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# Trade induced convergence through human capital accumulation in credit-constrained economies

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## Abstract

This paper shows how a poor economy trapped in a low-income (or low human capital) steady state can converge to a high-income steady state by trading with a human capital abundant economy which is in the high-income steady state. Upon opening to trade, the economy that is trapped in a low-income steady state experiences an increase in the unskilled wage. This relaxes the constraints on investment in human capital and triggers a process of skill accumulation and intergenerational mobility, which in turn allows the low-income economy to eventually converge to the high-income steady state. During transition from autarky to free trade steady state, even the high-income economy experiences an increase in the stock of human capital, before returning to its autarky level of human capital in the post-trade steady state.

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## 1. Introduction

This paper examines the consequences of opening a poor, skill-scarce economy to international trade. It constructs a model in which closed economies converge to one of two qualitatively different steady states depending on their initial level of human capital: either a low-income steady state characterized by a small fraction of skilled workers, no intergenerational mobility and high income inequality, or a high-income steady state

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characterized by a large fraction of skilled workers, positive rates of intergenerational mobility and low income inequality. The existence of a low-income steady state—the poverty trap—is a result of credit constraints. In this setting, it is shown that an economy that is trapped in a low-income steady state experiences an increase in the unskilled wage upon trading with an economy in the high-income steady state. This, in turn, relaxes the constraints on investment in human capital and triggers a process of skill accumulation and intergenerational mobility in the low-income economy. The low-income economy eventually converges to the high-income steady-state. During transition from autarky to free trade steady state even the high-income economy experiences an increase in the stock of human capital, before returning to its autarky level of human capital in the post-trade steady state.

The result on convergence driven by accumulation of human capital is consistent with the recent experience of East Asian economies where spectacular growth has come mainly due to the rapid accumulation of both physical and human capital concomitant with an increasing importance of international trade (e.g. Young, 1995). The model can also explain why some countries fail to grow, while others with similar initial conditions are able to grow. Integration with the world economy plays a key role according to our results.<sup>1</sup>

Despite the large body of empirical evidence on trade-induced convergence,<sup>2</sup> the theoretical underpinnings seem less than satisfactory. Some earlier attempts to study the impact of trade on factor accumulation have extended the static Heckscher–Ohlin model of trade to a dynamic setting (e.g. Stiglitz, 1970; Findlay and Kierzkowski, 1983; Grossman and Helpman, 1991, chapter 5), finding that trade would not lead to a convergence, but rather a divergence in factor endowments of trading economies. However, these papers do not take into account the possibility that credit constraints would influence physical and human capital accumulation. An implication of credit constraints, shown recently in several papers, is that small differences in initial conditions across countries can lead to large differences in income levels.<sup>3</sup> These models generate what is called a club convergence hypothesis, according to which the per capita incomes of parametrically identical economies converge to one another, provided their initial conditions are similar in the sense of being in the basin of attraction of the same steady state equilibrium; otherwise they diverge (see Galor, 1996). We integrate these two literatures by constructing a dynamic Heckscher–Ohlin model where skill accumulation is subject to credit constraints. The closed economy set up in our model is a three-sector extension of the one sector model developed in Maoz and Moav (1999) to show how intergenerational mobility increases along the process of development. The value added in our paper comes from the extension to an open economy. In addition, while Maoz and Moav (1999) proceed with numerical examples, we derive a simple condition on

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<sup>1</sup> For example, Korea and Philippines had similar per capita incomes and other characteristics in 1960. However, Korea which adopted an open trade regime, had a per capita income three times that of Philippines in 1988.

<sup>2</sup> See Ben-David (1993, 1996), Sachs and Warner (1995).

<sup>3</sup> See, for example, Galor and Zeira (1993), Banerjee and Newman (1993), Aghion and Bolton (1997), Chiu (1998), Maoz and Moav (1999).

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