

CHAPTER 5

CONCLUSION

This study aims to incorporate trade theory into an overlapping-generation model to see the general equilibrium model with the effect of trade. The details of the small economy model are described in chapter 3 while the details of the two-economy model are explained in chapter 4. However, most details are in mathematical explanation. Thus, in this chapter, it provides the whole conclusion and contribution of the study, as well as the recommendation for further study.

5.1 Summary and Conclusion

The first part of this study uses small countries in the integrated economy approach with two tradable intermediate goods and a single tradable final good in overlapping generations model to explain the convergence. The model is derivative from the setting of Ventura (1997), which the factor-price-equalization theorem of international trade is combined with the continuous-time Ramsey model of economic growth. On the other hand, the second part of the study uses the two-country economy with similar basic setting up, with derivative from the setting of Sayan(2004). However, model's solving and analysis are different in some details between these two models. Hence, the conclusion would be divided into small country model, two-country model, and comparisons of these two models.

5.1.1 Small Country Model

The assumption that the country's endowment is within the diversification range guarantees both intermediate goods are produced. Since wage and rental rates are determined by prices of intermediate goods at the world market, together with the country diversifying its production of intermediate goods, factor price equalization condition is ensured to be held. Although factor prices are equalized in each period, trade in intermediate goods still occurs in the long run dynamic Heckscher-Ohlin

model. That is, the range of the diversification changes accordingly to the over time change on the capital-labor ratio and the equilibrium prices of the integrated economy. As long as each country's capital-labor ratio is not equal to the world average level of capital-labor ratio, there exists an international trade in every steady state. Since the model assumes constant returns to scale on production and no factor intensity reversal, Stolper-Samuelson and Rybczynski is also satisfied.

Since both intermediate goods firms and final good firms take the world prices of intermediate goods as given, solving the small economy problem requires the integrated economy (or world average) approach. In addition, to easily solve for an equilibrium prices of the integrated economy, it needs each country's endowment being in the diversification cone to ensure the factor price equalization. Similarly, final good clearing also need final good demands and final good supplies from all over the world. As a result, all demands and supplies also depend on the world prices and eventually the world's capital-labor ratio.

Moreover, when the equilibrium prices are substituted into the allocations of labor and capital in that particular country, those allocations can be characterized by the country-to-world relative capital-labor ratio. That is, when comparing to the world's capital-labor ratio, countries that have a higher capital-labor ratio devote a larger fraction of capital and labor to the capital-intensive sector 2 whereas countries that have a lower capital-labor ratio allocate a larger fraction of capital and labor to the labor-intensive sector 1.

With the integrated economy approach, each country's equilibrium path of the capital stock and the steady state value depends on both its initial endowment of capital, and the world's equilibrium path of capital stock and its steady state. The dynamics of each country depend crucially on the saving rate and growth rate, as well as its initial conditions. A particular country that has high saving rate and low growth rate will move to a higher steady state than one that has low saving rate and high growth rate.

The relative capital-labor ratio of a particular country to the world capital-labor ratio is also the relative specific rate of saving and dependency ratio of that country to the world average's. The difference between the levels of income per worker in a given country in next period to the world's average depends on the

country's relative of a dependency ratio and saving rate to the world's relative of a dependency ratio and saving rate.

Furthermore, it can be concluded that an increase in saving rate will lead to an increase in next period relative capital-labor ratio in that country. Similarly, an increase in dependency ratio – in other words, smaller population growth rate – will lead to an increase in next period relative capital-labor ratio in that country. Thus, if saving rate and dependency ratio of any particular country increase, then that country would face a fast growing economy and speedy expansion of capital stock compared to the world's capital stock. In this case, country that is previously labor abundant, but recently increase its saving rate and dependency ratio can move faster and the difference of capital-labor ratio to the world's capital-labor ratio would lessen. It will lead to an increase in next period relative capital-labor ratio in that country. As a result, the production of intermediate good 2 that relatively more capital intensive will increase while the production of intermediate good 1 that relatively less capital intensive will decrease. In addition, the difference between the next period level of income per worker in a given country to the next period average world's income level will reduce if the less capital abundant country increase its saving rate and dependency ratio. Thus, the convergence can be occurred.

