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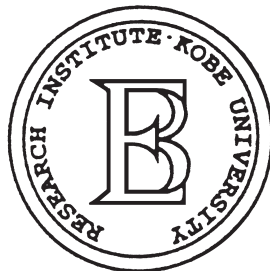
Co-Editors

Kazuhiro Igawa; Munehiko Itoh; Nobuaki Hamaguchi

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# A NOTE ON EFFECTS OF ECONOMIC DEVELOPMENT IN CHINA: CLIMBING TECHNOLOGY LADDER AND TRADE SURPLUS IN EAST ASIA

**KAZUHIRO IGAWA** Kobe University

## Abstract

A general survey of East Asian economic integration is sketched, including economic developments of China and ASEAN. Fast economic development of China is an issue in early 21<sup>st</sup> Century. Specific characteristics of economic developments in China and ASEAN are shown, using simple model of increasing return and of regional segmentation. International divisions of labor in East Asia are discussed, depending on the model. Trade balance surplus of China with respect to US is compared with the case of Japan-US trade conflicts. Foreign exchange rate system, including Renminbi, in East Asia is also investigated.

*JEL Classification:* F42

*Keywords:* Development of China, Division of labor in East Asia, Appreciation of Renminbi

## 1. Introduction

After Asian Currency Crisis, most of East Asian countries showed V-shape recovery. Now high growth of China is a new factor to strengthen economic agglomeration in East Asia. Development of China has many effects to the world economy, especially to the East Asian economy. There are positive and negative evaluations about effects of the development of China.

Positive evaluation refers to positive economic externalities of a large production center and a large market of China. The positive externalities come from scale economies and economies of scope, which facilitate potentials of endogenous economic growth induced by

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Corresponding Address:

Kazuhiro Igawa

Research Institute for Economics and Business Administration (RIEB), Kobe University

2-1 Rokkodai-cho, Nada-ku, Kobe 657-8501 Japan

E-mail: igawa@rieb.kobe-u.ac.jp

Phone / Fax: 81-78-803-7001

economic agglomeration. An economic agglomeration has cumulative effects for further economic developments.

Developments of China increase an economic agglomeration in the East Asia. There are already several agglomerations in East Asia, Japan, Korea, Taiwan, Hong-Kong, Singapore, Bangkok, Kuala Lumpur, and etc. An economic agglomeration is one of the most important factors for sustainable economic development, and can be extended through many types of investments. Social capitals must be invested by governments and many competitive enterprises should invest in the same region to enjoy external economies. In East Asia, one large economic agglomeration is formative process, and an economic division of labor among East Asian countries is in the process of deepening. An economic agglomeration has a center and peripheries, which support the center. Quantities and qualities of supporting peripheries' economic conditions are also important factors to determine an economic quantity and quality of the center. Large centers of the world, like US and EU, have high-tech industries with R&D institutions and have advanced financial institutions. Many supporting industries in peripheral supply parts, and cheap labors of peripherals are used for the profit in their center. These dynamic economic developments and divisions of labor produce efficient economic environments for further endogenous developments. East Asia has not completed yet an efficient large agglomeration. East Asia has potentials of a large production place and a large market of demand, in the world. It also has large growth potentials of peripherals, New ASEAN 4, inland provinces of China, and possibly of South Asia. East Asia is still one of growth centers of the world. East Asia can regain its glory days of economic boom, with some qualifications. Environmental constraints and energy supply constraints may not be satisfied for East Asian developments.

Negative evaluation refers to competition with cheap products of China and large absorption of Foreign Direct Investment (FDI) into China. United States complains bilateral large balance of trade deficits and also Chinese cheap manufacturing product exports to US. Japan complains cheap agricultural product imports from China and imitation (copy) of Japanese manufacturing products by China. ASEAN countries are competing with China in export of labor intensive manufacturing products to US and EU. ASEAN countries are very cautious on shifting their industrial structure to increase more capital intensive manufacturing products, and thus on inviting FDI of capital and technology intensive industries.

Developments of China have shifted FDI flow trend from flow into ASEAN to flow into China. This might change the order in the position of goose flying pattern in the East Asia of Japan-NIEs-ASEAN-China. If those countries' comparative advantages and production specializations are kept in the order of high-tech, capital intensive, labor intensive, then international division of labor will produce inter-industry trade among countries. However, if Japan stops structural reform of acquisition or development of new high-tech industries, and if China develops faster to catch up countries going ahead, then competition among countries

in international market becomes severe. International division of labor producing intra-industry trade will be the appropriate results of this situation. Sever competition has a pressure for efficiency and also has an inefficiency of collapse of the defeated. The latter is always emphasized with loud voice, but former is more important in the long run.

In the following sections, we discuss the effects of fast development of China to the East Asian countries and to the world (US). In section 2, three characteristics of Chinese development will be investigated; one is a separation of area of rapidly developing region and retarded region within China, and another is FDI of capital with new technologies. The third is a trade imbalance. Section 3 is used for discussing changes of international division of labor among the East Asian countries with effects of the Chinese developments. A sustainability of trade surplus of China (and also of the East Asia) with respect to US is a topic of section 4. In the final section, a revival possibility of the East Asian miracle will be discussed.

## 2. Characteristics of economic development in China

### (a) Disparity in Economic Development Stage among Regions

China is a country with large population and territory, but it is rather segmented into many regions. The economic development stages are different among these regions, and this is maintained by regulations of labor mobility between regions. The difference of economic development stage depends on an amount of FDI inflows into regions. The increase of FDI and regulation of labor mobility have accompanied unique characteristics of economic development in China.

To capture the characteristics of development in China, we use the following simple model. China consists of several regions, where labor mobility is free within a region, but is regulated between regions. Each region has labor  $L$  and capital  $K$ , most of the latter is an accumulation of FDI inflows. There are two types of products (domestic products  $A$  and tradable products  $M$ ). To produce one unit of domestic products,  $\ell_a$  of labor input is used. To produce one unit of tradable products  $\ell_m$  of labor and  $k_m$  of capital are used as inputs. Production of the tradable requires fixed labor cost  $F_i$  in  $i$ -th region. Therefore,  $\ell_a A + \ell_m M + F_i = L$  (1), for full-employment condition, and  $k_m M = K$  (2), for full-utilization of capital. Now for price relations, no profit condition requires,  $w\ell_a = p_a$  (3), and  $w\ell_m + r_i k_m + F_i/M = p_m$  (4), for domestic products and tradable products, respectively. Where  $w$  is a wage rate,  $r_i$  is a rental rate of FDI capital in  $i$ -th region,  $p_a$  is a price of domestic product,  $p_m$  is a price of tradable product in terms of domestic currency. The international price of tradable products in terms of foreign currency  $p$  is given, and thus  $p_m = \pi p$  (5), where  $\pi$  is foreign exchange rate in terms of domestic currency (that is,

Chinese Renminbi).

From this system, productions of  $A$  and  $M$ , and prices  $p_a$  and  $p_m$ , and also rental rate  $r_i$  is determined as follows. Given  $K$  and  $k_m$ ,  $M$  is determined from (2). Then from (1) and given  $L$ ,  $\ell_a$  and  $F_i$ ,  $A$  is determined. From (3) and given  $w$ ,  $p_a$  is determined.  $p_m$  is determined from (5). Therefore  $r_i$  is determined from (4).

This situation in some region might be brought as follows At the beginning of no FDI in China (that is  $K = 0$ ), foreign investors calculate rentals for FDI capital in different regions. If a rental rate after discounting risk factor, is higher in some region in China than rental rate in the rest of the world  $r_w$ , then FDI will be in action. If wage rate is same for regions, FDI will go to the region where  $F_i$  is small (if  $F_i$  is same and wage rates are different in regions, the lowest wage region will invite FDI inflows). Because of a fixed cost, initial FDI must be large enough to have scale economy. However, once FDI is invested, increase of  $K$  reduces fixed cost per unit product, and thus FDI follows in the same region. When the total labor of the region is used fully for production of tradable goods, wage level will be increased in the region. When more FDI flows in, labor immigration from other regions might be invited and the wage rate might be increased further. The wage increase will reduce the profit rate of FDI in the region, and FDI will move to a new region of highest expected profits. Because of fixed cost, which produces a scale economy, concentration of FDI will start in the new region, and continues till a wage rate increase reduces a profit rate of FDI investment. The third region will become FDI inflow region, and this development process will continue until FDI into other countries become more profitable.

### (b) Gradual Step up of a Technology Ladder

Now it is a position to introduce an industrial structure of many types of tradable products. As a simple model, it is assumed that there are three tradable products of a labor intensive product, a capital intensive product, a high-tech product. Here the tradable in the above model in (a), is called labor intensive products, technology of  $\ell_m$  and  $k_m$ . Now technology coefficients of the capital intensive product are  $\ell_c$  of labor input and  $k_c$  of capital input, and this industry use a different type of capital  $C$ . In production of the high-tech products, a coefficient of labor input is  $\ell_h$  and of capital input is  $k_h$ , and of intermediate input is  $h$ . A different type capital of  $H$  is used for the high-tech industry. The intermediary input is imported from abroad. Production levels are  $M_c$  and  $M_h$ , respectively for capital intensive products and high-tech products. Price of labor intensive product is  $p_m$ , of capital intensive product is  $p_c$ , of high-tech product is  $p_h$ , and of intermediary input is  $p_f$ . These prices in terms of US \$ are given, and thus foreign exchange rate  $\pi$  determine the prices in terms of domestic currency. Fixed costs  $F_c$  and  $F_h$  are necessary for capital intensive products and for high-tech products, respectively. Rental rates of capital (FDI) are determined from the zero



profit conditions similar to relation (4).

Constraints of going up a technology ladder are as follows. To produce capital intensive products, an experience and existence of production of labor intensive products of more than  $M^*$  level is necessary. In the similar way, an experience and existence of producing capital intensive products more than  $M_c^*$  level is necessary in producing high-tech products. Here it is also assumed that international price levels are given to bring higher profit rate for higher level of ladder products, if wage rates are same. With these preliminary setting, some different aspects of economic developments in China will be captured.

After production level of labor intensive tradable has increased more than  $M^*$ , FDI of capital intensive tradable  $C$  might be compared as an alternative project. Because of a fixed cost, new FDI of  $C$  must be more than some large scale. Furthermore  $M^*$  production should be kept in China, and thus  $C$  will inflow into the region as a substitute of production  $M$ . This means production level of  $M$  must exceed  $M^*$  considerably to start FDI of  $C$ . Once FDI of  $C$  started, scale economy of capital intensive tradable industry will invite more FDI of  $C$ , and  $C$  and thus  $M_c$  will increase until a wage increase prohibits inflows of FDI. Important restriction is; the level of production of  $M$  should be kept more than  $M^*$  to produce  $M_c$ . This means the substitution between  $M$  and  $M_c$  is partial. Both  $M$  and  $M_c$  will increase, if profit rates of FDI of  $K$  and of  $C$  into China are best choices. Production of high-tech tradable  $M_h$  starts in similar way as the case of capital intensive tradable. One difference will be a requirement of an intermediary input in producing  $M_h$ .

In this way, industrial structures in China sift from domestic products only, to increasing share of tradable products of labor intensive, next of capital intensive, then of high-tech industries. If scale economy works within a region and also within neighboring regions, a diffusion of economic development will start from one region and will move to adjoining regions. Here domestic capital formations should be mentioned. Starting production of new tradable products, FDI inflows of foreign capitals are necessary. After some experience of production, domestic capitals would start to be used in producing tradables. The domestic capital formation will start in labor intensive products, then next move in capital intensive products. It will take time to form a domestic capital in high-tech products and in the mean time intermediary capital goods input will be imported from abroad. This might be situations of the recent developing pattern of China.

### (c) Trade Balance of China

Imbalance was US-Japan trade until US-China imbalance has become serious problems, and thus there are possibilities of US imbalance with another country becomes issues in future. In the case of Japan, the imbalance was criticized for some specific exports, at first, like cotton manufactures, next TV and electrical appliances, and then car and computer. The

bilateral negotiation for a specific commodity had moved, then, to the one for many commodities in comprehensive ways. In the mean time, Japanese Yen appreciated more than three times, but the imbalance still exists. Saving minus investment is equal to a trade balance (a current account), and it was always the case that Japanese saves more and US people consumes more, and thus imbalance was always US's trade deficit and Japan's trade surplus. In the case of China, the large value of imbalance is criticized and specific exports are not strongly pointed out so far. Of course it is always the case that specific items are politically used for protection and for negotiation. If China exports its comparative advantage labor intensive products, the issue for US will just be a volume of imbalance. However if China has changed to export of high-tech products, which compete to US products, then their trade conflicts will become serious problems, like the case of US-Japan. Therefore whether Renminbi revaluation (including possible further revaluations) is sufficient enough or not to solve the imbalances in US-China trade imbalance, depends on two things. One is Saving-Investment balances both in China and US, and if these behaviors will not change dramatically, foreign exchange rates will have weak effects on their trade imbalances. The other is changes of export products of China to US, and if the export products change from labor intensive products to capital intensive products, and further to high-tech products, following Renminbi appreciations, China-US conflict will be serious in future.

Using the previous simple model, trade balances of China could be described as follows. The production side is described in (a) and (b), therefore a trade structure is determined if consumption side is introduced. It will be easier to assume the simple choice (utility) function of Cobb-Douglas type, and thus fixed proportions of income will be spent for different commodities. Production and consumption of non-tradable commodities should be equal within China, and a trade balance of China is the value of difference between production and consumption in tradable commodities. When China producing only labor intensive tradable commodities, China exports the labor intensive products, and thus imports both capital intensive products and high-tech products. If saving is larger than investment in China, a trade balance of China is in surplus and China accumulates Dollar assets or foreign reserves. When China producing both labor intensive and capital intensive products, then China will substitute import with domestic production in capital intensive products. There will be the case that China exports both labor intensive and capital intensive products. Those exports minus import of high-tech product determines trade balance of China, and this will be surplus as long as saving exceeds investment in China. When China started production of high-tech products, China must import intermediary inputs. There will be many different pattern of trade. Exporting one product and importing the other products and intermediary inputs, is one case. Exporting two products and importing the other product and intermediary inputs, is another case. It is possible to export all products and import only the intermediary inputs. The trade patterns will depend on exchange rate  $\pi$  and wage rates of regions in China. Again trade

balance of China depends on Saving-Investment difference in China.

