TNC-led Auto Industrialisation in Malaysia: An Empirical Value Chain Approach

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Summary: This study examines the development of the Malaysian automobile industry, particularly focusing on the development of Proton, a state-supported automobile company. The development was stimulated by technological and managerial assistance of Mitsubishi Motor Corporation, a Japanese multinational car assembler. Based on value chain analysis, this study develops an input-output method to examine the value-added distribution between the Malaysian automobile industry and foreign sectors. The results show that (1) only about a half of total value-added created in the industry was preserved within Malaysia, and (2) nearly a quarter of total value-added was out-flown to Japan. Two possible explanations are examined.

Keywords: *Transnational Corporations (TNCs), Automobile Industry, Value Chain Analysis, Input-Output Method, Southeast Asia, Malaysia*
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1. Introduction

The past decades have experienced drastic change in the global economy, in which the density and interdependence of networks among internationally operating firms have been created. A successful developing country, especially in the East Asian region, took an advantage of such change by introducing export-oriented industrialisation. Production facilities relocated to low-cost areas are closely linked through trade and investment with the major wealthy economies (Ernst and Kim 2002). Under such trends, developing countries are increasingly and inevitably integrated into global production networks.

Worldwide spread and relocation of production facilities, however, do not necessarily assure proportionate distribution of economic benefits among participants. The distribution of benefits is principally determined by several elements: where and how value is created, how it is shared, and who governs the integrated stream of the production process. At a macro perspective, a country's relative position in world economy is critical in determining its reward from globalisation. Fierce competitions in international markets clearly explain why some groups of countries gain and others lose. There is no doubt that steady integration into the global economy is not always beneficial but often harmful for less competitive developing countries.

The present study is intended to address this issue, focusing on the development of the automotive industry in Malaysia. Malaysia's automobile industry showed remarkable development in the late 1980s and 1990s, led by a substantially state-owned company, the Perusahaan

Otomobil Nasional (Proton), the largest automotive assembler in ASEAN region. The company was established in 1983 under the scheme of the Malaysian national car project. As the automobile industry is expected to contribute to industrial development and enhancing local technological capability, the Malaysian government provided enormous support for the company. However, Malaysia's lack of experience, technology and managerial know-how on automotive business called for a technologically advanced transnational corporation (TNC) to join and contribute to the project. For this purpose, Mitsubishi Motor Corporation (MMC) of Japan was invited. Thanks to the contributions of Mitsubishi, Proton successfully accomplished expected goals including localisation and employment creation for Bumiputra (ethnic Malay). Meanwhile, the industry was inevitably embedded into global production networks with MMC. Thus, the Proton case appears as an example of TNC-led industrial development in a developing country.

The hypothesis of this study is explained as follows. The development of Proton was made in great haste, which outpaced the advancement of local technological capabilities. To fill the technological gap, the industry continued to rely on the external contributions, mainly provided by MMC, to increase the competitiveness of the industry. However, the point this study emphasizes is that the external dependence caused outflows of value created in Malaysia to the overseas suppliers, leading to international inequality of income. The present study examines the extent to which such external dependence of Malaysian automobile industry caused the outflow of value.

To examine this hypothesis, a useful theoretical framework is offered by value chain analysis (Gereffi and Korzeniewicz 1994, Henderson 1998, Kaplinsky 2000, Gereffi and Kaplinsky 2001)[1]. Value chain refers to the full range of activities including design, production and marketing of a product. The analysis associates uneven economic development among countries with the spread and penetration of TNCs' global activities. Indeed, in order to gain international competitiveness extemporarily, firms of developing countries are increasingly reliant upon inputs of foreign capital, technology, managerial know-how and intermediate goods for their production. The reliance on such external factors, however, leads to outflows of value-added from the country in terms of payments for imported materials, license fees, loyalty, and repatriation of profit. As a result, manufacturing growth of a developing country may also benefit foreign suppliers. Thus, value chain analysis provides an appropriate framework to examine the influence of globalisation on industrial development of developing countries.

A major contribution of this paper is to provide empirical evidence to examine the aforementioned issue. Techniques used in input-output analysis are applied to our case study. Input-output analysis clearly demonstrates that value is created by inter-industrial linkages of the economy as a whole, and is distributed in the form of wages, profits and other rewards. This study offers empirical evidence of value distribution created in Malaysian automobile industry among home and foreign countries. The Asian international input-output tables in 1985, 1990, and 1995 are employed, enabling us to examine time-series changes in the international value distribution structure. Empirical results were carefully reviewed and examined by author's fieldwork both in Malaysia and Japan. As there is few empirical works in the existing value chain analysis, the development and application of input-output technique to value chain analysis will be a major contribution of this study.

This study is structured as follows. Section 2 briefly surveys the literature of value chain analysis, and re-examines their theoretical structure. A special focus is placed on the examination of the working definition of 'value' in order to construct an empirical model. Section 3 provides a historical review of the development of the Malaysian automobile industry. In section 4, input-output method is applied to the estimation and the empirical results are examined. Section 5 discusses the implications of the results. A summary of the findings as well as several points of discussion are presented in the concluding section.

2. Developing Countries in Global Production Networks

Is globalisation a blessing or an affliction for developing countries? The answer can be both. Firms and industries in developing countries may benefit from the insertion of themselves into global production networks. The networks provide them with opportunities for their learning, local capability formation, and skill acquisition to meet global competition. Close and interactive relationships with TNCs of developed countries enable local firms to upgrade and refine their technological and managerial capabilities. In an extreme case, developmental opportunities outside the connection with TNCs are desperately limited for firms in developing countries. There is little scope for the firms to succeed in the global market without any superior knowledge, technology, information, and competences to meet international standards. On the other hand, TNCs may bring those managerial assets to put all together into host developing countries. Thus, a connection with TNCs is important to developing countries for competition in global markets.

Involvement into global production networks via TNCs, however, does not necessarily guarantee proper benefits for developing countries. Instead, it often serves as a threat for firms in developing countries. Developing countries with less technological capability are forced to offer falling real wages to attract TNCs and serve themselves as simple manufacturing bases (Fröbel *et al.* 1980). In this case, an economic consequence of the alliance with TNCs may be sometimes unfavorable for a developing country. Thus, growing international integration of production and trade initiated by TNCs is often blamed for causing economic downfalls of many developing countries.

