

Policy complementarities in economic development
the case of South Korea

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Wooseok Ok
(University of Incheon)

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Abstract

In interpreting the South Korean growth experience during the three decades before the 1997 crisis, the confrontation was usually made between the outward-oriented growth strategy and the heavy government intervention in the decision making of private agents. In particular, the standard view on this issue considers that the outward-oriented strategy pursued by the East Asian NICs was at the core of their success, by helping these countries “getting price right” and neutralizing possible distortions arising from the government intervention that was very frequent in this region. The main objective of this paper is to suggest an alternative interpretation of the South Korean success story by help of the concept of “policy complementarities”.

The concept of “policy complementarities” is defined on the basis of the recent advances in institutional economics. This concept may allow overcoming the traditional dichotomy between market and government, because it puts accent on the coherency, rather than conflict, between different policy instruments. That is to say, this paper considers that both the outward-oriented trade policy and the investment and structural policies were indispensable in order to keep the development strategy coherent for the South Korean industrial development.

On the one hand, the standard interpretation of the so-called “East Asian Miracle” does not explain very well the South Korean economic growth, in that (i) the arguments based on the “stages of comparative advantage” *à la* Balassa are not empirically proved so that the standard view is not sufficient to explain rapid structural changes experienced by this country; and (ii) the impact of trade liberalization on the actual trade flow was only moderate.

On the other hand, South Korean experience shows that the interventionist policy tools and outward-oriented development strategy were not contradictory as usually interpreted but mutually reinforced the effectiveness of each other. The effectiveness of the outward-oriented trade policy seems to have been realized only by help of other policy instruments, namely investment policy: (i) although the transition in development strategy from import substitution to export orientation took place at the second half of 1960’s, there is no significant difference in the amount of export incentives between the 1950’s and the 1960’s, while since the 1960’s the composition of these incentives had changed radically in favor of those affecting both export activities and investments, such as tax and tariff reduction and financial incentives; (ii) trade liberalization at the end of 1960’s seems have had only weak impact on the actual trade flow, and this latter responded more actively to the investment incentives. Furthermore, when the real effective protection rate is used as the indicator of market protection, it can be shown that not only the share of value added and the TFP but also the export-production ratio have grown more rapidly in the heavily intervened industrial sectors than in the sectors where the government

intervention was moderate. Finally, the outward-oriented trade policy seems to have played in its turn an important role in keeping the investment and industrial policies in a right track for following reasons; (i) it guaranteed a strong inward-flow of advanced machinery and equipments from already industrialized countries; (ii) it prevented the government from going too far with its extremely voluntary policy objectives; and (iii) it provided the government with a very simple and transparent indicator when it needs to monitor subsidized firms, and for this reason, the South Korean government was able to avoid the negative results that may arise from the information asymmetry and moral hazard behavior.

1. Introduction

The 1997 Asian financial crisis has revealed in a dramatic manner the inherent problems of the development strategies pursued by the so-called East Asian High Performing Economies (EAHPEs) during the last three decades. The crisis, however, has also produced a negative outcome from the point of view of development economics, in that it has suddenly nullified the academic achievements brought by the long-lasting debate on the causes of the rapid growth in this region. If we consider the economic research as something which tries to find a conjuncture-free lessons by help of debates from diverse points of view, this situation is unfortunate because it resulted in a complete break between the past and the present. As a matter of fact, the existence of government intervention in EAHPEs had been longtime denied by a pillar of the debate, a trend which is slightly modified by the famous East Asian Miracle report published by World Bank (1993). In privileging the “market-friendly approaches” as a wishful development strategy, this report admitted the existence of industrial policies in EAHPEs but justified the success of EAHPEs by arguing that the industrial policies widely used in these economies were ineffective and/or that their negative impacts were compensated by the outward-oriented development policies. After the crisis, the advocates of this “market-friendly policies” seem to have changed their view, in attributing the crisis to the government interventionism and related capital market distortions in these economies. The revisionists, the other pillar of the debate who did not stop putting accent on the role of government in economic development, are the unfortunate winner of the debate, in that a consensus was drawn on the point that the government intervention in EAHPEs was not only widespread but also “effective”. The problem is that, while the principal objective of the debate on the East Asian Miracle was to derive appropriate policy lessons for other developing countries by means of benchmarking East Asian success story, after the crisis, the debate has moved to a completely different subject so that the ideas for appropriate development policies are inspired from purely theoretical discussions and are not any more rooted in historical experiences.

In order to overcome this situation, we need a new conceptual framework which can provide with a consistent story on both the past success and the present failure of these economies. This paper tries to provide such a new conceptual framework, namely policy complementarities and to explain the South Korean experiences by help of this concept. Of course, this idea is by no means new and appears in a large number of existing studies. Nevertheless, in the most of these studies, it appears only in an implicit way and is not developed as a conceptual framework. This paper argues that, in South Korea, the outward-oriented development strategy was able to materialize its potential benefits only because it is combined with other policy measures such as industrial and investment policies. From this perspective, the paper is organized as following.

The section 2 defines the policy complementarities. The section 3 points out a number of limits of the standard view on the South Korean economic development and justifies the necessity to introduce the concept of policy complementarities. The section 4 analyses the complementary relationship between trade policies and industrial and trade policies in the case of South Korean economic development. Finally, the section 5 summarizes the main results and discusses the way in which the concept of policy complementarities might be expanded to a more dynamic version.

2. Definition of the policy complementarities – internal coherency of development policies

This section defines the concept of policy complementarities between diverse forms of development policies. The notion of complementarity is widely diffused amongst economists and applies to a situation where the amount of returns from a set of inputs (or individual investments on a specific productive activity) depends on the existence of other types of inputs (or investments of the same inputs by other individuals). For example, if the returns to R&D expenditures increase with the amount of existing human capital invested in the production process, the R&D expenditure and the investments in human capital are complementary. In particular, there is a strong case of complementarity, namely strategic complementarity, where the expected returns from a specific investment activity are positive when complementary investments take place at the same time whereas they are negative if they do not. A natural outcome of the strategic complementarities is the existence of multiple equilibria: at the macro-economic level, even if all the individuals make decisions with a perfect rationality, the economy fails to attain the equilibrium which can be characterized as Pareto-optimum.¹

In recent days, a number of researchers try to apply this notion not only to the matter of inputs and investments but also to the matter of institutions (Aoki, 2001; Amable, 1999). The role of institutions in economic growth attracts a strong attention of contemporary economists (Acemoglu *et al.* 2001; North, 1990; Rodrik *et al.*, 2002). However, the implication of the notion of institutional complementarities goes beyond the arguments for the primacy of institutions in economic growth, and suggests that it is necessary to capture the hierarchy existing between different institutional arrangements and their internal relationship (Amable, 1999). In this context, the institutional complementarities can be defined when “the effectiveness (or the presence) of one exchange (property rights) governance mechanism can be reinforced, either directly or indirectly, by the presence (institutionalization) of a particular mechanism in the same or embedding domain (Aoki, 2001, p.87).

¹ This phenomenon is called “co-ordination failure”.

The notion of institutional complementarities is essential in understanding the existence or not of the internal coherence of an economic system and/or its evolution. In other words, the internal relationship between different institutional arrangements existing in a specific economy and the economic performance measured by, for example, economic growth and employment, arising from these institutions characterizes the internal coherence of this economic system. Therefore, in order to properly explain the performance of a given national economy, it is insufficient to take into account only the degree of development of institutions existing in this economy. By definition, the existing institutional arrangements in a given economy will reinforce each other in equilibrium and make the system persistent. On the contrary, a given internal coherence between different institutional arrangements (institutional complementarities) may evolve over time when, by some reasons, the internal coherence is put into question.²

This paper deals with the question of policy coherency between different economic policies which might promote economic development of developing countries, in borrowing the notion of institutional complementarities as defined above. The main point of disagreement in the debate on the East Asian Miracle between World Bank and the revisionists was on the which policy measures explain the economic performance of these economies between government interventions in private investments and “market-friendly policies”. This debate is often simplified in contrasting the import substitution development strategy based on industrial policies with the outward-oriented one of which the key element is export-led growth strategy. The notion of policy complementarities suggests that this kind of dichotomy between outward-orientation and industrial policy should be overcome, and tries to understand these two kinds of policy measures as complementary, rather than conflicting.

