Institutional Foundations for Economic Growth

Choi, Seung Mo

2010

Institutional Foundations for Economic Growth[1]

(Keynote Speech, North East Asian Forum)

October 20, 2010

Seung Mo Choi[2]

Abstract

A low-income economy tends to start catching up to advanced economies by adopting available useful knowledge from foreign economies after it conducts a certain form of institutional change. I argue that this institutional change is the one which enforces international interactions mainly by promoting manufacturing exports. It is not necessarily just to open up the economy to international trade. The Northeast Asian economies need to further promote the diffusions of knowledge, but as they further catch up other advanced economies, it will be increasingly important to construct an institution that protects patents, intellectual properties, and other useful ideas, so that research and development activities are encouraged as a fundamental source of economic growth. An international market to trade the knowledge needs to be further developed.

Keywords: Institution, Growth, International trade

---

[1] This article is prepared for a keynote speech at Northeast Asia Forum 2010, Liaoning University, Shenyang, Liaoning, P.R. China.

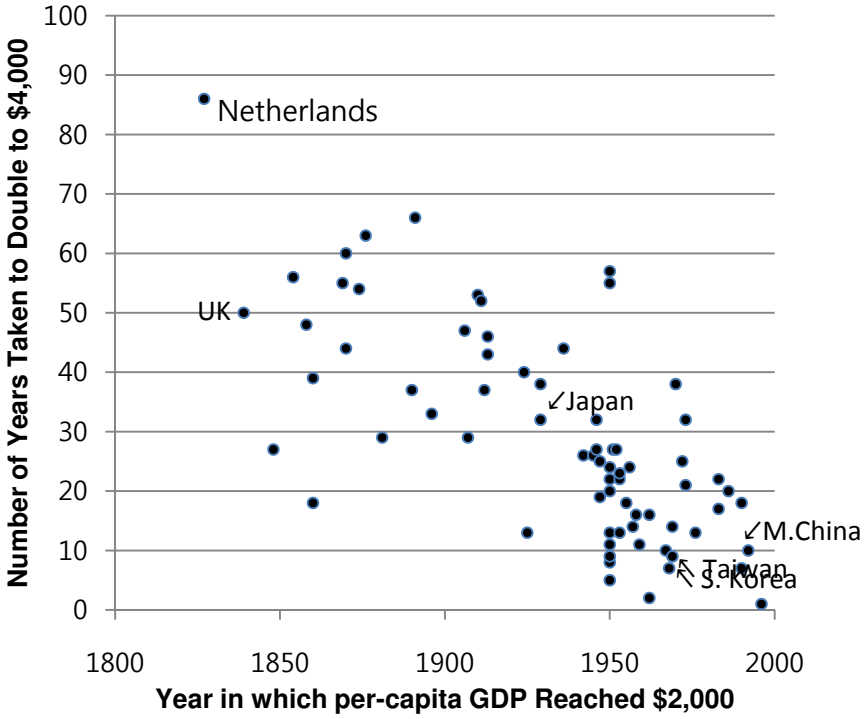
[2] School of Economic Sciences, Washington State University, PO Box 646210, Hulbert 101, Pullman, WA, 99164-6210, U.S.A. Email: choism@wsu.edu. Website: http://www.ses.wsu.edu/People/choi.htm.

1. Importance of Economic Institutions

The theme of this year's Northeast Asian Forum is the political, legal, economic and civil institutions for Asia's long-term prosperity. This article focuses on an economic institution. I will take the term "economic institution" as a broad concept of any legal or political systems that determine how economic activities are conducted. In this section, I emphasize the importance of economic institutions by discussing cross-country data. I argue that once an economy experiences a certain form of institutional change, it starts to catch up advanced economies by adopting available useful knowledge from foreign economies. In Section 2, I take it a step further to show that some of the most critical institutions are those that enforce international interactions, especially in promoting manufacturing exports. In Section 3, I provide the implications of the discussions so far on the Northeast Asian economies.