Global Unequalisation and the Contributions of Value Chain Analysis

Questions related to the impact and implications of globalisation on international distribution of income have stimulated many theoretical and empirical studies. In recent years a growing number of studies has addressed this issue through the lens of value chain analysis (Gereffi and Korzeniewicz 1994, Henderson 1998, Gereffi 1999, Kaplinsky 2000, Gereffi and Kaplinsky 2001). Value chain analysis is aimed to provide useful analytical structure to clarify interactions between globalisation and international income inequality, examine income distribution among participating individuals, firms, and countries, and identify effective policy measures to alleviate trends, if any, towards international unequalisation. The analysis sees that participation into the global chain is particularly important for firms in developing countries. It is a necessary, but not a sufficient, condition for these firms to upgrade their capabilities in order to move themselves

into higher-skill and higher value-added segments of the chain. The initiative to construct global networks is normally taken by leading TNCs; therefore, the focus of the analysis is centred on firms, especially TNCs. TNCs coordinate and control, through governance, the organisation of the entire production process[2]. TNCs' governance often leads to making contributions to the upgrading of the entire global value chain.

However, the analysis puts more stress on the fact that "the value-added capacities of companies at each nodal point in the chain tend to vary and in any case are constrained by the way the chain is organised and by the nature of corporate power within it." (Henderson 1998: 369). Actually, the bulk of the value is added in the marketing, design, and some special productions, which are exclusively carried by technologically and managerially advanced TNCs, with high barriers to entry. Only relatively simple manufacturing activities are open for firms in developing countries, in which an intense competition squeezes the profit. As a result, profit is greatest in the relatively concentrated nodes of the chain located in developed countries, while less profitable segments are left to developing countries. Thus, the analysis takes the integration into global production networks to be often unfavorable for developing countries.

The value chain analysis provides a number of useful concepts, frameworks, and hypotheses; however, the analytical techniques have not been refined, generalised and well developed as yet, especially from the economists'points of view (Wood 2001). Partly due to this reason, only few numbers of studies offer quantitatively convincing evidences whether internationally unequal distribution of income actually exists, is persistent, and is being aggravated[3]. The lack of empirical evidences is, thus, a crucial shortcoming of the analysis, as one of the core objectives of the analysis is to examine and then contribute to eliminate international income inequalities. Empirical findings will provide a basis of our understandings on growing disjuncture between the global spread of productions and incomes. Hence, this study is intended to construct a quantitative model for value chain analysis and to provide a practical method to map distribution of value among countries.

The Use of 'Value' in Value Chain Analysis

For a construction of a rigorous quantitative tool, the first step we must take is to elaborate and sharpen the definitions of the key term 'value', consistent with the use in the value chain literature. In value chain analysis, the term 'value' is literally a core concept; however, there is no general agreement with the definition of value itself. In value chain analysis, the term 'value' has been used interchangeably with other economic variables such as profits, value-added, price mark-ups, and costs (Gereffi et al. 2001, Kaplinsky, Morris and Readman 2001). However, economic theory clearly demonstrates that these variables can never be the same and, therefore, cannot be used in such a way to present value. Thus, we must examine what economic variable is most appropriate as a working definition of 'value' for value chain analysis.

This study posits that 'value-added' is, among others, an appropriate and convenient economic variable to represent the term 'value' in the conventional context of value chain analysis. Value-added is the difference between total revenue of a firm and the cost of bought-in raw materials, services and components. It thus measures the value that the firm has added to these

bought-in materials and components by its processes of production. The central concern of value chain analysis is individual's well-being. Value chain analysis is intended to explain the distribution of income flows among those participating in the global economy. The benefit of globalisation typically comes into view as various types of income, which is normally defined as a return to a factor of production such as labor, capital, land and entrepreneurship. These returns appear as forms of wages, interest, rent, and profit, respectively. From a firm's perspective, income can be seen as total sales turnover minus input costs. This is, by definition, value-added. Put another way, value-added is ultimately divided into wages, dividend payments, rent, and profits, all of which are economic gains of agents such as laborers, capitalists, land-owners, and entrepreneurs. Thus, the term 'value-added' contains all economic returns attributed to the contributors to the chain.

In this sense, value-added is a better-qualified concept over other candidates such as profit, price mark-ups, and costs. Profit is, by definition, a return to capitalists and entrepreneurs; therefore, rewards to other owners of production, particularly laborers, are excluded from the calculation. In addition, it is often difficult to obtain profits data that are open to the public. Thus, this concept is highly problematic as a working definition of value. The next candidate, price mark-up, has a similar problem. Finally, costs can never be value, since it is contained in the brought-in materials used up in the production process. Thus, although several candidates have been introduced, value-added can best represent value itself.

Another conceptual advantage of value-added is its wide inclusiveness. Value-added may involve various forms of generated incomes including 'economic rents,' which play an important role in value chain analysis (Gereffi 1999: 43-44). Economic rents may come from a firm's exclusive superiorities such as technology, labor productivity, better management and marketing, organisational excellence, and so on. Economic rents are always difficult to grasp and to estimate; however, those simply come into view as a premium in profit and wages, which are captured in the form of value-added.

Application of Input-Output Methods

The immediate advantage of the 'value-added' definition is an applicability of input-output methods for mapping the flows of value-added among industries. Input-output analysis sees an economy as a system of inter-linkages between all inputs and outputs. The output of a good or service in an economy is either used in the production of goods or services (including itself) or it goes into final consumption (e.g. households, exports, government). Each output in an economy can be represented by an equation, with output equal to its final consumption plus the sum of its inputs used in all production activity throughout the economy.

Moreover, value-added, as the definition, is consistent with recent theoretical and empirical development of value chain analysis. The generation of value-added is a cumulative process. Regarding this point, recent contributions of value chain analysis emphasise the importance of systemic efficiency of a chain as a whole (Schmitz and Knorringa 1999, Kaplinsky 2000, Bair and Gereffi 2001). A firm's competitiveness is based on other firms' contributions, which appear in forms of price, quality, flexibility, delivery speed, and degree of trust and cooperation within

the cluster. Without any superiority in these factors, the competitiveness of the final product is largely undermined. This is why the supply-chain management normally seeks to supervise every node of production. Value chain analysis follows this logic, arguing that increased horizontal and vertical expansion of linkages among firms may have positive effects on each firm's performance. Value chain analysis sees firm's upgrading as a process in which firms concentrate on their own advantageous, but exclusive, resources to other firms in the value chains. This is to say that the upgrading process is a structural development of division of labor in a cluster in which the concerned firms are embedded. At an industry level, a change of productivity at one sector affects other sectors' profitability through direct and indirect input-output linkages (Okishio 1993). Thus, the introduction of the term 'value-added' requires us to see a value chain as an input-output interdependence. Based on this perspective, our model will be introduced in section 4.