Nevertheless, there are a number of problems in applying the notion of institutional complementarities without modification to the domain of economic policies. The institutions are in general the cumulative outcome of various policy decisions and conventions between economic agents, while the policies vary much more easily and are much more reversible than the institutions. Therefore, while the institutions are very often inert vis-à-vis external changes in economic environments, resulting sometimes in a system crisis or performance stagnation, a system of policy measures can be relatively easily discarded or modified. In addition, the policy complementarities can be defined only on the basis of the existence of a proper institutional infrastructure, and the evolution of this institutional infrastructure might affect the efficiency of

² In this way, the static version of institutional complementarity deals with the stability and the internal coherence of a given economic system, while its dynamic version aims at explaining the emergence or disappearance of this internal coherence. According to Aoki (2001), the dynamic mechanism of the institutional evolution might arise from three broad classes of diachronic linkage between institutions: (i) overlapping social embeddedness; (ii) reconfiguration and/or reshuffling of linkage of games other than social embeddedness; and (iii) existence of complementary institutions when a new policy choice is activated.

the policies in question.

As a result, in trying to define the existence of not of the internal coherency of the development strategy of a given economy, it is necessary to draw attention on three different levels of analysis (Fig. 1). First of all, it should be questioned whether the various development policies are independent or complementary. For example, if we consider two sets of development policies, open trade policies and industrial policies, it is necessary to understand whether these two kinds of policies have their own impacts on economic performance regardless the existence of the other or the effectiveness of one kind of policies depends on the existence of the other. Second, the complementarities between divers policy measures cannot be understood without supporting institutions. Finally, a specific policy combination and its relation with the existing institutional arrangements are not applicable to any time and any situation, but should be evaluated in relation with the specific goals of the economic development.

The policy complementarities might be considered in dynamic terms, as in the case of institutional complementarities. The internal coherency of a set of complementary policies that has proven their performance might be weakened or disappear for several reasons. On the one hand, a part of policy measures which has constituted a coherent system altogether cannot be used any more by the government because of the changes in the external environment as in the case of the prohibition of use of selective industrial policies under the multilateral trade negotiation with WTO. On the other hand, existing policy complementarities might disappear due to the evolution of institutions which has supported these complementarities. Whatever the reasons of this change, if a system of policies loose its internal coherence, this will negatively affect the performance of the economy and necessitate a complete reconsideration of the system, which might induce, in a long term, changes in institutions (Fig. 1).³

3. Limits of the standard approach on the South Korean economic development

Three stylized facts characterize the South Korean economic development since the take-off of this economy in the 1960s. First of all, in the end of the 1960s, the South Korean economy moved definitively toward an outward-oriented development strategy in combining various measures of trade liberalization with the diverse export incentives, and experienced a sharp rise in the trade intensity. Second, during the same period, the South Korean has experienced a very rapid increase in the investment rate. Finally, one should not forget the rapid structural change during the industrialization process.

³ In this paper, I discuss only the static aspects of policy complementarities and leave its dynamic dimension for future researches.

Even though there is a risk of oversimplification, one can say that the standard approach attributes the South Korean success to the outward-oriented trade policies adopted during the 1960s. The studies in this category rely explicitly or implicitly on the theory of stages of comparative advantage à la Balassa (1978). In other words, the new outward-oriented trade policies including a large-scaled trade liberalization and reinforcement of export incentives permitted the South Korean economy to increase the exports of labor-intensive products such as textile and clothes over which this economy has comparative advantage, and made foreign intermediary and capital goods cheaper. In a longer term, the increased interaction with advanced foreign firms facilitated the South Korean firms' acquisition of foreign technologies. In addition, according to this interpretation, the catch-up process brought by the outward-oriented development strategy will necessarily accompany a corresponding change in endowment conditions and explains the dynamic transformation in the specialization pattern. By the same token, this approach suggests that the interventionist industrial policies has played no, or, if any, a negative role in this process. For example, World Bank (1993) argues that, in the South Korean economic development, the selective industrial policies has virtually no impact on the industrial structure, and this can be explained by the fact that the negative impacts of the government's selective intervention were compensated by the positive effects brought about by the reinforced export incentives. In this paper, I argue that the standard approach as defined above reveals serious limits.

a. Economic development and structural changes

As it is mentioned above, the standard approach on the South Korean economic development considers the structural changes in the exports and the production as a by-product of the growth process. For this reason, in the studies adopting this approach, it is very rare to find a serious analysis on reasons why the South Korean economy has achieved such a rapid structural transformation during its industrialization. By contrast, many other non-standard approaches take this transformation very seriously and suggest that the rapid industrial up-grading of the South Korean industrial structure represents this country's ability to learn and absorb foreign technologies. In fact, in this part of the paper, I will show that the evidence supporting the proposition according to which the structural changes will follow automatically the rise of per capita income (as it is predicted in the theory of the stages of comparative advantage) is by far very weak.

It is well-known phenomenon that the EAHPEs have aggressively increased their market share in the world market, in particular in the technology-intensive industries. However, less attention is given to the fact that the contribution of the structural changes to the overall

increases in market share is very strong in this region. Table 1 reports the results from a Constant Market Share Analysis, which decomposes the overall changes of the market share in the world market into 5 components, namely “market share effect”, “product composition effect”, “market composition effect”, “product adaptation effect” and “market adjustment effect”. The “market share effect” is calculated as the sum of the changes in market share for each industry under the assumption that the economy’s product and market compositions did not change during the period under analysis. The “product composition effect” represents the increases in the overall market share which can be attributed to the initial composition of export products of the economy: this effect comes from the fact that the economy was initially specialized in those industries which has grown more rapidly than average. The “market composition effect” is similar to the “product composition effect” but applies to the economy’s trade partners instead of their products. The “product adaptation effect” is the interaction term between the changes in market share of the economy for each industry and the growth of the industry in world trade. It represents the increases of the overall market share that can be attributed to the fact that the economy managed to change its export structure towards those industries of which the demands are rapidly increasing in their trade partners. Finally, the “market adjustment effect” is the residual and reflects the increases of the overall market share due to changes in trade partners towards those countries of which the import demands are rapidly increasing.

Amongst these five components, the “product adaptation effect” is of particular interest. As it is shown in Table 1, the contribution of the contribution of the “product adaptation effect” to the overall market share increase is particularly strong for the first generation EAHPEs, except Hong Kong. For Singapore and Malaysia, this effect counts for almost a half of the market share increases, while the corresponding figure is about 1/4 for South Korea. On the contrary, it is shown that the contribution of the “product composition effect” is very weak or even negative for these countries implying that their initial specialization patterns were generally unfavorable in terms of market growth. The pattern for these first generation EAHPEs contrasts sharply with the one for developed countries, where the contribution of the “product composition effects” are relatively strong and the “product adaptation effect” is generally weak. The pattern for the first generation EAHPEs also contrasts with the Latin American Newly Industrialized Countries, where the overall market share increases rely principally on the strengthening of competitiveness inside the existing sectors while the changes in export structure did not play a significant role. It is also interesting to see the case of Hong Kong, of which the pattern of market share increases looks very like the one for the developed countries. According to Young (1992), Hong Kong is the only EAHPE which has shown a significantly strong TFP growth, and this can be explained by the fact that this economy did not adopt aggressive industrial policies

differently from the case of Singapore or South Korea. However, as Table 1 shows it, in the end of 1960s, Hong Kong has already a specialization pattern similar to the one for developed countries and the tasks required for this economy's industrialization were quite different from those for other EAHPEs. From my point of view, it is not appropriate to compare two different types of economies for which the tasks required for the industrialization are different in putting them in a same context as Young does it.

Is it appropriate to consider these impressive structural changes in the EAHPEs as a natural consequence of rapid economic growth of these economies? In order to answer to this question, I report the results from a cross-country regression of a structural divergence index on various endowment conditions and their changes over time. The theory of stages of comparative advantage implicitly supposes that, with the convergence of per capita income between countries, the specialization pattern will also converge. Therefore, if the structural gap between two different countries is reduced with a reduction of per capita income gap, one could not reject the theory of stages of comparative advantage. However, if, on the contrary, the structural gap does not react sensitively to the changes in per capita income, one can conclude that this theory is not adequate in explaining the East Asian industrialization.

One can first measure the structural gap between different countries as follows.

$$\Delta_{ikt} = \sum_j \left| \frac{X_{ijt}}{X_{it}} - \frac{X_{kjt}}{X_{kt}} \right|$$

where Δ is a structural gap index which is greater when the export structures of two compared economies are more different. The indices i and k represent the two compared countries. j and t represent industry and year, respectively. X is the amount of export in US dollar. In calculating the difference between two different year, one can measure the degree of structural *divergence* between two countries during the given period.

$$\text{Structural Divergence Index (SDI)} = \Delta_{ikt(1)} - \Delta_{ikt(0)}$$

In the regression, various data sets are used: CHELEM for export data, World Development Indicator for population density, Penn World Table 5.6 for PPP-adjusted per capita income and investment rate, and Barro-Lee database for schooling years. The countries for which all these data are available count for 44, so that in total one can make 990 combination from these dataset. The regression was made on the basis of the following equation:

$$\text{SDI} = f(\Delta_{ikt(0)}, \text{average schooling years over the period, average trade intensity over the period, average investment rate gap during the period, initial per capita income}$$

gap, initial population density gap, changes in per capita income gap, changes in population density gap)

In order to take into account specific growth patterns in different regions, the dummies for the couples between first generation EAHPEs and developed countries, between second generation EAHPEs and developed countries, and between Latin American Newly Industrialized countries and developed countries are also included in the regression.