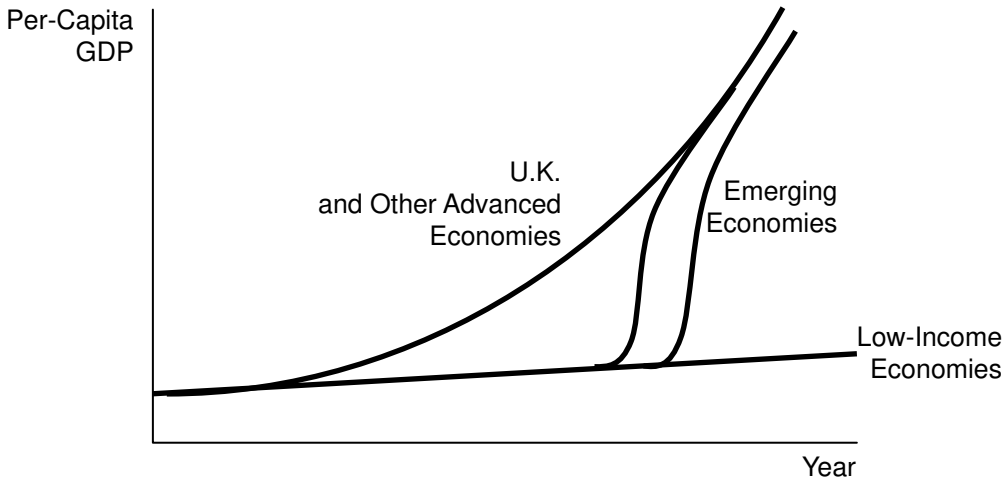
Figure 1 is a duplicate of Figure 2.3 in Parente and Prescott (2000, p. 22), extended to more recent observations based on the data provided by Angus Maddison. The horizontal axis shows the cross-country observations on the initial years in which per-capita GDPs first reached $2,000 in 1990 constant purchasing-power-parity dollars. The vertical axis shows the numbers of years taken for these per-capita GDPs to double to $4,000. For example, the United Kingdom (U.K.) is one of the first economies reached $2,000, in around year 1840, and it took about 50 years to double it. Among the Northeast Asian economies, Japan reached $2,000 in around 1930, and doubled it in 32 years. South Korea or Taiwan reached $2,000 in around 1970, and doubled it in about 10 years. The Mainland China reached $2,000 in around 1990, and also doubled it in about 10 years. An obvious trend from the figure is that this doubling period has decreased over time.

Figure 1: Per-Capita GDP Doubling Years ($2,000→$4,000)



This implies that the evolutions of per-capita GDPs can be depicted as in Figure 2. Advanced economies started their engines first. The economies such as the U.K. and Netherlands started to grow first, and the data suggest that their growth of per-capita GDPs was relatively stable at around 2% per year since then. Other economies hadn't started their engines yet, but after a while, some economies began to emerge. They are late starters compared to the U.K. and Netherlands, but once their engines started, they tend to rapidly catch up the advanced economies, suggesting that there is a convergence of per-capita GDPs in this club. After such catch-up was completed, these emerging economies tended to grow with advanced economies at relatively similar speeds.

Figure 2: Stylized Growth of Per-Capita GDP



The descriptions so far suggest two important observations on economic growth. First, the main source of economic growth for low-income economies is potentially to use the knowledge that is already available to other advanced economies. The term "knowledge" here includes all ideas used to produce goods and services, including the technologies, know-how, patents, etc. As an economy starts the engine in a later year, there is a further gap from the advanced economies, and hence, there is a greater scope of knowledge acquisition from them. This explains why the doubling time has decreased over time. I cannot think of other explanations that are consistent with the observations in Figure 1 and Figure 2. The interpretation so far is consistent with Parente and Prescott (2000) and Lucas (2009).

Second, once the engine starts, and hence an emerging economy reaches $2,000 in per-capita GDP, it continues to grow following a relatively common path that other emerging economies also followed. This is important for our Forum. To rephrase, there is an *institutional change* which starts the engine. Once this institutional change is made, then the economy tends to catch up with advanced economies. Of course, it would also possible that even after the engine has started, the economy can improve its engine (or institution) to speed up its growth. An obvious question is what sort of the institutional change starts and improves the engine, which I discuss in Section 2.

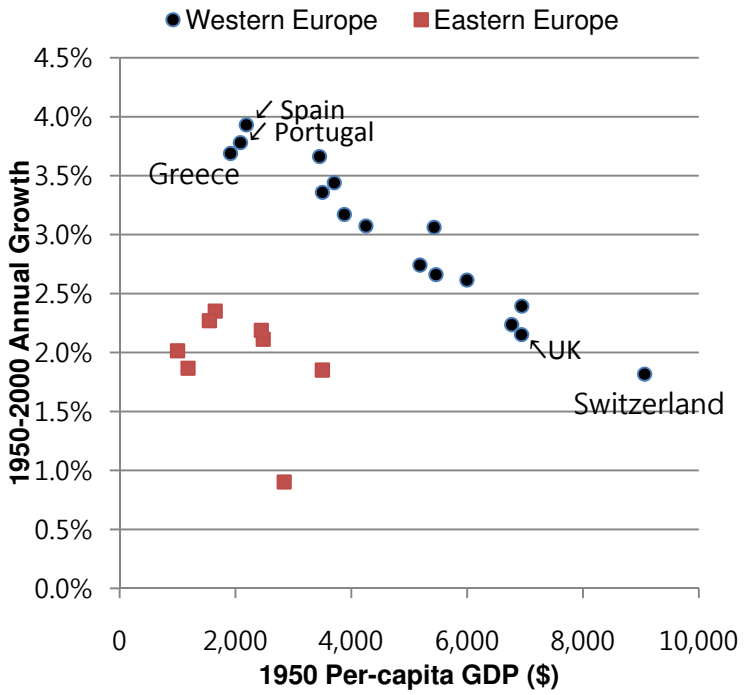
2. Which Institution Starts the Engine of Economic Growth?

