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【論文】

# The Contribution of “Firm-based Late Industrialization” to the Traditional Catch-up Model

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## 1. Introduction

One of the significant contributions Kimura (2007) has made is to introduce the concept “firm-based late industrialization (FLI)” into a development strategy. He unravels the complicated process of the birth and development of Japanese aircraft industry. His point is new because the existing literature of development economics tends to be macro-based and highly policy-oriented. Kimura’s work emphasises the importance of micro-rooted/bottom-up development process of a private firm from the point of view of a latecomer country. In theory, the national income is largely determined by the production scale and productivity of private enterprises; therefore, it is reasonable that the firm-level analysis should be placed at the centre of development analysis. Undoubtedly, Dr. Kimura maintains this position. Consequently, he has taken important steps to re-examine the interaction among private firms (both domestic and foreign) and political environment affecting economic development.

To understand the dynamic process of FLI, Kimura’s analytical framework is not very complicated and, partly because of this, highly persuadable. Principally based on the recent contribution of Global Value Chain (GVC) analysis, he distinguishes the ‘catch-up’ from ‘upgrading’ strategies as alternative options to pursue FLI. His conclusion is clear; under some specific circumstances, upgrading is more feasible, applicable, and even optimal than catch-up strategy for successful development of latecomer countries. In addition to this contribution, he explicitly focuses on the role of government in facilitating this process. He puts stress on the impact of globalisation on development process of a latecomer country and, on the understanding of this, he refreshes the classical debate regarding the efficacy of industrial policy. His conclusion is that Japanese government played a pivotal role in fostering development of Japanese core industries. He explains

What determines the prospects of upgrading for a particular dependent firm? Why can (or cannot) a particular dependent firm achieve upgrading as a supplier within a GVC? To

answer these questions, we identify three critical factors, which will promote and/or impede a dependent firm in upgrading its activities towards a higher value-added level (Kimura 2007, 90).

According to his work, the development of a private firm is principally determined by the interaction among three key factors: namely, (1) lead firm's sourcing strategy, (2) latecomer firm's dynamic strategic fit, and (3) local institutional setting. His case study provides a clear evidence to support this argument.

The purpose of this article is to revisit the issue Dr. Kimura addresses, particularly focusing on the role of government in creating favourable environment and institutions both for firm-based 'upgrading' and 'catch-up' strategies. While the present study principally follows his analytical framework, we see that it may be useful to look more closely at some peculiar features of the government in nurturing domestic firms. Moreover, it seems that Dr. Kimura does not explicitly explain the extent to which his FLI model shares the views with the traditional development model. In this regard, the present study argues that Kimura's FLI model can never be conflict with the traditional argument. Far from that, the FLI is largely compatible with traditional development model in a sense that they are complementary each other. The interactions among private firms and government are a central argument in Kimura's FLI model. This study sees that such interactions are consistently incorporated into a broader framework which the traditional development model presents.

This paper is organised as follows: the following section examines Kimura's work in a broader context of development literatures, with special reference to Abramovitz's catching up hypothesis. Section 2 provides the necessary conditions for latecomer's successful catch-up and examines Kimura's case study in this context. Concluding section discusses latecomer's catch up and upgrading strategies in a broader perspective.

## 2. FLI Model as a Development Strategy

In this section, Dr. Kimura's FLI model is re-examined in the context of the existing literature related to development economics. We mainly focus on the catch-up hypothesis proposed by Abramovitz (1989). In Abramovitz, the process of catching-up is defined in terms of the scope for diffusion of technology in a broad sense from the advanced countries to the catching-up countries. Backwardness in level of productivity carries a potential for rapid advance. It seems appropriate to quote Abramovitz in full in summarizing his position.

Countries that are technologically backward have a potentiality for generating growth more rapid than that of more advanced countries, provided their social capabilities are sufficiently developed to permit successful exploitation of technologies already employed by the technological leaders. The pace at which potential for catch-up is actually realized in a particular period depends on factors limiting the diffusion of knowledge, the rate of structural change, the accumulation of capital, and the expansion of demand (Abramovitz 1989, 225).

