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Location of industry, market size, and imperfect international capital mobility

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ABSTRACT

This paper examines the impact of imperfect international capital mobility on an industrial location when increasing returns are present. When the international capital mobility is perfect, agglomeration of manufacturing firms progresses with a decline in transportation costs of manufactured goods, and full-agglomeration in a large-market country is observed at low transportation costs. In contrast, when international capital mobility is imperfect, agglomeration in a large-market country progresses with capital trade integration. When the transportation costs of manufactured goods are low, all capital holders in two countries invest their capital into a home market.

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1. Introduction

This paper examines the impact of imperfect international capital mobility on an industrial location when increasing returns are present. A Martin and Rogers (1995)-type two-country model is constructed in which the utility function is assumed to be a Pflueger (2004)-type, and the international capital investments incur some transaction costs.[1] Two types of international integration are considered in this study. The first is international manufactured-goods trade integration, and the second is international capital trade integration. In this paper, we show that both international goods market integration and international capital market integration have significant effects on industrial locations.

> Baldwin et al. (2003; Chapter 12) assert that international capital investments incur both natural costs and man-made costs.[2] They state that:Natural costs include linguistic, cultural, and climatic differences between a firm's host and home nations and coordination costs over distance. The list of manmade barriers is much longer. Nations, especially developing nations, have many policies that implicitly make it difficult for foreign firms to produce locally. For instance, foreign firms may require a large and uncertain number of permits in order to do business. Alternatively, they may be required to adhere strictly to local tax, labor, health, and environmental laws, while local firms may be allowed to skirt them. Foreign firms may also be systematically subjected to greater pressures to directly or indirectly pay off local officials. Finally, foreign firms may have much higher costs of acquiring information about local production conditions, legal systems, and local consumers. (pp. 286–287)

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[1] In Martin and Rogers (1995), the utility function is assumed to be Cobb–Douglas in form. However, Baldwin et al. (2003) showed that it is difficult to solve the model of imperfect capital mobility using a Cobb–Douglas utility function. In our model, we assume that the utility function is a Pflueger (2004)-type-quasi-linear. With this specification, the income effects of the consumption of manufactured goods disappear, and we obtain the analytical solutions presented in this paper.

[2] Baldwin et al. (2003; Chapter 12), investigate the effect of transaction costs of international capital investments, within the model of new economic geography. However, they construct their model using a Cobb–Douglas utility function, and their focus is to derive a "no-delocation band," which we derive in Appendix C. On the other hand, our focus, in this paper, is on the effect of transaction costs on the international distribution of manufacturing firms.

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Feldstein and Horioka (1980), in their highly influential paper, report empirical evidence suggesting that capital is quite immobile. de Menil (1999) presented strong evidence that the long-term capital markets of Europe remained highly segmented on the eve of the monetary union. He indicated that, in order to study real capital market integration, it is important to understand the influence of recent European integration on economic activities. Persson and Tabellini (1992) reported that recent European integration has caused higher international capital mobility. In their model, they assume that international capital investments incur some transaction costs, which decrease with European integration. They determined that the transaction costs of international capital investments refer to all the additional complications that foreign direct investments require, when compared to domestic investments. These costs include those associated with gathering extra information regarding legal issues or marketing, overcoming country-specific regulations, and hiring foreign employees. These studies showed that international capital mobility is imperfect. The purpose of this paper is to study the effect of imperfect capital mobility on the location of industry.

To investigate the effects of international transaction costs on international firms of distribution, we follow the spirit of studies that focus on international (inter-regional) firms of distribution, such as Baldwin et al. (2003), Fujita et al. (1999), Krugman (1991), Martin and Rogers (1995), and Ottaviano and van Ypersele (2005). In these studies, the relative market size between two countries plays an important role: a large-market country attracts more firms than a small-market country (market-size effect). This market-size effect becomes strong at low transportation costs.[3] In the case of low transportation costs, we can observe full-agglomeration in the large-market country. However, in these models, international capital mobility is assumed to be perfect.[4] In our model, we assume that, when capital holders invest in foreign manufacturing firms, these international capital investments incur some transaction costs. The transaction costs of international capital investments induce a capital holder to invest in domestic firms. We call this a home-market bias of capital investments.[5] While international capital investments incur some transaction costs, there are no international investments in the case of low transportation costs. This is because capital holders avoid international capital investments that incur transaction costs and the difference in the relative market size shrinks with a decline in the transportation costs of manufactured goods. Thus, in the case of low transportation costs, the home bias becomes strong, relative to the market-size effect. Our model then shows that agglomeration in a large-market country progresses because the home-market bias is weakened by capital trade integration. International goods trade integration alone may not cause agglomeration in a large-market country, while international capital trade integration does cause agglomeration in a large-market country.

We also present the welfare implications of the model. With capital outflow (inflow), the price index of differentiated manufactured goods in a country increases (decreases). Therefore, with capital outflow (inflow), welfare in the country decreases (increases) because the price index of manufactured goods increases (decreases). However, the per capita income of the country may increase (decrease) with capital outflow (inflow). The effects of capital outflow (inflow) are then ambiguous. In a case where agents in a large-market country have all the capital, the welfare of a small-market country always increases with capital outflow. However, the welfare of a large-market country decreases with capital outflow, if the price-index effect is large. In this case, the government of a large, developed country applies policies for the integration of a manufactured-goods market and the restriction of international capital trade, while the government of a small, developing country follows policies that restrict the manufactured-goods market and the integration of international capital trade.

Section 2 presents the model. In Section 3, we present a case of perfect international capital mobility. Section 4 investigates the case of imperfect capital mobility. Section 5 discusses the implication of the model and some welfare implications. Section 6 concludes.

2. The model

The economy consists of two countries, 1 and 2. There are two factors of production, capital and labor, and two sectors, manufacturing and agriculture. Labor is intersectorally mobile and internationally immobile. We assume that there is a constant amount of capital endowments in the world, k. Country 1 (2) has labor endowments l_1 (l_2) and capital holdings k_1 (k_2). Thus, $k=k_1+k_2$. As we will explain later, capital is used as a fixed investment by manufacturing firms. Capital is internationally mobile: the owners of capital in country 1 (2) can invest into firms in country 2 (1). National capital endowments are evenly owned by local workers, who inelastically supply one unit of labor. Thus, l_1 and l_2 are the number of workers residing in countries 1 and 2, respectively. Country 1 is assumed to be larger than country 2; that is, $l_1>l_2$.

Following Pflueger (2004), preferences are assumed to be identical across workers. Each household preference in country 1 is characterized by

$$U_1 = \alpha \ln C_{M1} + C_{A1}, \tag{1}$$

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[3] Davis (1998) showed that, if the transportation costs for homogenous goods are equal to the transportation costs of differentiated goods, the large-market country does not acquire more than a proportional share of manufacturing firms. Head, Mayer, and Ries (2002) state that, in a model that links variety to countries rather than to firms, there are cases in which a large-market country does not host more than a proportional share of firms. Yu (2005) showed that an endogenous expenditure share has important implications for international firms of distribution because, in addition to the relative market size, the different share of expenditures on differentiated goods across countries would also affect the distribution of the manufacturing industry.

[4] Martin and Rogers (1995) point out that international capital mobility is imperfect. They studied the cases of perfect immobility and perfect mobility of capital. On the other hand, we study the case of imperfect capital mobility.

[5] According to Martin and Rey (2000, 2004), if international investments incur transaction costs, there is a home-market bias of asset holdings.

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