One can approach this question by observing the differences between the economies that have successfully started and maintained the engine and the economies that have not done so. Figure 3 is an extended version of a figure reported in Lucas (2009). It compares the initial per-capita GDPs in 1950 and the average annual growth of per-capita GDPs in 1950-2000 for selected economies. The data are provided by Angus Maddison. Part (A) compares Western European and Eastern European economies. A notable feature is that Western European economies have higher growth rates. More importantly, their per-capita GDPs converged. For example, Switzerland and the U.K. already had high per-capita GDPs in 1950, but since then, they grew relatively slowly compared to other Western European economies. This is because in 1950, Switzerland and the U.K. already used much of the knowledge available at that time, and hence, it is more challenging to continue to find new knowledge to improve productivity. On the other hand, Greece, Portugal and Spain initially had low per-capita GDPs, but since then, they grew faster. This is because they interacted with other Western European economies to learn the knowledge, which is easier than discovering it on their own. These explanations are also consistent with Figure 1 and Figure 2.

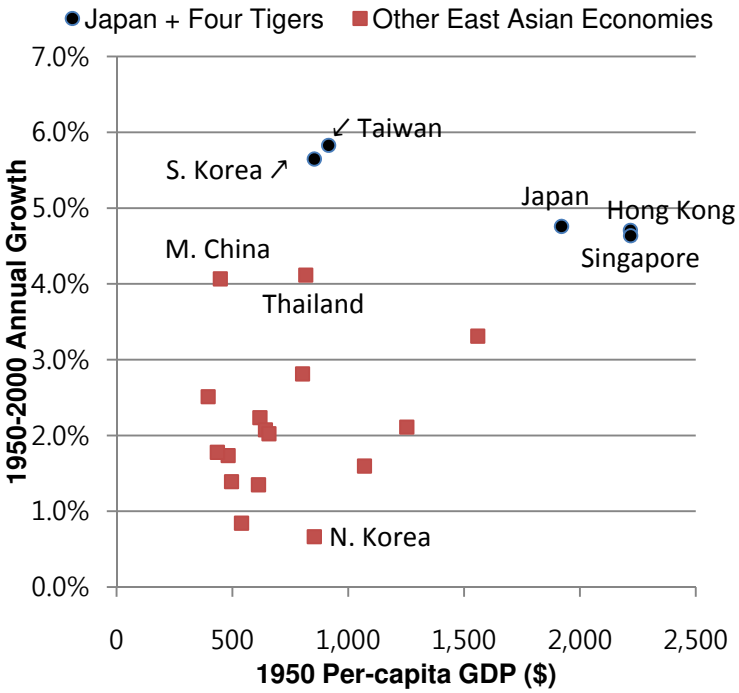
Part (B) is a counterpart figure for East Asian economies, and the interpretations are similar. One can observe a convergence of per-capita GDPs across Japan and the Four Asian Tigers – Hong Kong, Singapore, Taiwan and South Korea. The growth of per-capita GDPs in those economies is also higher than others.

Figure 3: 1950 Per-Capita Income vs. 1950-2000 Annual Growth of Per-Capita Income

(A) Europe



(B) East Asia



The discussions so far suggest that there are institutional differences between Western European and Eastern European economies, and between Japan plus the Four Asian Tigers and remaining East Asian economies, during the period of 1950-2000. The institutions of Western European economies and of Japan plus the Four Asian Tigers are likely to have facilitated international knowledge flows into them. A common feature of the institutions can be to encourage a participation in international trade on the basis of private competition. For example, Western European economies encouraged international trade, which eventually evolved into the European Union. Japan and the Four Asian Tigers, and the Mainland China since the 1980s as well, emphasized participation in international trade. A positive relationship between international trade and economic growth has been empirically documented by numerous studies including Sachs and Warner (1995), Frankel and Romer (1999), and Alcalá and Ciccone (2004).