### 3. Division of labor among East Asian countries

#### (a) Development of ASEAN

Developments of China have many effects to foreign countries, especially to East Asian countries. Developments of ASEAN countries started before those of China. Singapore is a developed gateway and a financial center for other ASEAN 4 countries of Thailand, Malaysia, Indonesia, and Philippine, the latter two are catching up the former two. Brunei is special country depending on oil production. New ASEAN member 4 of Vietnam, Cambodia, Laos, and Myanmar are peripheral of the ASEAN 4. For the economic development of ASEAN, development model of China in the previous section might be applicable with some modifications. Now in each ASEAN 4 country there are two regions, urban and rural regions, and one country is one region for new ASEAN 4, in the above model.

Development of ASEAN might be described as follows, using the above model. FDI into ASEAN comes from developed countries, a large and important investor is Japan, and Asian NIEs of Korea, Taiwan, Singapore, and Hong-Kong are new investors. FDI flows into urban regions of Thailand and Malaysia, where labor intensive tradable products have produced and exported. Labor movement within those countries is not restrictive but with increasing costs as a labor movement volume increases. Wage rates in Thailand and Malaysia will increase in those urban regions. When production level become more than  $M^*$ , FDI of  $C$  flows into those regions. Some of the productions of labor intensive tradable in urban regions of Thailand and Malaysia will shift to urban regions in Indonesia and Philippine. FDI from Asian NIEs to ASEAN has assisted this trend. Externality in production between labor intensive tradable and capital intensive tradable, which is reflected in the requirement of  $M^*$  production for producing any of  $M_c$ , is maintained through unification of ASEAN. Transaction within ASEAN has increased and connections among firms are maintained through networks of Japanese firms' and of overseas Chinese's. When production of capital intensive tradable becomes more than  $M_c^*$ , FDI for high-tech products has started in urban regions of Thailand and Malaysia. Minimum requirement of  $M^*$  and of  $M_c^*$  within ASEAN, might request extension of ASEAN to include new ASEAN 4. It is a situation now that new ASEAN 4 have started production of labor intensive tradables, Indonesia and Philippine have started production of capital intensive tradables, and Thailand and Malaysia have started production of high-tech tradables. Although starting new products depends on FDI inflow, extension in production, after some experience of the production, could be carried out by domestic investment (domestic capital formation).

**(b) Development and Competition in East Asia: Before Asian Currency Crisis**

There are three types of economic group in East Asia. One is Japan and Asian NIEs, which make FDI to China and ASEAN and export intermediary inputs and capital goods to China and ASEAN. Another group is ASEAN (old ASEAN 4 plus new ASEAN 4). Old ASEAN 4 is a center (urban regions of Thailand and Malaysia are cores), which climbed up products technology ladder from labor intensive to capital intensive, and now to high-tech products, introducing necessary FDI inflows and formation of domestic capital. New ASEAN 4 just started production of the labor intensive, using FDI inflows. The third is China, development of it is explained in the previous section.

Catching up of China to ASEAN is very fast and ASEAN have extended to include less developed four members. This brought hard competition between ASEAN and China in export markets of tradable commodities. Thailand and Malaysia were the bypass countries of export from Japan to US and to EU, this was after Plaza accord of 1985. Appreciation of Yen made it difficult to export from Japan and production place moved first to Thailand and Malaysia. Exports from Thailand and Malaysia were promoted as policies of these countries. Indonesia and Philippine were second bypass countries of Japanese export. In Thailand and Malaysia wage rates had increased and production sift started from the labor intensive to the capital intensive products, this was in early 1990s. Here China has entered export competition and depreciation of Renminbi in 1994 made labor intensive Chinese products more competitive. This had big effects on ASEAN countries. Thailand and Malaysia should hurry up shifting from labor intensive products to capital intensive ones, and Indonesia and Philippine should be more efficient in producing labor intensive products, competing to China products.

Report of East Asian Miracle from World Bank intensified FDI inflows and capital fund inflows into old ASEAN 4. Development of old ASEAN 4 was more rapid than the potentially appropriate rate of economic growth. It is criticized by P. Krugman that the growth in East Asia accompanies few productivity improvement. His judgment is too extreme but had pointed out some truth. For the rapid economic development, political dictatorship, which controls domestic markets and transaction systems, was used in many East Asian countries. A dictatorship has side effects of inefficiency, and international standards for transaction in markets and transparency of systems are called for. There are many different countries of culture in East Asia. Each country has its own economic systems, which inherited from past history. Unique domestic systems have some inefficiency in the systems of international standards. The old ASEAN 4 had involved many inefficient economic systems of dictatorship and of historical inheritance.

The capital fund inflows, especially inflows of short-term capital, became trigger of currency and financial crises, when trend of inflows changed to outflows. It is rightly pointed out that both Dollar Peg of ASEAN currencies to stabilize their values and their use of

short-term funds for long-term purpose were their mismanagements. Speculative attack in 1997 was symbolic in the sense that short-term capital fund can produce crisis in the country of economic difficulty, even if this is very small. Asian Currency Crisis taught importance of flexibility of exchange rates and of large foreign reserves to avoid currency attack. This is reflected in recent increase in flexibility of exchange rates and rapid accumulation of foreign reserves in East Asia. It was also important to make new efficient economic system accompanied with the development of both ASEAN and China. Efficient division of labor in competitive market was necessary in East Asia.

### **(c) Recent International Division of Labor in East Asia**

Asian Currency Crisis has reduced difference of economic development stage between ASEAN and China or have reversed their orders of development stage position. Thailand and Malaysia showed rapid recovery of *V* letter shape, and recoveries of Indonesia and Philippine were taking time. New ASEAN 4 are catching up steadily. Therefore, roughly speaking, comparative advantage in Thailand and Malaysia is capital intensive products, the one in Indonesia and Philippine is labor intensive products, and they are climbing up one step more of products technology ladder to give a space of labor intensive products to new ASEAN 4. Recent development in China is very rapid and China has three different types of regions. Best developed regions have comparative advantage in capital intensive products, and next developed regions have comparative advantage in labor intensive products, and the rest regions are catching up. However those three types of regions are also trying to climb up products technology ladder.

Japan and Asia NIEs are exporting high-tech products and intermediary inputs to China and ASEAN. They also outflow FDI to China and ASEAN. China and ASEAN now started to outflow FDI with each other. Japan seems to be recovered from long recession and deflation of more than ten years, after the collapse of the bubble economy in 1990. Japan still has large assets of FDI and strong network of firms in ASEAN, and is increasing FDI into China. Korea recovered from Asian Currency Crisis, by carrying out economic structural reforms. The dissolution of its zaibatsu and reforms through integration and separation of business activity has increased its competitiveness of firms in international market. However Korea still has unemployment of high level. Taiwan outflows FDI to China and de-industrialization or hollowing is feared. Although, relative economic positions of Japan, Korea and Taiwan may have decreased in East Asia, they still have strong connection to ASEAN and China.

It is still in the process of economic development and of constructing organizational architecture, East Asia gradually forming an efficient system of international division of labor. Most interesting feature in East Asia is an increase of intra-industry trade. This implies

division of labor within East Asia is deepening and products differentiation is making progress. Complexes in division of labor cause trade network of intra-regional trade in East Asia. Another interesting feature is a trade of intermediary products within East Asia. This implies division of labor among production processes is progressing, and could be called vertical division of labor. This causes intra-industry trade and also intra-firm trade. Many countries (regions) of different development stages can join for making the same products by sharing production processes. With intra-industry and intra-firm trade, economic territories with center (core) and peripheral can overlap in East Asia. Now economic territories of China, ASEAN, Asia NIEs, and Japan are closely related with each other. The other features in East Asia are movements of formal economic integrations, Free Trade Agreement (FTA) and monetary and financial cooperation. The efforts for building these formal frameworks will help further deepening of division of labor, horizontal and vertical division of labor, in East Asia.

#### **4. Trade balance of East Asia and US**

Recently, July 2005, China decided to increase the value of Chinese Renminbi and moved from the pegged exchange rate system to a managed float using a basket of currencies. This was surprising timing for Japan, but is expected for long period. China has responded to the foreign pressure of appreciation of Renminbi, and has still kept foreign exchange rate policy instrument by adopting managed floats of gradual appreciation. The new system is accepted as a first step for more free market of Renminbi, and Chinese foreign exchange rate adjustment is very meaningful for the world and also for other Asian countries. Appreciation of Renminbi might have plus and minus effects, but as a total Chinese economy will enjoy net plus effects, if exchange rate adjustments are gradual. This is an average or majority evaluation of Renminbi appreciation, at this moment.

To evaluate and expect an appreciation of Renminbi, the experience of Japanese Yen might be useful. In early 1970s', many (large) countries have moved from IMF fixed rates to floating rates. From 1970s', Japan was always complained, especially by US, to reduce Japanese trade surplus, and Japanese Yen has appreciated from 1\$=360 Yen to 1\$=110 Yen (1\$=80 Yen, at peak, in 1995). Yen is now three times stronger than before. If we apply the Japanese experience to China, Renminbi might also appreciate more than two times in future. But this might not be true, because in the case of Japan productivity in exporting industry has increased rapidly and export products have changed from labor intensive to capital intensive and high-tech products. It is said that development of China depend on inputs increase, and technology (or productivity) increase was not main factor for its growth. If this is the case, 20-30% appreciation might be expected for the coming decade.

Appreciation of Renminbi might not reduce foreign reserves of China, because China wants to increase the reserves for stability of Renminbi and for increasing its political power.

US has been asking foreign exchange rate appreciation to foreign countries to reduce US deficit of trade balance in vain. Trade balance is a reverse side of Saving-Investment balance. US saving is smaller relative to its investment, and saving in East Asian countries is larger relative to their investment. If we divide the national Saving-Investment balance into private Saving-Investment balance and government budgets balance, the latter government balance deficit is a part of counterpart of trade deficit. Therefore determinants of private saving and investment and also government surplus or deficit, explain the counterpart of trade balance. Export minus import is a trade balance, and determinants of export and import should be consistent with those of Saving-Investment balance. Although a trade balance is determined by the interaction between Saving-Investment decision and Export-Import decision, most of the cases Saving-Investment decision dominates Export-Import decision. Determinants of macro saving are many but current (or permanent) income level might be one of the most important determinants. Interest rates and foreign exchange rate might also be determinants, but the effects of them on macro saving would be weak. Determinants of macro investment are also many, and expected returns of investment might be the most important determinant. Foreign exchange rate is one of signals of future returns of investment, especially in export or in import competing industries. Domestic goods industries or service industries would have no strong effects from foreign exchange rates for their investment. By and large, foreign exchange rates would have no strong effects on macro trade balances, and its effects are rather on micro individual firms or on comparative advantage among industries.

When Japanese Yen appreciated, in the last 30 years, its trade surplus is not strongly affected from appreciations, but industrial structure of Japan has changed. Japan has reduced labor-intensive industries and has increased capital-intensive industries and further has increased high-tech and service industries. Non-comparative advantage industries have been shifted production location to East Asian countries. Important point is the fact that in the mean time Japan accumulated US \$ and US enjoying Seigniorage. Japan donated the benefits of Seigniorage by accumulating foreign reserves.

Appreciation of Renminbi does not have strong effects for trade imbalance between China and US, besides in the long run. The effects will be on economic structure of China. China is now enjoying cheap and efficient labor inputs and enjoying capital inflows from abroad in labor intensive and also in capital intensive industries. However, with appreciation of Renminbi, China generally reduces competitiveness in exports. For continuous growth, China must shift its production structure to increase the share of products, whose productivity growth are high. Those products are usually capital intensive or high-tech products. Therefore future rate of Renminbi depends on how China could shift its economic structure from labor intensive industries to capital intensive industries, and further to high-tech industries. If China succeeds in these structural change, China will experience the similar economic conflicts of Japan-US, in 1970-90. The different cases might happen when China opens large domestic



market to foreign countries, especially to US.

Other East Asian countries gain competitiveness with appreciation of Renminbi. Especially less developed countries in ASEAN might get chance to invite FDI in labor intensive manufacturing industries and will become competitors to less developed region in China. South Asia (India, Pakistan, and etc.) will also enjoy the chances. If China changes its economic structure, accompanied with appreciation of Renminbi, competition with developed ASEAN countries might become severe, and this produces more efficient division of labor in East Asia region, as mentioned in section 3 (c). This will produce a large center of economic agglomeration and will strengthen East Asian regional economic integration. Appreciation of Renminbi will be big momentum of more complicated horizontal and vertical international division of labor in East Asia region.

East Asian countries, especially China, have been accumulating foreign reserves mostly in US \$. East Asian countries have been exchanging their commodities to money of US \$. Important point is US enjoying Seigniorage and East Asia should take the benefits of Seigniorage by using East Asian Currency for international transactions. As the Asian currency crisis showed, East Asian countries had heavily depended on US \$ for international transactions, and US \$ shortage could not be solved without IMF assistances. If East Asia countries had some regional currency for international transactions, the Crisis might be solved quickly. We are now in the position to consider East Asian Money, like Euro in EU, or at least foreign exchange rate coordination for stabilization. ASEAN plus three at Chiang Mai, in 2000 (Chiang Mai Initiative), financial corporation through currency swap was agreed, and it might be a first step for Asian Monetary Fund (AMF). With AMF, East Asia can form one large economic agglomeration, which is comparable to NAFTA or EU and can retain Seigniorage within the region.

## **5. Possibility of the East Asian Miracle**

East Asia has many countries of different economic development stages. If development of recent trend in East Asia continued, the area will have one link more advanced development situations from now. Less developed countries or regions will shift to more developing countries or regions, and developing countries or regions will partially catch up to developed countries or regions. Therefore their economic structures will change from labor intensive industries to capital intensive industries, from capital intensive industries to high-tech industries, and from agricultural industries to manufacturing industries, from manufacturing industries to service industries. This is a strong trend in East Asia.

