Imitation Trap and Catching-Up —A Benchmark Model Based on Horizontal Innovation Theory

WEI FENG

HEILONGJIANG UNIVERSITY

weifeng@hlju.edu.cn

CONTENTS

Introduction

- After World War II, The reason why some countries successfully achieve industrialization and economic catch-up while others stand still attracts attentions of many economists.

- Kaldor's (1961) famous conclude the features of general economic growth

- Jones and Romer (2009), re-doing the similar work, summed up the new stylized fact that national economic growth emerged in the last half century:

Introduction

- Two categories: successful catch-up and those failed even caught in stagnation.

- China can be regarded as the representative after newly industrialized countries that are expected to achieve economic catch-up and China's growth provides us with a good study object.

Introduction

- This article builds up an endogenous growth model for developing countries. By offering manufacturers in developing countries with imitation and innovation, the article analyzes the process of economic growth in developing countries in the view of technological progress, looks for in which the state they can achieve catch-up, and what kind of reasons make some countries to a standstill

I. Basic model -- imitation promotes technological development

There are three forms of goods in economy: final products, intermediate products and labor. The final product can be directly used for consumption.

Zhao Zhiyun (2007)finds that for China, introduction of equipment is the main introduction of technology

1. Behaviors of manufactures of final products

- Manufacturers in perfectly competitive market use labor and intermediate products to produce the final product in the form below:

$$Y_t = \left[\int_0^n x_{tj}^{\alpha} \cdot L dj \right]^{\frac{1}{\alpha}}, 0 < \alpha < 1 \qquad (1)$$

2. Behaviors of manufactures of intermediate products

The monopoly manufactures of intermediate products determine the price of intermediate products by addition process: px = Rt / a
We suppose it as 1 per unit:

$$\sum_{j=1}^{n} p_x^j x_j = n p_x x = P_y Y = 1$$

Thus, monopoly profits can be:

$$\pi_t = p_{xt} x_t - R_t K_t / n = \frac{1-\alpha}{n}$$

Let $v(t)$ be the sum of indefinite profit flow of operating firm during time t:

$$v(t) = \int_t^\infty e^{-[R(t)-R(t)]} \pi(t)dt \qquad (2)$$

3. Technical Research and Development Department Behavior

- When $v > R$, profit-oriented manufacturers will invest in purchasing more advanced technology equipment to promote technological progress,

- When $v \leq R$, manufacturers will not invest to imitate and all the savings of the whole society will be used to produce intermediate products.

4. Market Equilibrium

- Static equilibrium requires that when the total output in a specific form of capital resources equals the total demand. The number of product categories will obey the following dynamically evolutionary path:

$$\dot{n} = \begin{cases} \left(sn^{1-\alpha/\alpha} - 1 \right) \cdot \dfrac{1}{ap} & v > \bar{v} \\ \\ 0 & v \leq \bar{v} \end{cases} \qquad (3)$$

The equilibrium conditions for capital market require the following equation to be established:

