

CHAPTER 1

INTRODUCTION

1.1 Statement of the Problem

There have been many studies trying to describe the dynamics of rich and poor economies in both theoretical and empirical researches. Early discussions on income convergence rely on models of closed economies, as well as many characteristics of economic growth, such as Solow-Swan model with exogenous saving rate, and Ramsey-Cass-Koopmans model with consumer optimization (and thus endogenous saving rate). These exogenous technological process growth theories, however, cannot capture an empirical evidence that some countries remain in poverty while developed countries continue to be rich (Deardorff, 1997). Recently, there are two different ways that can describe this fact. One is introducing human capital, knowledge spillovers, R&D activity, and the roles of increasing returns to scale into the growth model, known as endogenous growth theory. (See further in Barro and Sala-i-Martin, 1995.) The other is introducing international trade in order to be analyzed in the context of open economy.

A natural way to introduce international trade into neoclassical growth is by assuming the Heckscher-Ohlin static trade structure that comparative advantage is based on cross-country differences in relative factor endowment (Cuñat and Mafezzoli, 2004). The main result after trade is that the factor prices are equalized across countries if the countries' initial relative factor endowments stay within the cone of diversification. Thus, conditional convergence can be occurred in this circumstance. However, if there are more than one cone of diversification as studied in Deardorff (1997), or there are large differences in factor-endowment ratios as studied in Cuñat and Mafezzoli (2004), then factor price equalization does not hold. As a consequence, there exist multiple steady states in which country that has a low level of factor endowments will converge to a low steady-state capital-labor ratio and

hence remain poor. In this case, club convergence becomes the outcome of the development path.

The above discussions are based on the assumption that all countries face identical technological and behavioral parameters. However, some parameters are different across countries along with empirical data. Even though the factor price equalization induces the conditional convergence, there are still other factors that can cause the differences in income levels in the long run. Moreover, these factors, such as saving rate and population growth rate, can be the sources of growth miracles as studied in, for example, Ventura (1997) and Mountford (2006). International trade can eliminate the effect of diminishing returns on capital accumulation in contrast to the dynamics of closed economy.

According to table 1.1, it is evident that saving rates are different across countries and the least developed countries have the smallest rate compared to the rest of the world. Furthermore, the saving rates have also changed over time with a large increase in particular miracle economies such as Korea and Singapore. In addition, since the growth rates of population are also varying across countries, each country's dependency ratio, defined as the ratio of old to young, is different. As can be seen in Table 1.2, these old to young ratios in developed countries are higher than those in developing countries. Likewise, the ratios have been increasing substantially in developed countries, especially in Japan.

Table 1.1
 The Average Saving Rates in Selected Countries during the year 1960-2004
 (as a percentage of GDP)

Country	average 1970s	average 1980s	average 1990s	average 2000-4
Australia	27.07	24.23	21.77	22.22
Canada	24.48	23.84	21.04	25.02
United States	19.71	17.88	16.89	14.82
Argentina	27.20	22.36	17.03	22.02
Brazil	20.81	23.20	20.43	22.25
United Kingdom	20.11	18.42	16.23	14.19
France	26.10	20.19	20.14	20.66
Germany	23.27	19.78	22.69	21.84
Norway	31.14	31.97	29.31	34.45
Europe 12 Countries ^{1/}	25.92	22.91	24.43	25.46
Russian Federation	n.a.	34.73	31.48	33.94
Poland	n.a.	33.40	20.10	17.04
Turkey	12.24	16.38	20.45	19.09
China	30.46	34.74	39.49	38.09
Hong Kong, China	30.80	33.30	31.51	31.00
Japan	35.68	31.80	30.80	26.21
Korea, Rep.	22.12	30.87	36.30	32.63
Malaysia	27.10	30.25	40.66	43.64
Philippines	24.89	20.57	16.23	17.74
Singapore	28.61	41.67	48.26	46.33
Thailand	22.26	26.47	35.26	31.21
Vietnam	n.a.	5.11	16.02	28.08
Indonesia	24.97	31.59	30.17	28.26
India	17.34	20.04	22.06	21.63
Least developed countries	6.06	6.07	8.64	12.02

Source: World Development Indicator, 2006

1/ is the average of 12 Europe countries including Norway, Sweden, Netherlands, Denmark, Luxembourg, Belgium, France, Germany, Switzerland, Italy, Spain, and United Kingdom.