The central idea of this statement is simple. The stronger the follower’s potential for growth in productivity, the faster one expects the follower’s growth rate to be. As a result, followers tend to catch up faster if they are initially more backward.

The emphasis on the role of technology in economic development may lead to the following proposition. The level of GDP per head in advanced countries is principally determined by their human capital and knowledge stocks as well as the efficiency with which they use those stocks. Therefore, the ultimate limits to economic growth in developing countries are determined by their capabilities to assimilate those knowledge stocks and bring their own human capital stocks up to the same level. This argument is appropriate to derive lessons from the experiences of currently developed and emerging countries. However, several important questions arise; how can social capabilities be built? Who learns what?

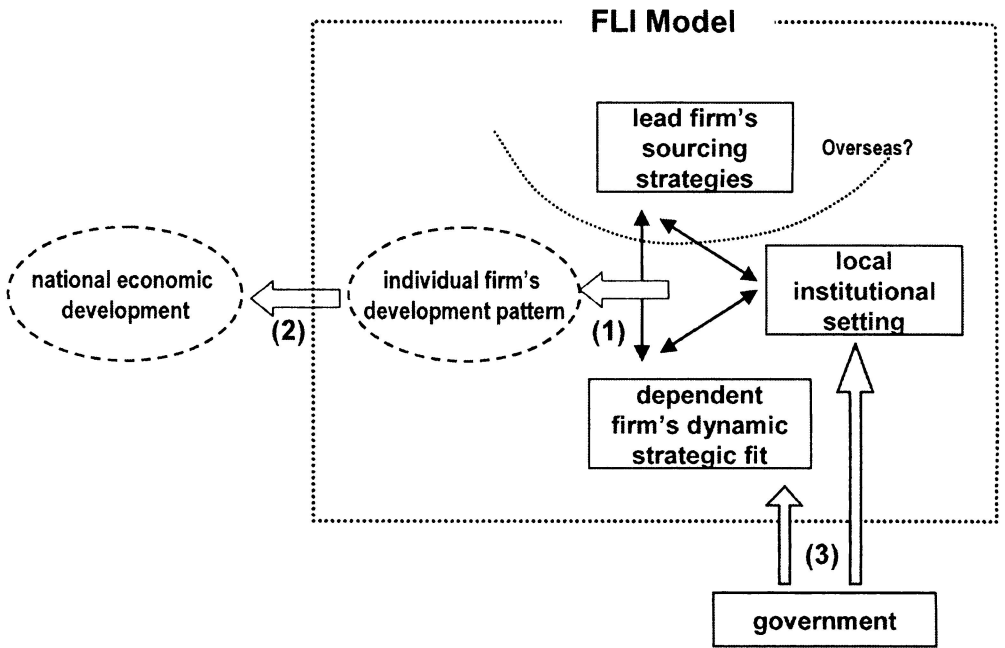
The critical contribution of FLI model appears to address these questions. The model focuses on the interaction between private, public and environmental factors in explaining catch-up process. Such a viewpoint is important because the diffusion of knowledge is not a natural and automatic process. Assimilative capabilities can be not spontaneously but purposefully built in developing countries. Moreover, the traditional catching-up hypothesis tends to slight the idiosyncratic, path-dependent, and firm-specific nature of learning in economic organisations. Private firms seek growth and development; for that, they are required to overcome the obstacle and, at the same time, exploit the opportunities. Thus, research on firm-level dynamics provides micro-foundation and case-studies in relation to late industrialisation.