The next section examines the development of the Malaysian automotive industry, mainly focusing on the first decade of the development of Proton, Malaysia's state-supported automotive company to assess the achievements with respect to rationalisation, localisation, and technological development of the industry. An interesting feature of the Malaysian automobile industry is its strategic alliance with TNCs. Malaysia's lack of a strong technical skill base and professional management experiences called for a participation of TNCs to assure the effective development of the industry. Mitsubishi Motor Corporation (MMC), a Japanese automotive multinational, was invited to the Proton project as a joint venture partner to supply technology and business know-how. It is no doubt that Proton project could not have been successful without MMC's contribution; however, due to those superiorities, MMC maintained large leverage over Proton's management. This resulted in the persistent dependence of Proton on MMC's contributions such as technology, managerial know-how, and imported intermediates from its affiliates in Japan. Thus, the Proton story shows an interesting case in which industrial development was achieved through globalisation but controlled by leading TNCs.

3. The Development of Malaysian Automobile Industry

Malaysian Automobile Industry before Proton

Before the launch of Proton, the situation of the Malaysian automobile manufacturing was inconsequential. The problem was basically twofold. First, there were a number of assemblers in Malaysia at that time. In 1984, i.e., immediately before the operation of Proton was to start, twelve assemblers were there, and altogether they made more than ninety types of vehicles to supply to the small Malaysian domestic market whose annual absorption capacity was less than a hundred thousand vehicles (UNIDO 1985). These assemblers in such a small auto-market could not enjoy scale merits, resulting in inefficiency of operation (Chee 1984). Secondly, the Malaysian automobile industry then suffered from a low level of localisation. The forward and backward linkages of the Malaysian auto sector were extremely shallow, since most of the assemblers were simply assembling imported Completely Knocked Down (CKD) automobile parts to produce

finished vehicles. It was estimated that the finished cars contained less than 18 percent local content by value in 1984.

The problem was in turn an outcome of the small domestic market, in which it is not profitable for the assemblers to produce parts locally. Another reason can be attributed to the lack of capabilities of local suppliers to produce component parts efficiently. Because of the inefficiency of production and high-priced imported components, the price of locally assembled vehicles remained high in Malaysia (Jayasankaran 1993). Thus, the national car project placed the first priority on the promotion of rationalisation and localisation. This policy targeted Malaysian automotive manufacturers to be concentrated into fewer but larger companies and, at the same time, encouraged them to use locally produced component parts.

Starting from such unsatisfactory initial situations, it seemed an enormous leap for the Malaysian automotive industry to manufacture the first Malaysian car at a competitive base. In order to jump-start domestic car manufacturing, the policy Malaysian government pursued seemed paradoxical. The government decided to make full use of the participation of foreign carmakers. Since the launch of the 1968 Investment Incentive Act, Malaysia had been active in attracting foreign direct investment in various industries. Based on Mahathir's instigation, a joint venture partner was sought and selected among Japanese automobile multinationals to work with the Heavy Industries Corporation of Malaysia (HICOM), which Mahathir had created as a former Trade and Industry Minister in 1978 to implement major industrial projects[4]. After negotiations with several automotive companies, the Mitsubishi group was the one who showed the largest interest and had strong sympathy with the project. Thus, in 1981, the Prime Minister Mahathir visited Mr. Mimura, then-president of Mitsubishi Corp., in Tokyo and obtained the overall commitment of Mitsubishi group companies to the Malaysian national car project. Consequently, Proton was established in 1983 and started its operation in 1985, as a joint venture corporation with HICOM, MMC and Mitsubishi Corporation (MC) (Doner 1991, Machado 1989).

Mitsubishi's commitment was crucial for Proton's success, as Malaysia then had little technological base for automobile manufacturing. Since managerial, technical, clerical and production jobs were created primarily for non-experienced Malays, many of them were trained by Japanese counterparts in Malaysia or by MMC in Japan[5]. This is an example to understand that the initial and further development of Proton critically depended on technological assistances by MMC.

Proton's Achievements

Some of the main objectives of the Malaysian auto project seemed accomplished. The first achievement was rationalisation, accompanied with a growing volume of domestic production. A large measure of rationalisation had taken place in the auto industry, which was made largely through the curtailment of auto assemblers other than Proton. Discriminatory import duty stimulated the concentration of car production onto Proton. A forty percent import tax was imposed on CKD kits; however, Proton was, at its initial period of operation, completely exempted from this obligation. Import duty on a finished car was also prohibitively high, for example, between 130 and 300 percent on the CIF price for a passenger car. In addition to those preferential treat-

	No. of Prod. (thousand)	Market Share	Price (RM thousand) 30 40 50 60 70
Proton Saga (1300-1500cc)	84.8	65.0	29.8 38.4 ◄——►
Honda Civic (1500-1600cc)	5.4	4.1	61.8 73.6 ◄——►
Nissan Sunny (1300cc)	5.7	4.4	35.7 38.6 ◄►
Toyota Corolla (1300-1600cc)	5.7	4.4	51.0 70.3 ◄——►
Daihatsu Charade (1000-1300cc)	3.9	3.0	33.5 48.0 ◄——►

(Source) MMC

Fig.1 Price Comparison of Proton and Other Cars in 1991

Table.1 Production and Sales of Proton Cars

	Production		Sales in Malaysian Market		
	Domestic	Export	Proton Cars	Other Passg. Cars	Proton's Mkt Share
1985	8.6	0.0	7.5	60.4	11.0
1986	24.9	0.0	24.1	27.2	47.0
1987	24.0	0.0	24.9	13.3	65.2
1988	43.7	1.0	42.3	15.4	73.3
1989	51.3	14.4	52.7	27.2	66.0
1990	72.6	13.0	72.5	44.2	62.1
1991	87.0	15.0	84.8	45.6	65.0
1992	80.2	18.7	80.4	37.6	68.1
1993	96.3	21.8	94.1	32.9	74.1
1994	110.7	16.5	111.3	45.3	71.1
1995	132.0	23.0	140.6	84.0	62.6
1996	151.9	25.7	176.1	99.6	63.9
1997	185.0	27.9	198.8	111.1	64.1

(Source) Proton Corporate Information Booklet

ments, a half exemption of sales tax was granted to Proton. Hence, Proton enjoyed a price advantage over its competitors. Figure 1 shows a comparison of the retail prices of the Proton Saga and other passenger vehicles in Malaysia in 1991. According to the table, the Proton Saga was the cheapest passenger car in the 1300-1600cc engine class. Due to those advantages, as is shown in Table 1, Proton's market share increased steadily from 47 percent in 1986 to 74 percent in 1993[6]. As a result, auto production in Malaysia gradually concentrated on Saga, at the sacrifice of other car assemblers' production.

