration occurs because production is cheaper due to the large amount of nearby economic activity in agglomeration economies. These increasing returns to scale exist for several reasons: larger markets support more highly specialized products; efficiency increases as a large number of producers and consumers allows for less idle time (a source of increasing returns called demand smoothing); economies of scale of intermediate inputs make production cheaper even for sectors without increasing returns; externalities diffuse learning and expertise, as people can see each others' products and work methods; and search costs are lowered when the search process is spatially concentrated. Florida (1995) pioneered the concept of the 'learning region': to minimize transport costs and maximize learning, firms benefit from spatially concentrating their activities, and thus firms looking to augment their capabilities have strong incentive to locate in these learning regions.

New economic geography

The 'new economic geography' of recent decades grew from the Dixit and Stiglitz (1977) model of monopolistic competition under increasing returns to scale. Though admittedly a special case, this model became a workhorse in many fields, and a foundation for the new economic geography. The theoretical backbone of new economic geography is the core–periphery model in Krugman (1991), which looks at three effects: the 'market-access effect' (monopolistic firms locate in big markets and export to small markets), the 'cost-of-living effect' (cost of living is cheaper where there are more firms, due to low transport costs), and the 'market-crowding effect' (imperfectly competitive firms look to locate in regions with few competitors). The model was an important step

forward in understanding spatial dynamics, but has the downside of being difficult to manipulate analytically and requires numerical simulations (instead of explicit expressions) to derive results.

Another important concept in the location of economic activity is that of clusters, especially in the work of Porter (1990; 1995; 1998a; 1998b). A cluster is a group of interconnected companies and institutions in a particular location (perhaps a city, or a state, or even a group of neighbouring countries). Companies in a cluster benefit from important complementarities, spillovers, and a relationship with public institutions, which improve productivity and productivity growth, and stimulate new business formation. The important contribution of this literature is that a firm's comparative advantage (or 'competitive advantage' in the business phrase) can include characteristics outside the firm itself; often geography and location have important implications on how firms or industries can compete in the market.

One of the striking implications of the new economic geography is that spatial concentration arises in a homogeneous region, where is no fundamental geographical advantage to locating in one place or another. The precise location of firms is accidental. Early advantages in agglomeration can lead to a snowball effect. First movers in regional development can achieve a lasting competitive advantage by attracting other mobile workers and investors. Growth proceeds with 'preferential attachment' to the places that get an early start.

The role of physical geography

In addition to the new economic geography models of agglomeration, a second basic approach seeking to shed light on growth poles and regional development is based on intrinsic geographical advantages. The assumption of homogeneous space is abandoned, and the role of coasts, hinterlands, rivers, mountains, and a vast array of other geographical variables is brought to the fore. Adam Smith himself asserted that the division of labour is limited by the extent of the market, so that coastal regions, by virtue of their ability to engage in sea-based trade, enjoy a wider scope of the market than interior regions. More recently, climatic conditions have been found to have pervasive effects on regional development through disease ecology, agricultural productivity, transport costs, vulnerability to natural hazards, water stress, and other factors that may affect economic performance.

Several studies (Gallup, Sachs and Mellinger, 1999; Bloom and Sachs, 1998) have noted that tropical areas are consistently poorer than temperate-zone areas, and hypothesize that this may be related to the effects of tropical ecology on human health and agricultural productivity. Tropical infectious diseases, for example, impose very high burdens on human health that in turn may lead to shortfalls in economic performance much larger than their direct short-run effects on health. Another study (Gallup and Sachs, 2000) found that, after purchased inputs such as capital, labour, and fertilizers are controlling for, the average productivity of tropical food production falls short of the productivity of temperate-zone food production. In the course of economic

development, this poor performance in food productivity may have had serious adverse effects on nutrition levels, with adverse consequences for human capital accumulation, labour productivity, and susceptibility to infectious disease. These geographical penalties can often be compensated by other kinds of interventions (such as malaria control or improved agronomic practices), but, since those interventions require added resources, affected regions may persistently lag behind more fortuitously located regions.

Geographical advantages can trigger subsequent agglomeration based on increasing returns to scale. The agglomeration is then self-reinforcing, even after the initial spatial advantage loses some of its importance. For example, Chicago's port is not as important as when it was the main driver of the city's growth in the middle of the 19th century. Glaeser (2005) illustrates that New York's rise in the 19th century was due to a technological change that moved ocean shipping from a point-to-point system to a hub and spoke system, and the city's geography made it the natural hub. Today, however, New York's pre-eminence is based not mainly on the port, but on the legacies of the earlier success: finance, business, remarkable infrastructure, and the benefits of agglomeration.

Changing dimensions of geography

It is important to stress the changing nature of a region's geographic advantage as technology changes. In early civilizations, when transport and communications were too costly to support much interregional and international trade, regional advantage came from agricultural productivity and local transport rather than from access to oceans. As a result, early civilizations almost invariably emerged in highly fertile river valleys such as those around the Nile, Indus, Tigris, Euphrates, Yellow and Yangtze rivers. These civilizations produced high-density populations that in later eras were often disadvantaged by their remoteness from international trade. As the advantages of overland trade between Europe and Asia gave way to oceanic commerce in the 16th century and later, and as the trade routes to the Americas were discovered, economic advantage shifted from the Middle East and eastern Mediterranean to the North Atlantic. In the 19th century, the high costs of transporting coal for steam power meant that industrialization almost invariably depended on proximity to coal fields.