More importantly, economic integration will be advanced in Asia and intra regional economic interdependency will be strengthened in East Asia. Both horizontal and vertical trade through deepened international division of labor will be increased in the region. On the



one hand, depending on comparative advantage, different outputs will be produced in different countries and inter-industry trade also will be extended more. On the other hand, and more importantly, division of labor among production processes will be extended, and specialization in production of parts, in intermediary inputs, in assembling, in managements, and etc. will step forward, and intra-industry trade will be increased. Economic integration or economic agglomeration in East Asia will be advanced. This is very important for further development in East Asia. During the next decades in East Asia, there will be many business opportunities. When market size becomes large and divisions of labor progresses, and regional integration proceeds, there will be many business chances, even though economic environment of markets might be more competitive.

There are three business network systems in East Asia. One is Japanese business firms' network, the power of which might be decreasing. Similar Korean network could be included in this type of network. Another is Overseas Chinese network, which is increasing power with development of China and ASEAN. The third is market oriented network using international (US) transaction standards. The combination of these three networks will produce more efficient international division of labor among East Asia.

As already mentioned, after appreciations of Japanese currency Yen, many Japanese companies have shifted their production place from Japan to East Asian countries. Japanese companies have their own management systems and their organizations have unique team oriented behaviors. Many Japanese human resources for management have moved out with FDI and some of management know-how are transferred to local managers in subsidiary companies. Japan had taken roles of economic leadership when Japanese management system is appreciated and accepted. In 1990s, especially after Asian Currency Crisis, a global standard of management system lean to US style of contracts and to market oriented decisions. Of course Japanese style of managements of using organizational relations and team-work are still efficient within the Japanese network system. However when an appropriate system itself is in the process of international selection, Japanese systems seem to be difficult to show their advantages.

The situations have increased where Japanese companies must accept a global standard of market-contract oriented. The Japanese business power using Japanese management system has become weaker than before. Japanese companies in East Asia now must use local human resources of management. The local managerial resources might be managers with MBA or Ph. D. of universities in US. Furthermore Japanese government is always far from assisting Japanese companies in East Asia, at least superficially. There are many political difficulties due to the history of before and during World War Second. Strong economic leadership supported by Japanese government will be difficult to be accepted in East Asia. Of course Japan will still show its leadership in bilateral relations.

There are many evidences about important presence of Overseas Chinese in the develop-

ment of East Asia. Here it is enough to cite general information from “imidas” and “chiezo”. There are 27 million Overseas Chinese in the world and 23 million peoples are living in East Asia. Immigration from China to East Asia increased by colonial policy of Britain and increased more by the rise of numbers in poor people, they suffered after Opium War (1840-42). Some of the Overseas Chinese succeeded in economic activities, especially in distribution and financial businesses. Ethnic Chinese business enterprises have got large economic power in East Asian countries. Business with China has increased after China’s change to open policy, using Overseas Chinese network. There is a concept of “greater Chinese economic area”, which implies that Ethnic Chinese business activity is supporting East Asian economic development. In 1970s, Asian NIEs attract a great deal of attention, but except Korea, their developments are dominated by Chinese economic activities. In 1980s ASEAN and the coast area of China have developed using Overseas Chinese network. It was expected in 1992 by the World Bank that the economic scale of “greater Chinese economic area” will be larger than US, in the beginning of 21th century. Actually, it is taking time more than the expectation, partly because of Asian Currency Crisis. However higher economic growth of China and ASEAN will continue, using Overseas Chinese network.

Development of market transactions will be limited if it mostly depends on Japanese business network and/or Overseas Chinese network. It is necessary to use advantages of arms length transactions. This is not existing network but controlled by confidence and trust for performances of market transaction system, which is formed with juristic restrictions and contract rules. After some good experiences of arms length transactions in markets, a network which depends on confidence and trust for market system will be constructed. An economic development in East Asia depends on FDI inflows and on export to international markets. Therefore it is necessary to introduce international standard for market transactions. East Asian countries are rapidly adopting international standard (mostly of US and EU) for market transaction, especially after Asian Currency Crisis.

There are still socialist countries in East Asia, where bureaucrats system substitutes market mechanisms in many places. However increase of FDI inflows and international transactions has called for transparency of market transactions and for an international standard of market transactions. Now an international standard for market transaction is penetrating not only in capitalist countries but also into socialist countries. Network formed in arms length transaction of markets is not stable and it changes flexibly depend on economic conditions. This flexible network system is the strength of a market mechanism. Increase of FTA negotiation in East Asia is accelerating formation of this flexible network.

Combining three types of network (Japanese/Korea business network, Overseas Chinese network and the flexible network of market) proficiently, East Asia could construct more efficient system of regional division of labor.

Integration in East Asia is on going in economic activities of trade and FDI, that is, in

real economic (goods and services) activities. This integration will produce larger economic agglomeration for economic growth in East Asia. To evolve into further agglomeration in East Asia, monetary integration will also be necessary, like Euro in EU. Monetary integration is not on formal process but financial cooperation is on process among East Asian countries. Japan, Asia NIEs and Core of ASEAN will be ready for monetary integration through stabilizing foreign exchange rates. China might be the most difficult country for monetary integration, because of political system and of many controls on economic activities.

Appreciation of renminbi is helpful for financial cooperation in East Asia. To show this, let us take four countries, China, Japan, Korea, and US, as an example. China and US are important partners of international trade and they are partners both for Japan and for Korea. Foreign exchange rates among currencies of Japan-Korea-China-US are important indices for economic activity of these countries. If China-US exchange rate is fixed, then Japanese Yen and Korean Won have to move, taking into account of the fact of its fixed rate. Appreciation of Yen and Won for US \$ means appreciation of them for Renminbi. However, the appreciations of Yen and Won appreciation could be larger when Renminbi also appreciates, and could be smaller when Renminbi depreciates for US \$. In the same way, East Asian currency can move more jointly with Renminbi in managed float than in the case of its peg to US \$. More appropriate adjustments of exchange rates become possible with Renminbi's floats. East Asian currencies including Renminbi will become easier to stabilize exchange rate fluctuations among the East Asia region, and this will be a first step for East Asian currency area or at least currency cooperation.

When trade integration increased in East Asia, regional financial integration also will be increased in East Asia. The region of East Asia might be in the position to consider about establishment of institutional regional integration, including exchange rate stability in the region. The exchange rate stabilization becomes possible when economic conditions of member countries are similar. More specifically, when macro economic indices move coincide directions within the region, when labor and capital move more freely within the region, and when openness of each country is high in the region. In these situations, monetary policy coordination within the region might be easier.

The important macro economic indices for regional financial integration are inflation rates, interest rates, money supply rates minus GDP growth rates, and government budget deficit per GDP ratios. If these indices are similar within the region, it is ready to be active for regional financial integration or currency integration. The country where financial regulations or controls by government are strong and financial markets are not developed, it will be difficult to include the countries into the regional financial integration. This does not mean to exclude those regulated countries from integration, but implies the timing to include them into the financial integration depends on development levels of financial markets and it might take time for some countries to clear a certain level of financial development. Japan, Asian

NIEs and some developed ASEAN countries might be candidate members for first step of East Asian currency integration.

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**THE ANALYSIS OF PRICE DECLINES FACTORS  
— THE DIGITAL STILL CAMERA INDUSTRY CASE —**

**MUNEHICO ITOH** Kobe University

**Abstract**

Commoditization refers to the phenomenon where prices are declining so rapidly that market competitors are unable to earn a reasonable profit even though the market is expanding and there is strong demand. This sort of commoditization can be observed in many digital device industries, but in this paper, by taking up digital still camera industry, a representative digital product, and analyzing the specifications and prices of approximately 560 models brought to market from 1995 to 2003, we analyze that a rapid decline in price is occurring, and reveal their causes. Our analysis reveals that the modules used in digital camera designs are remarkably uniform, the industry is becoming horizontally specialized, due to new market entrants developing similar platforms made up of components with the same specifications, and price declines are occurring because product specifications between competing companies are becoming homogenous.

*JEL Classification:* L11, L22, M11

*Keywords:* Modularization, horizontal industrial structure, platform, digital device

**1. Introduction**

The digital device industry has continued to grow rapidly, and is expected to continue to play an important role as a key industry in the world economy. In this paper, after first learning that the structure of the digital camera industry has changed greatly from the type of structure prevalent in the days of analog device production, we analyze under what competitive strategies industries have developed to compete in this environment. As the most important perspective when considering product development in the digital device industry, we

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Corresponding Address:

Munehiko Itoh

Research Institute for Economics and Business Administration (RIEB), Kobe University

2-1 Rokkodai-cho, Nada-ku, Kobe 657-8501 Japan

E-mail: itohm@rieb.kobe-u.ac.jp

Phone / Fax: 81-78-803-7009

look at the relationship between modularization and price. Price declines are a necessary outcome of economy of scale, and the reductions in profit seen day after day also have been explained as the outcome of profits shifting from set industries to key component providers (Christensen and Raynor, 2003), but this has not been easily demonstrated. When these phenomena were called as commoditization, the relation between the dynamics of concepts such as homogenization and horizontal industrial structure became unclear. In this paper, by analyzing the competitive homogenization due to market domination by key modules, and the commoditization that emerges as a result, we perform a theoretical analysis of competitive strategy in the digital device marketplace.

## 2. Review of Previous Research

In this section, we review past research from the perspective of the impact modularization has had on product strategy. Many research results have been obtained regarding the concept of digital device modularization, for research on computers for the opposing aspects of hardware and software, or for the change in industry structure and product architecture from vertical/integral to horizontal/modular (Fine, 1998; Baldwin and Clark, 2000; Sturgeon, 2003). There is a wide variety of mainstream research in this field, such as research related to improving production or product development efficiency (Simon, 1962; Brusoni and Prencipe, 1999; Baldwin and Clark, 2000; Fixson, 2003; Schilling, 2002; Sturgeon, 2002; Sako, 2003), or research from the system perspective, that attempt to understand the relationship of how modules are connected to product structural elements, through modules and their interfaces (Ulrich and Tung, 1991; Ulrich, 1995; Garud and Kumaraswamy, 1995; Schilling, 2000; Baldwin and Clark, 2000).

The aim of this paper is to define the cause and effect relationship between modularization and the rapid price changes of digital devices. In order to correctly understand this kind of relationship, it is necessary to comprehensively analyze the industry and analyze appropriate market data such as cost structure and retail pricing data. An empirical study that looked at the price changes of modular products is the coffee pot research of Ulrich and Pearson (1998). They empirically showed the relationship between design and material cost, but their research did not consider cost equilibrium of the entire industry.

For the debate on rapid price change from the perspective of commoditization, there are several research results (Christensen, 1997; Christensen and Raynor, 2003). They use the label "commoditization" to describe this phenomenon of rapid and continual price declines even with remarkable improvements in performance and strong demand, and explain that the extreme profit reductions driven by proprietary architecture is because it is difficult to achieve product differentiation due to the growth of modularization and the spread of horizontal industrial structure. However, the range of the significance of this commoditization research

is not clear. As modularization progresses, technologically and commercially superior modules begin to be developed. The term “platform” is used to describe these modules. In other words, by developing platforms made up of combinations of limited parts and modules, a structure is formed through which product families can be easily and quickly developed based on the needs of customers (Hyer and Wemmerlov, 1984; Nobeoka and Cusmano, 1994; Meyer and Lehnerd, 1997; Robertson and Ulrich, 1998; Gonzalez-Zugasti, Javier, Otto and Baker, 2000; Gawer and Cusumano, 2001).

As described above, a theory of digital device product strategy is built from a theory based on many research studies characterized by modularization and horizontal industrial structure. However, many areas that are important remain unexplained. For example, there is little research that examines commoditization from a price and cost perspective, or research related to product strategy dynamics that examines the effectiveness of modularization and integration from an industry-wide perspective.

### **3. Hypothesis Formation**

Before forming the hypothesis of this paper, we shall again define commoditization. Commoditization refers the condition in which it is no longer possible to achieve additional profits through product differentiation in the marketplace (Christensen and Raynor, 2003). As asserted by Christensen, if we base a hypothesis on the argument that the development of a key modular market increases horizontal industrial structure and thus making product differentiation difficult, such a hypothesis could be expressed as follows.

Hypothesis 1: When key module product capabilities dominate the marketplace, product homogenization more easily occurs. Industry homogenization accelerates commoditization.

Certainly, in the digital camera market, similar digital device markets, over 100 new models are being developed annually, and the downward trend in prices is clear. Previous research has verified that platform development is an effective way to quickly develop such large numbers of new products. If we assume that platform development leads to commoditization, we are able to form the following hypothesis.

Hypothesis 2: Homogenization is caused by the development of similar platforms by competitors, which accelerates commoditization.



#### 4. Framework for Analysis

The digital camera industry was selected as the subject for analysis for the following two reasons. First, the digital camera industry is relatively young, making it easy to obtain data on actual market price and specifications for all products brought to market, which makes it possible to perform a comprehensive and objective analysis. Second, the development of digital camera core technologies and component markets, such as operating system<sup>1</sup> diversification, improved microcomputer performance, increased memory and miniaturization display components such as LCDs, shares main traits with other digital devices, increasing the likelihood that this research might reveal clues about the overall digital device market. First, we describe the overview of digital camera industry and define items as the subject of analysis, such as modules and platforms.

##### 4-1 Overview of the Digital Camera Industry and Analytical Perspective

In October 1988, Fuji Photo Film Co. Ltd. announced the prototype model of the first digital camera, and commercialized it three years later as the DSP-100. At nearly the same time, Kodak began selling two models, the DC 3/32 and DCS 200ci, which had internal hard disks and were developed together with Nikon.<sup>2</sup> Then, in October 1993, the VC-1000 from Olympus was introduced. These 5 models from these 4 companies were the inception models of the digital camera industry. The digital camera market took off in March 1995 when Casio released the affordable model QV-10, which had 250,000 pixels. Then, all the major market players had entered the market in the three years from 1995 to 1997, and by 2003, 564 models had been introduced. In this paper, after obtaining specifications of all commercialized products, we apply an index to represent the changes in product competitive strength. Specifically, our analysis in this paper is based on data acquired from product specifications, actual market prices, and industry association manufacturing statistics.<sup>3</sup>

1 Software that provides basic functionality shared by most applications, and that manages the overall computer system. By using the core features provided by the OS, software developers can reduce development effort and standardize the application operation. There are operating systems such as those used in personal computers as well as the embedded operating systems, such as those found in IT devices.