As it is shown in Table 2, the changes in per capita income gap and population density gap are very weakly correlated with SDI, while the initial values of these first variables show a positive and significant correlation with the second. During the period under consideration (1970-1989), the greater the initial gap in per capita income or in population density was, the bigger (the smaller) the degree of divergence (convergence) in specialization pattern between two different economies. In addition, the convergence in per capita income, whatever the reasons of this convergence, does not seem to bring about automatically a structural convergence. Another point of interest in this result consists in the fact that the average investment rate gap is positively and significantly correlated with SDI. This finding is not surprising if one takes into account the fact that many developing countries acquire new foreign technologies necessary to enter into a new industrial sector by investing on new capital goods. These findings are consistent with the results from a number of existing studies according to which the pattern of export comparative advantage for developing countries is in general very rigid, the EAHPEs being notable exception of this trend (Carlan, Singh and Talati, 1998; Gagnon and Rose, 1995).

b. Trade policies and trade flow

Another problem of the standard approach on the South Korean economic development consists in the fact that, as Rodrik (1994) argued it, the changes in trade policies in the end of 1960s do not seem to be the direct cause of the reversal of the actual trade flows. Although it is well known that the cross-country difference in trade intensity cannot be explained simply by the differences in trade policies, the observation that the effect of trade liberalization on actual trade flow is not clear even inside one country is quite counter-intuitive and needs further explanations.

Figure 2 describes the relation between the share of the total exports in GDP and the relative price of exports in South Korea.⁴ The relative price of exports is defined here as the

⁴ Nam (1995) argues that the trade liberalization in the end of the 1960s had a strong impact on the export flows by showing that there is a strong correlation between the real effective exchange rate and the growth rate of exports. This conclusion is misleading: while the real effective exchange rate affects directly the price competitiveness of exporting firms and affects positively export growth, this does not mean that it is an appropriate indicator measuring *the relative strength of the export incentives vis-à-vis*

ratio of the real effective exchange rate for exports relative to the real effective exchange rate for imports. As Figure 2 shows it, the increase of the export intensity in the end of the 1960s coincides with the rise in the relative price of export. However, there are two serious problems to interpret this result as the evidence showing that the changes in trade policies were at the core of the economy's transformation toward outward-oriented trade regime. On the one hand, the factor which induced the dramatic rise in export intensity does not seem to be much related with the strengthening of the export incentives. On the other hand, if we consider the export incentives, they were stronger in the 1950s than in the 1960s, while there had been virtually no change in the export intensity during this first period.

Sakong (1993) explains the bad export performance during the 1950s by the following factors: (i) widespread export pessimism; (ii) lack of administrative support in searching new foreign markets; and (iii) rent-seeking activities related to the multiple exchange rate system. Regarding the first factor, Sakong argues that the problem was solved in the 1960s because the government succeeded in making the firms assured on the stability of the export incentives over a relatively long period. However, as it is shown in Fig 2, the most significant changes in export intensity took place in the early 1970s, about 10 years after the adoption of the new export incentive system. Similarly, the second reason provided by Sakong is not completely convincing either. The most of administrative supports to export activities, such as the expansion of formal diplomatic relations with important potential trading partners and the fostering of trade-related institutions (KOTRA, KTA, Koryo Mu Yeuk) which supported Korean exporters, were implemented in the early 1960s. If these two first factors were effective in promoting the economy's outward-orientation, it was the case only with a long time lag. The argument that the existence of a large amount of windfall gains related to the multiple exchange rate system discouraged firms to engage themselves in export activities can be also criticized. In fact, under the multiple exchange rate system, the source of the windfall gains (US dollars) was accessible only through export activities. Therefore, it is hardly convincing to say that the rent-seeking activities created the barriers against export activities, although these activities might have brought about serious distortions in the other part of the economy.

A similar question arises when one examines the relationship between the trade liberalization and the evolution of market penetration ratio of imports. Fig 3 depicts the correlation between

the incentives for production aiming at domestic consumption. As it is argued by Edwards (1993), a right indicator for this purpose is the differential between the real effective exchange rate for exports and the real effective exchange rate for imports, because many factors affecting the real effective exchange rate for exports influence at the same time the real effective exchange rate for imports and thus change the incentives for domestic production. Similarly, the growth rate of exports does not measure adequately the relative strength of incentives between exports and production for domestic consumption. In this case, the right indicator should be the export intensity measured by the share of total exports in GDP.

the share of total imports in domestic demand on the one hand, and the real effective exchange rate for imports and the rate of trade liberalization from quantitative restrictions on the other.⁵ In the figure, the dramatic leveling-up of the rate of trade liberalization from quantitative restrictions in the late 1960s reflects the shift from the positive-list system to the negative-list system. The first thing which attract our attention is the fact that the average tariff rate in the 1960s did not drop so much and even increased compared to the one during 1950s. In addition, the relative price of imports (real effective exchange rate for imports) increased very rapidly since late 1960s due to the overall depreciation of the real exchange rate. Therefore, the steady increases in the share of imports in domestic demand do not reflect the changes in the relative price of imports.

One might try to explain the observation that the relative price of imports did not play an important role in the increase of the import share by the fact that the principal determinant of this evolution was the reduction in quantitative restrictions. In fact, the changes in quantitative restrictions in the late 1970s did accompany a steady increase in import share. Nevertheless, there still remain two important questions in order to accept a causality running from the trade liberalization to the increase of the import share. On the one hand, the import share had already begun to increase since the early 1960s, before the shift of quantitative restriction system. On the other hand, once again, the acceleration of the import share increase took place in the early 1970s, when the trade liberalization from quantitative restrictions was slightly weakening with the launch of the Heavy and Chemical Industrialization.

4. Complementarities between trade policy and interventionist trade and investment policies

The discussion of the previous sections shows that the standard approach based on the theory of stages of comparative advantage (*i*) does not explain consistently an important stylized fact observed during the industrialization of EAHPEs including South Korea, namely the rapid economic growth accompanied by a rapid structural transformation, and (*ii*) may overestimates the role of trade policies in explaining the evolution of the real trade flows. A number of questions arise from this observation. First of all, if the trade policies are not a good explanation variable for the evolution of the trade intensity, what other factors could be? Secondly, if the rapid structural transformation is not a natural outcome of the rapid economic growth, does the interventionist policies can explain it? And finally, if the interventionist industrial and investment policies have played a positive role in improving the specialization pattern and the

⁵ The tariff and corresponding taxes, but not the quantitative restrictions, are included in the calculation of the real effective exchange rate for imports.

productivity, which factors distinguish the South Korean success from, for example, the Latin American failure? This section tries to answer to these questions.

a. Investment policy and effectiveness of trade policy

This paper argues that the effectiveness of the outward-oriented trade policies could come to reality in South Korea only when they are combined with other policies, in particular the investment policies. This argument is supported by the following observations. On the one hand, while the quantitative amount of export incentives was not greater in 1960s than in 1950s, there was a significant difference in the *composition* of the rents arising from the export activities between the two periods. In other words, the export incentives provided by the government since 1960s did not affect only the relative price of exports vis-à-vis domestically consumed goods but also the overall rate of return to investments. On the other hand, the trade liberalization did not affect by itself the inward flows of foreign capital goods that were indispensable for the industrialization. In fact, it was the overall rise in the rate of returns to investment that played a crucial role to materialize the potential effects of the trade liberalization.

Jones and Sakong (1980) argue that the most important factor which caused the sharp increase in export intensity was the reduction of alternative higher-yielding sources of entrepreneurial income. According to them, “If you can make 100 percent in a few months with little risk, through privileged access to foreign exchange, there is little point in devoting effort to the difficult and complicated task of exploring export markets and putting together internationally competitive productive combinations. The exchange rate reforms closed out the zero-sum sources of rent, reduced opportunity costs, and drove rent-seekers into productive positive-sum activity (p.96).” However, they do not provide with an explicit explanation how the exchange rate reforms had changed the export incentives in this period. In fact, an important aspect that distinguished the export incentive system in 1960s from the one during 1950s lies in the fact that the export promotion policies during the take-off period were not limited in the domain of export incentives and were combined with investment incentives.