5.1.2 Two-country Model

All basic setting up in the two-country model is the same as those in the small country model. In this model, market clearing is done by only using demand and supply. Although the price of the two-country model before trade may be different (they take their domestic price as given), after trade occurred, all prices must be equated in order to clear market. The market clearing starts from the final good in order to find the final good demand which finally determine the final good supply. That is, the amount of final good produced depends on the final good demand, which is constituted by consumption and saving of each country. Then, consider the intermediate good clearing where the demand for intermediate good is conditional on final good needed to produce. Thus, price ratio of intermediate good is important to determine the whole economy. In this study, the price ratio at the steady state is based on price of intermediate good 1 since other prices are normalized to be one.

Unfortunately, there is no closed form solution for a steady state of price. The numerical examples are options to be considered. With the assumptions of all parameters based on the possibility on the real world, this study investigates four numerical examples subjected to the changes of important parameters. In the case of changing in factor intensive used in production of intermediate goods, when intermediate good 1 is much less capital intensive compared to intermediate good 2, the prices of intermediate good 1 become smaller. The other example on changing factor intensive of a final good provides that price of intermediate good 1 is quite high when final good is more labor intensive.

For the effects of country's specific parameters, the study investigates the changes in marginal propensity to save and the population growth. The former result is that when marginal propensity to save of country j decreases, which implies finally that capital stocks increase, it leads to an increase in the relative price (or the price of intermediate good 1). The latter result is that when the population growth rate of country j increases, which implies finally that labors increase – in other word, the dependency ratio decreases, it leads to a decrease in the relative price (or the price of intermediate good 1). Thus, in this two-country model, the convergence also depends on the effects of country's specific parameters as well.

5.1.3 Comparison between these two models

There are both similarities and differentiations between these two models. An obvious similarity is the model settings except for the number of countries in the world economy. Another similarity is the results on trade aspects. Since both models assume constant returns to scale on production and no factor intensity reversal, Stolper-Samuelson and Rybczynski is also satisfied. On the other hand, the differentiations are stated as follows.

First, the solving for equilibrium of these two models is different, and hence the characteristics of determinant variables are also distinctive. In the case of small country, the solving uses an integrated world which implies closed economy. All variables depend on the world capital-labor ratio – in other words, the world resource. In the case of two-country, each economy's characteristics can influence the

price of the world market since the prices are solved from market clearing between the two countries.

Second, in the context of convergence, it seems that the small country model can describe the real world situation as stated in the statement of problem rather than the two-country model. It is because that the dynamic path of the small country compared to the world economy can provide the linkage between the trade and growth in timeline through capital accumulation. On the contrary, the two-country model is analyzed only at the steady state of price ratio. Thus, it tries to explain the effects of country's specific parameters on price determination.

Therefore, these two models are evidently different in the solving methods of equilibrium and the results on explanation the economy.

5.1.4 Conclusion

The small economy model can describe the convergence in an open economy through trade and capital accumulation by comparable to the world resources and dynamics. Countries whose saving rate is increase overtime, such as Korea and Singapore, can catch up with the developed countries whose saving rate are almost constant during the time. However, if the rate does not increase high enough, there will be a club convergence, resulting in different steady states of income levels. In the real world that there is a rising trend in the dependency ratio, especially in developed countries such as Japan, this trend makes developed countries remain in high capital-labor ratio compared to the world average according to the model. Countries that face both increases in the saving rate and the dependency ratio contribute to very high economic growth. China is also in groups which the saving rate and the dependency ratio is increasing overtime. It still needs to see what would happen in the near future.

On the other hand, the two-economy can describe the interaction between country's specific parameters on price at steady state. Since the solving method is different from the small economy model, the results on explanation the world are also distinguished. With no closed form solution, numerical examples provide some useful explanation on effects of saving rate and population growth. These numerical examples provide additional describing factor-intensive parameters on prices at steady state.

5.2 Limitations of the study and Recommendation for further study

Even though the study depicts two different views of the world economy, as well as the dissimilar methods of market clearing in the small economy model and the two-country model, there are many assumptions on this study that can be considered to be the limitations of the study. The important assumption is that the study considers the economy only in the cone of diversification so that the factor price equalization is hold. However, there can be the economy outside the diversification cone in the real world. To do further study, it should be investigated more advanced in the case of outside the cone of diversification.

Moreover, the study induces the issues of trade in intermediate goods to grasp the real world situation on increasing trade in intra-industries trade. Nevertheless, it may not depict the apparently picture in the real world that there are more than one final good that can be traded concurrently with intermediate goods.

Finally, the study of small countries does not exhibit the simulation which can illustrate more clearly on the dynamic of the economy. Moreover, if the model of two-economy can be set up to find a closed equation at the steady state, it can also be investigated in simulation economy.