In the late 20th century, air transport and telecommunications have reduced the advantages of coastlines relative to hinterlands. The telecommunications sector, in particular, is deeply affecting the global division of labour and the nature of agglomeration economies. The disadvantages of interior and distant regions may well be eased or eliminated by the advances in telecommunications which allow for more disbursed production and new growth poles far from traditional trade routes. It is notable that Bangalore has become a booming centre of global information technology, despite being an inland city in southern India, and despite the weakness of India's roads and ports at the time of Bangalore's ascendancy. The examples of Bangalore and of course California's Silicon Valley show that today's competitive advantage has to do much more with the location of excellent universities and an attractive living environment for highly skilled and mobile information workers, much like the 'learning regions' described by

Florida (1995).

Regional policy design

The presence of agglomeration economies, increasing returns, and clusters suggests that countries can identify areas of potential growth poles and use policy tools and public investment to trigger these processes. Special policy instruments such as export-processing zones and special tax promotion schemes have helped developing countries to establish clusters in textiles and apparel, electronics, consumer appliances, software, and automotive components, to name just a few industries where active industrial policy has played a hand. In the case of growth poles in the knowledge economy (such as Silicon Valley and Bangalore), the importance of government support for higher education and R&D and for the creation of science parks is especially apparent. Spillovers from military technology may play a role as well.

It is clear, however, that the successful development strategies of some countries cannot produce the same salubrious results when implemented in very different settings. When China opened some coastal pockets for foreign direct investment, these Special Economic Zones quickly blossomed into vibrant export platforms and created backward linkages with the immediate hinterland. When landlocked Mongolia turned the entire country into a free trade and investment zone in the late 1990s, however, the inflow of foreign capital was a trickle compared with China's experience, and was based mainly on primary commodities (such as copper). Even within China, the coastal provinces in the east have boomed relative to the interior provinces of western China. Physical geography therefore continues to condition economic development. Geographical determinism should be avoided, however; special geographical hindrances may well call for special compensating investments (in roads, disease control, telecommunications, and so on), or for promotion of a judicious choice of industries (those that can be sustained in the face of high transport costs, for example).

Empirical studies

Empirical evidence supports the idea that economies of scale, agglomeration forces (Davis and Weinstein, 1998; 1999; Midelfart-Knarvik et al., 2000; Overman and Puga, 2002; Hanson, 2005), and backward and forward linkages (Midelfart-Knarvik and Steen, 1999) help explain why economic activity clusters together, and that the von Thünen model helps explain economic dynamics near cities (Fafchamps and Shilpi, 2003). The traditional core–periphery model has considerable empirical support, given that the core regions of the global economy (particularly North America, western Europe, and Japan), enjoy ever-increasing levels in productivity. At a smaller scale, studies of wages in the United States and in developing countries show that *ceteris paribus* workers earn much more in urban areas than rural areas, reflecting their higher productivity (Glaeser and Mare, 1994; Bairoch, 1988).

While looking for the presence of increasing returns to scale yields insights, it does not addresses the constraints physical geography may place upon economic growth.

For example, Adam Smith's observations on the role of access to navigable water still hold. Cross-country empirical research affirms that the level and growth rate of per capita income continue to be strongly positively correlated with geographic variables such as climate and coastal proximity (Gallup, Sachs, and Mellinger, 1999; Mellinger, Sachs and Gallup, 2000), while within-country differences in growth rates in India and China are clearly related to geography as well (Demurger et al., 2002; Sachs, Bajpai and Ramiah, 2002). Smith's observations also implicitly underscore the highly favourable economic geography enjoyed by the nations of western Europe. Extensive ocean shorelines host a succession of natural harbours, and numerous navigable rivers penetrate deep into the interior. In addition, despite the large landmass of the United States, 57 per cent of income was generated in counties within 80 km from the coast, though these counties account for only 13 per cent of land mass (Rappaport and Sachs, 2003).

Future theoretical and empirical work in understanding regional development should aim to disentangle the forces of differential geography and self-organizing agglomeration economies. Policy studies should examine in depth how regional development policy has been used in the past, and which instruments are particularly important. Economists and business specialists should aim to provide new tools to help specific regions identify appropriate instruments for regional development, including which kinds of industries are likely to flourish in which kinds of spatial settings.

Bibliography

Baldwin, R., Forslid, R., Martin, P., Ottaviano, G. and Robert-Nicoud, F. 2003. *Economic Geography and Public Policy*. Princeton: Princeton University Press.

Bairoch, P. 1988. *Cities and Economics Development: From the Dawn of History to the Present*. Chicago: University of Chicago Press.

Bloom, D. and Sachs, J. D. 1998. Geography, demography, and economic growth in Africa. *Brookings Papers on Economic Activity* 1998(2), 207–95.