The proposition that the export incentives were combined with the investment incentives can be verified through two kinds of evidence. On the one hand, the capital costs for exporters were significantly lower than those for other firms (Hong, 1981). Since 1967, a supplementary depreciation of 50 percent (15%) was allowed to the firms of which the share of incomes from exports in the total income exceeds 50 percent (was between 20-50 percent). In addition, the import tariff was exempted for the machinery imports by exporters during 1964-74. Combined with the exchange rate reform (transition to the multiple exchange rate system to the unified

single exchange rate system), these incentives reduced the weight of the export incentives that affect only the firm's choice between foreign and domestic markets and are not related to the firms' motivation to invest, as it is for the exchange premium arising from the multiple exchange rate system. On the contrary, the relative importance of financial incentives, tariff and indirect tax exemption grew rapidly (Fig. 4). On the other hand, in the 1960s, although the average level of the relative price of export did not change a lot compared to the one in the 1950s, it became much more stable, which, as it is pointed out by Sakong and Jones (1980), reduced substantially the uncertainty in rate of returns to export. As it can be verified in Fig. 4, under the multiple exchange rate system, the dollar premium took a major part of the export incentives and the amount of this premium fluctuated very much because it was determined through an auction process. Given that a field augmentation for exports requires in most cases new investments and that the return to these investments can be realized only with a time lag, this kind of uncertainty must have discouraged the firms from investing for export purpose.

In addition to the investment incentives combined with export incentives, during the 1960s, various types of incentive schemes to encourage investment were adopted in South Korea. First of all, the government intervened in a direct manner through investments in public firms. Let aside the fact that the weight of public firms in total investments was important in this period, the role of these firms was crucial because their investments were made principally in those industrial sectors of which the forward and backward linkage effect was very strong. In this sense, the public enterprises in this period played a "strategic" role in improving the rate of return to capital during this period (Sakong, 1993). Secondly, the government played a role as a "social insurer". On the one hand, the government socialized the risks related to investment activities, by implicitly guaranteeing a bailing-out when a "wishful" productive activity faces a worsening of profit rate due to a short-term fluctuation of business cycle (Rodrik, 1994). On the other hand, the government also intervened heavily in order to facilitate foreign borrowing by the private firms through the enactment of the Foreign Capital Inducement Promotion Act in 1960 and of the Law for Payment Guarantee of Foreign Borrowing in 1962. The interest rate applied to the use of foreign debt was far below the level of the market interest rate and the level of interest rate applied to the bank loans. Thirdly, the government explicitly gave a priority to the firms, that are supposed to be "wishful" in terms of their investment plans, technological importance, forward and backward linkage, and scale economies, through various channels, in particular credit rationing. It even used, when necessary, a more compulsory and direct methods in order to attract private investments towards the industrial sectors of priority.

By the result of these various investment policies, the investment rate of the South Korean economy rose from 11 percent in 1964 to 26 percent in 1969, and there could be no doubt in the fact that this increase of investment rate is correlated with a strengthening of investment

incentives. According to Sakong (1993), the rate of return to capital in the manufacturing sector was only about 9-18 percent in the late 1950s, but experienced a continuous increase to 9-26 percent in 1962-66, to 16-38 percent in 1967-72, and to 17-40 percent in 1972-76. In addition, the profit rate in the manufacturing sector was estimate about 9 percent in 1951-53, but increased to 16% in 1954-56, 28% in 1957-62, and to 35 percent in 1963-70 (Hong, 1993). The rapid growth of investment allowed firms developing a new product combination, exploring new markets and assuring a strong enough export competitiveness in the world market through acquisition of new foreign technologies. It seems that the new investments induced in this way have played an important role in correcting the existing anti-export bias and thus increasing the export intensity with a time lag.

One could not deny the importance of the export growth and the import liberalization in the late 1960s that made possible for the firms to import the intermediary and capital goods indispensable for the industrialization. However, once again, these factors constituted a necessary, but not a sufficient condition for the increase of the import share in GDP. The factor which played a more direct role in the increase of the import share, in particular the share of machinery imports, seems to have been the investment boom. As Fig 5 shows it, until the early 1980s, the machinery imports from developed countries explains a major part of imports, and the shares of these two variables in GDP goes hand-in-hand with the investment rate until the early 1970s. This observation is consistent with this paper's proposition according to which it is the investments rather than trade policies that played a more direct role in creating demands for foreign capital goods.⁶

b. Industrial policies and changes in specialization pattern

As it is shown in section 2, a great part of the rapid penetration of the exports from EAHPEs in the world market can be attributable to their ability to change product composition toward the industrial sectors that are rapidly growing. In the case of South Korea, the role of the government in this process is still a controversial issue. In particular, the East Asian Miracle Report (World Bank, 1993) and Dollar & Sokoloff (1990) argue that the industrial policies had virtually no impact on the specialization pattern, on the basis of their observation that there is no

⁶ The simultaneous increases of the investment rate and the import share observed during the South Korean take-off might be explained by the fact that a trade liberalization lowers the relative price of capital goods and thus influence positively the investment rate, as it is argued in Baldwin and Seghezza (1996) and Lee (1995). Nevertheless, this theoretical approach is not consistent with a number of empirical observations. On the one hand, as it is shown above, the upward movement of the investment rate preceded the trade liberalization in South Korea, which draws a doubt on their interpretation of the direction of causality. On the other hand, the trade liberalization does not always accompany an investment boom, as it can be shown in the cases of Chile and Mexico.

significant correlation between sectoral growth rate and capital intensity. Lee (1996) directly estimates the impact of selective government intervention on the productivity growth at the industry level, and concludes that the industrial policies (in particular tax incentives) played a positive role in the investment growth, but had an insignificant (and even negative in the case of the non-tariff barrier) impact on the TFP growth.

Several problems can be pointed out regarding the empirical evidence provided by the researches belonging to the standard approach. The World Bank Report (1993) and Dollar & Sokoloff (1990) does not provide with any explanation why the cross-industry difference in incentive system did not induce a sectoral difference in growth rate. In addition, their empirical analyses depart from an assumption that the government intervened more heavily in the capital-intensive industries than in the labor-intensive industries, which does not reflect what really happened in South Korea (see Annex Table 1). Lee (1996) avoids this type of problem by using the data measuring directly the cross-industry difference in the government intervention. However, in his analysis, quite heterogeneous periods are put together in the regression: the 1963-68 period was a transition period in which the consistency between different kinds of policies were not completely established from our point of view.⁷

I reproduce the estimation provided by Lee (1996) including only 1970-85 periods and including the comparative cost index (CCI) proposed by Lee (1997) on the basis of the judgment that the official tariff rate and the non-tariff barriers are only an incomplete measure of the open trade policies. The CCI is calculated on the basis of the real effective protection rate and neutralized the impact of exchange rate fluctuation. More concretely, it is calculated as the following equation.⁸

$$CCI_i(t) = (1+REP_i(t)) / (1+REP_a(t))$$

where $REP_i(t)$ ($REP_a(t)$) is the rate of real effective protection for the industry i (the manufacturing sector) in the year t . Two industries (petroleum refineries and petroleum and coal products) were excluded in the regression, because they constitute outliers due to the two oil shocks in the 1970s.

Table 3 reports the results from this regression analysis. As in the case of Lee (1996), one fails to find a significant correlation between beneficial bank loans on the one hand and the

⁷ In addition, the dataset reported by Lee (1996) does not include the statistics regarding financial incentives provided by the government during 1963-68 and it is unclear how he treated these missing data. Moreover, he includes two petrol-related industrial sectors which were affected seriously by the two oil shocks during 1970s. Indeed, the real effective protection rates of these two industries show an extreme fluctuation during this period.

⁸ Using the rate of real effective protection as an explanation variable does not affect the main conclusions of this paper.

changes in production structure or TFP growth on the other. However, the tax incentives and CCI shows a strong and positive correlation with the variation of the share of value-added and the growth rate of TFP. This result contradicts with the conclusion made by the above-mentioned studies according to which the South Korean industrial policies did not have a positive impact on the industrial structure and the economic growth.

It is interesting to note that the CCI show a strong positive correlation not only with the variation of the share of value-added and the TFP growth rate, but also with the variation in the export intensity at the industry level (measured as the ratio of exports in the total production), which implies that the favored industries were transformed more quickly than others into export industries and became increasingly outward oriented. On the contrary, the correlation between CCI and the variation of the share of imports in the total domestic demands is weak. This result is difficult to understand from the standard point of view, given that the rate of real effective protection is often considered as an index measuring degree of inward-looking protectionism. In summary, the correlations obtained from the regression analysis imply that, in South Korea, there was a mechanism that cannot be understood by the dichotomy opposing the outward oriented development strategy against the industrial policies. The next subsection tries to provide with some qualitative explanations to this paradox.

c. Trade policy and effectiveness of industrial and investment policies

I believe that the apparently surprising results reported in the previous section can be explained by the interaction between industrial and investment policies on the one hand and trade policies on the other. In other words, the policy measures constituting outward-oriented development strategies did not only contributed to the increasing interdependence of the South Korean economy with regard to the world market, but also helped to keep the industrial and investment policies on the right track.

