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Effects of an anticipated expansion in international public goods on public capital accumulation

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Abstract

This paper presents a generic model to include public capital accumulation and the services of international public goods provided by a neighbor country. It examines the long-run and short-run responses of private and public capital accumulation in the home country to an anticipated increase in international public goods. It is found that the home economy in effect cuts its public capital stock, but keeps an unchanged private capital stock in the long run when a neighbor commits itself to expanding the stock of public goods in the future. The key factor determining the short-run responses of the home country is the extent to which it will match its government spending with a neighbor country's policy, which is associated with the relative difference between the marginal utility of consumption and that of home public capital affected by an increase in international public goods.

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1. Introduction

This paper presents a generic model in which the agent derives utility from the stock of public capital and international public goods.¹ Our purpose is to investigate both the long-run and short-run responses of private and government capital accumulation to an anticipated increase in international public goods.

There are several examples involving international public goods that provide the motivation for such a study. Better public health is the first case in point. Avian influenza is expected to become the pan-epidemic in the near future and will endanger millions of lives. Maintaining better public health by one country prevents migratory birds from infecting avian influenza. This is likely to benefit not only her own residents but also other surrounding countries' residents through lessening threats of the bird flu. Global environmental issues are a second case in point. Mainland China attempts to improve the quality of the environment by planting trees around the desert areas of North China, thereby reducing the frequency and duration of dust storms. The environmental improvement in China will influence how neighbor countries maintain their own environmental quality. Defense alliances constitute a third case in point, as exemplified by the development of the US – Japan Security Treaty as well as the Theatre Missile Defense (TMD) which may encompass Taiwan. This proposal has been pushed forward step by step by the U.S. in recent years. Faced with this situation, the Taiwanese anticipate that such defense alliances will enhance the security of Taiwan in the future.²

In order to capture the features exhibited in the above examples, this paper extends the Ramsey (1928)–Cass (1965)–Koopmans (1965) growth model of capital accumulation to include government capital accumulation.³ The home country derives positive utility from its consumption and government capital services, as well as from the services of international public goods provided by a neighbor country. When a neighbor country announces that it will increase its stock of public goods in the future, how should the home economy respond? The answer depends on the extent to which the home country seeks to match its public capital services with those of a neighbor country, which is in turn associated with the relative extent to which the marginal utility of consumption and that of public capital are affected by an increase in international public goods. More specifically, three different responses of the home country are exhibited. First, on a global basis the home country acts in good faith to increase its public capital at the time when a neighbor's policy is realized. To achieve this goal, the economy will in advance decrease its public capital,

¹Studies on the role of international public goods (for example, Ithori, 1996; Boadway and Hayashi, 1999) have received considerable attention in the public economics literature.

²Agents living in France derive utility from the skiing facilities in France as well as from those in Switzerland. An increase in the stock of Swiss resorts will affect the accumulation of capital and the growth of ski resorts in France. This example of European ski resorts was provided by an anonymous referee, to whom we are grateful.

³This generic structure is similar to the specification in the literature on competitive arms accumulation, for example, Deger and Sen (1984), Murdoch and Sandler (1984), Van der Ploeg and de Zeeuw (1990), Bruce (1990), and Zou (1995).

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