Obviously, the traditional catch-up hypothesis and FLI model are unlike; however, both share similar goals in explaining the mechanism of late industrialisation. It is fair to understand that the two views focus on different aspects of the concerned issue. Kimura (2007) clearly shows how FLI model complement several shortcomings inherent in the catching-up hypothesis. On the other hand, the latter, in turn, explains the process of late industrialisation in a broader perspective than FLI. Based on this perspective, the following part of this section is intended to interpret the FLI model in a broader context of economic development.

We depict the functionality of the FLI and traditional models to explain economic

development process. In-depth investigation into the interaction among three key factors in FLI, i.e., lead firm's sourcing strategies, dependent firm's dynamic fit, and local institutional setting, are clearly indicated to explain the pattern of individual firm's development (See arrow (1) in the figure). However, the figure also shows two limitations inherent in FLI model.

Fig.1 FLI Model and National Economic Development



First, the FLI analysis does not explain the subsequent development process after the successful development of individual firm/industry. For a model to be completed and consistent explanation, it must explain how the development of an individual firm, or industry, may lead to the national economic development (arrow (2)). This is a critical question because an individual firm's development may not necessarily lead to overall development at national level. A full understanding of national economic development in a broader perspective demands further investigation on how individual success can stimulate that of others. Otherwise, a single success may be interpreted as a special case.

Second, from a broader perspective, three key factors are not independent but simultaneously determined in the medium/long run. For simplicity, lead firm factor is tentatively excluded to consider (because lead firms may be located abroad as GVC analysis assumes), the other two factors are equally influenced by various local factors, particularly government policies (arrow (3)). For example, dependent firm's capabilities for strategic fit are largely determined by domestic education system. A number of local institutional settings, e.g. regulatory framework, labour standard, competition policy, and resource allocations, are principally controlled by

government. Kimura’s FLI model does not pay much attention to the interactions between three players and external factors (outside the box in Fig. 1).

Such limitations may lead us to deem that the FLI is an “unclosed” framework and rather unsuccessful to distinguish endogenous and exogenous variables related to economic development. It is important for policy makers to identify which factors are operational and which are not. In other words, it is highly possible that individual firm’s strategies should be determined in a broader framework than the FLI model covers. If this proposition is accepted, the FLI model appears not as a general model but as an important unit of a comprehensive system to explain economic development. Based on this argument, the next section examines the conditions for economic development.

### 3. Determinants of Economic Development

This section aims to develop a framework to systematically identify the key determinants of economic development in latecomer countries. Let us first consider all the possible factors of growth. In general, all related variables to economic development can be broadly categorised into the following three sets of factors.

- I. Value and perception: preferences such as attitudes towards time, income, wealth, risk and leisure; perception including honesty, discipline and beliefs or priors;
- II. Available resources: natural, man-made (e.g., physical capital), and human resources; (geographic) locations, languages, foreign aid, and technologies;
- III. Policies and Institutions: monetary, fiscal, financial, industrial, trade, and FDI policies, formal rules such as the constitution, laws and regulations, and informal (human devised) constraints such as the conventions and norms of behaviours.

These sets of factors together constitute the economic environment in which private agencies pursue their own goals. Preferences are, relatively speaking, characteristics at an individual level, while perception may be a social level characteristic embedded in informal constraints. Both together form the mental constructs. They are structural parameters and given in a short and medium run. Resources are also fixed in a short and medium time horizons.

Contrary to the first two factors, policies are option variables executed by politicians and bureaucrats. In this regard, following North (1992), institutions are defined as humanly devised constraints that shape human interactions. Both are also changeable in a short or medium term to pursue policy objectives politicians and/or bureaucrats set.

In the context of economic development, among others, state-market institutions are particularly important. They are the sets of rules governing the game in which the decisive

players are politicians, bureaucrats, and businessmen. More formally, they are the sets of game forms governing the allocation of political and economic authority as well as economic rent. State-market institutions guide political agents and economic agents by shaping their opportunity sets, information flows and payoff matrices. Just as businessmen rationally choose technologies to maximise their own profits, politicians and bureaucrats choose policies to maximise their self-interests. Needless to say, all three sets of factors affect economic growth and, in turn, growth itself interact each other. Moreover, the change of policy and/or value would affect institutions. Thus, each of three factors is determined interdependently.