First of all, in condition that the efforts for import liberalization are accompanied, the export growth make possible for the firms to import advanced foreign capital goods that are indispensable to the acquisition of new foreign technologies. In particular, when a developing country tries to achieve its industrialization through a rapid structural transformation, it is imperative to assure the emerging industries to be quickly transformed into an exporting sector in order to sustain its outward-oriented development strategy in a long run. The reason is that if this country relies, for its exports, wholly on those sectors in which it has traditionally a comparative advantage, the emergence of new industrial sectors might produce a downward trend in the export intensity. This implies that the simple protectionism is not compatible with a rapid acquisition of foreign technologies. Fig 6 shows a surprising correlation between the share

of the machinery and equipments imported from the developed countries and the rate of structural changes in production and exports, which implies that the contribution of foreign machinery and equipments were critical in the South Korean structural dynamics. One should not forget here that a continuous upgrading of specialization pattern, in its turn, tends to create new demands for the foreign machinery and equipments. Ok (2002) shows that the cross-country difference in the share of machinery and equipments imported from the developed countries in the total domestic investment is better explained by the revealed comparative advantage in the same sector than by the trade policies. This implies that, whatever the reasons behind this phenomenon, the demand for advanced foreign machinery and equipments is getting larger and larger with advancement of industrial structure in favor of machinery and equipment industries.⁹ In this respect, the strong dependence on imported capital goods observed in the South Korean industrialization should not be considered as reflecting the failure in developing domestic capital good sector, but as an outcome of the rapid demand growth for foreign capital goods which arised from the rapid structural transformation and the specialization within the capital good sector (Westphal, Kim and Dahlman, 1985).

Secondly, the export-oriented development strategy may reduce the risks resulting from the government's erroneous decision which is not avoidable when it intervenes in the private decision-makings. The co-implementation of the industrial policies and the export promotion policies implies that the firms benefiting from the industrial policies should survive in the competitive international market. Therefore, even if a developing country does not follow its current comparative advantage but "creates" one by means of industrial policies for its industrialization, the newly created comparative advantage could not lie in a sector of which the technological requirements go far beyond the country's current capability and resource endowment (Wade, 1990). Furthermore, the government itself is an economic agent with only a limited rationality and cannot make a perfect anticipation (Matsuyama, 1997). The export performance provides with a clear signal when the government goes wrong on its decision. If the government targets a relatively wide range of industries, as there are very heterogeneous industries in terms of the factor requirements, the export promotion policies can push the firms to find a niche market with a reasonable factor requirement, compared to the country's current relative factor prices, because they are obliged to improve export performance. For example, the rapid growth of the South Korean electronic industries during the 1970s could constitute an

⁹ Ok (2002) explains this observation through the notion of "absorptive capability". That is to say, what makes the costs involved in the utilization of foreign machinery and equipments different among developing countries is not limited to the factors affecting explicitly the price of these goods, but could be also the implicit costs related to the different ability to use foreign machinery and equipments. If a developing country shows a strong competence in the machinery sector, these implicit costs will be reduced due to the existence of technological externalities.

example of this story.

Last but not least, the export promotion policies provided the government with a clear and simple criterion necessary to properly monitor the private firms' performance. This function of the export promotion policies might help reducing, albeit not eliminating, the problems arising from the information asymmetry between the government and the private agents which is an important source of the government failure (Krueger, 1990; Murphy, Shleifer & Vishney, 1991). It is well known that the South Korean government effectuated an intensive export monitoring during its early industrialization (Rhee, Ross-Larson & Pursell, 1984). By monitoring the export performance of the subsidized firms, the South Korean government was able to enforce these firms to do their best in order to achieve their pre-fixed goals at least approximately.

In fact, what distinguishes the South Korean experience with many other developing countries does not lie in the degree of the government intervention but consists in the difference of the government's capability to impose the pre-fixed priorities upon the private firms. In this respect, the export monitoring constituted a focal point in creating the virtuous circle between the industrial and investment policies on the one hand and the trade policy on the other. According to Rodrik (1997b), the export incentives provided by the government were much stronger in Turkey and Chile than in South Korea and Taiwan, while the increase in the export intensity was insignificant in those first countries. He also points out that many other developing countries, for example, Bolivia and Kenya, failed to implement properly export promotion policies because, although, in these countries, the export incentives are provided much more in accordance with the "orthodox" rules than in South Korea, the lack of efficient monitoring allowed the firms cheating and made the trade reforms inefficient.

The export monitoring in South Korea could be implemented efficiently thanks to two particular institutional arrangements: a particular relationship between private firms and the government which can be called "quasi-internal organization" (Lee, Lee & Lee, 2000) and the government-dominated financial system that provided the government with a tool to "punish" the firms that were not able to respect their implicit contract with the government. On the one hand, through the export targeting and the monthly meetings with exporters, the government could make a sufficient caution to fix the export targets in a reasonable range in order not to discourage the firms with too ambitious targets (Rhee, Ross-Larson and Pursell, 1984). In addition, through this kind of meetings, the government could not only discourage the firms' unproductive rent-seeking activities but also provided firms with the information that could not be transmitted by the market (Cho and Helpman, 1994).

On the other hand, in case where the firms could not respect their contract with the government regarding exports, the government was able to "punish" them by, for example, interrupting bank loans. The implication of this kind of intervention through the government-

dominated financial system goes far beyond the simple correlation between industrial growth and amount of quantitative financial incentives in the industry level, as it is measured in the Table 3, because a failure for a firm in respecting the export target does not imply simply that it should give up the export incentives provided by the government, but also that it could lose the rents on the domestic market to which it had a quasi-exclusive access.¹⁰ In other words, the rents on the domestic market appropriated by a firm (or a group of firms) were assured only in condition that it shows a strong enough export performance, and the export performance played the role of passport for access to the domestic rents. This mechanism was reinforced by the fact that, in South Korea, the major private firms belonged to a Chaebol, group of enterprises, which ties a number of subsidiaries operating in various industrial sectors through cross-investment and cross-guarantee. The Chaebols were able to assure themselves a high profit rate in a long term by reinvesting their income arising from their export activities on the newly promoted sectors or the non-tradable sectors such as services, constructions and real estates (Hong, 1986). The “cooperative” attitude of the private firms constituted a major criterion which was used by the government to give entry permission into these sectors. In particular, the entry permission and the financial supports were often provided as a bundle (Cho, 1997). Ironically, the privileges accorded to the firms with a good export performance allowed the government reinforcing its control over them because of the lower level of capital market development. As the firms were heavily dependent on the bank loans and the financial structures of the firms belonging to a same Chaebol were strongly interrelated through cross-participation, an interruption of the financial support by the government would put the entire group in danger.

5. Conclusive remarks

This paper proposed the notion of policy complementarities in economic development and investigated the case of South Korea in order to show that this notion might help developing a consistent explanation to a successful industrialization experience. This notion is still highly hypothetical so that there is not doubt that it should be further developed. However, looking at the case of South Korea, it seems to provide a useful framework, in particular to overcome the deficiencies of the standard approach. First of all, the standard approaches could not provide with a consistent explanation to the three distinguished stylized facts (the export boom, the investment boom and the structural changes), while the notion of policy complementarities seems to do it in a sufficiently satisfactory way. Secondly, the outward-oriented trade policies do not play an independent role in economic development as it is often supposed in the existing

¹⁰ During the most of the 1970s, the profit rate in the domestic consumption sector was higher than in the export sector (Cho and Cole, 1992).

studies, but can realize their full potential only combined with other complementary policies. As it is shown in the case of South Korea, this combination is crucial for a developing country when it aims at achieving economic development through rapid structural transformation. In this respect, it is inappropriate to compare two different developing economies of which the imperatives for development are different. For example, while a lot of studies put South Korea and Chile on a same horizon in order to privilege the beneficial role of the open trade policy in economic development, the evolution of industrial structure in the two countries contrasts sharply after the opening of the market. The case of South Korea shows that the structural transformation is not a natural by-product of the economic growth and can be achieved only through a specific combination of the trade policies and the industrial and investment policies. Therefore, one could say that an appropriate evaluation of one country's development strategy should take into consideration various elements such as the country's long-term growth trajectory, the existence or not of complementarities between different policy measures and their institutional backgrounds.

