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Labor market frictions, investment and capital flows

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HIGHLIGHTS

- Economic theory predicts that high productivity growth leads to sharp increases in investment.
- These sharp increases are then followed by rapid declines.
- Such an investment behavior contrasts with the empirical evidence of a rather hump-shaped response.
- I present a two-country general equilibrium model with labor market frictions.
- This model generates the empirically observed investment behavior.

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ABSTRACT

The standard neoclassical model predicts that countries with higher productivity growth rates experience sharp increases in investment that are followed by rapid declines. This monotonic investment response contrasts with the empirical evidence that suggests a rather hump-shaped investment behavior. In this paper, I present a two-country general equilibrium model that generates hump-shaped investment responses from labor market frictions. In the model, I decompose investment into tradable and non-tradable components and show that an increase in the growth rate of a country results in scarcities of the non-tradable components which raise the relative price of investment goods. These scarcities occur because labor is unable to reallocate quickly between sectors within economies. This mechanism has two main implications. First, the induced movement in relative prices equates cross-country returns to capital and thus greatly reduces initial investment. Second, domestic saving now plays a more important role in financing investment, inducing a co-movement between these variables.

1. Introduction

In the standard neoclassical model capital moves from slow- to fast-growing countries. Gourinchas and Jeanne (2013), among others, show that the empirical relation between growth and capital inflows is, contrary to what the standard model predicts, negative. As a potential explanation, recent literature emphasizes the role of underdeveloped financial markets in fast-growing countries (e.g. Caballero et al. (2008), Mendoza et al. (2007) and Coeurdacier et al. (2015)). While financial market limitations may well explain why consumers in fast-growing developing countries cannot borrow against their future income, this argument does not restrict global firms, which do not rely on domestic financial markets to finance themselves, from making massive front-loaded investments in fast-growing countries. These investments should lead to sizable capital inflows which remain unobserved empirically. This paper discusses frictions in economic restructuring, i.e. slow reallocations of production factors within the economy, as a mechanism to generate investment responses to growth shocks that are consistent with the empirical evidence.

The main takeaway from my analysis is that economic restructuring results in a hump-shaped response of investment to economic growth. I illustrate this mechanism in a two-country general equilibrium model. The mechanism is the direct result of an interaction between two frictions: non-tradable components in investment goods and slow labor reallocations within economies. In my framework, an increase in the growth rate of a country raises its demand for both tradable and non-tradable investment components. Scarcities occur because the domestically produced non-tradable components are in short supply relative to the globally produced tradable components. Labor therefore strives to reallocate to the non-tradable sector. But since labor can reallocate only slowly between sectors, it takes time for the supply of non-tradable components to catch up. Meanwhile, the non-tradable good has a

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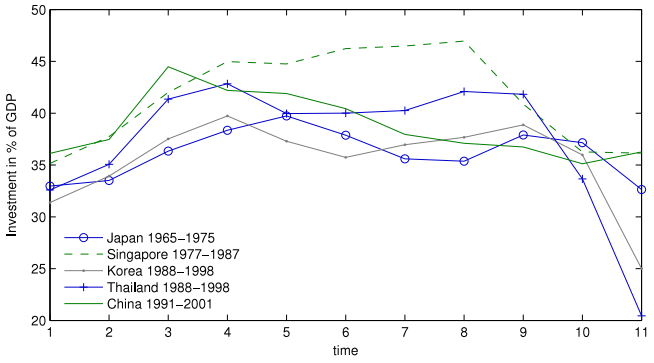

Fig. 1. Asian Investment-to-GDP ratios during economic take-off periods.
Source: Worldbank Development Indicators, The Economist.

temporarily higher price which depresses returns to capital and very much mutes initial investment. As a result we observe a hump-shaped investment response that contrasts with the large, front-loaded increase in investment and the sharp decline that follows it that the standard model predicts.

The intuition behind this mechanism is quite simple. Fast-growing developing countries, for instance, are initially scarce of human capital and structures (non-tradable investment goods). These scarcities deter global investors because the kinds of tradable investment goods that come from global firms (equipment, blueprints) complement non-tradable investment goods. Only when the supply of non-tradable investment goods improves is investment fruitful for a global firm. Because the supply of the non-tradable investment goods can only be gradually raised with growth and after some restructuring of the domestic economy, the investment profile is hump-shaped. This profile is, for example, coherent with the experience of Asian emerging market countries during economic take-off periods in Fig. 1.