The second achievement was localisation. Overall local content levels increased very slowly from 8 percent in 1979 to 18 percent in 1984, and still only 30 percent in 1986. An increase in local sourcing with quality improvement could never be attained without the technological assistance of MMC. However, this was not an easy task. Despite the government's earnest objec-

Table.2 Number of Vendors and Local Parts

	Production		Sales in Malaysian Market		
	Domestic	Export	Proton Cars	Other Passg. Cars	Proton's Mkt Share
1985	8.6	0.0	7.5	60.4	11.0
1986	24.9	0.0	24.1	27.2	47.0
1987	24.0	0.0	24.9	13.3	65.2
1988	43.7	1.0	42.3	15.4	73.3
1989	51.3	14.4	52.7	27.2	66.0
1990	72.6	13.0	72.5	44.2	62.1
1991	87.0	15.0	84.8	45.6	65.0
1992	80.2	18.7	80.4	37.6	68.1
1993	96.3	21.8	94.1	32.9	74.1
1994	110.7	16.5	111.3	45.3	71.1
1995	132.0	23.0	140.6	84.0	62.6
1996	151.9	25.7	176.1	99.6	63.9
1997	185.0	27.9	198.8	111.1	64.1

(Source) Proton Corporate Information Booklet
*) Local Parts = In-house + Local + Resourced

tive of localisation, MMC was at first reluctant to use locally produced parts under the existing local content scheme. MMC often argued that a large-scale localisation of Proton and its vendors was premature to meet standards in quality, price, and delivery time. The progress in localisation could be achieved only by continuing government pressure on MMC, sometimes accompanied with concessions to the company. In the end, the company, in most cases, agreed to follow the policy, albeit reluctantly with loopholes to maintain MMC's benefits (Machado 1994: 307-310).

The progress of localisation is given in Table 2. It shows that local parts makers have grown in number of items, especially for years after 1989. At the end of 1985, Proton was producing only 176 components in-house and procuring 52 parts from about 17 locally based companies, two thirds of which were newly opened in that year. By 1995, over 380 parts were manufactured in-house and nearly 3,500 items were being supplied by more than 130 locally based vendors. As a result, local content of the Saga was estimated to be 69 percent.

Such an increase in localisation was a mixed product of several political and international factors. Prime Minister Dr. Mahathir often publicly criticised MMC for being too slow in transferring technology to Proton and its vendors, which placed pressure on MMC to increase local contents. On the other hand, responding to MMC's complaint about poor local technology base, the Malaysian government started a project to enhance local labor skills. Proton component scheme, a government-supported measure to promote local small- and medium-seized enterprises subcontracted to Proton, started in 1988 to outsource components. However, the most decisive impact was given externally; a steep appreciation of the Japanese Yen in the mid-1980s, by which higher-priced import components from Japan motivated MMC to replace them with locally produced ones including in-house production. Thanks to these factors, localisation of sourcing parts increased remarkably[7]. Thus, localisation was a notable feat of the Proton project; however, we will deeply examine this issue in the later part of this section.

The third front of achievement of Proton was technology transfer. Technology transfer was a central issue of Proton in order to achieve global competitiveness. Proton's approach was rather unique－to make collaborations with other technology owners as well as component manufacturers to acquire advanced technology. The policy was called as 'Match Making' in which Proton initiated a bridge between local vendors and reputable overseas technical collaborators. Foreign suppliers helped local vendors who failed to meet a quality level Proton required, via the Technical Assistance Arrangement. This was largely achieved through strategic alliances with foreign suppliers included non-Japanese automakers in, for example, Taiwan, Korea and France; however, the largest contribution was made by Japanese suppliers subcontracted to MMC. By 1995, a total of 40 such collaborations with overseas companies had been developed with Proton's suppliers, among which 35 arrangements were made with Japanese suppliers (Anazawa 1998). Although the effect was not immediately observable, it is reasonable to conclude that technology transfer was encouraged through such strategic alliances.

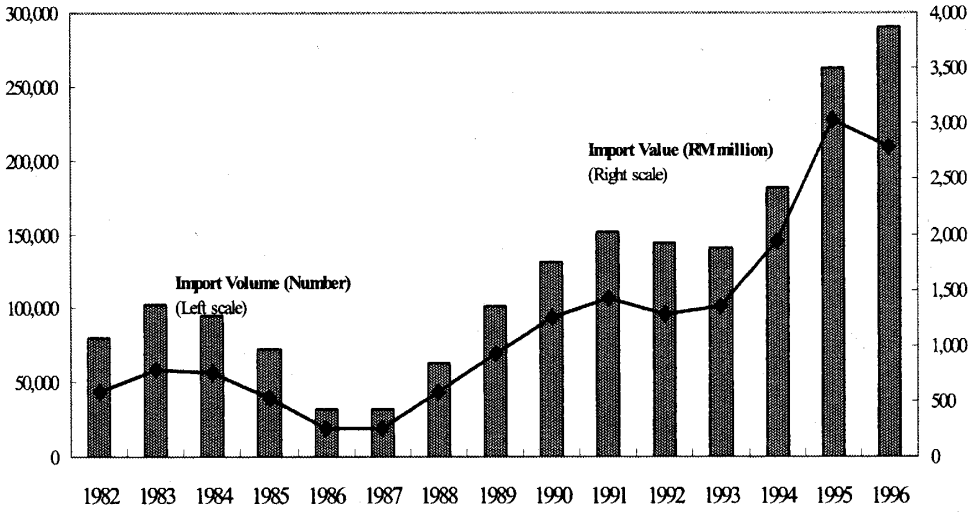
Persistent Dependence of Proton on Imported Components

Despite such remarkable achievements in the automobile industry in Malaysia, it seems that the development of Proton was fraught with a serious problem. The national car project aimed to generate employment and income, especially for Bumiputera, and to become a further basis of technological spillover to other industries. Proton and its vendors were expected to play a central role for this purpose, and these objectives were largely met. However, a fundamental problem lay in the persistent dependence of Proton and its vendors on imported materials.