In this paper, I was not able to expand the analysis into dynamic aspects of the policy complementarities. I think that this expansion could help understanding how the successful development strategy was transformed into its counterpart in South Korea, leading this country to the financial crisis. A number of existing studies provide with some clues on this issue. On the one hand, since 1980, the South Korean government began to retreat in the private decision-makings, partly due to the international pressure. On the other hand, the institutional infrastructure supporting the policy complementarities has evolve slowly but irreversibly. In particular, the proposition of Lee, Lee & Lee (2000) is highly suggestive in this respect: according to them, while the "quasi-internal organization" tying the government and the private firms began to be weakened due to the change of relative power of the two agents, the government was not able to respond timely to the general trend of financial market liberalization by rearranging its financial policies, principally due to the risks of large enterprise failures.

Reference

- Acemoglu, D, S. Jhonson & J.A. Robinson (2001), The Colonial Origins of Comparative Development – An Empirical Investigation, *American Economic Review*, December 2001.
- Amable, B. (2000), Institutional complementarity and diversity of social systems of innovation and production, *Review of International Political Economy* 7(4), 645-687.
- Amsden, A. (1989) *Asias next giant : South Korea and late industrialization*, New York and Oxford : Oxford Univ. Press.
- Aoki, M. (2001), *Toward a comparative Institutional Analysis*, The MIT Press, Cambridge, Massachusetts.
- Balassa, B. (1978) Exports and economic growth: further evidence, *Journal of Development Economics* 5 : 181-190.
- Baldwin, R.E. & E. Seghezza (1996) Trade-induced investment-led growth, NBER Working Paper Series N° 5582.
- Carolan, T., N. Singh & C. Talati (1998) The composition of U.S. East Asia trade and changing comparative advantage , *Journal of Development Economics* 57 (2) : 361-89.
- Chang, H.-J.(1994) *The political economy of industrial policy*, New York, St. Martins Press.
- Cho, Y-J. & D.C. Cole (1992) The role of the financial sector in Koreas structural adjustment, dans V. Corbo & S-M. Suh (éds.) *Structural adjustment in a newly industrialized country : the Korean experience* Baltimore, Md.: Johns Hopkins Univ. Press : 115-37.
- Cho, Y-J. & T. Hellmann (1994) The governments role in Japanese and Korean credit markets: a new institutional economics perspective, *Seoul Journal of Economics* 7(4) : 383-415.
- Cho, Y-J. (1997) Government intervention, rent distribution, and economic development in Korea, dans M. Aoki, H-K. Kim & M. Okuno-Fujiwara (éds.) *The Role of government in East Asian economic development*, Oxford and New York: Oxford Univ. Press : 208-32.
- Collins, S.M. & W. Park (1989) External debt and macroeconomic performance in South Korea, dans J.D. Sachs & S.M. Collins (éds.) *Developing country debt and economic performance*, Chicago and London, The University of Chicago Press : 151-362.
- Dollar, D. & K. Sokoloff (1990) Patterns of productivity growth in South Korean manufacturing industries, 1963-79, *Journal of Development Economics* 33(2) : 309-27.
- Fageberg, J. & G. Sollie (1987) The method of constant market share analysis reconsidered, *Applied Economics* 19 : 1571-83.
- Frank, C.R.Jr., K-S. Kim & L.E. Westphal (1975) *Foreign trade regimes and economic development: South Korea*, New York and London, Columbia Univ. Press.
- Gagnon, J.E. & A.E. Rose (1995) Dynamic persistence of industry trade balance : how pervasive is the product cycle ? *Oxford Economic Papers* 47 : 229-48.

- Hong, W.T. (1986) The financing of export-oriented growth in Korea, dans A. Tan & B. Kapur (éds.) Pacific growth and financial interdependence, Allen & Unwin.
- Hong, W.T. (1993) Trade and development : The experience of Korea and Taiwan, dans G.Hasson (éd.) International trade and development, Routledge, London : 184-202.
- Hong, S. & S. Kim (1996), *The long-term trend of the Total Factor Productivity in Manufacturing*, The Korean Development Institute, Seoul, Korea (in Korean).
- Jones, L.P. & I. Sakong (1980) Government, Business, and Entrepreneurship in Economic Development : The Korean Case, Cambridge, Massachusetts and London, England, Harvard Univ. Press.
- Kim, S. (1988), *Economic impact of the import liberalization and structural adjustment policies*, The Korean Development Institute, Seoul, Korea (in Korean)
- Krueger, A.O. (1990) Government failure in economic development, *Journal of Economic Perspective*, 4(3) : 9-23.
- Lee, C.H., K. Lee & K. Lee (2000) Chaebol, financial liberalisation and economic crisis : Transformation of Quasi-Internal Organization in Korea, papier présenté au colloque annuelle de l'association coréenne de l'économie 2000, Séoul, Corée du Sud.
- Lee, J. (1997) The maturation and growth of infant industries: The case of Korea, *World Development* 25(8) : 1271-1281.
- Lee, J.-W. (1995) Capital goods imports and long-run growth, *Journal of Development Economics*, 48 : 91-110.
- Lee, J.-W. (1996) Government intervention and productivity growth, *Journal of Economic Growth* 1 (3) : 391-414.
- Matsuyama, K. (1997) Economic development as coordination problems, dans M. Aoki, H-K. Kim & M. Okuno-Fujiwara (éds.) *The Role of government in East Asian economic development*, Oxford and New York: Oxford Univ. Press.
- Murphy, K.M., A. Shleifer & R. Vishny (1991) Allocation of talent and economic growth, *Quarterly Journal of Economics* 106 : 503-30.
- Nam, J-H. (1995) The role of trade and exchange rate policy in Korea's growth, dans T. Ito & A.O. Krueger (éds.) (1995) *Growth theories in light of the East Asian experience*, Chicago and London, The University of Chicago Press, 154-79.
- North, D. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge Univ. Press.
- Ok, W. (2002), *Echange internationaux de biens d'équipement, capacité d'absorption et rôle de l'Etat dans le développement économique*, Ph.D. Thesis, EHESS.
- Rhee, Y.W., B. Ross-Larson & G. Pursell (1984) Korea's competitive edge: managing the entry into world markets, Baltimore, The Johns Hopkins Univ. Press.

- Rodrik, D. (1994) Getting interventions right : how South Korea and Taiwan grew rich, NBER Working Papers N° 4964.
- Rodrik, D. (1997) The paradox of the successful state, *European Economic Review* 41, 411-42.
- Rodrik, D., A. Subramanian & F. Trebbi (2002), Institutions Rle: The Primacy of Institutions over Geography and Integration in Economic Development, NBER Working Paper Series W9305.
- Sakong, I. (1993) Korea in the world economy, Washinton DC, Institute for International Economics.
- Timmers, M. (1999) The dynamics of Asian manufacturing. A comparative perspective, 1963-1993, Eindhoven Centre for Innovation Studies
- Wade, R. (1990) Governing the market : economic theory and the role of government in East Asian industrialization, Princeton NJ : Princeton Univ. Press.
- Westphal, L.E., L.Kim & C.J.Dahlman (1985) Reflections on the Republic of Koreas acquisition of technological capability, dans N. Rosenberg & C. Frischtak (éds.) *International technology transfer*, New York, Praeger : 167-221.
- World Bank (1993) *The East Asian miracle : Economic growth and public policy*, New York : Oxford Univ. Press.
- Young, A. (1992) A tale of two cities: factor accumulation and technical change in Hong Kong and Singapore, *NBER Macroeconomics Annual* : 13-54.