The analytical framework of this paper is based on the large open economy stochastic growth setup of Backus et al. (1992) and Backus et al. (1994). I integrate into this framework stochastic shocks to the growth rate of productivity à la Aguiar and Gopinath (2007). The paper otherwise mainly relates to the literature on global imbalances and, more generally, the direction of capital flows. One branch of research approaches global imbalances from the perspective of financial market frictions. Examples of this approach are Caballero et al. (2008), Mendoza et al. (2007) and Coeurdacier et al. (2015). Another line of research emphasizes the return equalizing effects of goods markets frictions on capital flows. This paper differs from these approaches in that it places central emphasis on trade and labor market frictions. My argument is close to Obstfeld and Rogoff (2000) and Eaton et al. (2016) in emphasizing the role of trade costs. It differs from these papers in that it assigns a key role to output composition shifts. It finds that the interaction of labor market and trade frictions can explain why the massive initial investments that the standard theories predict remain empirically unobserved in fast-growing countries. Instead, it suggests an alternative investment response that is hump-shaped and more in line with the empirical behavior.

2. The model

Consider a world with two countries, Home (H) and Foreign (F), each populated by an infinitely lived, representative consumer. Each country produces a tradable (T) and a non-tradable (N) intermediate good with the same technology. The tradable good is traded between countries at zero cost. The representative consumes an aggregate good that may differ in its composition from an aggregate good that is used for investment in each country.

2.1. Firms

The representative firm in the perfectly competitive intermediate sector $n \in [T, N]$ in country $i \in [H, F]$ maximizes profits in every period t,

$$\pi^i_{n,t} = P^i_{n,t} Y^i_{n,t} - r^i_{n,t} K^i_{n,t} - w^i_{n,t} L^i_{n,t}, \tag{1}$$

where $r^i_{n,t}$ and $w^i_{n,t}$ denote the marginal return to capital and labor, respectively. Output of good n in country i, $Y^i_{n,t}$, is produced with capital, $K^i_{n,t}$, and labor, $L^i_{n,t}$ and is given by:

$$Y^i_{n,t} = [K^i_{n,t}]^\alpha [A^i_0 \Gamma^i_t L^i_{n,t}]^{1-\alpha} \tag{2}$$

where $\Gamma^i_t = e^{g^i_t} \Gamma^i_{t-1} = \prod_{s=0}^{t} e^{g^i_s}$; α is the share of capital and is identical across countries and sectors. The growth rate of productivity is g^i_t. Γ^i_t represents the history of growth since period 0 and follows a stochastic process,

$$g^i_t = (1 - \rho_g)\mu + \rho_g g^i_{t-1} + \epsilon^i_g, \tag{3}$$

where ϵ^i_g represents independently and identically distributed draws from a normal distribution with zero mean; μ is the long-term growth rate; ρ_g governs the persistence of the growth shock. The initial level of labor-productivity, A^i_0, can vary across countries. Firm n's choice of capital and labor maximize profits and imply the following returns:

$$r^i_{n,t} = \alpha P^i_{n,t} \frac{Y^i_{n,t}}{K^i_{n,t}}; \quad w^i_{n,t} = (1 - \alpha) P^i_{n,t} \frac{Y^i_{n,t}}{L^i_{n,t}}.$$

2.2. Consumers

The representative consumer in country i maximizes the discounted utility from future consumption,

$$U^i_0 = E_0 \sum_{t=0}^{\infty} \beta^t \frac{C^{1-\phi}_{i,t}}{1 - \phi} \tag{4}$$

where β denotes the discount factor and ϕ the inverse of the intertemporal elasticity of substitution. $C_{i,t}$ denotes the aggregate consumption in country i at time t. Intermediate goods are combined with an elasticity of substitution θ to form two final goods, which are used for consumption, C^i_t, and investment, I^i_t. The consumption good takes the form of

$$C^i_t = [\gamma^{\frac{1}{\theta}} [C^i_{T,t}]^{1-\frac{1}{\theta}} + (1 - \gamma)^{\frac{1}{\theta}} [C^i_{N,t}]^{1-\frac{1}{\theta}}]^{\frac{\theta}{\theta-1}}, \tag{5}$$

where γ is the share of the tradable good in aggregate consumption. The investment good differs from the consumption good in its share of the intermediate good γ_I and takes the form of

$$I^i_t = [\gamma_I^{\frac{1}{\theta}} [J^i_{T,t}]^{1-\frac{1}{\theta}} + (1 - \gamma_I)^{\frac{1}{\theta}} [J^i_{N,t}]^{1-\frac{1}{\theta}}]^{\frac{\theta}{\theta-1}}, \tag{6}$$

where γ_I is the share of the tradable good in aggregate consumption. Since the tradable intermediate good is traded without frictions between countries, the price of this good is the same in both countries. Let $P^i_{N,t}$ denote country i's price of the non-tradable good N in terms of the tradable good, T. Normalize the price of the tradable good $P_{T,t}$ to 1 so that country i's consumption and investment price indexes are, respectively:

$$P^i_{C,t} = \left[\gamma 1^{1-\theta} + (1 - \gamma)[P^i_{N,t}]^{1-\theta}\right]^{\frac{1}{1-\theta}} \tag{7}$$

$$P^i_{I,t} = \left[\gamma_I 1^{1-\theta} + (1 - \gamma_I)[P^i_{N,t}]^{1-\theta}\right]^{\frac{1}{1-\theta}}. \tag{8}$$