2 This information gathered through interviews with members of the Kodak R&D department who were involved with digital camera research in the 1980s.

3 For recent models, Product specifications were gathered from various media such as catalogs, trade magazines, and the manufacturer's home page. Actual selling price data is a collection of data that has been gathered since this database was first created in 1999, by researching prices displayed at discount stores and online retailers. The prices have not been adjusted for inflation. The greatest fluctuations in market price occur as the product gets older. Wherever possible, reference prices were set to the selling prices of new models in March and December, when sales were most brisk. Data for product volumes and market share for each manufacturer was collected with the assistance of the Camera and Imaging Products Association (CIPA).



## 4-2 Modular Structure of Digital Cameras

Digital cameras are built from modules such as the lens, the optical image sensor, (CCD or CMOS)<sup>4</sup>, image processing engine, liquid crystal display, power supply, and external memory. The digital camera function built into mobile camera phones is formed from a single module containing both a fixed-focus lens and an optical image sensor. Compact type digital cameras are made from higher level modules made of lens modules containing several lenses and a finder, and further by combining with an optical image sensor module, these form an optical platform. However, in single lens reflex cameras, lenses, viewfinders and optical image sensors are modularized but they are not tied together as a platform. Thus, even digital cameras using the same modules have different architectures depending on their combination.

## 5. Modularization and Commoditization

We set 564 digital camera models sold by 33 companies between 1995 and 2003 as the subject of our research and range of analysis. A database<sup>5</sup> was created containing specifications and price information for all digital cameras to be analyzed. From the analysis results of this database, we shall examine how modularization drives homogenization and commoditization.

### 5-1 Commoditization of Digital Cameras

Using different product names, manufacturers, clearly differentiate their products into 4 different product classes: basic cameras with less than 2 mega pixels, standard cameras with more than 2 mega pixels but that use dry cell batteries, compact cameras which are light and thin, and SLR cameras which have removable lenses. The left diagram in Figure 1 plots the change in pixels for each of the 564 models that were analyzed. While the specifications for basic models remained less than 2 mega pixels, by 2003 compact and standard types had

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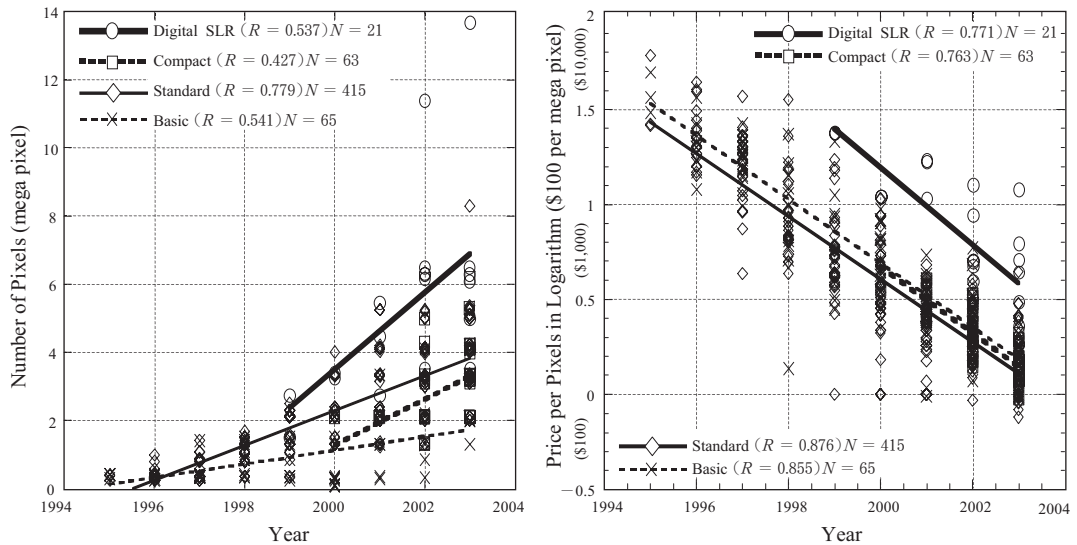
4 CCD: Charge Coupled Device. A device which electronically encodes images by converting light energy into electronic signals. A core component of digital cameras. CMOS: An image sensor using CMOS (Complementary Metal Oxide Semiconductor), a standard IC manufacturing technology. Low voltage and runs on 10% of the energy of conventional image sensors, enabling integration with surrounding circuitry. The sensitivity was lower than conventional image sensors, but recent improvements have increased the hopes that it can realize greater energy efficiency and size reductions as a new image sensor technology for digital cameras.

5 A database was created based on the products of the below 33 firms and analyzed: Fuji Photo Film (61), Olympus (65), Canon (43), Sony (71), Kodak (23), Ricoh (31), Casio (40), Sanyo (21), Epson (12), Matsushita (24), Konica (21), Toshiba (20), Kyocera (19), Pentax (17), and other (33) (Apple Computer, Chinon, NEC, Polaroid, Sega, Plus, Pentax, Victor, Mitsubishi Electric, Takagi Sangyo, Takara, Bandai, Nichimen, Hitachi, Mujirushi Ryohin, Maxell, Leica). Numbers in ( ) are the number of products used in the analysis.

grown to 4 mega pixels, and SLR types had already exceeded 6 mega pixels. Moving in conjunction with the left diagram, the right diagram of Figure 1 indicates the change in the market price per mega pixel. The price decline for all types is extreme. Excluding SLRs, the price for one mega pixel in 2003 was a twentieth of the 1995 price from 8 years earlier.

Considering these conditions, let us review the factors behind the digital camera price decline. The total variable costs of compact 4 mega pixels cameras, which were the best selling camera type, were approximately \$155<sup>6</sup> in 2003. For the average market price of a 4 mega pixels compact camera in the right diagram Figure 1 of \$365, the total variable costs come to 42.5% of total costs, an extremely narrow profit margin.<sup>7</sup> Meanwhile, the number of shipped digital cameras has grown substantially, and by 2003 had exceeded 35 million units.<sup>8</sup>

Fig. 1 Shift in Digital Camera Number of Pixels/Price



Data Source: Created by the author, based on data obtained from digital camera manufacturers

6 The results for Nikon, Canon, Sony, and Sanyo are based on a joint survey conducted in March 2004 by Kobe University and Brainchild corporation. Broken down, optical 3x zoom lens module (including finder) is \$35.5 (23%), 1.8in. TFT LCD module is \$21.8 (14%), 4 mega pixels progressive photo image sensor (CCD) module is \$26.4 (17%), SDRAM, FRAM memory is \$7.3 (5%), ASIC (image processing engine) is \$12.7 (8%), and other semiconductors are \$12.7 (8%), accessories and case parts (battery, adapter, etc.) is \$38.2 (25%), for a total variable cost of \$155. Numbers in ( ) are the percentage of the total variable cost for each component. Also, in response to requests from the surveyed manufacturers, prices have been rounded.

7 Presuming an average manufacturer operations, when adding 20% for internal costs (advertising, labor, and depreciation), 30% for logistics expenses, the total is 92.5%, resulting in a very narrow profit margin. Normally, in order to obtain more than 10% profit margin, it is necessary to keep total variable costs to below approximately 30%. Furthermore, the cheapest 4 mega pixels digital cameras cost about \$273, and the variable total costs for this case exceed 50%, making it difficult to obtain any profit.

8 According to Camera Manufacturing Association materials.

From these two reasons, it is evident that the cause of the rapid price declines due to increase in shipment volume cannot be explained simply by scale of economy and experience effect. Firstly, commodity modules — semiconductor components such as LCD modules, microprocessors, memory, or memory cards, or power unit or batteries — are also used in large quantities in other types of digital devices. According to a JEITA<sup>9</sup> survey for 2002, when 22 million digital cameras were produced, 136 million personal computers, 411 million mobile phones, 73 million video cameras, 37.3 million video game consoles, 4.3 million car navigation systems, and 85 million camera mobile phones, were also produced for a total of more than 700 million digital devices. Thus, digital cameras account for only 3% of the total digital device production volume.<sup>10</sup> In other words, it is difficult to imagine that changes in the volume of commodity modules consumed by digital cameras had a great impact on the overall digital device industry through economy of scale and experience effects beginning to take effect. Next, of the key components in digital cameras, lens modules, image sensors and image processing engines are industry-specific, and image sensors are used in video cameras and four times as many image processing engines are used in camera mobile phones, making it difficult to determine whether the effect of price declines attributable to economy of scale are large or not.

## 5-2 Homogenization and Commoditization

In order to investigate homogenization, shifts in 7 key specifications are shown in Table 1. In the table, the ratio of specifications found in the majority of products in 2003 is calculated for each year, and this average is shown as degree of concentration. For lenses, 29 SLR-type cameras have been introduced since 1999, but the majority of these were fixed lens technology. For the color filtering system, complementary color filter<sup>11</sup> were the majority, but after 1999, this was dominated by primary color filter, and as of 2003 all products were primary color filter.

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9 JEITA: Japan Electronics and Information Technology Association

10 According to Nikkei BP Consulting's (Digital Appliance Market Outlook 2004), of total volume for LCD manufacturers, the ratio for consumption in digital cameras for 2000 is 3%.

11 The CCDs in digital cameras typically only record black and white images. For this reason, they are used together with filters to recreate color. For primary color filter, a filter is applied to each sensor in the CCD, and by passing R (red), G (green) and B (blue) light through each of the sensors, the color data of the image is recreated. Complementary color filters are filters which filter light complementary to RGB. Since using Complementary color filters increases the ability of light to pass through, they have a benefit of having higher sensitivity, but they also have a drawback that complicated data processing is required to recreate the color data. On the other hand, primary color filters have the benefit of crisp representation of the original colors without complicated data processing, but they are less sensitive. Recently growing is the trend to combine large diameter lenses with primary color filters.

**Table 1 : Shift in Digital Camera Key Specifications**

Item		Year									Total
		1995	1996	1997	1998	1999	2000	2001	2002	2003	
Lens	Fixed	7	27	46	47	55	77	88	92	96	535
	SLR	0	1	0	0	2	2	3	6	15	29
	Degree of Concentration	1.000	0.964	1.000	1.000	0.965	0.975	0.967	0.939	0.865	0.949
Color Filtering System	Primary	1	7	14	18	35	51	66	84	109	385
	Complementary	6	21	32	29	22	28	25	14	0	177
	Degree of Concentration	0.143	0.250	0.304	0.383	0.614	0.646	0.725	0.857	1.000	0.685
Data Storage	Embedded	4	14	15	2	2	9	6	5	0	57
	Media	3	14	31	45	55	70	85	93	111	507
	Degree of Concentration	0.429	0.500	0.674	0.957	0.965	0.886	0.934	0.949	1.000	0.899
Finder	None-optical	2	9	19	12	8	17	15	21	23	126
	Optical	5	19	27	35	49	62	76	77	88	438
	Degree of Concentration	0.714	0.679	0.587	0.745	0.860	0.785	0.835	0.786	0.793	0.777
Monitor	None	5	10	6	2	2	10	9	1	1	46
	LCD	2	18	40	45	55	69	82	97	110	518
	Degree of Concentration	0.286	0.643	0.870	0.957	0.965	0.873	0.901	0.990	0.991	0.918
Battery	Customized	3	6	9	13	18	29	37	55	60	230
	Standard	4	22	37	34	39	50	54	43	51	334
	Degree of Concentration	0.429	0.214	0.196	0.277	0.316	0.367	0.407	0.561	0.541	0.592
Interface	Customized	7	28	45	47	46	16	6	2	2	199
	USB	0	0	1	0	11	63	85	96	109	365
	Degree of Concentration	0.000	0.000	0.022	0.000	0.193	0.797	0.934	0.980	0.982	0.647
Average of Concentration Degree		0.429	0.464	0.522	0.617	0.697	0.761	0.815	0.866	0.882	—
Product Volume	Industrial Production Volume ( ×10000 )	9	102	180	392	612	1,356	1,666	2,660	3,907	—
Price Information	Price per Pixels (\$100 per mega pixel)	35.09	21.96	14.57	7.70	5.92	3.86	3.19	2.60	1.55	—

Data Source: Created by the author, based on data obtained from digital camera manufacturers

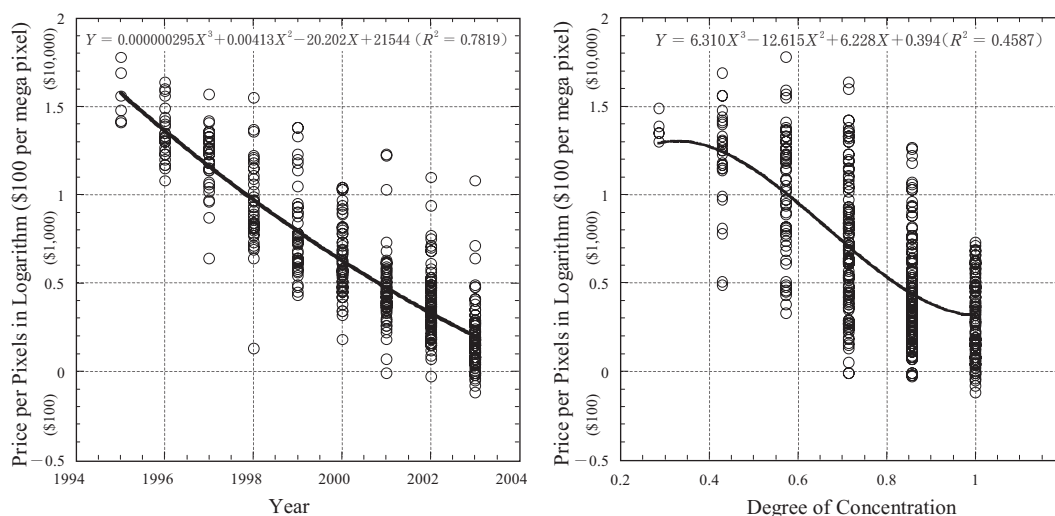
Similarly, memory cards are used as the storage medium, and we can see that LCD and USB interface specifications are dominant. However, finder and power specifications were split between optical/non-optical finders<sup>12</sup>, and specialized batteries versus general purpose batteries, with neither commanding a dominating share. This is because general purpose batteries are too large for compact type digital cameras, so specialized thin batteries have been developed. The average value for the degree of concentration was 0.429 in 1995 and 0.882 in 2003, allowing us to confirm that homogenization is prominent. Let us now review

12 The optical finder is the window which you look through in a camera to view the subject being photographed. In film cameras these are simply called "finders," but since an LCD monitor can be used as the finder in digital cameras, the term optical has been added to differentiate the two. Here, filters that work together with the photographed image, in other words finders where the image is seen through a lens, are called optical finders. An example is a finder that zooms the image when the camera operator uses the zoom feature on the camera. There are also digital finders, for these, an LCD is attached to the finder and the actual image is displayed.

the issues surrounding declines in price for digital cameras. First, key modules such as memory, LCD and power units used in digital cameras are also used in large volumes in other digital device industries, and it is difficult to presume that the 3% consumption attributable to digital cameras has any strong effect on economy of scale or experience effect. Also, from 1999 to 2001, increases in mobile phone production, has made it difficult to obtain flash memory key modules. Actually, the price has been rising,<sup>13</sup> making the price decline of digital cameras not easy to explainable due to economies of scale or experience effect of key modules.