$$\pi + \dot{v} = rv \Rightarrow \dot{v} = rv - \frac{1-\alpha}{n} \qquad (4)$$

4. Market Equilibrium
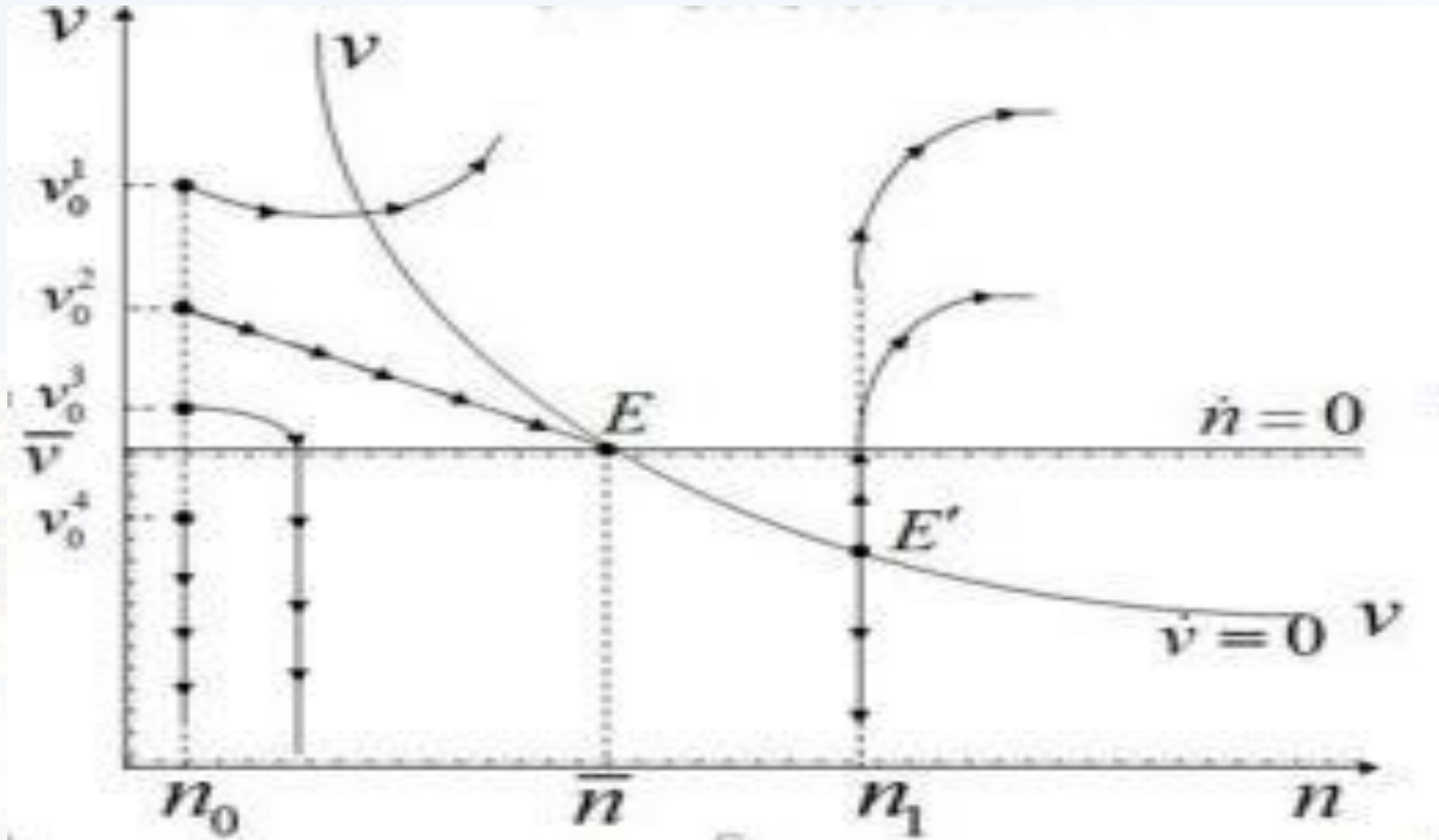
II. Extended model-- imitation and innovation can both promote the advancement of technology

The number of product categories regards $\hat{n} = 1/ab$ as the cut-off point, but there are