Clark, G., Feldman, M. P. and Gertler, M. 2000. *The Oxford Handbook of Economic Geography*. Oxford: Oxford University Press.

Davis, D. R. and Weinstein, D. E. 1998. Market access, economic geography, and comparative advantage: an empirical assessment. Working Paper No. 6787. Cambridge, MA: NBER.

Davis, D. and Weinstein, D. E. 1999. Economic geography and regional production structure: an empirical investigation. *European Economic Review* 43, 379–407.

Demurger, S., Sachs, J. D., Wing, T.-W., Bao, S. Chang, G. and Mellinger, A. 2002. Geography, economic policy, and regional development in China. *Asian Economic Papers* 1, 146–97.

Dixit, A. K., and Stiglitz, J. E. 1977. Monopolistic competition and optimum product diversity. *American Economic Review* 67, 297–308.

Dunning, J. H., ed. 2002. *Regions, Globalization, and the Knowledge-Based Economy*. New York: Oxford University Press.

Fafchamps, M. and Shilpi, F. 2003. The spatial division of labor in Nepal. *Journal of Development Studies* 39(6), 23–66.

Florida, R. 1995. Towards the learning region. *Futures* 27, 527–36.

Fujita, M., Krugman, P. and Venables, A. J. 1999. *The Spatial Economy: Cities, Regions, and International Trade*. Cambridge, MA: MIT Press.

Gallup, J. L. and Sachs, J. D. 2000. Agriculture, climate, and technology: why are the tropics falling behind? *American Journal of Agricultural Economics* 82, 731–77.

Gallup, J. L., Sachs, J. D. and Mellinger, A. D. 1999. Geography and economic development. *International Regional Science Review* 22, 179–232.

Glaeser, E. L. 2005. Urban colossus: Why is New York America's largest city? Working Paper No. 11398. Washington, DC: NBER.

Glaeser, E. and Mare, D. 1994. Cities and skills. Working Paper No. E94-11, Hoover Institution.

Hanson, G. H. 2005. Market potential, increasing returns, and geographic concentration. *Journal of International Economics* 67, 1–24.

Henderson, J. V. 1988. *Urban development: Theory, Fact, and Illusion*. Oxford: Oxford University Press.

Henderson, J. V. and Thisse, J.-F., eds. 2004. *Handbook of Regional and Urban Economics*, vol. 4. Amsterdam: North-Holland.

Krugman, P. 1991. Increasing returns and economic geography. *Journal of Political Economy* 99, 483–99.

Marshall, A. 1920. Principles of Economics, 8th edn. London: Macmillan.

Mellinger, A. D., Sachs, J. D. and Gallup, J. L. 2000. Climate, Coastal Proximity, and Development. In *Oxford Handbook of Economic Geography*, ed. G. L. Clark, M. P. Feldman and M. S. Gertler. Oxford: Oxford University Press.

Midelfart-Knarvik, K. H., Overnman, H. G., Redding, S. J. and Venables, A. J. 2000.

The location of European industry. Economic Papers No. 142. European Commission Directorate-General for Economic and Financial Affairs.

Midelfart-Knarvik, K. and Steen, F. 1999. Self-reinforcing agglomerations? An empirical industry study. *Scandinavian Journal of Economics* 101, 515–32.

O'Flaherty, B. 2005. *City Economics*. Cambridge, MA: Harvard University Press.

Overman, H. G. and Puga, D. 2002. Unemployment clusters across European regions and countries. *Economic Policy* 34, 115–47.

Porter, M. 1990. *The Competitive Advantage of Nations*. New York: Free Press.

Porter, M. 1995. The competitive advantage of the inner city. *Harvard Business Review* 73, 55–71.

Porter, M. 1998a. Clusters and competition: new agendas for companies, governments and institutions. In *On Competition*. Boston: Harvard Business School Press.

Porter, M. 1998b. The microeconomic foundations of economic development. In World Economic Forum, *Global Competitiveness Report 1998*. Geneva: WEF.

Rappaport, J. and. Sachs, J. D. 2003. The United States as a coastal nation. *Journal of Economic Growth* 8, 5–46.

Sachs, J. D., Bajpai, N. and Ramiah, A. 2002. Understanding regional economic growth in India. *Asian Economic Papers* 1(3), 32–62.

Saxenian, A. L. 2006. *The New Argonauts: Regional Advantages in a Global Economy*. Cambridge, MA: Harvard University Press.

von Thünen, J. H. 1826. *Der Isolierte Staat in Beziehung auf Landtschaft und Nationalökonomie*. Hamburg. Trans V. M. Wartenberg as *Von Thünen's Isolated State*. Oxford: Pergamon Press, 1966.

How to cite this article

Sachs, Jeffrey D. and Gordon McCord. "regional development, geography of." The New Palgrave Dictionary of Economics. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2008. The New Palgrave Dictionary of Economics Online. Palgrave Macmillan. 12 May 2008 <http://www.dictionaryofeconomics.com/article?id=pde2008_R000077>