Why is international trade related to economic growth? A hypothesis is that the firms need to improve their productivity in order to survive in global markets which are more competitive. Alternatively, it may be that low-income economies are now able to import capital goods (such as electronic equipments), or purchase patents, trademarks, etc. from other economies. It may be that low-income economies can send students and trainees to advanced economies to learn the knowledge accumulated there, which is partly made possible by deeper international interactions encouraged by trade.

I argue that the economic institution which makes the convergence of per-capita GDPs shown in Figure 3 possible is not necessarily just to open the domestic market to foreigners, but to promote manufacturing exports more effectively. It is *exports* rather than imports since the global market provides a bigger league of competition in which domestic firms can improve the productivity in order to survive there. It is *manufacturing* rather than agriculture since manufacturing provides a greater scope of learning by doing -- improvements in productivity arising from producing more. The automobile industry of South Korea is an interesting example of the causality from manufacturing exports to growth. South Korea has become the fourth largest producer of automobiles as well as the sixth largest exporter, but its domestic market in automobiles had been protected for decades. South Korea's productivity growth in automobiles is likely to

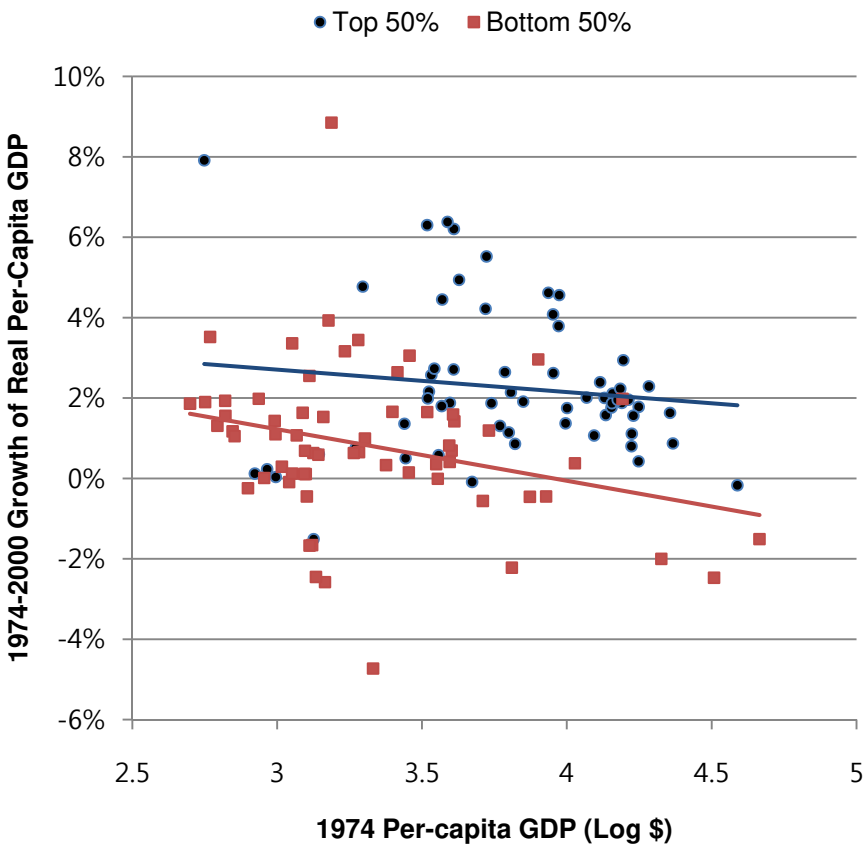
have been linked to a competition in the global market, not in its domestic market.

Do the cross-country data support this causality from manufacturing exports to growth? Figure 4 is taken from Choi, Kim and Ma (2010). It plots manufacturing exports as shares of GDPs, and the real per-capita GDP growth rates for 128 economies in the period of 1975-2000. The trade data are obtained from the United Nations (UN) Commodity Trade Statistics Database ("Comtrade").[3] The GDP data are provided by Angus Maddison. The figure suggests a positive relationship between manufacturing exports and per-capita GDP growth. Figure 5 compares per-capita GDP growth in 1975-2000 of two groups of economies, each consisting of 64 economies, with higher and lower shares of manufacturing exports out of GDP. It shows that the economies with higher shares of manufacturing exports tend to grow faster, controlling for initial per-capita GDPs. Hence, Figure 4 and Figure 5 are consistent with the causality of interest.