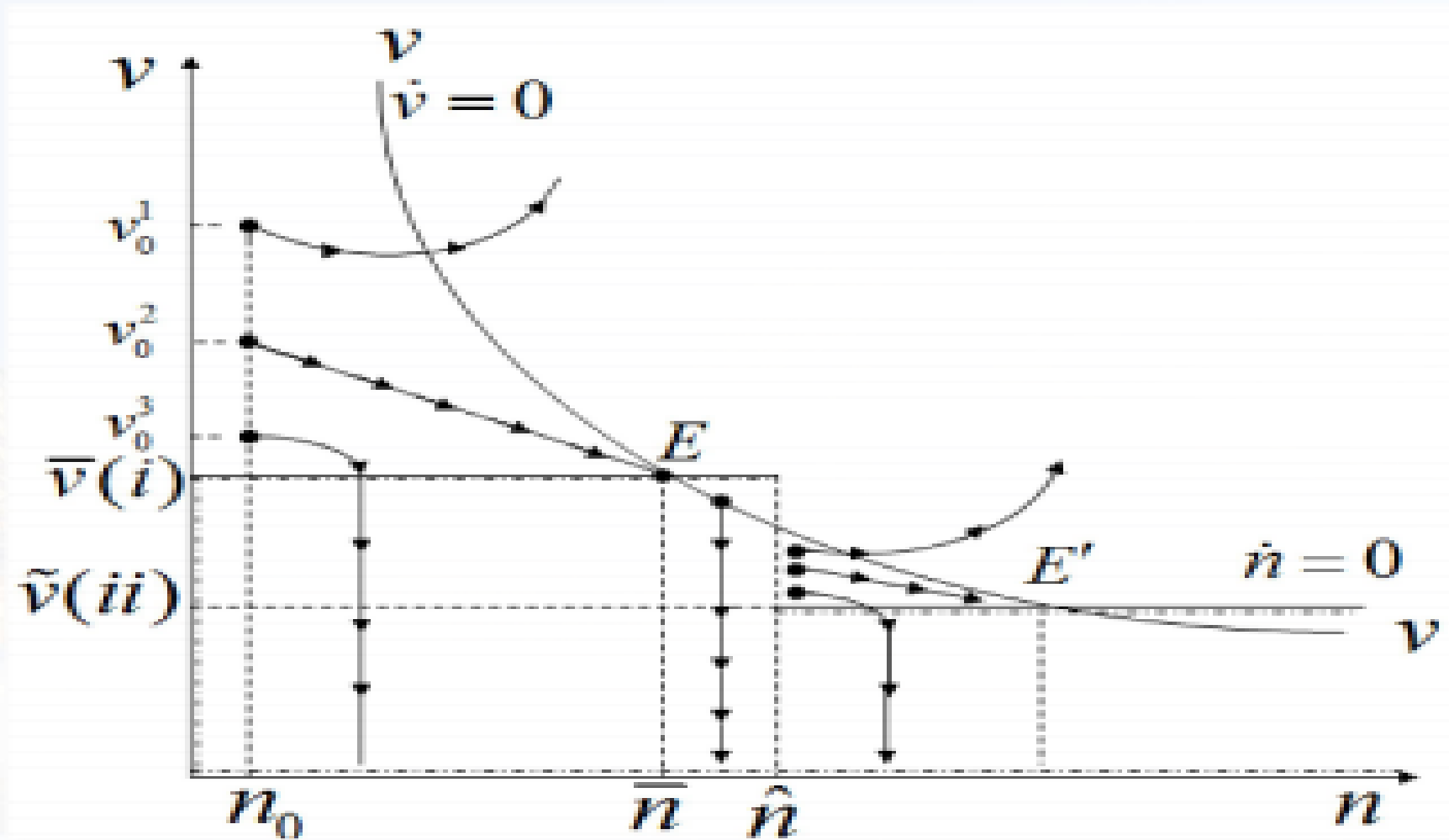different dynamic paths of evolution before and after the process:

$$\text{When } n < \hat{n},\ \dot{n} = \begin{cases} (sn^{1-\alpha/\alpha} - 1)\cdot\dfrac{1}{ap}, & if \quad v > \bar{v} \\[2mm] 0, & if \quad v \le \bar{v} \end{cases} \qquad (5)$$

