



Internet externalities and location of foreign direct investment: A comparison between developed and developing countries

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Abstract

This paper presents a two-stage game, which demonstrates that positive (negative) network externalities associated with Internet usage encourage (discourage) foreign direct investment (FDI). These hypotheses are tested by two major empirical methodologies—the panel data regressions and the system general method of moments estimator. The empirical findings provide strong evidence that the presence of negative network externalities in developing countries discourages inward FDI, and the presence of positive network externalities in developed countries attracts more FDI. In addition, positive network externalities are found to be more effective than negative network externalities in reducing the distance effect on FDI. As well, the evidence suggests that Internet development is likely to reduce the impact of the initial concentration of FDI, but is unlikely to reverse the self-reinforcing process of FDI.

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1. Introduction

The widespread use of the Internet in developing countries since the mid-1990s has created high expectations concerning the attraction of inflows of foreign direct investment (FDI). However, in recent years, even though the Internet traverses every single country in the world, disparities in the quality of its infrastructure in developing and developed countries have become apparent. As such, developing countries face a dilemma about increasing Internet usage, which gives rise to both positive and negative network externalities. In the present study, “positive network externalities” mean that new Internet users can add value to the value of all other users. For instance, as more users share communication network costs, the cost per user of the network decreases. Also, as more users are connected, a larger base for prospective customers and suppliers is created. On the other hand, “negative network externalities” mean that the growing number of users increase the strain on existing connections, causing Internet congestion. The purpose of the present study is to examine how the Internet—a communication network—which is characterized by the presence of positive and negative network externalities affects the locational choice of FDI¹.

It is worth noting that developing countries have experienced a severe Internet congestion problem and that the lack of bandwidth² in these countries is one of its major causes. According to Sarrocco (2002, p. 23), “the availability of adequate and reliable bandwidth on international links, together with the quality of the local network, is one of the primary obstacles to universal connectivity³ of and within the less developed countries.”⁴ The report also points out that until a few years ago, few developing countries had more than 64 kbit/s, which means that an entire country had, on average, the same amount of bandwidth that a single user could access in Europe or the United States.

The present study mainly builds on the studies by Harris (1995), Choi (2003), and Freund and Weinhold (2004). In Harris (1995), the role of communication technology is to facilitate coordination within a firm, and between a firm and the suppliers of factor services. His general equilibrium model predicts that negative network externalities (i.e., Internet congestion) reduce the extent of market expansion. Choi (2003) finds a positive relationship between Internet development and FDI. Freund and Weinhold (2004) provide evidence of a positive relationship between Internet development and trade flows. This study distinguishes itself from these studies in three aspects. First, unlike Choi, and Freund and Weinhold, this study highlights the importance of positive and negative network externalities for determining the location of FDI. Second, this study extends Freund’s and Weinhold’s (2004) use of Cournot competition as a theoretical framework. This study applies a two-stage game in which firms not only compete with each other in terms of quantity but also compete to reduce coordination cost by using the Internet. Third, this

¹ This study draws heavily on Ko (2006).

² The width of the “digital route” is the bandwidth, for example, the maximum amount of information (bits/s) that can be transmitted along a channel (data transmission rate). This definition is taken from Sarrocco (2002).

³ “Connectivity” makes it possible for a user of an electronic network to communicate with other networks. If access to other networks is non-existent or too narrow, it is impossible to communicate with other countries regardless of the content.

⁴ This is a background paper for the workshop “Improving IP Connectivity in the Least Developing Countries” organized by the International Telecommunication Union. IP is an acronym for Internet protocols.

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