Figure 4: Manufacturing Exports as Shares of GDPs and Per-Capita GDP Growth, 1975-2000

[3] The data for manufacturing exports and imports are obtained by aggregating Standard International Trade Classification (SITC) Revision 2 codes starting from 5 to 8, and a half of the one starting from 9. Data do not include Russia and Germany due to historical reasons.

Figure 5: Top Half vs. Bottom Half, 1975-2000 Manufacturing Exports as Shares of GDPs



While Figure 4 and Figure 5 illustrate the correlations, the causality can be further supported by a more sophisticated statistical method called an instrumental-variable (IV) regression. Choi, Kim and Ma (2010) test whether the shares of five trade variables, (i) total trade, (ii) manufacturing exports, (iii) manufacturing imports, (iv) agricultural exports and (v) agricultural imports, as a share of GDP, cause per-capita GDP growth with the following regression equation:

$$(\text{ygrow})_i = \alpha + (\text{trade})_i\beta_1 + (\text{iqual})_i\beta_2 + (\text{yini})_i\beta_3 + L_i\beta_4 + \varepsilon_i,$$

for all economy i, where $(\text{ygrow})_i$ is the annual growth (%) of per-capita GDP over 1975-2000, and $(\text{trade})_i$ is the logarithm of one of the five trade shares over 1975-2000. Here, $(\text{iqual})_i$ is a proxy of "traditional" institutional quality which is to be explained in detail below. Also, $(\text{yini})_i$ is the logarithm of

year-1974 level of per-capita real GDP, and L_i is the logarithm of population on average of the period 1975-2000. Assume ε_i is independent and identically distributed with $N(0, \sigma^2)$.

In this equation, a proxy for "traditional" institutional quality is included as an explanatory variable. This is to control for the effects of other components of institutions traditionally accepted in the literature, reflecting the components such as government stability, internal conflict, external conflict, corruption, militarized politics, protection from religious tensions, law and order, protection from ethnic tensions, democratic accountability, bureaucratic quality, etc., in order to study the effect of international trade more clearly. Following Alfaro, Kalemli-Ozcan and Volosovych (2005), this proxy is constructed as the sum of several indices using the dataset provided by the International Country Risk Guide (ICRG). This proxy takes a value from 0 to 76 for each economy, where a higher score means lower risk. Notice that the proxy does not include a variable directly related to international trade.

Now I discuss the instrumental variables. To control for the endogeneity regarding trade, I use the logarithm of trade share out of GDP predicted by the gravity equation, as suggested by Frankel and Romer (1996).[4] This IV is correlated with all five trade shares. To control for the endogeneity regarding institutional quality, I use the distance from equator as an absolute value of the latitude, as in Hall and Jones (1999). Historically, this variable is correlated with institutional quality. It is less likely to be directly related to the growth rate. The data on distance from equator are obtained from Robert Hall.

Table 1 summarizes the estimation results for OLS (ordinary-least-squares) and IV methods. First, the institution proxy is significant in most cases. Our concern is whether an additional dimension of institution, which is a system promoting international trade, is important. The slope for total trade is significant at 5% level for the OLS method, but not for the IV method. Manufacturing exports are significant at 5% level for

[4] The dependent variable is the logarithm of bilateral trade between economies. Explanatory variables are geographic or populational, including logarithm of distance, logarithm of population, dummy variable indicating whether two economies use a common language, dummy variable indicating whether two economies share the border, logarithm of the sum of populations, and a dummy variable indicating the number of economies landlocked. The data in 1985 and 1993 are used for estimation.

both methods. The result implies that as the share of manufacturing exports increases by 20% (e.g, from 5% of GDP to 6%), annual per-capita GDP growth is raised by about 0.15% points (e.g, from 2.0% to 2.15%). Manufacturing imports are significant at 5% level for the OLS method, but not for the IV method. The slopes for agricultural exports and imports are negative or insignificant. The result also finds the convergence of per-capita GDPs across economies. The population size is also often significant at 5% level.

Table 1: OLS and IV Regression Results

(Dependent variable is annual per-capital GDP growth, 1975-2000. All trade variables as shares of GDPs.)