To consider the factors behind digital camera price decline, Figure 2 shows the results of an aggression analysis in which price (logarithmic) is set as the dependent variable and homogeneity and generation change as the independent variables. The regression analysis is a regression with 3 expressions for all digital cameras sold for time trend (year) and the degree of homogenization as the objective variables and price as the subordinate variable.<sup>14</sup>

**Fig. 2 Product Homogenization and Price Decline**

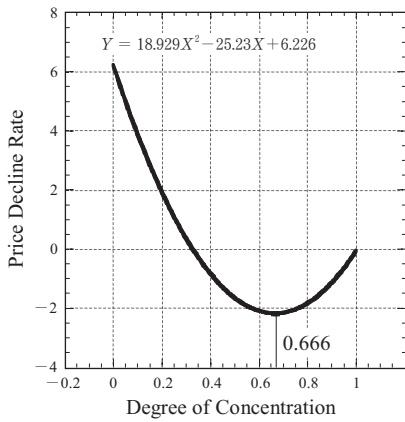


Data Source: Created by the author, based on data obtained from digital camera manufacturers

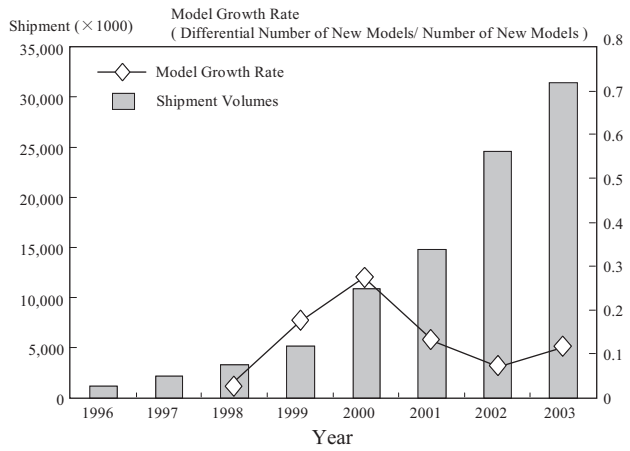
13 On Page 336 is of Nikkei BP Consulting's "Digital Appliance Market Overall Outlook" is shown the shift in flash memory market prices, and the price for 8M, 16M, and 32M used in digital cameras has increased from 1999 to 2000.

14 Of the 7 key modules shown in Table 2, for the dominant design features of fixed lens, RGB converter, external storage medium, optical finder, LCD monitor, general purpose battery, and USB interface, a calculation of how many digital cameras sold contain these features was calculated and a regression analysis was performed together with price. Namely, if all dominant designs were included the degree of homogenization is 1; if only 1 is included, the degree is 0.143. Also, for the dummy year variable, each year from 1995 when digital cameras were first sold until the target year of 2003 were added to the dummy variable and regression analysis was performed.

**Fig. 3 Product Homogenization and Price Decline**



**Fig. 4 Shipment Volumes and Model Growth Rate**



Data Source: Created by the author, based on data obtained from digital camera manufacturers

Since the price curve due to time trend shows a tendency for the price to fall as time progresses, a scale of economy or experience effect is suggested. The relation between the degree of concentration and price in the right-hand diagram in Figure 2 draws a backward-S curve. Then, since commoditization is probably most prominent at the point where the price declines the fastest, a plot to obtain the differential is shown in Figure 3. This Figure indicates that the price decline rate is greatest when the specification degree of concentration is 0.666. Let us consider this point. Because degree of concentration is calculated based on the 7 specifications shown in Table 1, instead of a continuous value, we would obtain the values near 0.666: 0.57 or 0.71. There are 303 models with these degrees of concentration that distributed from 1996 to 2003. It is characteristic that USB interface and RGB color system, the specifications which completely dominate the marketplace in 2003, are undergoing transition here, with values of 65% and 71% respectively. Furthermore, the ratio of 1/1.8 and 1/2.7 inch image sensors, which would later become the standard sizes, account for 28% and 25% respectively, and considering that these two sizes account for 72% of the total in 2002, this verifies our assumption that the period can be thought of the period where the transition to “dominant design” occurs. Namely, instead of the point in time where full modularization and homogenization have been taken place, the most rapid price declines are occurring immediately before then.

Furthermore, in order to investigate the relationship between the rate of new digital camera model introduction and commoditization, Figure 4 shows the changes in sales volume and growth rate of new models on a yearly basis. This figure shows that new model growth rate peaked in 2000 and has shown a slowing trend since then, and since then, the per model unit sales have been growing largely. As is also apparent from Table 1, this coincides with

period where primary color filter and USB interface are dominant and homogenization becomes prominent.

To investigate in detail the relation between time trend and specification concentration, a multiple regression analysis was performed with price as the subordinate variable. Those results are shown in Table 2, and of the analysis results, both degree of concentration and time trend were significant at 1%. Also, significant correlations at 1% were observed for price, time trend, and concentration. Here, the VIF value (Variance Inflation Factor) in multiple regression analysis was 1.591, which does not indicate multicollinearity. Thus, the factors of time trend and homogeneity each independently contributed to price decline.

In the digital camera industry, we have shown that even as specifications were improving, price declines were significant. Here, let us verify the importance of platform concept comprising of lens and image sensor. The most difficult component in digital camera production is the lens and image sensor combination. To minimize distortion around the edges of the image and ensure even pixilation across the entire image, lens, the image sensor and finder are joined as a single optical platform. By handling the modules that deal with optics as a single large module, or platform, design quality and production quality can be maintained at a certain level and production yields are improved. This results in large modules having common interfaces, but internally they use integral designs developed by each manufacturer. If we call commoditization the phenomenon of rapid price declines over short periods of time, it becomes necessary to investigate the relation between homogenization and commoditization of product specifications between market entrants that occurs due to platforming.

**Table 2 : Regression Analysis Results**

Pearson's Correlation Coefficient N = 525

	Price Index	Degree of concentration	Time trend
Price Index	1	-.667**	-.882**
Degree of concentration	-.667**	1	.610**
Time trend	-.882**	.610**	1

\*\*Correlation coefficient is 1% significant

**Multiple Regression Analysis Results**

Dependent variable: Price Index N = 525

Coefficient of determination	Model	Regression corefficiency		T value	Significance probability
		B	Residuals of regression		
$R^2 = 0.803$	(constant)	1.748	.038	45.431	.000
	Degree of concentration	-.507	.060	-8.415	.000
	Time trend	-.140	.005	-30.936	.000

VIF value was 1.591, which does not indicate multicollinearity.



**Table 3 : Correlation Analysis Results for Image sensor size and Degree of Concentration**

CCD Size (inch) Year	1/1.8		1/2.7		1/3.0		Others		Pixels (mega)	Price per Pixels (\$100 per mega pixel)
	Number	%	Number	%	Number	%	Number	%		
1995	0	0.00	0	0.00	2	28.57	<b>5</b>	<b>71.43</b>	36.00	35.09
1996	0	0.00	0	0.00	<b>16</b>	<b>57.14</b>	12	42.86	39.71	21.96
1997	0	0.00	0	0.00	<b>25</b>	<b>54.35</b>	21	45.65	48.52	14.57
1998	0	0.00	<b>14</b>	<b>29.79</b>	<b>16</b>	<b>34.04</b>	17	36.17	109.60	7.70
1999	0	0.00	7	12.28	8	14.04	<b>42</b>	<b>73.68</b>	160.73	5.92
2000	<b>23</b>	<b>29.11</b>	<b>20</b>	<b>25.32</b>	10	12.66	26	32.91	223.17	3.86
2001	<b>30</b>	<b>32.97</b>	<b>30</b>	<b>32.97</b>	8	8.79	23	25.27	279.96	3.19
2002	<b>32</b>	<b>32.65</b>	<b>39</b>	<b>39.80</b>	1	1.02	26	26.53	323.14	2.60
2003	<b>23</b>	<b>21.10</b>	<b>44</b>	<b>40.37</b>	0	0.00	42	38.53	384.64	1.55
Total	108	19.22	154	27.40	86	15.30	214	38.08		
Correlation Coefficient with price per pixels	<b>-0.778**</b>		<b>-0.917**</b>		<b>0.823**</b>		<b>0.577</b>		*5% significant **1% significant	
Significance probability	<b>0.014</b>		<b>0.001</b>		<b>0.006</b>		<b>0.104</b>			

Data Source: Created by the author, based on data obtained from digital camera manufacturers

To do this, we analyzed the details of the key image sensor module. Table 3 shows the correlation analysis results for the degree of concentration for image sensor size, and price. When digital cameras were first commercialized in 1995, they used image sensors from video cameras. Afterwards, 19 different sizes of image sensors were used in digital cameras until 1999, 1/2.7 and 1/1.8 inch image sensors rapidly became prevalent after 2000, and by 2002 these two sensor sizes accounted for over 70 percent of the digital camera market. Price (shown logarithmically) in the table has a significance of 5% for 1/1.8 inch, and 1% for 1/2.7 inch image sensors, and for 1/3.0 inch image sensors shows a positive correlation with 1% significance. Generally, an increase in price from using what should be a cheaper 1/3.0 inch image sensor can be thought of as being due to the fact that it does not contribute to the development of an optical platform. Conversely, statistical data indicating that using 1/1.8 and 1/2.7 inch image sensors helps to lower prices can be interpreted as being attributable to the homogenization of reusable platforms. In this way, the concentration of image sensor size is shown to have a strong correlation with price decline. However, even here, the impact of economy of scale due to volume expansion of 1/1.8 and 1/2.7 inch image sensors cannot be denied.

In this paper, we analyzed the commoditization of digital cameras. The results allowed us to presume that price decline due to time trend is attributable to economies of scale and experience effect, and to confirm the trend of price declines in digital cameras. Furthermore, we verified that concentration of specifications up to a certain point due to product homogenization accelerates price decline. In other words, the results of this analysis, which show that the key image sensor module of digital cameras being concentrated in a few sizes for the whole industry and that the degree of concentration of other specifications also results in



significant price reductions, support the establishment of Hypothesis 1: “When key module product capabilities dominate the marketplace, product homogenization more easily occurs. Industry homogenization accelerates commoditization and the establishment of Hypothesis 2: “Homogenization is caused by the development of similar platforms by competitors, which accelerates commoditization.”

## 6. Analysis of Product Competitive Advantage

We showed that the occurrence of product homogenization and the migration to a platform architecture in the digital camera industry, and the occurrence of commoditization. We shall conclude this paper by discussing in what way manufacturers in this competitive environment should manage their product strategy and improve the competitive strength of their products.

We analyzed the competitive makeup of the digital camera industry. Most companies were conducting technological research on digital cameras in the late 1980s, but at the time nobody expected that they would replace silver-halide photo cameras.<sup>15</sup> In early initial stage, product development had not yet delivered modules or a component market, so it was necessary to improve product performance through trial and error and the use of proprietary modules. Then, after core customer demands were satisfied and there was further capabilities were being developed, the key module market was established, expanding horizontal industrial structure. The module market developed from 1995 to 2000, and during this period, manufacturers worked to improve capabilities through various module designs. In the digital camera industry, at first modules from video cameras were used for digital cameras, but eventually key industry-specific modules such as image sensors and image processing engines began were available on the market. The formation of this module market made it possible to shift manufacturing operations overseas, and rapid declines in product price through increased production efficiencies began to drive product commoditization. During this period, as shown in Table 3, 1/1.8 inch and 1/2.7 inch image sensors had a 60% share of the overall market,

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15 By the late 1980s companies like Fuji Film, Sony, and Kodak had already begun technological research aiming to make digital camera breakthroughs. We conducted interviews with Research Director Mr. Nanai, who was responsible for Kodak’s digital camera research and development from the late 1980s until the birth of the digital camera in 1995. “At the time, nobody even thought that digital camera quality would every reach the quality of silver-halide film. We conducted our research whole heartedly assuming that it would be applied to only specialized applications such as test shooting in photo studios. Kodak developed a 1 megapixel CCD before anyone else, but even if we thought it had an advantage we were unable to take control of the market. The sales and profitability of silver-halide film at the time was so great in comparison to the sales of the first digital camera which were so small, we thought that it was a miserable opportunity.” In other words, the first digital cameras were not thought as a replacement for silve-halide photo cameras as they are today, but were developed for specific applications.

and after 2000, market entrants began creating optical platforms from combinations of image sensors of this size and lens modules and viewfinders, and together with the image sensor improvements, continued to increase pixel capacity. In this way, commoditization occurred for compact digital cameras with standard component fixed lenses built from these platforms.