As was discussed earlier, thanks to the enormous effort made by the Malaysian government as well as the contribution of MMC, localisation progressed remarkably in the Malaysian automobile industry. However, it is important to note that the real effect of localisation was largely unfilled. Statistics support this argument. Imports to the Malaysian automobile industry increased steadily even after the launch of Proton's operation in 1985. Figure 2 shows an increasing number and value of importing cars and CKD kits in Malaysia. According to the figure, the value of imports, for example, did increase drastically from RM 252 million in 1986 to RM 3,037 million in 1995. Table 1 shows that, as an increase in car production after 1985 was largely attributed to the contribution of Proton, the imported items were primarily used for the production of Proton cars.

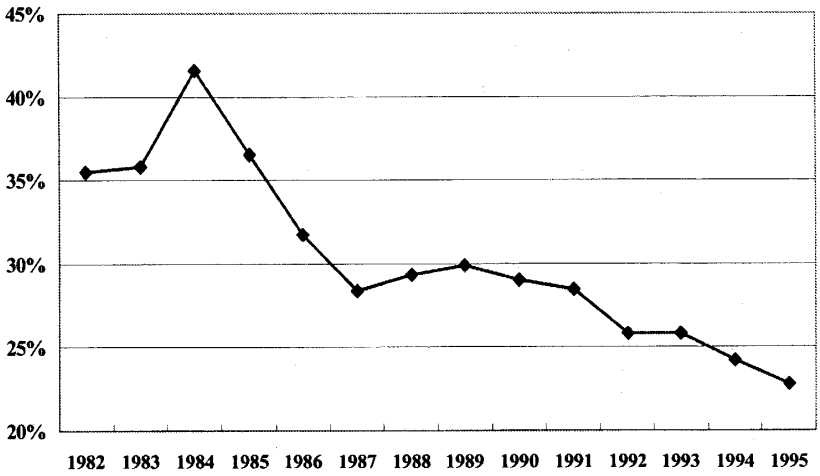
It is rather paradoxical to experience such an increasing number and value of auto parts import, since, as was reviewed above, localisation seemed successfully in progress. A possible explanation is that the imported units were used as indirect intermediates for local contents. In fact, according to the Malaysia's standard, local content does not take indirect inputs into account[8]. Increases in local contents of the automobile sector were, in reality, merely nominal in calculation. Intermediate goods were massively imported at higher costs to meet increasing demand for components and to maintain product quality (O'Brien 1993). Then, it is reasonable to conclude that the development of Proton contributed to the increase, instead of the decrease, in dependence on imported materials.

Economic problems in the continuous import of intermediate materials appeared in two



(Source) Yearbook of Statistics, Malaysia (Various issues)

Fig.2 Imports of Motor Cars and CKD Kits



(Source) Yearbook of Statistics, Malaysia (Various issues)

Fig.3 Pronfit Margin of Malaysian Automobile Industry

ways. The first issue was a decreasing profit margin of Malaysian automobile industries. Figure 3 indicates the change of the profit margin of the transport equipment sector in Malaysia[9]. The figure clearly shows that, in 1985 when the operation of Proton started, the profit margin of the sector exceeded 40 percent. After that year, however, it decreased steadily and fell to less than 25 percent in 1995. The main reason was increasing input costs, particularly imported components from Japan. As Table 3 shows, Japan maintained the position of the largest exporter to Malaysian automobile industry; therefore, Yen-valued import prices surged after 1985 when the Japanese Yen was drastically appreciated. Rising prices of imported parts considerably squeezed the profit margin of the Malaysian automobile industry.

Related to the first point, the second problem appears in a pattern of international distribution of income between Malaysia and foreign countries. An industry with the heavy use of

Table.3 Machinery and Transport Equipment Imports by Country Origin

(by Value, %)

	Singapore	Japan	S. Korea	Taiwan	U.S.A.	France	W.Germany	ROW
1985	10.5	33.0	0.0	0.0	24.0	3.3	5.8	23.4
1986	12.2	27.0	2.4	2.1	30.6	2.8	5.7	17.2
1987	12.4	29.8	3.0	2.9	30.2	1.6	4.9	15.2
1988	10.9	32.8	2.7	4.7	28.1	1.5	4.4	14.9
1989	12.1	33.5	2.5	5.1	26.4	1.0	4.5	14.9
1990	12.6	32.3	2.6	5.6	25.7	1.2	5.3	14.7
1991	15.0	33.0	2.9	5.1	21.7	1.1	5.7	15.5
1992	15.7	31.8	3.3	5.2	22.1	1.0	5.2	15.7
1993	15.2	33.4	3.1	4.9	23.2	1.4	4.7	14.1
1994	14.8	31.2	3.3	4.4	21.5	3.4	4.7	16.7
1995	12.4	32.0	4.3	4.5	19.6	4.2	5.4	17.6

(Source) Yearbook of Statistics, Malaysia (various issues)

imported intermediates may have a limited capacity to expand backward linkages and fail the creation of an interdependent manufacturing base with both depth and breadth. Moreover, a large amount of value-added was squeezed to purchase imported materials. This implies that a part of economic gains created by the Malaysian industries was transferred, through the international transaction of intermediates, to foreign suppliers. The next section examines this issue and derives quantitative evidence of international value distribution in the Malaysian automobile industry.

4. Estimation and Results

This section explains the quantitative method used and shows the result to map the international distribution of value in the Malaysian automobile industry. On input-output tables, the value of a commodity is captured as the sum of value added such as wages, profits and natural resource rents. The input-output method regards industrial linkage as a unit of system to generate value-added, which encompasses not only domestic industries but also foreign sectors. A dependence on external intermediate inputs comes into view as an international transfer of value-added among different industries and countries. Thus, the input-output method is advantageous for examining complicated economic systems in which vertically and horizontally inter-firm networks are formed.