Table 1.2
The Average Ratio of Population Aged 65 and Over to Population Aged 15-64 during
the year 1960-2004 (in percentage terms)

Country	average 1960s	average 1970s	average 1980s	average 1990s	average 2000-4
Australia	13.66	13.70	15.38	17.31	18.43
Canada	12.87	13.02	14.94	17.55	18.64
United States	15.69	16.26	17.54	18.80	18.53
Argentina	9.69	11.92	13.98	15.30	16.00
Brazil	6.49	6.94	7.05	7.74	8.73
United Kingdom	18.72	22.09	23.45	24.59	24.26
France	19.46	21.44	20.50	23.44	25.28
Germany	19.16	23.05	21.81	22.58	25.58
Sweden	19.09	23.12	27.07	27.41	26.55
Europe 12 Countries ^{2/}	17.52	20.38	21.39	22.96	24.13
Russian Federation	10.49	13.06	14.60	17.07	18.51
Poland	10.85	14.16	14.90	16.59	17.98
Turkey	7.19	8.11	7.40	7.19	8.13
China	8.08	7.82	8.05	9.00	10.31
Hong Kong, China	5.70	8.13	10.64	13.45	15.70
Japan	9.30	11.55	14.98	20.63	27.03
Korea, Rep.	6.09	6.11	6.52	8.28	11.38
Malaysia	6.44	6.71	6.39	6.33	6.83
Philippines	5.78	5.79	5.86	5.74	6.13
Singapore	4.79	6.39	7.35	8.62	10.75
Thailand	5.67	5.85	5.82	7.08	9.33
Vietnam	8.81	9.41	9.01	8.75	8.69
Indonesia	5.70	5.90	6.19	6.80	7.85
India	6.28	6.77	7.18	7.60	8.19
Least developed countries	5.79	5.95	5.91	5.82	5.85

Source: World Development Indicator, 2006

2/ is the average of 12 Europe countries including Norway, Sweden, Netherlands, Denmark, Luxembourg, Belgium, France, Germany, Switzerland, Italy, Spain, and United Kingdom.

Thus, to describe the effects of both saving rates and old to young ratios, overlapping generations model is chosen. Although there have been many researches investigating the effects of population aging, for example, Brooks (2003), and Eakin, Lovely, and Tosun (2004), most of them do not concern international trade situation. Together with Heckscher-Ohlin trade structure, this study would be advantage to describe the interdependence of the economy in the present and may predict the evolution of the economy in the future.

1.2 Objectives of the study

The objectives of this study are

- 1) To construct the neoclassical growth model in overlapping generations with the environment of international trade.
- 2) To study the effect of changing in saving rate and population growth, as well as the dependency ratio over time on the capital accumulation and trade.

1.3 Scope of the study

The first part of this study uses small country in the integrated economy approach with two tradable intermediate goods and a single tradable final good in overlapping generations model to explain the convergence. This model is derivative from the setting of Ventura (1997), which the factor-price-equalization theorem of international trade is combined differently with the continuous-time Ramsey model of economic growth. The second part of this study uses two countries with similar two tradable intermediate goods and a single tradable final good in overlapping generations model. The latter model is derivative from Sayan (2004), and investigates effects of parameters on price equilibrium at the steady state with numerical examples.

1.4 Organization of the Study

This study is divided into five chapters.

Chapter 1: Introduction, this chapter consists of statement of problem, objective of the study, and scope of study

Chapter 2: Literature Review, this chapter discusses about the previous studies which related to this study. It is divided into Heckscher-Ohlin with Neoclassical Ramsey Growth Framework and Heckscher-Ohlin with Overlapping Generations Framework.

Chapter 3: Small Economy Model, this chapter is a self-contained study, consisting of four parts. The first part is the environment and setting up the model. The second part describes an integrated economy and its contribution to price clearing. The third part illustrates resource allocation in small open economy and results on trade aspects. Finally, the last part discusses about dynamic equilibrium and its analysis.

Chapter 4: Two-Economy Model, this chapter is also a self-contained study, comprised of three parts. The first part is the environment and setting up the model. The second part exhibits the equilibrium at the world market. The last part discusses about sensitivity analysis with numerical examples.

Chapter 5: Conclusion, this chapter summarizes and provides conclusion of the study and limitations and recommendations for further study.