The objective of this paper is to examine the commoditization caused by rapid price declines and reveal the factors behind this. The analysis results showed that the modules used in the digital camera industry are remarkably uniform, and market entrants compete by developing similar optical platforms using lens modules, image sensors, and graphics processing engines. In this type of marketplace, commoditization occurs as the result of homogenization, and manufacturers are increasingly finding it hard to secure a fair profit.

We would like to close this paper by pointing out the findings we have made. First, the digital camera industry is characteristic in that it has a partial horizontally specialized structure with set manufacturers and device manufacturer aspects. Modules designed by set manufacturers are already resolving many product design issues, and they are easily integrated into products. Problem resolution is quickly fed back into products making for extremely easy to use products. Also, as long as the device purchased from that firm, the risk of patent violation is low. Furthermore, this problem resolution capital makes it easier to sell modules to new market entrants from China or elsewhere, increasing the market supply in a short time. On the other hand, supplying set manufacturers can maintain their product selling price if they limit the sale of modules, but since the production investment for digital device modules is extremely large, and they know that they cannot recover these fixed costs with only their own sales volume, it is difficult to avoid making a decision to sell their modules on the market. In this way, set manufacturers selling modules face a dilemma wherein they contribute to market growth but they also cause commoditization. In order to increase profits in a commoditized industry, strategies to either establish profits only from module sales or to internally develop key modules are effective.

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## **IN DEFENSE OF THE AUTONOMY IN NEOLIBERAL ECONOMIC POLICY REFORM IN LATIN AMERICA<sup>†</sup>**

**NOBUAKI HAMAGUCHI** *Kobe University*

### **Abstract**

This article addresses the question of how do we implement necessary economic policy reform in Latin America. A search for an alternative of the unconditional liberalization should be developed in the direction to take full advantage of economic opportunities from the enhanced market mechanism and globalization, rather than denying these irreversible processes. The government should play active role in keeping tight a rein on the process of adaptation to the globalization, without renouncing the autonomy in the conduct of economic policy and institutional reform which should be managed for improve functioning of the market on the basis of the local specifics. Especially, consolidation of macroeconomic stability and harmonization of social conflicts are major challenge to obtain autonomy. The globalization process will be more unbiased by letting developing countries to assume more active role in global institutional building, which should be based on the awareness of diversity and justice.

*JEL Classification:* F02, F43, O24

*Keywords:* globalization, neoliberalism, Latin America, stabilization, economic growth

### **1. Introduction**

This article addresses the question of how to implement necessary economic policy reform in Latin America. The aim of such reform is to strengthen the role of the market mechanism as the best guide to economic development. However, we argue that unconditional liberalization may generate high degree of instability in the real sector, due to some nonlinear

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Corresponding Address:

Nobuaki Hamaguchi

Research Institute for Economics and Business Administration (RIEB), Kobe University  
2-1 Rokkodai-cho, Nada-ku, Kobe 657-8501 Japan

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natures of the economic growth process. By taking into account as much local specific conditions as possible, we should be able to maintain the autonomy of policy implementation.

The remaining part consists as follows. In the next section, we review the historical background of the developmental regime in Latin America until the neoliberal reform was introduced. In Section 3 we evaluate the outcome of the reform and point out the question of the instability in the real sector. This question is further elaborated in Section 4 with the argument of the importance of autonomy in economic policy. Then we shed light on the necessity of considering local specific conditions in order to enhance the policy autonomy in Section 5. Finally, Section 6 concludes the discussion.

## 2. Historical roots

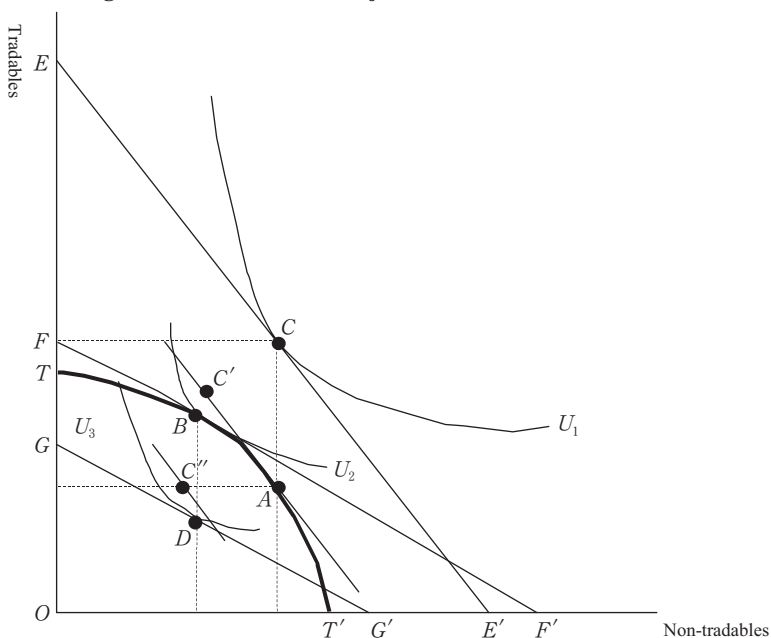
Once upon a time, Latin America was governed by wide variety of economic development regimes in which the state exerted strong control over an allocation of resource and price adjustment. Such systems date back to the traditional populist governments of Cardenas, Peron, and Vargas during the period between 1930s and 1950s. Initial economic growth, even if existed, was short-lived not only because the government-led resource allocation missed the consideration on the efficiency but also because the fiscal imbalance due to excessive public spending led to high inflation. Economic failure lured the populists to get more radical in income redistribution to secure the support from the popular class. Their propensity to offend the private property right in so doing brought serious social divide and class conflicts.

In 1960s, the economic and social turmoil run into military coups in several countries of the region. In fact, military interventions had not been rare in Latin American history since their independence but they used to govern only temporary until the social and economic order would be restored. It was not the case at that time. The military regime came to power to stay much longer. The U.S. was also supportive to apparently authoritarian and undemocratic regimes because the spread of the influence of the communism in the Western Hemisphere after the Cuban revolution was more seriously concerned.

The military governments concentrated the political power to the technocrat bureaucracy which advocated the strengthened version of the state-led import-substitution oriented to heavy and chemical industrialization. The role of the state was thus even enlarged under the authoritarian regime with high tariff and non-tariff protection for the domestic industries and direct participation with state-owned enterprises.

While the domestic savings remained scarce, the pursuit of this development strategy was made possible thanks to the mobilization of the foreign savings. Incidentally, there were abundant liquidities in the international capital market after the oil boom in the 1970s. However, when the second oil shock hit the world economy, industrialized countries squeezed the liquidity to contain inflation. With abrupt interest rate hike, it became no longer viable

Fig. 1 Macroeconomic Adjustment in the 1980s



(Source) Adapted from Corden (1971) Chapter 1, Appendix.

for most of Latin American countries to continue servicing the piled external debt. The declaration of the moratorium by Mexico in 1982 triggered the sudden contraction of the financial inflow to the region which forced the other countries to follow suite.

Thus, Latin America entered the decade-long adjustment in the 1980s. The policy package prescribed by the International Monetary Fund (IMF) based on the absorption and switching approach. (Corden, 1977) Its main logic can be illustrated by Figure 1. The pre-adjustment economy is expressed as the combination of supply at A on the production possibility frontier  $TT'$  and consumption at C where the budget constraint  $EE'$  and the indifference curve of utility level  $U_1$  are tangent. The expenditure measured by non-tradable goods is  $OE'$  and the slope of this line expresses the relative price between two goods. The point A corresponds to an economy in which the politically set relative prices induce more production of non-tradable goods including import substituting industrial sector than tradable goods such as primary commodities. Thanks to the availability of the external finance, this economy is able to realize greater consumption than the income from domestic production. Thus the distance CA expresses the demand-supply gap (current account deficit). If this situation is maintained, the economy would cumulate external debt.

Now suppose that the external finance is not available anymore. Since the expenditure cannot exceed the income, the consumption should be determined at point  $C'$  unless the relative price does not change. Yet, the point  $C'$  is not sustainable because the economy still

runs current account deficit expressed by the vertical distance  $AC'$ . Equilibrium can be reached if the relative price will be changed to move the production to  $B$ , producing more tradable goods and less non-tradable goods. The government can bring the economy to this point by the relative price switching policy with the depreciation of the currency in real terms. Notice that the utility level  $U_2$  achievable at  $B$  is lower than  $U_1$  but it is still better than achieving external balance without switching because such equalization of supply and demand of tradable goods requires deep expenditure (=absorption) reduction to get to the point such as  $C''$ . At this point the economy incurs serious cost of unemployment (the economy is interior of  $TT'$ ) with the utility level unambiguously lower.

In fact, the policy recommended in 1980s to Latin America by the creditor countries and the multilateral financial institutions was a bitter one. They were even obliged to curtail the absorption further to  $GG'$  level and generate the current account surplus  $BD$  to comply with the required net resource transfer to abroad. In the perception of both debtors and creditors, the contraction of the international capital market should have been temporary and the sooner that a country would regain its creditworthiness, the more likely it would be able to return to the market. Yet, such premise was proved to be unfounded. The finance inflow to Latin America continued to be deterred because of the deterioration of the economic condition of the debtor countries. One critical issue was the devaluation-inflation spiral. Devaluation gave inflationary impact and the inflation invalidated the relative price switching effect requiring further devaluation. The absorption control was practically inoperative to control inflation but it was effective in hindering the potential growth because it eroded per capita capital stock due to the lack of new investment. Over the period, the real economic growth remained quite low, the household income declined, and the poverty problem got accentuated. Not being able to see the other side of the dark tunnel, wide spread adjustment fatigue in the region made several countries to abandon the adjustment program to resort to moratorium since the fresh money would not flow into Latin America any way. Then, the economic policy departed from the economic orthodoxy to the heterodoxy.

There was a short revival of the traditional structuralist thinking in the late 1980s. According to the proponents of the heterodox policy, the main cause of the inflation is not the excess demand as in the orthodoxy's proposition. They emphasize the dynamic mechanism of the price adjustment propelled by the conflict between the capital and the labor. Namely, the labor demands the full adjustment of their wage to compensate the loss of their purchasing power from inflation. Firms may raise their prices by adding the labor cost increase. In their view, since the inflation may progress because such an interaction generates self-reinforcing effect, the absorption control alone will not do the job of stabilization. Instead, any measure to control the inflation should involve price and wage control. This type of policy was widely experimented because of the advantage of less social cost of adjustment, at least in short-term.

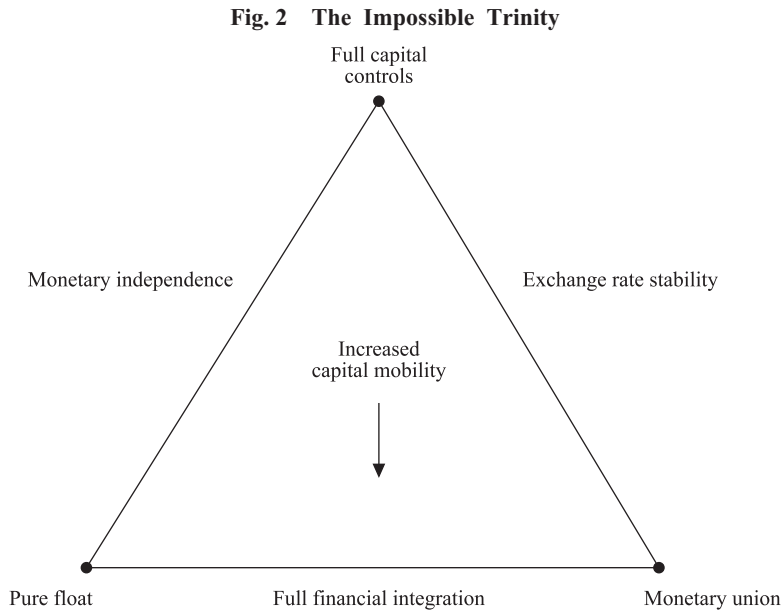
However, such stabilization policies were highly problematic because they ignored the importance of sound fiscal and monetary policy. When the price control was eventually lifted without having consolidated the lax fiscal and monetary policies, the inflation returned with entire force. The government began to lose the control of the economy and the economy was drifted toward the hyperinflation. Undoubtedly, the economic turbulence affected most the lower income class.

Having tested the Latin American structuralist economic model which ended in devastating failure, it became a consensus among both Latin American policy makers and the international financial institutions that macroeconomic stability requires disciplined fiscal policy and conservative monetary policy. Around the beginning of the 1990s, such ideas were formulated as the Washington Consensus. The economic policy of the region made a big swing toward the orthodoxy.

The Washington Consensus aimed at more profound economic reform than the previous orthodox absorption-switching approach. It was understood that the fiscal imbalances had deep structural causes that could not be solved by just cutting the spending. In most cases, privatization of publicly owned enterprises and changes in the regulation protecting the vested interests were advised. The revenue from privatization and the debt restructuring arrangement by the Brady Plan contributed to reduce the debt service burden at the beginning of the reform process. The governments established a numerical target of the fiscal balance, usually in terms of the primary surplus (the balance before debt interest payment) in order to show the ability to pay and reduce the country risk.

In the monetary policy sphere, a nominal anchor was established to increase the transparency and predictability. Since the hyperinflation already made people's asset holding virtually dollarized, it was natural to select the nominal exchange rate as an anchor. Exchange rate was either strictly pegged to the dollar or allowed to float only within a narrow band. As being depicted by Frankel (1999), reproduced in Figure 2, when an economy chooses to maintain the exchange rate stability with full financial integration to the world market, it should abandon the monetary policy independence. This intensified the interest rate fluctuation in response to the vulnerable external economic environment and erratic capital movement. In case of the foreign exchange shortage due to the terms of trade shock or the lack of financial liquidity, interest rate should rise to induce capital inflow in order to restore the balance of payment. Alternatively, this job could be done by tightening fiscal policy which reduces imports. Within this framework, it was unavoidable the monetary and fiscal policy to have pro-cyclical characteristics which was translated into the high degree of variance of economic growth and employment. Thus, the vulnerability of the real economy increased in exchange for the financial stability.