The Model

The value of output is, by definition, equal to the total value of inputs including bought-in input costs, payments for imported materials, wages, tariffs, taxes, transportation costs, and profits as a residual surplus. Now suppose that the total numbers of sectors and countries are n and s, respectively. Then, the unit price of output of the j^{th} sector in the k^{th} country, P_j^k, can be written as

$$(1)\quad P_j^k=\sum_{h=1}^{s}\sum_{i=1}^{n} a_{ij}^{hk}P_i^h+L_j^k w_j^k+\Pi_j^k+M_j^k P^W+T_j^k$$

where a_{ij}^{hk} represents the physical amount of intermediate input of the h^{th} country's i^{th} sector's product to use for the unit output of the j^{th} sector in k^{th} country $(\alpha_{ij}^{hk}\geq 0)$. L_j^k is physical labor input coefficient for the product of that sector, w_j^k is a average wage rate in that sector, and Π_j^k is the operating surplus. M_j^k is physical coefficient of aggregated inputs from the rest of the world other than s countries. P^W is the indexed price of import from the rest of the world. The unit prices of P_i^h and P^W are all expressed in domestic currency terms. T_j^k is other payments including, taxes, tariffs, and transportation costs to spend for the unit product of j-th sector in k-th country.

Equation (1) can be extended to the fundamental input-output assumption in which fixed physical coefficients of production are written out of the system. Input-output tables are prepared in value terms so that by choosing quantities such that the price is unity, value coefficients and physical-term coefficients will coincide in the base year. Thus, the price of one commodity is seen to depend on the prices of all other related sectors. Based on this maniplation, equation (1) is rewritten as

$$(2)\quad 1_j^k=\sum_{h=1}^{s}\sum_{i=1}^{n} \alpha_{ij}^{hk}+l_j^k w_j^k+\pi_j^k+m_j^k+\tau_j^k$$

where α_{ij}^{hk}, l_j^k, π_j^k, m_j^k, *and* τ_j^k are value-termed coefficients of intermediate inputs $(\alpha_{ij}^{hk}=a_{ij}^{hk})$, labor, profit, imports form the rest of the world, and other inputs, respectively, per unit of price of the output of j^{th} sector in k^{th} country. The above equations are solved, for all sectors, in matrix form as,

$$(3)\quad i=[I-A'][Nw+\pi+m+\tau]$$

$$A'\equiv\begin{bmatrix} A^{11} & A^{21} & \cdots & A^{n1} \\ A^{12} & : & & : \\ : & : & & : \\ A^{1n} & \cdots & \cdots & A^{nn} \end{bmatrix} \quad \text{where } A^{hk}\equiv\begin{bmatrix} \alpha_{11}^{hk} & \alpha_{12}^{hk} & \cdots & \alpha_{1n}^{hk} \\ \alpha_{21}^{hk} & : & : & : \\ : & : & : & : \\ \alpha_{n1}^{hk} & \cdots & \cdots & \alpha_{nn}^{hk} \end{bmatrix},$$

$$N\equiv\begin{bmatrix} N^1 & \cdots & \cdots & 0 \\ : & N^2 & \cdots & : \\ : & : & : & : \\ 0 & \cdots & \cdots & N^n \end{bmatrix} \quad \text{where } N^k\equiv\begin{bmatrix} l_1^k & 0 & \cdots & 0 \\ 0 & l_2^k & : & 0 \\ : & : & : & : \\ 0 & \cdots & \cdots & l_n^k \end{bmatrix},$$

where the dot (') demotes the transpose, i is the vector whose elements are all equal to unity, that is, $i'\equiv(1,\ 1,\ \ldots\ldots,\ 1)$, and I is the identity matrix. A^{hk} is the coefficients matrix of h^{th} county's product used for k^{th} county's unit output, and N^k is a diagonal matrix of labor coefficients of sectors in k^{th} county. w, π, m, and τ are row vectors of wages, profits, rest of the world price index, and other costs per unit of output, respectively. All of these variables are directly obtained

Table.4 International Distribution of Value-Added Generated in Malaysian Automobile Industry

	1985	1990	1995
Malaysia	49.97%	59.29%	57.09%
Japan	24.54%	20.28%	18.60%
Indonesia	0.26%	0.27%	0.43%
Thailand	0.16%	0.14%	0.38%
Philippine	0.05%	0.02%	0.06%
Singapore	0.85%	0.43%	0.58%
Taiwan	0.48%	0.50%	0.64%
Korea	0.16%	0.26%	0.78%
China	0.24%	0.21%	0.36%
USA	1.52%	1.63%	2.46%
Rest of World	11.17%	8.46%	10.07%
Transport Cost	6.91%	1.44%	1.67%
Tariffs	3.70%	7.06%	6.90%
(Total)	*100.00%*	*100.00%*	*100.00%*

in international input-output tables. Equation (3) clearly demonstrates that, since it is set to equal to unity, the price of any sector's output can ultimately be decomposed into the contributions of labor and non-labor production factors in home and foreign countries.

Equation (3) enables us to quantify the international transfer of value between two economies. Now we define *the value distribution index,* $V_j^{k\to h}$, as the distribution of value-added generated in the k^{th} country's j^{th} sector and transferred to the h^{th} county, expressing as

$$(4)\quad V_j^{k\to h} \equiv \sum_{i=1}^{n} b_{ij}^{hk}(l_i^h w_i^h + \pi_i^h)$$

where b_{ij}^{hk} is the coefficient of $[I-A']^{-1}$ matrix in equation (3). Obviously, $V_j^{k\to h}$ is less than unity. Note also that $V_j^{k\to h}$ is the ratio of value-added remained within the home country.

The Result

Table 4 sets out our main results for the international distribution of value created in the Malaysian automobile industry among home and foreign countries. The data used here is from the *Asian International Input-Output Table* in 1985, 1990, and 1995, published by the Institute of Developing Economies (IDE), Japan. Several interesting features emerge as follows.

The first notable feature is a relatively small share of remained value-added of Malaysian automotive industry within the country. About half of total value-added created in this sector disappears within the Malaysian border. Although the ratio of value-added 'preserved' gradually improved from 49.97% in 1985 to 57.09% in 1995, more than 40 percent of value-added of the Malaysian automotive industry still leaks out from that country. This implies that, despite an enormous effort to increase local contents, external economic dependence of the industry has not

been substantially reduced during this period.

The second feature is the fact that Japan has been continuously the biggest foreign beneficiary from the Malaysian automotive industry. Japan gained, surprisingly, nearly one quarter of value-added generated in the Malaysian automotive sector in 1985, which accounted for almost half of the aggregated value Malaysia then gained. Despite a number of Malaysian efforts to reduce dependence on direct and indirect intermediate inputs from Japan, the Japanese share still remains high, that is, 18.60%, in 1995, albeit with its share decreasing steadily.

