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Competition and human capital accumulation: a theory of interregional specialization and trade

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Abstract

We consider a model with several regions whose technological ability and factor endowments are identical and in which transport costs between regions are non-negligible. Nonetheless, certain goods are sometimes produced by multiple firms, all of which are located in the same region. These goods are then exported from the regions in which their production is agglomerated. Regional agglomeration of production and trade stem from two forces. First, competition between firms for the services of trained workers makes it easier for workers to recoup the cost of acquiring industry-specific human capital. Second, the technology of production is more efficient when plants are larger than a minimum efficient scale and local demand is insufficient to support several firms of that scale. We also study the policy implications of our model. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Regional agglomeration in the production of goods is pervasive: the Swiss specialize in the production of watches and chocolates; Silicon Valley in com-

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puters; and shoes, haute couture, and movies originate disproportionately in Italy, Paris, and Hollywood respectively. Regional specialization extends even to product subcategories. Within automobiles, luxury sedans tend to come from Germany, sports cars from Italy, and reliable forms of basic transportation from Japan.

The existence of regional agglomeration suggests a different rationale for cities than that which is provided in Krugman (1991). He assumes that manufactured goods are costly to transport and subject to economies of scale in production. The result is an equilibrium where the entire array of manufactured goods is produced in small geographical areas called cities. The role of the city is to keep the producers and the consumers in close proximity so as to avoid transportation costs. In fact, as our previous examples suggest, many manufactured goods are produced in one city and consumed in another. It is thus possible that cities are not a consequence of transportation costs but a consequence of having many people do similar work in close proximity. In this view, cities exist only because particular industries demand regional agglomeration.

The standard explanation of regional agglomeration (e.g. Marshall, 1920; Melvin, 1969; Markusen and Melvin, 1981; Ethier, 1982) is that, for given inputs, the output of an individual firm is larger the larger is the aggregate output of other firms producing the same good in the same region. So, for example, the level of inputs required by a new watchmaker to produce a given output is lower if that entrant locates in Switzerland where there are other watch manufacturers. Romer (1986) and Lucas (1988) have shown that external returns of this type can also explain the fact that some nations seem to remain forever more advanced than others.

A possible source of external economies of this kind is the spillover of knowledge i.e., the possibility that knowledge acquired by one agent can be used by others. In order for knowledge spillovers to provide a compelling explanation, however, it must be the case that they are somehow localized. If an engineer in Taiwan can reverse engineer a product of Silicon Valley as easily as an inhabitant of Silicon Valley, there is no good reason for regional concentration of computer companies.

Marshall (1920) posits instead that the external economies arise from proximity to specialized inputs. As noted by Helpman and Krugman (1985), unless there is a natural comparative advantage for the production of these inputs in the region, this explanation is incomplete. The puzzle is simply rolled back to the previous production stage: Why do the producers of inputs locate in the region?

Our theory is that the equilibrium locations of firms and their input suppliers are interdependent. Thus, as in the Heckscher–Ohlin–Samuelson model, exporting firms are located where inputs are abundant. The key novelty is that inputs become abundant wherever there are several exporting firms. The reason is that input suppliers would not choose to invest *ex ante* in the accumulation of the capital necessary to supply the inputs efficiently unless they have *several* potential customers. The resulting competition among customers assures suppliers of a fair

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