$$\text{When } n > \hat{n},\ \dot{n} = \begin{cases} b(sn^{1/\alpha} - n)\cdot\dfrac{1}{p}, & if \quad v > \tilde{v} \\[2mm] 0, & if \quad v \le \tilde{v} \end{cases} \qquad (6)$$
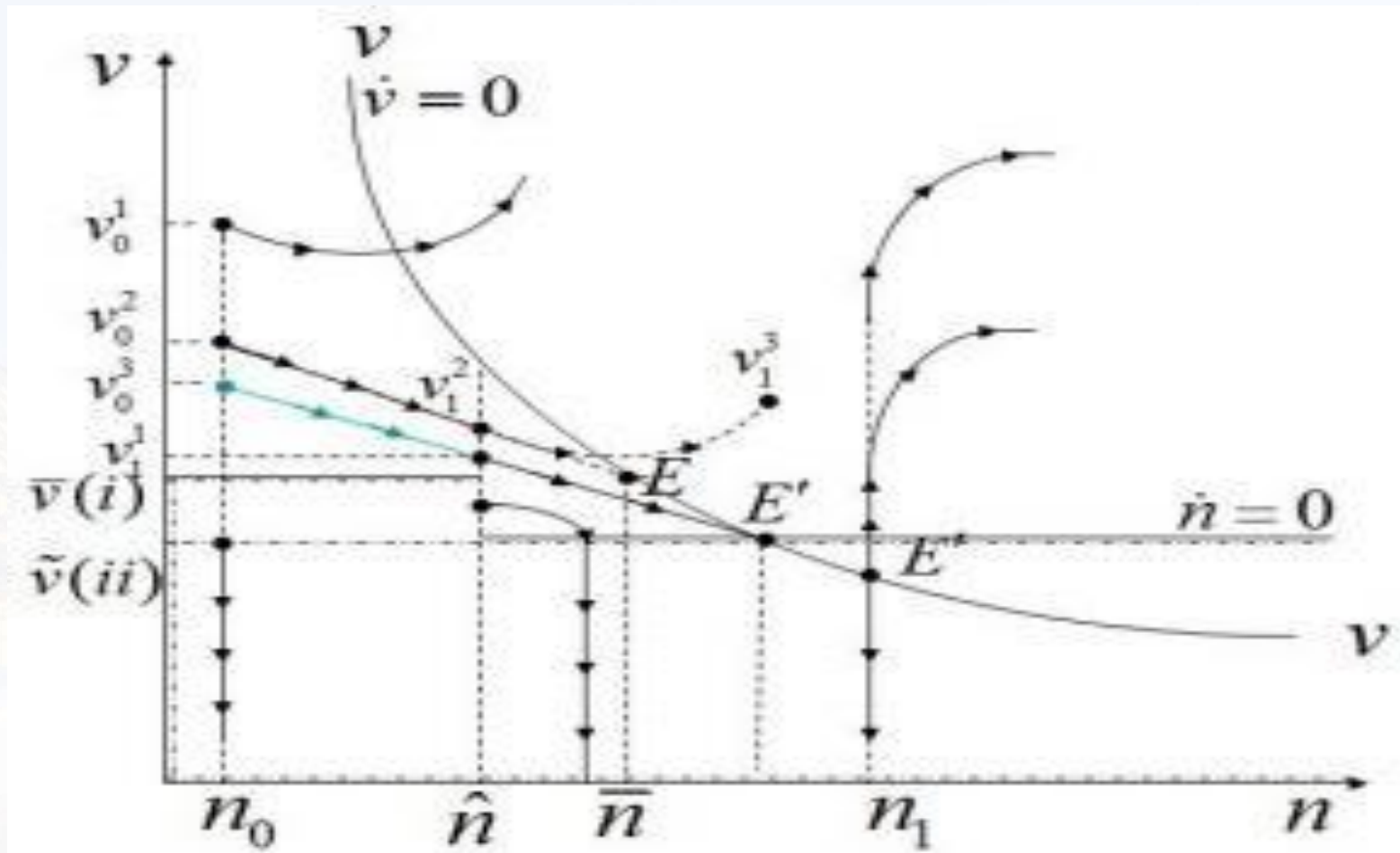
Together determine the piecewise function

$$v = \begin{cases} \overset{1-\tau}{v}, & if \quad n < \hat{n} \\[2mm] \tilde{v}, & if \quad n > \hat{n} \end{cases} \qquad (7)$$

Case 1: imitation trap

Case 2: Transition from imitation to innovation

A balanced comparative static analysis

the government can proceed innovation behavior through **tax incentives, financial subsidies and other fiscal policie**s

- Use some tax policies to support and encourage enterprises to increase investment in R&D efficiency.

- Use financial subsidies to encourage independent R&D, and the government can also directly purchase products of innovative enterprises.

- Reducing the price of capital will help developing countries to get rid of the imitation of the trap.

Conclusion

1.Countries in the imitation stage choose the low-cost industrialized road, which are inherent requirements of optimal growth path in the stage.

2. Distorted factor prices has stage optimality, but it is difficult to be sustained in the long term, and the growth path of conversion is imperative.

3. Shortcomings in the improved model and direction during the following research.

Спасибо экспертам.

WEI FENG

HEILONGJIANG UNIVERSITY

weifeng@hlju.edu.cn