Thirdly, the result shows that the relative regional shares in value-added distribution have not changed significantly. We should especially note the relative small shares of ASEAN countries in value-added distribution. The regional economic integration of ASEAN countries has been expected to share economic benefits and intra-regional trade has actually been developed among member countries. However, the evidence shows that spillovers of value from Malaysian automotive sectors to other ASEAN nations are very little. During the period from 1985 to 1995, ASEAN countries did not clearly show an increasing trend in their shares of the value distribution within the Malaysian automotive industry.

Finally, the share of value distribution to tariff and transportation is relatively large in the Malaysian automotive industry, amounting to nearly 10% totally. We should note that these two items are not value but pure costs in value chain, and that these items have different economic implications in the distribution of value. The transportation costs include both inland and overseas logistic costs, a larger amount of which may outflow from the Malaysian territory. On the other hand, though they increase input price, tariffs may contribute to a part of the government revenue, resulting in the increase in the Malaysian share of value distribution. Actually, the domestic market for finished cars and its assemblies is protected with high tariffs in Malaysia. Imposition of tariffs creates the 'trade policy rent (Gereffi 1999; 43-44)', to the government. Despite a recent trend of trade liberalisation, it is an interesting feature that the share of tariffs is increasing in the value distribution structure.

To sum up, a large proportion of value-added has been lost from the Malaysian automotive industries within the national boundary. The biggest beneficiary is Japan, followed by the US. The gains of neighboring ASEAN countries are negligible. These facts imply that high dependence on external contributions of Proton induced large income outflows to developed nations, and it may not be easy to reduce such external dependence even with strong interventions by the government.

5. Implications and Discussions

The empirical results shows that Malaysia did not enjoy a remarkable increase in a share of value-added produced by its own automobile industry. This implies that there continuously exists a leakage of value from Malaysia to foreign countries, especially to Japan, through intermediate trade. A fundamental problem behind the persistent dependence on imported materials lies in relatively weak technological capabilities of the industry. In order to enhance the competitiveness, especially after the commencement of the export in 1989, such weakness called for more participation of foreign contributions to improve the quality of Proton cars. As was overviewed in

section 2, the contributions were made in various forms: provision of training for local employees, local vendor promotion, and other forms of technological assistances, mainly provided by MMC. Those efforts are correctly expected for MMC as a joint venture partner of Proton to make an upgrading of the entire value chain of the sector. Actually, the development of the Malaysian automobile industry was undoubtedly admirable. However, upgrading of local technological capabilities was relatively unsatisfactory and, as a result, direct and indirect imports of intermediate inputs continued. Based on this perspective, the central question is to ask why Proton and MMC were not so successful in improving local manufacturing capability of the Malaysian automotive industry. There are two views to interpret this question.

The first view focuses on a complicated structure of management in Proton. HICOM and MMC are both responsible for management of Proton, and further development of the Malaysian automobile industry. However, some studies see that there has been a conflict of interests over Proton management between Malaysian and Japanese contributors (Jayasankaran 1993, Jomo 1994, Machado 1994). These studies emphasize a large potential benefit for the Japanese companies to gain from Proton's business. In addition to this, another important node of the chain management, marketing channel, of the Saga was exclusively carried out by another private company, Edaran Otomobil Nasional (EON), in order to compensate for the lack of marketing experience of Proton. As a result of such decentralised corporate governance, there was some inconsistency between who governs and who substantially contributes to upgrading of the Malaysian automobile industry.

This point of view can be interpreted in the context of value chain governance. Governance is a key concept in cross-border supply-chain management, and useful to understand how internationally lead firms are to contribute to upgrading in technology and managerial capabilities of locally operating firms (Humphrey and Schmitz 2001). Governance by lead firms plays an important role in facilitating this process. However, three major players in Proton－HICOM, Mitsubishi, and EON－seemed to have different prospects and pursue inharmonious goals in the Proton project. The Malaysian government had, through the control over HICOM, often set the development of Proton in the NEP context, expecting more participation of Bumiputra[10]. On the other hand, for Mitsubishi as a group, profits from the Proton project were assured not only by the development of Proton itself but also by the intermediate sales of its affiliates in Japan. Their disputes over Proton's management were witnessed in several aspects; for example, when the Malaysian government was eager to increase local contents, and also to begin exporting Saga, MMC/MC was rather cynical about the challenges. An economic consequence of such complicated and decentralised governance structure of the chain led to the lack of institutional capabilities to increase systemic efficiency of the chain as a whole. This results in continuing dependence on external contributions, causing leakage of value from Malaysian territories. This view concludes that poor governance is largely to be blamed for the unsatisfactory level of value preservation in the industry.

The second view cast a rather sympathetic interpretation over the development of the Malaysian national car project. This is related to the technological learning issue. This view sees that it is premature at this stage to conclude whether the Malaysian automobile project has been unsuccessful. As the automobile industry requires advanced and complex technology, the period

over which the development of the industry to assess may need a longer period than we examine in this study. It is not surprising that a country like Malaysia whose domestic technological base is small and still in the early stage of development may take a long time to enhance local technological capabilities and achieve industrial efficiency. During the initial learning period, dependence on imported technology and materials are inevitable. This explanation is, in fact, consistent with the words expressed by an MMC officer, saying, "Malaysian government and MMC did best to develop Proton and Malaysian automobile industry in general. It is a pity that the government seem rather unsatisfactory with the pace of the development; however, MMC sees the speed of the progress has been reasonable. We know that automobile manufacturing requires advanced technologies as well as wide and deep local industrial base, which need a longer time to set up than the Malaysian government initially expected.[11]" Also, Lall (1996) elsewhere examines the Malaysian industrial policy and concludes, "In a country with a relatively shallow industrial base, like Malaysia, it is creditable that Proton has done well as well as it has in its relatively short life (160)"This view sees that, although it is still small, the share of preserved value-added for Malaysia will increase as the overall local technological capability is, if successful, enhanced.

Obviously, these two views are equally right and use different aspects of the problem in the Malaysian national car project. The first view emphasises the disorganisation of management over Proton's governance and, as a result, the consequent inefficiency in management and production. According to this view, since the foreign company strongly holds its own business interest, the Malaysian national car project was meant to benefit foreign contributors. Unequal distribution of value-added between Malaysia and foreign countries was an outcome due to the invitation of the technologically superior MMC. This well explains why Japan gained most and Malaysia's share increased slowly. The view, however, does not pay much attention to the issue of local technological capabilities. Some research critical of MMC's benefit does not mention anything about the possible outcome of the national car project *without* the company's contributions.