	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Total Trade	1.12** (0.24)	0.33 (0.37)								
Manufacturing Exports			0.81** (0.12)	0.63** (0.15)						
Manufacturing Imports					1.15** (0.23)	0.45 (0.31)				
Agricultural Exports							-0.08 (0.20)	-0.85** (0.22)		
Agricultural Imports									0.93** (0.20)	0.42 (0.24)
Institutional Quality	3.59** (1.04)	3.88** (1.44)	1.87* (1.01)	2.24** (1.12)	3.10** (1.03)	3.62** (1.16)	3.96** (1.17)	2.88** (1.10)	2.82** (1.06)	3.44** (1.17)
Initial Per-Capita GDP	-0.78** (0.19)	-0.35** (0.19)	-0.78** (0.16)	-0.44** (0.17)	-0.69** (0.17)	-0.31 (0.18)	-0.32 (0.20)	-0.33 (0.17)	-0.51** (0.17)	-0.26 (0.19)
Population	0.35** (0.11)	0.27 (0.17)	0.19** (0.09)	0.30** (0.10)	0.38** (0.11)	0.32** (0.16)	0.12 (0.12)	-0.23 (0.14)	0.36** (0.10)	0.32** (0.14)
R^2	0.28	0.15	0.39	0.27	0.30	0.16	0.15	0.24	0.27	0.17
N	118									

Note: ** = Significant at 5% level. * = 10%.

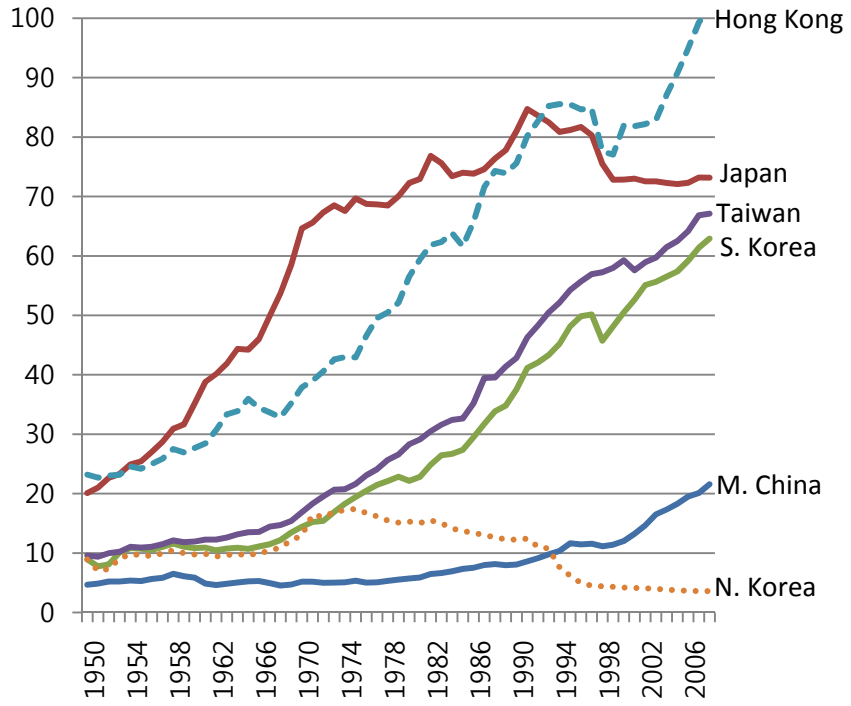
To conclude, an institution that promotes manufacturing exports tends to facilitate economic growth. This result is also consistent with Hausmann, Hwang and Rodrik (2007). This institution helps the firms to compete with foreign firms so that they can improve their productivity by learning by doing and/or by adopting the knowledge available in foreign economies. Again, this does not necessarily imply that an economy can just open up to international trade to grow faster, as shown in Table 1. For example, Young (1991) predicts that low-income economies continue to specialize in low-quality products which have less

scope of learning by doing. Hence, they are likely to *lose* from opening to international trade. An important aspect of institutional building for economic growth is to promote international competition, but domestic firms appear to need to be protected to some degree, at least at the beginning of this institutional building. I believe that South Korea's automobile industry will not have been successful as now if its domestic market had been widely open to other automobile firms from Japan, the United States (U.S.), Germany, etc.

3. Implications on North East Asia

What do the discussions so far imply on the North East Asia? Figure 6 provides the paths of per-capita GDPs of North East Asian economies, while the U.S. per-capita GDP of each year is normalized to 100 for comparison purposes. It is widely accepted that the U.S. economy is relatively stable, growing its per-capita GDP about 2% per year on average after the World War II. In other words, this figure shows how North East Asian economies have caught up the U.S. economy in living standards.