### 3. Results of the Policy Reform

The struggle for controlling hyperinflation in the 1980s came to an end by the mid 1990s. As shown by the Table 1, the inflation dropped sharply between 1990 and 2002. We can also see in Figure 3 that in 1990s Latin America achieved an economic growth which was higher and less fluctuating in comparison with the situation in the 1980s. Judging on this ground, the overall evaluation of the stabilization should be positive.

Still, the economic growth in the post-reform era has been disappointingly slow except for Chile. Moreover, the growth performance has shown high degree of instability. Latin America has experienced several currency crises since the beginning of the 1990s: such as the cases of Mexico (1994), Brazil (1999), Ecuador (2000) and Argentina and Uruguay (2001). According to the economic theory, weak fundamentals (Krugman, 1979) and self-fulfilling expectation (Obstfeld, 1996) are direct reasons leading to a currency crisis. In the particular case of Latin America, the weak fundamentals come from the trauma of the 1980s. In order to illustrate this point, recall an economy in the lower right corner of the triangle of Figure 2. With fixed exchange rate and full integration to the international financial market, the foot-loose capital demands high interest rate because the inherited low credibility of the price stability. The government also inherited the condition of high indebtedness which tends to push the fiscal balance target (primary surplus) upward because the government should comply with the enlarged interest payment due to the high interest rate. Hence, although the

**Table 1 : Latin America — Socio-Economic Indicators 1990-2002**

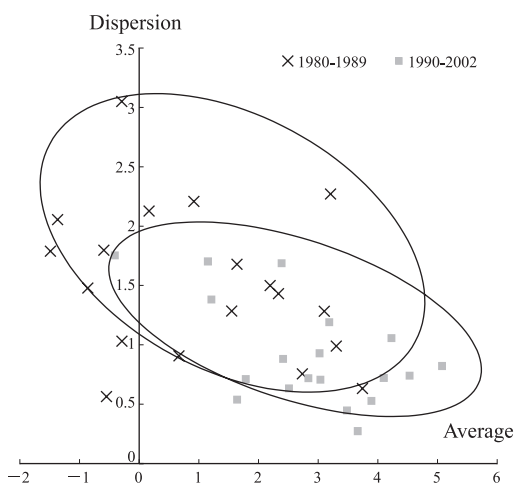
	Consumer price change (Monthly average, %)		Average real GDP growth rate (%)	Urban unemployment (%)		Infant mortality ratio*		Female labor participation (%)		Population under poverty line (%)		Income distribution**	
	1990	2002		1990	2002	1985-90	1995-2000	1990	2002	1990	2002	1990	2002
Argentina	24.92	2.9	0.7	7.4	19.7	27.1	21.8	36	46	21.2	41.5	2.3	3.1
Bolivia	1.28	0.2	1.2	10.2	8.7	90.1	66.7	47	57	53.1	52	3.2	4.3
Brazil	26.53	0.99	1.0	4.3	7.1	55	42.2	45	53	41.2	34.1	4.6	4.6
Chile	2.03	0.23	3.8	7.8	9	18.4	12.8	35	42	38.4	20.1	3.1	3.0
Colombia	2	0.56	0.4	10.5	17.6	41.4	30	48	57	52.7	56.6	4.2	3.3
Costa Rica	2.03	0.77	2.0	5.4	6.8	17.4	11.8	39	46	24.8	17.5	1.5	2.1
Ecuador	3.41	0.75	0.5	6.1	8.6	57.1	45.6	43	53	62.1	49	1.8	2.2
El Salvador	1.48	0.23	1.9	10	6.2	54	32	51	51	45.8	39.4	2.1	2.5
Guatemala	1.54	0.51	1.1	6	3.6	65	46	43	58		44.3	3.4	2.6
Honduras	2.62	0.65	0.3	7.8	6.1	53	35	43	47	69.8	66.7	4.3	3.5
Mexico	1.51	0.46	1.4	2.7	2.7	39.5	31	33	45	42.1	32.2	2.3	2.1
Nicaragua	50.58	0.33	0.5	7.6	11.6	65	44.6	44	52	66.3	63.8	3.7	3.3
Panama	0.13	0.16	1.4	19.3	16.1	29.6	23.7	43	54	39.6	25.3	2.6	2.3
Paraguay	3.09	1.15	-1.2	6.6	14.7	46.7	39.2	50	57	42.2	42.7	1.6	2.9
Peru	43.69	0.13	2.0	8.3	9.4	65	42.1		54		42		2.5
Uruguay	7.15	1.94	0.4	8.5	17	22.6	17.5	44	50	17.8	15.4	1.6	1.3
Venezuela	2.63	2.29	-0.7	10.4	15.8	26.9	20.9	38	55	40	48.6	1.7	2.2

\* Death before completing one year among 1,000 new born.

\*\* (Income earned by upper 10% class)/(Income earned by lower 40% class).

(Source) CEPAL, 2004.

**Fig. 3 Average and Dispersion of Growth Rates in Latin America 1980s and 1990s**



(Note) The average is non weighted average of growth rates of real GDP and dispersion is a standard deviation from the mean. The sample consists of eighteen countries include Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Haiti, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela.

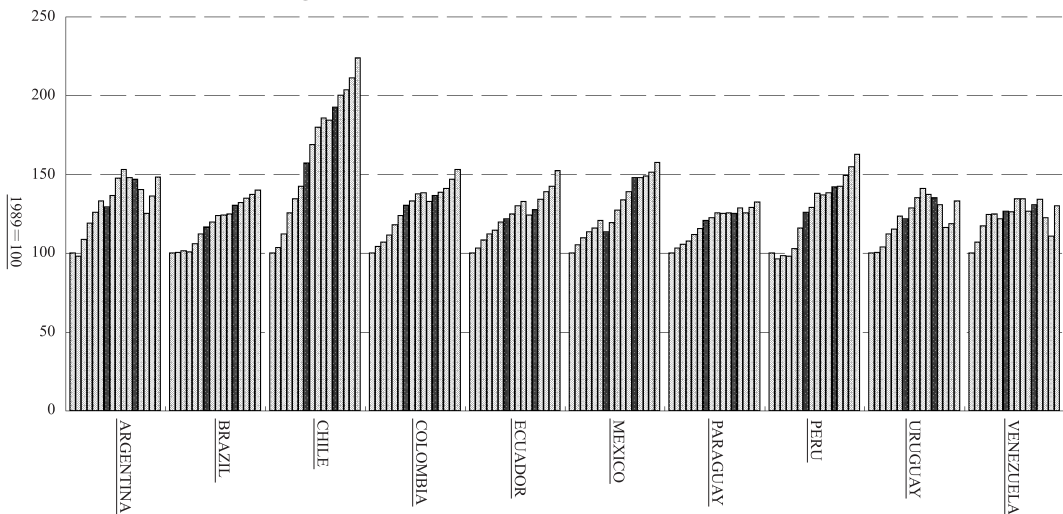
(Source) CEPAL, 2004.

impossible trinity obliges the government to abandon the autonomy in monetary policy, there exists strong temptation to control the interest rate lower. The policy inconsistency thus created (to seek exchange rate stability, monetary policy independence, and open capital account at the same time) should pave the way to speculative attacks. After this actually happened, Mexico, Brazil, Uruguay, and Argentina abandoned the nominal exchange rate anchor and adapted free float exchange rate regime with inflation targeting monetary policy rule, represented by the lower left corner of the Figure 2. On the contrary, Ecuador opted for full dollarization remaining in the lower right corner and becoming more explicit in abandoning monetary independence by adapting dollar as the currency.

In Figure 4 we can see that economic growth has been not only slow but also discontinuous. In Brazil and Peru a steady growth started to be seen only after 2000. Argentina experienced fall of the real GDP when she was hit by the Tequila shock in 1995 and the sequence of crises of the Brazilian Real and its own Peso (1999-2002). Colombia and Ecuador also felt the impact of the emerging market crises around the turn of the century. Mexico's growth by the combined effects of the post-Tequila shock recovery and the benefit of the participation in the North American Free Trade Agreement clearly lost momentum in the 2000s. In Paraguay, Uruguay, and Venezuela, there was little progress in income over the fifteen years. In this figure Chile again appears as an exceptional case.

Ironically, the stabilization of inflation is coined by the increased instability in growth and employment. As being demonstrated in Table 1, the unemployment rate is quite high in all countries. Even in Chile and Costa Rica where the growth rate was relatively higher the

**Fig. 4 Real GDP in Latin America: 1989-2004**



Note: Darker bars indicate 1995 and 2000.  
 Source: IMF, International Financial Statistics

employment did not fully recovered from the decline in the 1990s. According to IDB (2003), volatility in labor market reflects effects of the stabilization. During the high inflation period, macroeconomic shock was absorbed in real wage fluctuation by allowing the nominal wage adjustment lag and the employment could be preserved. With price stability, such mechanism should be replaced by the adjustment of employment. Hence, macroeconomic vulnerability is more directly translated into employment vulnerability. Rodrik (2001) points out the influence of the labor market flexibilization, which took place as a part of the structural reform, appearing as a sharp reduction of the unionization rate, workers' loss of job security, and extended informal market.

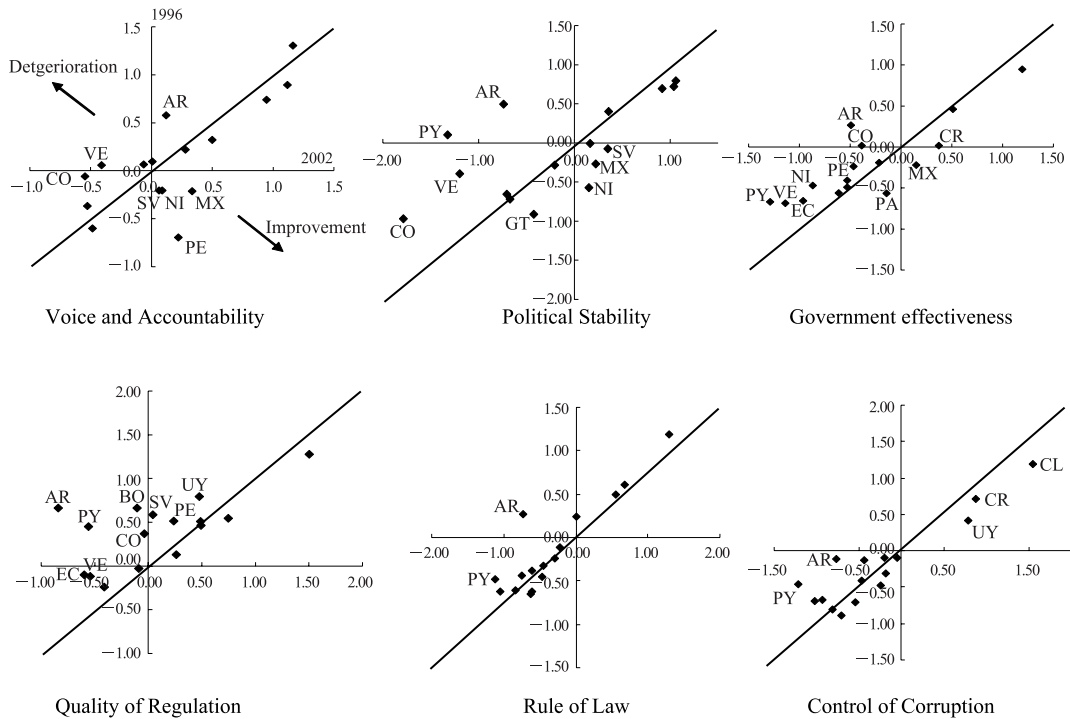
This real economy vulnerability was mostly seriously felt in the persistent incidence of poverty in Table 1. Infant mortality rate was successfully reduced but the ratio of the population living under the poverty line has increased in Argentina, Colombia, and Venezuela which underwent serious political crises. There were mixed results regarding the income distribution. We also see the rising female participation in the labor market in many countries, implying increased necessity for a woman to get a job as a survival strategy of Latin American households.

The growing insecurity redirects us to the issue of how the policy reform was implemented, which is as important as which reform was implemented. Recently, IMF (2005) points out that "good institutional outcomes appear to be robustly associated with greater economic openness and the degree of accountability of the political executive". (IMF, 2005, p.152) The causality in such association is mutually reinforcing. Namely, stabilization and growth are more likely to be achieved under good governance and the institutional building can be promoted under good economic condition.

In this view, Figure 5 shows some interesting facts about the development of the quality of institutions in Latin America, based on the internationally comparable database compiled by World Bank economist Daniel Kaufmann's research group (Kaufmann et al., 2004). These graphs exhibit Kaufmann's six governance quality indices (voice and accountability, political stability, governance effectiveness, quality of regulation, rule of law, and control of corruption) for Latin American countries plotting 1996 score on the vertical axis and 2002 score on the horizontal axis to make a comparison between the two years. They show that there was an improvement in score when a country is located at the northwest from the 45-degree straight line and deterioration toward southeastern direction in the quality of governance. These indices are deviation from the mean of 199 countries normalized to be zero. This means that a score should be interpreted as how much a country is different from the world mean. So changes in numbers do not reflect changes in quality of governance in absolute term but they simply tell us how evaluation of one country changed in relative sense.

For Latin America in general, we can point out that these plots are concentrated in the first and fourth quadrant regarding "Voice and Accountability" and "Political Stability",

**Fig. 5 Governance Quality of Latin American Countries**



(Source) World Bank Institute, *Aggregate Governance Indicators Dataset* ([http://www.worldbank.org/wbi/governance/gov\\_data.htm](http://www.worldbank.org/wbi/governance/gov_data.htm))

implying that countries are evaluated above the world mean and/or showed improvements during this period in these two aspects. On the other hand, scores are clustered in the third quadrant in regards to “Government Effectiveness”, “Rule of Law”, and “Control of Corruption”, suggesting structural problems involving these aspects. There were clear tendency of deterioration of the governance quality in many aspects in Argentina, Colombia, and Venezuela. We can also point out that Paraguay also suffered from worsening in “Political Stability” and “Rule of Law”, and “Control of Corruption”. This tendency coincides with poorer economic performance in these countries, suggesting meaningful link between the economy and institution.