It is important to identify what factors are the most critical determinants of economic development. This is an inquiry into distinction between exogenous and endogenous variables and cause-and-effect relationships leading to economic development. To answer this question, the present study sees that policies and institutions can be more dominant over other factors. They are control variables, while the others such as value and resources are endogenously changed according to economic development and social change. Moreover, policies and institutions are more important to determine the economic performance than initially available resources. A simple example is a contrast in economic performance between NIEs and ASEAN (excluding Singapore). The four dragons enjoy none or much less natural resources than the ASEAN countries; however, per capita income of the former exceed those of the latter. More initial physical capital or external financial aid per capita may help to increase growth rate in the short-term; however, they themselves are neither necessary nor sufficient conditions for catching up. Technological advancement is also determined by institutional factors, rather than historical or geographical environment. Institutions can be designed and implemented to meet policy objectives and, in the long run, they dictate growth through shaping policies, technologies, structures and endowments. Thus, for the majority of developing countries, adequate institutional arrangements are principal determinants to affect catching up. Development of dependent firms will follow such an environmental setting.

Given that the institutional arrangements are efficient in a latecomer country, what types of policies are needed specifically for successful catch-up? There are five conditions for successful policy implementation as follows:

1. A set of policy operations and philosophy is stable and consistent;
2. The policies are oriented to economic development;
3. The economy is governed primarily by market mechanism;
4. The market is open to the world; and
5. The international economy favours trade, investment, and technology transfer.

Condition (1) is necessary for adaptive efficiency. Growth requires specialisation.

Specialisation requires asset-specific investments, which in turn require low uncertainty of the future returns. This can only be achieved by credible rules embodied in a stable polity. Based on numerical indexes of political stability, empirical studies have generally confirmed that there exists significant positive correlation between political stability and economic growth (Barro 1991).

Condition (2) is also necessary for allocative efficiency to foster economic development. By supporting economic development, government is to allow civil freedom and to provide adequate public goods such as infrastructure, education, enforcement of contracts, and the coordination function among different sectors. Civil freedom is necessary for decision-making decentralisation, which is crucial for achieving allocative efficiency in a substantially decentralised economy with self-interest-maximising agents.

Conditions (3), (4) and (5) are well justified in a number of literatures. They have been investigated by Barro (1991) and Scully (1992), Krueger (1993), and Maddison (1989) respectively among others.

Conditions (1) through (5) are all necessary, not sufficient, for the institutional arrangements to be efficient. Together all these five conditions need to assure that a follower can fully capture the gains from the existing set of advanced technologies. Even if only one condition is not satisfied, a development strategy is unlikely to be successful. The successful and failed story of the Japanese commercial aircraft industry (Kimura 2007) can be explained with this framework. Japan's YS-11 project was deemed to fail because condition (4) was not satisfied. As Japan Air Lines was forced to use YS-11 for local routes in Japan, it would lose incentive to survive in international markets (Roehl and Truitt 1987). This is a type of import substitution industrialisation and, therefore, this does not meet the condition (4). Contrary to this, the success of Japanese aircraft manufacturers as a supplier can be explained on the same line. A number of subcontracted items Japanese aircraft manufacturers produced enjoyed open free trade system.

Conditions (1) to (5) are not sufficient, implying that a full set of these five conditions cannot necessarily guarantee successful catch up. There are a number of barriers to catching up, ranging from occasional to structural ones. In other words, even if a latecomer country is fully satisfied with the five conditions explained above, the catching up strategy may be hindered by immediate or potential barriers. The following part of this section discusses this issue.