Figure 6: Per-Capita GDPs of North East Asian Economies (US=100)



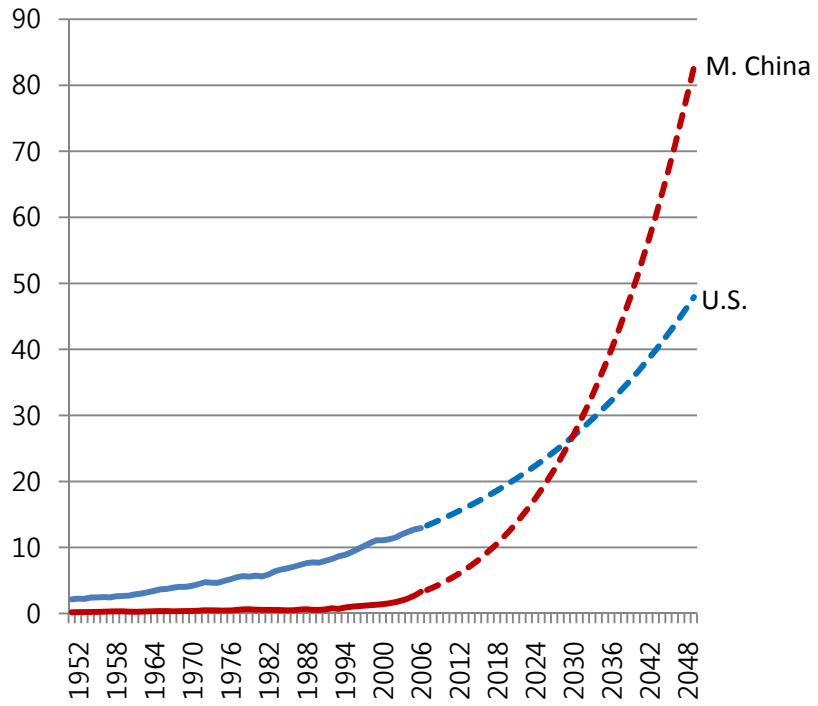
Hong Kong's per-capita GDP has fully caught up the U.S. level although there were some fluctuations in 1990s. It is possible that Hong Kong might grow even further, in which case its living standard will be higher than the U.S. level. Japan grew up to about 75% of the U.S. per-capita GDP, but Japan's per-capita GDP relative to the U.S. decreased since around 1990. At this point, it is not clear from which year Japan will further catch up the U.S. In fact, Taiwan and South Korea have almost caught up with Japan's per-capita, though both Taiwan and South Korea's per-capita GDPs were only about 10% of the U.S. level in 1950. As of 2008, it is about 60-70%. The four economies that we considered so far, Hong Kong, Japan, Taiwan and South Korea, are now considered developed economies by many standards. They already have relatively preferred economic institutions at least for economic growth.

The per-capita GDP of Mainland China was roughly 5% of the U.S. level from 1950 to 1980. After that, it appears that China successfully conducted certain institutional changes, perhaps including a system which enabled more active participation in international trade. As of 2008, the per-capita GDP is about 25% of the U.S. level. It is reasonable to assume that Mainland China will continue to catch up the U.S. level, which will affect the global economy considering its large population. Here, I conduct a brief computation based on a simple model of economic growth. (See, for example, Lucas (2009), for further discussions on this model.) I assume $Y_{1t}/L_{1t} = A_{1t}$ and $A_{1,t+1} = (1 + g_A)A_{1t}$ for the U.S., where a subscript "1" implies the U.S., Y_{1t} is the total GDP, L_{1t} is the population, A_{1t} is the productivity which is also interpreted as per-capita GDP, all of which are for year t, and g_A is a constant. For Mainland China, I reflect its catch-up property by assuming $Y_{2t}/L_{2t} = A_{2t}$ and $A_{2,t+1} = (1 + g_A)(A_{1t})^{\theta}(A_{2t})^{1-\theta}$, where a subscript "2" implies Mainland China, Y_{2t}, L_{2t} and A_{2t} are total GDP, population, and productivity, respectively. Here, θ is a parameter representing the convergence speed of Mainland China to the U.S. According to this model, Mainland China grows faster than the U.S., and then the growth rate declines as the gap between the two economies shrinks. Eventually, per-capita GDPs will converge, after which the two economies grow together at the same rates. This description is consistent with the experience of other economies as illustrated in Figure 2. I further assume that the population grows at constant rates in each economy, so that

$L_{1,t+1} = (1 + g_1)L_{1t}$ and $L_{2,t+1} = (1 + g_2)L_{2t}$, where g_1 and g_2 are population growth rates.