In summary, the financial stability in the 1990s has encountered vulnerability in the real economy. The high real interest rate and the fiscal austerity kept the domestic demand at low level. The trauma of the 1980s is still vivid in the public debt stock. The occasional upswing of the interest rate, influenced by external economic environment and the loss of the autonomy to implement anti-cyclical monetary policy, imposed huge difficulty in the debt management. Even though the policy change from the nominal exchange rate anchor stabilization policy to the inflation targeting is expected to allow monetary policy independence, the

interest rate cannot be reduced easily, owing in part to the lasting memory of the inflationary economy and the large outstanding public debt. Adjustment cost is still concentrated in the employment. It can be also suggested that weak institution tend to generate more vulnerable economic condition.

#### **4. Development as Autonomy**

As we analyzed above, the economic reform in Latin America has had both upside and down side. Difficulties may arise because of the sizable existing public debt and institutional weakness, which may induce the governments to interrupt the continuity of the reform program. Most common criticism is given to the one-size-fits-all stance of the proponents of the reform which do not take into consideration the political viability influenced by each country's institutional specifics, geographical nature and historical pathways. For example, Joseph Stiglitz, who was the central piece of the Washington Consensus as the Chief Economist of the World Bank, harshly criticized the way that the IMF considers taking accounts of country specifics is a waste of time and eventually caused chaotic situation in a number of countries.

There is growing amount of literature criticizing such simple-minded pro-liberalization reform, labeling it as a neoliberalism. The point of discontent is low degree of economic and political sustainability of such policy recommendations and social conflicts when they are push ahead without high regards to diversified local values. Yet, the neoliberalism entered in Latin America after the economic crisis in the 1980s and has stationed there since then to fill the vacuum of the economic policy guideline after the devastating failure of the interventionism.

Although the anti-neoliberalism criticism should be taken, if its counter policy recommendation points to the other extreme denying the economic principle of adjustment through the market mechanism, it is unrealistic and not useful. We know that the market mechanism is never perfect, but it still is the best guide for economic agents to make decisions more efficiently and non-discriminatorily. In the era of globalization, opportunities that the market can offer should provide wider variety of choices.

Globalization can be understood as a process through which a dimension of the market is being expanded on the earth surface, intensifying transactions of goods and services across borders. On the other hand, there is a power of globalism intending to impose a particular kind of socio-economic system to the rest of the world as the global standard. Thus, the distinction between the globalization and the globalism should be clear. Regardless of what the politically intended globalism may pursue, globalization is irreversible owing to the technology development in communication through the Internet and in transportation making delivery time shorter and shorter. My point is to emphasize that an economic policy should

take advantage of the globalization to strengthen the adjustment capability of the market and the globalization to open the access to wider market should be will offer. A country should adapt itself to the globalization maximizing benefit and minimizing cost from them, by maintaining autonomy in deciding the speed and scope of policy reform and desirable form of institutions based on its specific local context.

Obviously no one can defend that the market mechanism is a panacea. None of us who study economic theory may think that the market behaves perfectly. Scale economies entitling monopolistic price making power to a dominant big company are the typical examples. Besides, asymmetry of information and moral hazard of whom trying to free ride others' strategy without paying cost should create supply and demand gaps. Much attention is being paid to psychological effects whose impact may create anomalous reaction to price such as addiction to risk and spread of panic, which explains occurrence of self-organizing bubble and bust, for example. Thus, market may fail and go out of control for many reasons. It is often criticized that a market does not have effective solution to the problem of income distribution. Such problems as hindering industrialization, instability and fragility of economic conditions, and serious poverty and highly skewed income distribution are typically seen in developing countries and we do not have high hope in market to solved these problems at least in the short-term. Someone may even argue that it is quite doubtful if a market in modern sense does really exist in some developing countries where traditional value dominates the society.

Admittedly, the market is not created and regulated equally anywhere. It was from the natural necessity of a society to protect itself, as observed by Polanyi (1957), that experiments of governments to intervene in the market surged. Economists have been busy in exploring theoretical problems how to amend the market failures and to prevent evolution of recklessness, resulting in codes and standards in many areas, such as an anti-trust law, environmental codes, social safety net for vulnerable class of people, and targeted poverty reduction programs. Even Hayek, who was known as a representative neoclassical economist, did not advocate the *laissez-faire*, but pointed out that a market should be always maintained and disciplined, admitting the role of the government in it.

That to what extent the government should intervene has always been a subject of heated debate. While Polanyi predicted that the government would have to take ultimate responsibility as a regulator because persistence in liberal regime should end up with favoring a limited group of firms who would dominate the market, Hayek (1944) sustained that the government should do only what it should do but should not meddle with what it should not do (such as to distort the resource distribution). It is to be noted that this kind of debate is often made under the dichotomy of "efficiency vs. justice". Yet, advocates of the market intermediation tend to consider that the government intervention is not even effective in promotion of justice. Interventions tend to be made under the influence of a particular political interest and can never be neutral, nor can solely represent the widely ranged interests in the society.

Excessive intervention should restrict private property rights and freedom of choice and prevent each person from appropriate reward to his paid efforts. In view of Hayek, planned economy or government intervention is a gateway to the totalitarianism because attempts to get rid of the market adjustment mechanism unwittingly help the dictators to come into the scene. Even in the area of poverty reduction, Easterly (2001) points out that what the government should do is not to grant food but to construct a mechanism by which the poor people react the incentives of the market signal and help themselves to come out of the poverty trap. On the other hand, those who support the wider role of government intervention consider that the government can do better job than a market even in resource allocation because the complexity of the economy in the real world should prevent the efficient functioning of the market.

Of course, to impose the neoliberalism and globalism should be a matter of criticism, but the jury is still out on this never-ending debate on market or state. What can be said about this is still empiricism. As Winston Churchill once said, "Democracy is the worst form of government except all the others that have been tried", the same thing could be true to the market mechanism. Namely, the extent of the government activism cannot be determined at global unique point, but with the piled evidence of failed planned economy and excessive government intervention and the lack of convincing new model of socialism, we can hardly deny the importance of maintaining the freedom of search for individual interest guided by the market incentives as long as the institutional framework guarantees a consistency of social cost and benefit, the stable macro-financial environment, the rule of law, and established private property rights.

So the case in point here is the role of market institution. The argument here is to honor the autonomy of each country to introduce a viable and effective form of institution. China, who did not throw out the monetary policy autonomy by not opening the financial market, is often referred as the latest most relevant successful example in this sense. Latin America, on the other hand, has inherited macroeconomic uncertainty since the deep crisis in the 1980s, which still ties hands of policy makers tightly due to inevitable surveillance of the IMF and the capricious behavior of the international financial market.

The approach emphasizing the government role in institutional building may resemble to Rodrik's "augmented Washington Consensus" (Rodrik, 2003), which is also called as a "market-friendly approach" or a "functional intervention" by the World Bank (1993). However, as Rodrik clearly pointed out, although the "augmented Washington Consensus" showed awareness of institutional reform in its neoliberal menu, it is still problematic because it remains to be underpinned by the globalism attitude to enforce the "global standard" institution to any country. This reflects the conceited thinking that the reason why the neoliberal reform has not born fruit should be in the ground where the reform is implemented, so the reality should approach to the theoretical assumptions. This, in turn, reinforces the criticism on the



pointlessness of introducing unrealistic market institution to developing countries where the market mechanism does not work properly. The role of the government should depend on the specific situation of each country and it also transforms during the course of its economic development. Rodrik's assertion that "institutions do not travel well" should be true with regard to both distance and time. Namely, a simple copying of particular institution worked well in one location may not give the same good result and efforts are needed to build suitable variant of capitalism adapted to the local needs.

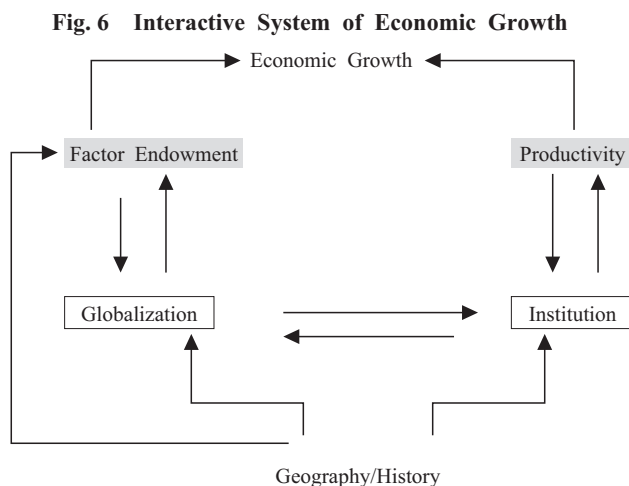
### **5. How much do we care about the local conditions?**

According to Rodrik (2003), economic policy should fail if we do not consider locally specific matters. The growth accounting usually decomposes factors of economic growth into factor accumulation (labor/capital) and growth in total factor productivity. Now, the traditional comparative advantage theorem of the trade theory says that the pattern of trade integration to the global economy is ruled by factor intensity and/or technological difference embodied in productive factors. On the other hand, capital inflow may affect capital intensity of the economy. Then the two way interaction is established in the link between the globalization and the productive factor condition of each country. The relationship between institution and productivity also can be viewed as the interaction in both directions because the business environment influences the productivity in general, while the efficiency of productive sector will have an effect on efficiency of institutions (technology, infrastructure and regulation make co-evolution over time). Furthermore, integration to the global economy should keep consistency with the consolidation of institutional basis in order to avoid undesirable behavior of the market. Conversely, institutions should be always upgraded so that economic agents can take advantage of globalization as much as possible. In this sense, institutional reform receives external stimulus from the interface with the global economy while accompanying the internal evolution. Thus, institution and globalization are also mutually interacting. Thus, the entire picture should be characterized by non-linear dynamics which exhibit multiple equilibria and the long-term consequence is not predictable. The system might be quite sensitive to the pre-determined initial conditions given by geographic nature and history. Thus analyzing, stable economic growth is more likely when we take the whole picture into consideration in order to maintain systemic consistency in advancing the market institutional reform. Like a human body a simple transplant of unrelated outsider's institution will cause malfunction of the system as a whole. As argued by Sachs (2005), today's development economics needs the perception of the "clinical economics". This essentially requires the autonomy in economic policy.

Yet, autonomy is in conflict with the globalization in today's reality. Country may not have sufficient degree of autonomy to implement reform in the manner depicted in Figure 6.

Firstly, there is macroeconomic stability condition, classified into two stages. At first, if a country still does not establish macroeconomic stability its economy is under disordered relative price structure and strong uncertainty. In this situation, not only that expected adjustment of resource distribution may not occur, but also that market liberalization increase the risk of balance of payments crisis triggered by potential external shocks. Another concern is that even if the macroeconomic stability is restored, the possibility of economic policy maneuver is quite limited if it should still depend on a financial package of the IMF or on short term external finance obtained with high interest rate and/or nominal exchange rate control. Thus, autonomy of institutional reform is conditioned by maturing of macroeconomic stability. To be more specific, market-based restructuring of the public debt (including the reduction of volume and transformation of composition to be less dependent on foreign currency denominated debt) and expansion of export capability are needed. Secondly, the autonomy is also restricted when there is a serious conflict in the society because it invalidates coordination of the internal consistency. Once failed the government coordination, such conflict obscures any agreement between labor and capital and the one among different sectors, then, in turn, may provide a motive for one-sided reform on the pretext of external pressure. Therefore, better harmonization of interests of the society constitutes another necessary condition for autonomous institutional reform. Naturally, organized civil society is expected to play substantial role in this process.

While developing countries should improve their institutional capability internally, there is another challenge of raising voice to make the globalized economy more advantageous to them. The globalization is in motion and it is irreversible. However, the process does not involve all kinds of commodities and productive factors with the same intensity and in a



(出所) Rodrik, 2003

symmetric way, owing in part to unbalanced international political power. Agricultural products and light industrial goods like textile are barred from entry to the developed country markets while other industrial products are put on the table of multilateral trade negotiation. Another example is that capital owned mainly by the developed countries flows much more freely across borders than labor in which developing countries are much richly endowed. Moreover, industrial countries are putting increasing pressure to enforce developing countries to adhere to the global standard of intellectual property rights, financial market regulation, trade in services, and government procurement.

In this context, there is no wonder why developing country groups led by Brazil, India and the others are gathering voices in international fora demanding equal opportunities. These countries are willing to assume more active role in economic globalization rather than to remain in the back seat. This process is not only about the government but, in parallel, organized groups of civil society are now interacting across borders in their trying to influence the international decision-makings. Such forces are gaining growing political influence. One notable example is growing number of international attendance to the World Social Forum originated claiming anti-Davos (World Economic Forum) in the city of Porto Alegre of Brazil.

## **6. Concluding remarks**

Let us conclude the discussion by summarizing our main points. A search for an alternative of the simple-minded liberalization should be developed in the direction to take full advantage of economic opportunities from the enhanced market mechanism and globalization, rather than denying these irreversible processes. The government should play active role in keeping tight a rein on the process of the adaptation to globalization, without renouncing the autonomy in the conduct of economic policy and institutional reform which should be managed for improve functioning of the market on the basis of the local specifics. Especially, consolidation of macroeconomic stability and harmonization of social conflicts are major challenge to obtain autonomy.

In regards to the question of autonomy, it is vital to consolidate the anti-cyclical macroeconomic policy. Chile established the Copper Price Stabilization Fund and the fiscal rule under which by law the central government must post structural (cyclical factor adjusted) budget surplus by one percent of GDP. This type of formula can be followed by countries which depend on the revenue from a few commodities. The international economic institution could help by controlling erratic capital movement and opening their market for agricultural commodities. The globalization process will be more unbiased by letting developing countries to assume more active role in global institutional building, which should be based on the awareness of diversity and justice. Furthermore, the cyclical factors of the vulnerability should

be addressed by the government extending the social safety net, as well as well-targeted poverty reduction program.

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