On the other hand, the second view focuses on Malaysia's weak local technological capabilities in general. A relatively low economic return from the national car project was, according to this view, attributable to a weak technological base in Malaysia. However, as enormous efforts have been conducted to enhance local technological skills, Malaysia's technological capabilities must have been gradually formed to a certain amount. Thus, the technological point of view is convincing to explain why the Malaysian share in value distribution slowly but *steadily* increased. The view emphasises the merit, rather than the danger, to have a link with global TNCs for technological learning, which was widely reported in successful experiences in NIEs (Hobday 1995) and stressed in the value chain literature (Schmitz and Knorringa 1999). The speed to increase Malaysia's share in value distribution critically depends on how fast the country will increase local technological capabilities, to which MMC has made a significant contribution.

6. Summary and Conclusion

This paper examines the industrial development of the Malaysian automobile industry. Pro-

ton was expected to play a central role in the national automobile project and, in fact, made significant contributions to the development. Thanks to various supportive measures provided by the Malaysian government, the automobile industry in Malaysia accomplished remarkable achievements, especially with respect to rationalisation, localisation, technological upgrading. A very large-scale commitment of a foreign company, MMC, was a unique characteristic of Proton's development. MMC's contribution to Malaysian automobile industry could never be negligible, since local technological capabilities were initially insufficient to start and advance the automobile manufacturing in Malaysia.

The present study, however, casts a critical point of view over the development of the industry. Under the TNCs' initiatives, developing countries are increasingly involved into global production networks and, however, they are often confined in less profitable manufacturing activities. This study posits that Malaysia looses and foreign suppliers gain through international input-output linkages. The present paper examines the extent to which the value-added created in Malaysian automobile industry was retained within the country and out-flown to foreign suppliers.

An input-output method is applied to examine this issue. The result clearly shows that only slightly more than half of the value-added created in the sector remained within the Malaysian border, and the rest of the value was taken out by foreign countries, especially by Japan. During the period from 1985 to 1995, there was only a little improvement of the value preservation for Malaysia. This implies that, despite the remarkable achievement to increase local content, it was rather nominal and the industry substantially continued to depend on external inputs such as technology, intermediate materials, and management skills of MMC. These findings support the view that such external dependence has been firmly structured in the Malaysian automobile industry.

Two possible explanations are examined. One is to focus on the decentralised interests among HICOM, MMC and EON, resulting in the inefficient managerial and technological upgrading capabilities of the entire automobile value chain in Malaysia. Consequently, the industry continued to rely on imported materials to improve and maintain the quality of the car. Another view is related to the technological capability argument, by which external dependence is less problematic as far as local technological capabilities are steadily improved. The view also considers MMC's contribution requisite to such improvement in Proton. Both views well explain a different side of the development of Malaysian automobile industry. Thus, it is reasonable to conclude that the experience of the industry may typically represent danger and opportunity of industrialisation in a developing country under globalisation.

–NOTES–

[1] There are several terminologies whose implications are similar to value chain analysis: global commodity chains, global production networks, filiere, and value networks. These studies have a lot in common in the perspectives to see the interaction of cross-border activities of TNCs and international inequality as its consequence. Although those studies are somehow different in nuance (see Gereffi *et al.* 2001; 2, Henderson *et al.* 2001), we shall make no fur-

ther discussion of this point, and may mainly use the term 'value chain analysis'.

[2] A number of case studies show how governance structure influences upgrading of firms in a developing country; canned fruit industry in South Africa (Kaplan and Kaplisky 1999), shoe makers in China, India, Brazil and Italy (Schmitz and Knorriga 1999), horticulture industry in Kenya and Zimbabwe (Dolan and Humphrey 2000, Dolan and Tewari 2001), coffee trade (Fitter and Kaplinsky 2001), apparel trousers industry in Mexico (Blair and Gereffi 2001), and furniture industry in South Africa (Kaplinsky, Morris, and Readman 2002). These studies clearly show that a leading firm plays a decisive role, through chain governance, in the pattern and outcome of upgrading of firms in the chain and, as a result, of chain itself.

[3] There are several empirical contributions of value chain analysis; for example, canned fruits value chains (Kaplan and Kaplinsky 1999), furniture industries (Kaplinsky, Morris, and Readman 2002) both in South Africa, and coffee value chains (Fitter and Kaplinsky 2001). These studies conclude that there exists an undeniable inequality between developed and developing nations. These results are critically based on their findings that there exists a high margin in retail sectors in developed countries. However, the method these studies based on is theoretically questionable. The shortcoming is mainly due to the lack of definitions of value and inequality. See detailed discussion in the following section.

[4] HICOM was not a pure government agency, since it was established under the Companies Act. However, as it was a 100% government-owned holding company, the government maintained its influence over Proton management through HICOM.

[5] Malaysian workers were newly employed and, from spring in 1983, more than three hundred of them were set to MMC's Mizushima and Nagoya factories in Japan to receive training. The period of training ranged from three months to one year, depending on their positions and required skills.

[6] During this period, because of economic recession, Malaysian auto market was shrinking. The number of produced passenger cars decreased from 60.4 to 45.3 thousands in 1985 and 1994 respectively, implying that the other carmakers reduced the number of car production drastically.

[7] For a typical example, by early 1990, all engine requirements were satisfied by local assembly. Although the local content of engines was only two to three percent at the launch of Proton, the ratio slowly but steadily increased with the opening of a HICOM Engineering Complex for casting and machining in 1991.

[8] An MMC officer says, "Estimation of local contents in Malaysia is ostensible, in which only direct inputs are counted. An item is considered as a local content as far as the final assembling was made domestically, even if a lot of its intermediates were imported." The GSP standard is more rigorous, however. Based on my interview on 14th May 2003.

[9] The figure includes non-automobile industries such as shipbuilding and aircraft manufacturing; however, as the automobile industry is absolutely large in the value of turnover, we see the figure represents a major tendency of the change of profit in the automobile industry.

[10] In 1988, according to figures from public data, 94 percent of employees in Proton plant were ethnic Malay. However, a majority of those workers were inexperienced, while very few experienced workers, mostly non-Malays, were laid off at the expense of their employment

(Jayasankaran 1993, 278).

[11] Based on my interview on 14th May 2003.

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