To understand the implication of this quantifiable model, I use the GDP and population data from the Penn World Table. When one considers the size of the economy, the market exchange rate (rather than the purchasing power parity) appears to be considered as a more relevant way to transform the currency. Hence, for Y_{1t} and Y_{2t}, I use the GDPs under the market exchange rates. The data from 1960-2008 imply that the U.S. per-capita GDP growth is about 2% per year, and hence, I assume $g_A = 0.02$. Then, a parameter value of $\theta = 0.02$ can match the observed values and the values predicted by this model of Mainland China's per-capita GDPs, for two years, 2000 and 2008. I use the recent five-year average population growth for g_1 and g_2. This provides the future paths of the total GDPs which are illustrated in Figure 7.

Figure 7: Projections on Total GDPs of Mainland China and the U.S.



The implication is that the current economic institution of Mainland China would enable its total GDP to exceed the U.S. total GDP in around year 2030. This implies that Mainland China, as well as the North East Asian economies which all grow to catch up as we have seen in Figure 6, will be more significant in the

global economy of the future.[5] I also expect that as Mainland China becomes a more successful economy, the changes in political, legal and civilian institutions will also follow, as South Korea and other countries experienced similarly.

In Figure 6, North Korea falls behind in relative per-capita GDPs. Its per-capita GDP was similar to South Korea's until around 1975, but after that, the gap between the two economies has increased. North Korea's per-capita GDP was exceeded by Mainland China in around 1993. As of 2008, its per-capita GDP is only about 5% of the U.S. level. North Korea would be able to join other successful North East Asian economies to catch up the advanced economies with institutional changes conducted in Mainland China and elsewhere.[6]

What sort of institutional changes should all North East Asian economies have in order to hasten the economic growth even further? The discussions so far emphasize an active participation in manufacturing exports. An improved institution would further foster private competitions across the firms so that they have incentives to adopt the knowledge available elsewhere. However, an important observation is that some of North East Asian economies have almost caught up other advanced economies. This implies that it will be increasingly important for North East Asian economies to *produce* the knowledge in order to continue their growth path. While it is important to strengthen the international interactions across the economies, they need to construct an improved system of protecting the knowledge to encourage research and development. This is a difficult task since the system needs a balance. On one hand, a heavier protection on inventions, discoveries, copyrights and other intellectual properties will result in more incentives to participate in the activities to produce them. On the other hand, too much protection will make it more difficult to share the knowledge across firms, which will distract them from improving productivity successfully. Also, the North East Asian economies need to build up a more active international market to trade knowledge, including patents, copyrights, know-how, etc. A study on protecting knowledge and building up a market to trade it

[5] A more detailed discussion on the growth of Mainland China can be found in Luckstead, Choi and Devadoss (2010).

[6] Choi, Keam and St. Brown (2010) provide further discussions on the North Korean economy.

would be important.

References

Alcalá, Francisco, and Antonio Ciccone (2004), "Trade and Productivity," *Quarterly Journal of Economics*, 119(2), 612-645.

Alfaro, Laura, Sebnem Kalemli-Ozcan, and Vadym Volosovych (2008), Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation," *Review of Economics and Statistics*, 90(2), 347-368

Choi, Seung Mo, Hwagyun Kim, and Xiaohan Ma (2010), "Learning by Exports," unpublished manuscript.

Choi, Seung Mo, Hyung Seok Keam, and Max St. Brown (2010), "Output Convergences after Unifications in Germany and in Korea," unpublished manuscript.

Frankel, Jeffrey A., and David Romer (1996), "Trade and Growth: An Empirical Investigation," NBER Working Paper, 5476.

Frankel, Jeffrey A., and David Romer (1999), "Does Trade Cause Growth?", *American Economic Review*, 89(3), 379-399.

Hall, Robert E., and Charles I. Jones (1999), "Why Do Some Countries Produce So Much More Output per Worker than Others?", *Quarterly Journal of Economics*, 114, 83-116.

Hausmann, Ricardo, Jason Hwang, and Dani Rodrik (2007), "What You Export Matters," *Journal of Economic Growth*, 12(1), 1-25.

Lucas, Robert E., Jr. (2009), "Trade and the Diffusion of the Industrial Revolution," *American Economic Journal: Macroeconomics*, 1(1), 1-25.

Luckstead, Jeffrey A., Seung Mo Choi, and Stephen Devadoss (2010), "A Decomposition of China's Productivity Growth," unpublished manuscript.

Parente, Stephen L., and Edward C. Prescott (2000), *Barriers to Riches* (Boston, MA, USA: MIT Press).

Sachs, Jeffrey D., and Andrew Warner (1995), "Economic Reform and the Process of Global Integration,"

Brookings Papers on Economic Activity, 1995(1), 1-118.

Young, Alwyn (1991), "Learning by Doing and the Dynamic Effects of International Trade," *Quarterly Journal of Economics*, 106(2), 369-405.