Fig. 1. Policy complementarities and its evolution

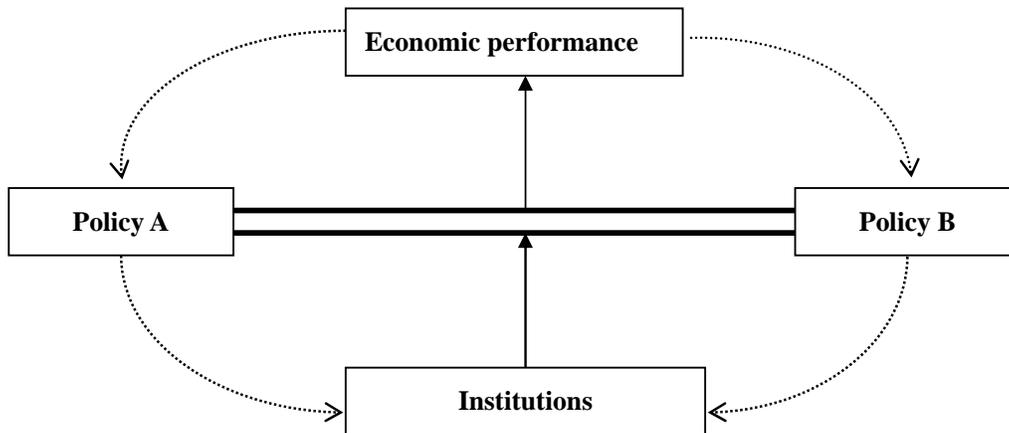
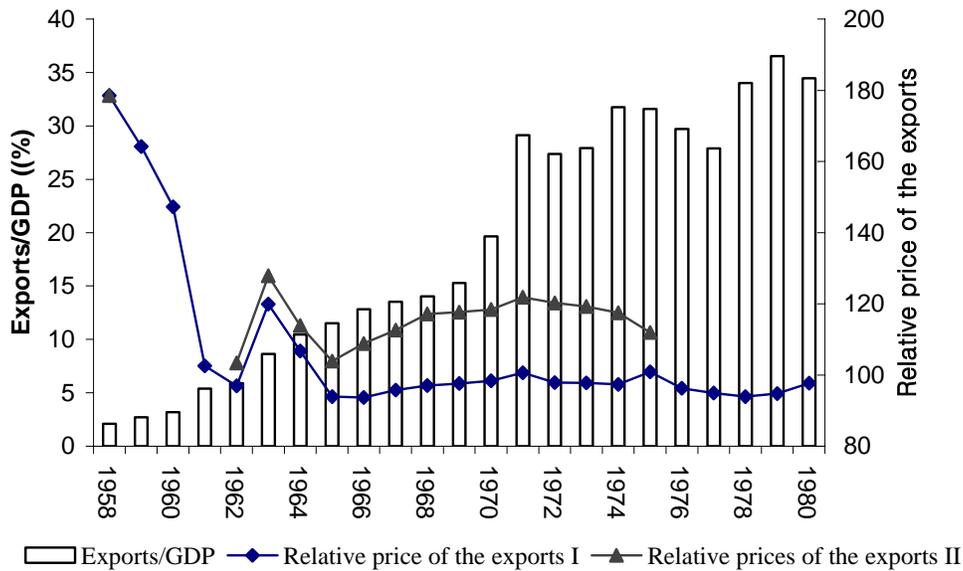


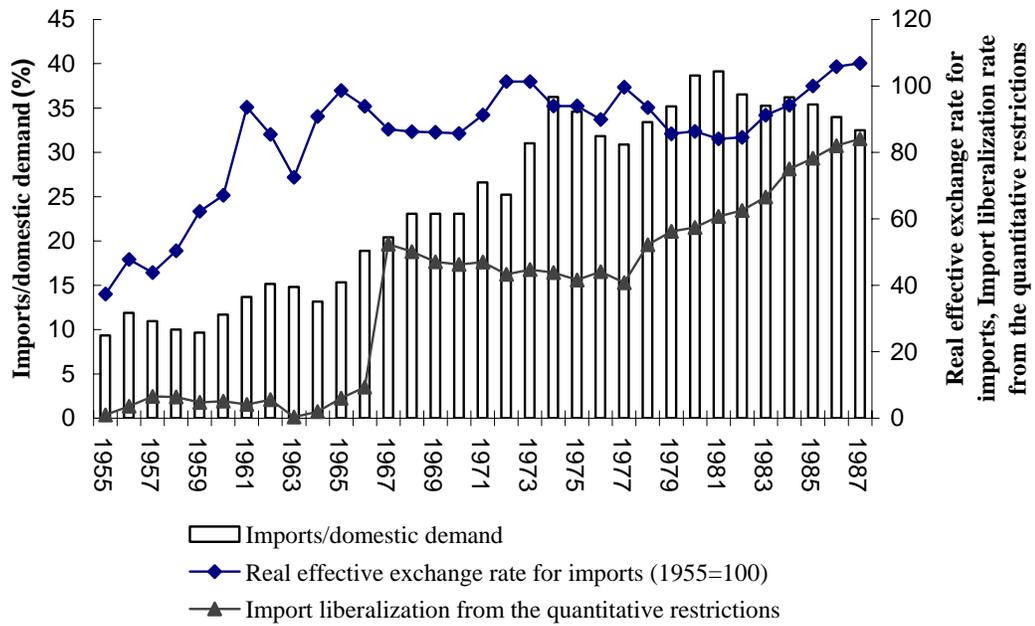
Fig. 2. Relative price of the exports and export intensity



Note: The relative price of the exports is calculated as the ratio of effective exchange rate for exports divided to the real effective exchange rate for imports (multiplied by 100). The relative price of the exports I includes exchange premium resulting from the multiple exchange rate system, direct cash subsidies, direct tax reductions, and interest rate subsidies per dollar of exports, but excludes the indirect tax reduction and tariff exemption. The relative price of the exports II includes the indirect tax reduction and tariff exemption.

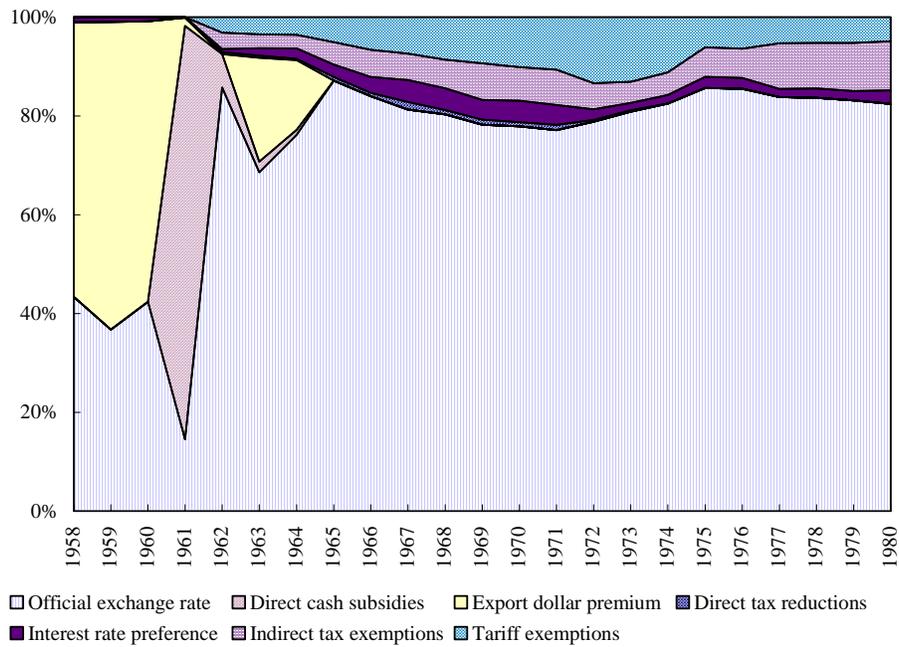
Data: Bank of Korea, Nam (1995), Sakong (1993)

Fig. 3. Import liberalization and market penetration ratio of the imports



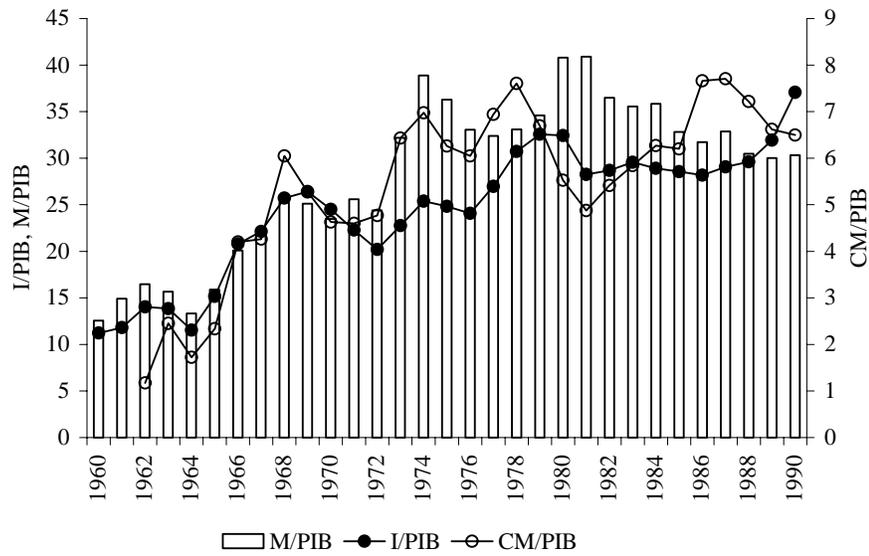
Data: Bank of Korea, Kim (1988), Nam (1995), Frank, Kim and Westphal (1975)

Fig. 4. The composition of the real effective exchange rate for exports



Data: Collins and Park (1989)

