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On the enlargement of interconnected communications networks in the world economy☆

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Abstract

This note develops a multi-country model of trade that captures the role of country-specific communications network interconnectivity, which enhances trade in intermediate business services. The effect of an enlargement of the network, which implies an increase in the number of countries connected through networks, is examined. It is shown that, from the viewpoint of the connected countries, an enlargement of the interconnected networks has two conflicting effects: gains due to increased specialization and losses from a deterioration in the terms of trade.
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1. Introduction

Recently it has become increasingly clear that the rapidly growing connectivity of individuals and organizations achieved through improved communications networks (e.g.,

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the Internet, mobile telephone networks, and satellite communications systems) has allowed a consequent increase in the flow of business services (e.g., consulting, engineering, software development) across borders.[1] In accordance with this, it has also become increasingly recognized that sophisticated and well-connected communications networks are the 'competitive weapons' upon which the structure of comparative advantages will critically depend. One example is the strong showing of the U.S. economy, which is equipped with the most sophisticated communications infrastructure and thus easily connected to the other countries' communications networks.[2]

The seminal contribution on the role of communications networks is Harris (1998), which analyzes the impact of introducing networks on factor markets. Harris suggests that the improved networks create 'virtual mobility' for business services and thus enhance trade of those services. Along this line, Kikuchi (2003) explores another important aspect of communications networks — *interconnectivity* which allows network users in one country to communicate with ones in another country. The latter research shows that when the production of intermediate business services requires communication through a network, a comparative advantage in the good which uses business services is held by countries whose communications networks are connected to each other (referred to as *connected countries*).

While these studies have developed important insights into the role of communications networks in the world economy, the enlargement of interconnected communications networks (i.e., an increase in the number of the connected countries) has not been fully discussed. Since discussion about the network connection and enhancement of service trade in the world economy is stimulated by technological change and a pervasive deregulatory mood, it is important to understand the effects of network enlargement. This note extends the analysis of Kikuchi (2003) to the case of expanding interconnected communications networks. We demonstrate that, from the viewpoint of the connected countries, an enlargement of the interconnected communications networks has two conflicting effects: gains due to increased specialization and losses from a deterioration in the terms of trade. We also show that the connected countries might become worse off by accepting a newcomer, while the unconnected countries become unambiguously better off.

The structure of this paper is as follows. The next section presents the basic model. The nature of the trading equilibrium is considered in Section 3, followed by discussion about the enlargement of interconnected networks presented in Section 4. Concluding remarks are presented in Section 5.

2. The model

Consider a world economy consisting of a continuum of identical, small countries. Each country is endowed with L units of labor. There are two consumption goods, Good X and Good Y. The representative consumer has Cobb-Douglas preferences over Good X and Good Y, with share coefficients μ and $1 - \mu$. Both goods are sold in perfectly competitive

[1] See, e.g., the discussion in Cairncross (1997).

[2] Related to this, MacKie-Mason & Varian (1995, p. 1144) conjectured that a primary factor in determining the industry structure of digital communications networks will be ease of interconnection.

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