



Economic geography and endogenous determination of transport technology

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Abstract

This paper studies the interdependence of economic geography and transport technology. A two-region model is used to obtain the conditions for the modern transport technology to be adopted in an economy. In particular, the impact of economic geography upon the adoption of the modern technology is examined. Furthermore, I discuss what combination of economic geography (symmetric or core–periphery pattern) and transport technology (traditional or modern technology) is to be realized in an economy.

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1. Introduction

Since the seminal work by Krugman [6], a number of theoretical and empirical studies have been conducted to strengthen our understanding of location of economic activities. One of the basic messages of the “new economic geography” is that transport cost matters: it affects the decision making of each producer and consumer and, as a result, determines the emerging geographical patterns.¹ Krugman [6], for instance, constructs a simple two-region model to show that low transport cost tends to cause an agglomeration of economic activities while high cost a dispersion. This result recurs in various contexts in most chapters of Fujita, Krugman and Ven-

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¹ For recent overviews of the field, see Ottaviano and Puga [11], Fujita and Thisse [4] and Neary [10], among others.

ables [3] and Fujita and Thisse [5], which examine such diverse topics as regional development, urban systems and international trade.²

Surprisingly, however, few researchers have discussed the opposite causality, that is, the causality from the economic geography to the transport cost. Casual observations suggest that the transport technology adopted in an economy depends on the location of economic activities within it. A good example may be provided by cities. In cities like Los Angeles where the economic activities are highly dispersed over a broad range of space, a considerable portion of the transport is made by automobiles. In contrast, cities like Paris where the activities are historically concentrated in a narrow district usually see the development of mass transport systems such as subways and trams, probably because the concentration generates enough demand for their services to cover the cost of their construction. Thus, the economic geography affects the adopted technology and, as a result, the transport cost.

Studying such a relationship between economic geography and transport technology is a matter of great importance for several reasons.

First, we often observe that some countries succeed in adopting a “modern” technology like a railroad whereas the others, although similar in most aspects, especially in their levels of economic development, fail to do so, sticking to a “traditional” technology like a motorcycle. This puzzling observation may be well explained by the difference in the economic geography of each country.

Second, the adopted technology determines not only the current level of welfare but also the future path of economic development and consequently its future level. In this regard, studying the adoption of technology is the more important.

Third, the topic is closely related to the problem of a coordination in economic development and may have some important policy implications. Consider the situation, for example, where the modern transport technology can be introduced only if the economic activities are concentrated in one region. Suppose, furthermore, that the welfare level is higher at the spatially concentrated economy with the modern technology than at the dispersed economy with the traditional technology. Then, the coordination among producers to locate themselves in the same region is necessary to attain the superior state with the modern technology. In this case, consequently, economic policies should aim at promoting such a coordination. Thus, this study offers another version of the famous ‘Big Push’ story by Murphy, Shleifer and Vishny [9].

Fourth, combining both directions of the causality between the economic geography and the transport technology, we can complete the picture of a circular causation or positive feedback mechanism. Suppose, as in the earlier discussion, that agglomeration rather than dispersion is associated with the more efficient modern transport technology. Then, if a sufficient fraction of economic activities happens to be concentrated in one region, that technology is adopted. As a result of its adoption, the transport cost will decline, which will, in turn, strengthen the tendency toward the agglomeration according to the mechanism described in the standard literature of new economic geography.

Finally, in order to study the adoption of transport technology, it is inevitable to explicitly incorporate a transport sector into the analysis. Although abstracting the sector away from the

² While most of the studies including Fujita, Krugman and Venables [3] deal with a *general level* of the transport cost, Behrens [1] pays attention to its *scheme* with respect to the distance of shipping. He explores the effects of the difference in the scheme upon the economic geography.

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