Fig. 5. Investments and machinery and equipment imports

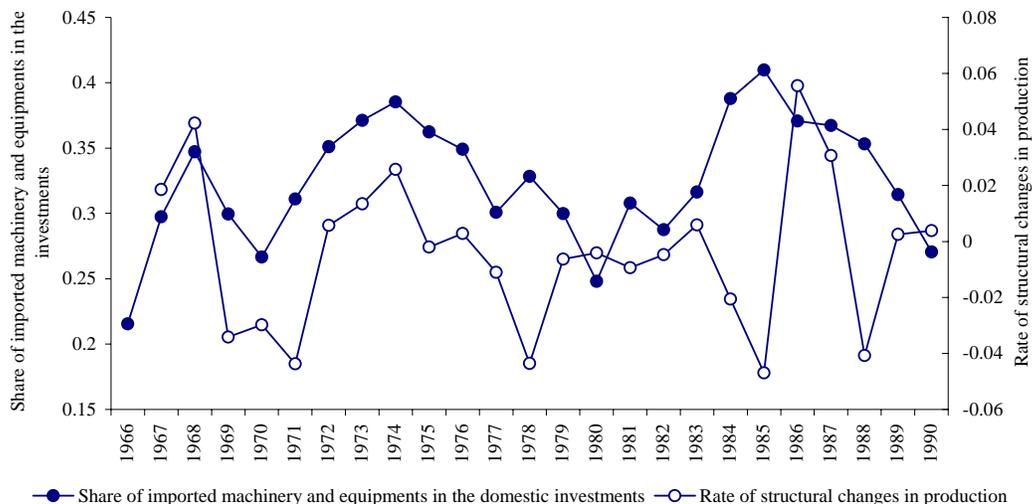


Note: M/PIB and I/PIB represent the share of the total imports and the gross fixed capital formation in GDP, respectively. CM/PIB represents the share of machinery and equipments imported from the OECD countries in GDP.

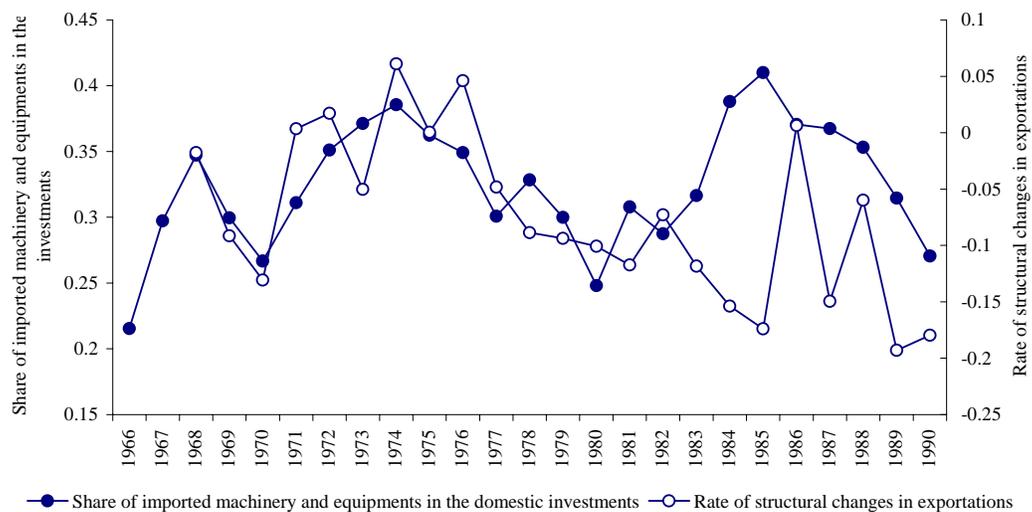
Data: World Development Indicator, OECD Historical Statistics on International Trade by Commodity.

Fig. 6. Machinery and equipment imports and structural changes

Panel A. Production



Panel B. Exports



Data: Sakong (1993), Collins and Park (1989), World Development Indicator, CHELEM Database, Timmers (1999)

Table 1. Decomposition of the variation of the market share for various countries, 1967-95

1967-1995	Market share effect	Product composition effect	Product adaptation effect	Market composition effect	Market adjustment effect	Total variation
USA	-3,482	1,131	-0,952	0,101	-0,275	-3,477
Germany	0,299	2,448	-0,453	-0,318	-1,695	0,281
France	0,749	0,970	-0,572	-0,269	-0,304	0,574
Japan	-0,149	0,806	1,174	2,783	-0,287	4,327
Hong Kong	-0,258	0,448	-0,286	0,110	0,047	0,062
Singapore	0,278	-0,082	0,597	0,227	0,183	1,203
South Korea	1,417	0,082	0,572	0,048	0,328	2,446
Malaysia	0,270	-0,305	0,525	0,326	0,087	0,904
Philippines	-0,122	-0,212	0,245	0,146	-0,058	0,000
Thailand	0,783	-0,156	0,031	0,171	-0,026	0,803
Argentina	-0,032	-0,266	0,095	-0,001	-0,025	-0,228
Brazil	0,727	-0,420	-0,123	0,018	-0,108	0,093
Mexco	0,897	0,030	-0,073	0,103	0,095	1,053
Turkey	0,309	-0,145	0,159	-0,007	-0,132	0,184
India	0,068	-0,155	0,044	-0,046	0,034	-0,055

Data: CHELEM Database

Table 2. Convergence in per capita income versus structural convergence, 1970-89

Dependent variable: SDI

	1	2	3
Constant	27,888** (9,92)	28,205** (10,36)	29,028** (10,33)
Structural difference in 1970	-0,321** (-16,24)	-0,350** (-17,27)	-0,354** (-17,08)
Schooling year gap	1,212** (3,88)	0,522 (1,47)	0,486 (1,36)
Investment rate gap	0,703** (5,70)	0,688** (5,62)	0,640** (5,01)
Trade intensity gap	0,032* (2,53)	-0,005 (-0,38)	0,009 (0,56)
Variation in per capita income gap	1,318 (0,34)		5,125 (1,15)
Variation in population density gap	-0,813* (-2,39)		-0,658 (-1,56)
Per capita income gap in 1970		6,372** (2,61)	8,987** (3,09)
Population density gap in 1970		2,380** (4,72)	1,911** (3,31)
Dummy for 1st generation EAHPEs - developed countries	-10,961** (-3,61)	-12,548** (-4,78)	-11,839** (-3,92)
Dummy for 2nd generation EAHPEs - developed countries	-12,259** (-5,78)	-13,681** (-6,22)	-13,912** (-6,30)
Dummy for Latin American NICs - developed countries	-17,219** (-7,28)	-17,385** (-7,46)	-17,005** (-7,21)
R²	0,29	0,31	0,31

Data: CHELEM Database, World Development Indicator, Penn World Table 5.6, Barro-Lee Database

Table 3. Impacts of the industrial policies

Dependant variable	Variation in the share of value added	TFP growth	Variation in export/production	variation in market penetration ratio of imports
Constant	-0,0035 (-0,94)	0,026 (1,24)	0,059 (1,18)	0,036 ⁺ (1,90)
Initial value added per employee	-0,0049** (-5,04)	-0,052** (-6,51)	-0,039** (-3,32)	-0,003 (-0,33)
Average wage rate	-0,0030* (2,18)			
Capital intensity	0,0001 (0,07)	0,020** (3,19)	-0,012 (-1,06)	-0,007 (-1,05)
Initial export/production (import/domestic demands) ratio	0,0025 (0,91)	-0,029 (-1,47)	-0,150** (-3,48)	-0,146** (-6,52)
Tax incentives	0,0295** (6,48)	0,120** (3,50)	0,070 (1,16)	0,043 (1,16)
Bank loans	-0,0061 (-0,90)	-0,014 (-0,29)	-0,103 (-1,00)	0,036 (0,63)
CCI	0,0060** (3,00)	0,030* (2,44)	0,093** (5,77)	-0,012 (-0,93)
Obs.	96	96	96	96

Note: Panel WLS estimation

Data: Hong & Kim (1996), Lee (1996), Lee (1997)

Annex Table 1. Correlations between factor intensity and degree of the government intervention, South Korean manufacturing 1970-85

	<i>Tax</i>	<i>CCI</i>	<i>Tarif</i>	<i>NTB</i>	<i>Loan</i>
<i>Capital intensity</i>	0,28**	0,00	-0,39**	-0,32**	-0,16
<i>Value added per employee</i>	0,20*	-0,19	-0,11	-0,08	-0,24*
<i>Exports/Production</i>	0,07	-0,06	0,10	0,02	0,26*
<i>Imports/consumption</i>	0,40**	0,40**	-0,60**	-0,21*	0,12

* significant at 5% confidence level

** significant at 1% confidence level

Data: Hong & Kim (1996), Kim (1988), Lee (1996), Lee (1997)