In general, the long-term actual growth rates of most latecomer countries are far below their supposed long-term potential growth rates. Moreover, most low income countries grew slower than the OECD countries in the last century. Such a phenomenon is mainly due to the barriers to technology learning and adoption. Barriers due to an inadequate location, human capital and some institutional arrangements can affect the speed of assimilating technologies and, consequently, catching up.

It is helpful to classify all the barriers into three groups, which are related to the



"transfer itself, absorption and environment" of technology, respectively. First, direct barriers in technology transfer may exist. Examples are little capability to find an appropriate technology, little purchasing power to buy technology, geographical isolation, difficult nature of technology to transfer, and the ban of technology transactions. North Korea, for example, cannot introduce advanced technology from Japan because there is no diplomatic and commercial links between the two countries.

Second, absorption barriers may exist to make full use of available technology. This occurs in the cases of, for example, the lack of critical minimum physical (or financial) capital, human capital and a market to technology adoption. At a more fundamental level, this includes a backward infrastructure, poor contract enforcement, unpredictable government intervention, and macroeconomic and political instability. These types of barriers are usually larger for a latecomer country because of a shortage of high-skilled labour force, underdeveloped capital market and low purchasing power.

The third barrier is environmental including political and historical hindrances. This typically appears as what Kimura (2007) emphasises as the structural obstacles a latecomer firm may encounter. Obviously, technology transfer is not an automatic or cost-free but conscious and goal-pursuing process. By definition, technology transfer occurs from a leader to a follower. However, the former is not always generous to provide advanced technology it maintains to the latter. Far from that, in order to maintain its technologically superior power over potential competitors, a lead firm always seeks to control the flow of technology. Such a power asymmetric structure appears as a barrier of technology transfer. Other examples include rival relationship, economic sanctions, and trade wars.

It may not be easy to overcome each individual barrier since there may exist network externalities in technology adoption, contract enforcement, and human capital investment, and indivisibilities, as well as economies of scale/scope in infrastructure construction. Therefore, if this argument is justified, there are two alternative routes for successful catching-up strategy. The first is to make tremendous efforts to overcome these barriers. In this respect, it is worth noting the fact that almost all these barriers are mutually complementary; that is, a successful technology adoption requires overcoming most, if not all, the barriers. The second route is to avoid audacious efforts to eliminate overall barriers to technology transfer. Instead, under the condition that human, financial and physical endowment is given, all available resources should be devoted into the activities which absorb advanced technology most effectively. Obviously, the former is termed as "catch up strategy," while the latter is "upgrading strategy" in Kimura's (2007) terminology. Clearly, an active government is needed for both routes.

#### 4. Conclusion

This paper has attempted to re-examine the FLI strategy in the context of traditional development model, particularly along with Abramovitz's catch-up hypothesis. We interpret the scope of FLI from the perspectives of traditional development model and find that both are complementary each other to explain the development process of latecomer's industrialisation. Kimura's contribution is reconfirmed in that the FLI model nicely extracts key players affecting industrial development and clearly explains the interactions among them.

Kimura's FLI model would be more elaborately sharpened if external political and environmental factors are suitably incorporated into his framework. For example, there is no doubt that Japan's public education system played an important role in building technological capabilities in Japanese manufacturing sectors. This forms the very basic foundation for dependent firms to acquire advanced technology from foreign lead firms. Moreover, thanks to such technological foundation available, the drastic shift from catch-up to upgrading strategies finally resulted in successful outcomes. Thus, it is reasonable to assume that the interactions among lead firms, dependent firms, and institutions can be re-examined in such a broader context.

Further research may be needed to develop the FLI model. One important step is to sharpen the analysis of global value chains (GVCs) on which Dr. Kimura's argument is largely based. GVC analysis has so far provided just a point of view, not a formal theory. How globalisation affect the development of a latecomer country/industry/firm? What conditions are needed for latecomers to upgrade or catch up along GVCs? Is government-led industrial policy is still effective in the recent globalising phenomena? Undoubtedly, Dr. Kimura's work presents an integral contribution to address these issues.

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