Chapter **1**

The Determinants of Industrial Agglomeration in Indonesia

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Abstract

The Indonesian manufacturing sector transformed rapidly in the past 30 years leading up to the crisis and had become an important source of growth by the mid 1990s. Some part of this rapid industrial development could be attributed to the industrial agglomeration in the country. This study examined industrial agglomeration in Indonesia. A review of previous studies on this subject informed us that industrial agglomeration in Indonesia is located mainly in Java and caused by natural market forces and infrastructures. In addition, the role of small and medium enterprises (SMEs) was also important in accelerating industrial development. Descriptive analysis, meanwhile, suggested some early evidence on the extent of industrial agglomeration in the three regions covered by the survey. Among the findings, and perhaps the most important one, is that all kind of infrastructures and supporting activities, the availability of skilled labour and professionals, and the size of domestic markets, are the important factors for establishing business. This finding supports the "flowchart approach" of industrial agglomeration. The results, however, did not find the size of export markets to be an important factor for establishing business. The results also indicate incentive for investment as another important factor. This finding might be related to the worsening situation of investment climate in Indonesia after the 1997/98 economic crisis. Most of the findings from the descriptive analysis were supported by the findings from the econometric analysis. Among others, the econometric analysis found that variables that can be categorized as incentives for investment were found to have significantly affected the establishment of the "first movers" in a region, which are definitely important for stimulating the development of industrial clusters and promoting technology spillovers. The econometric analysis also found some evidence of

the technology transfer that happened from the industrial agglomeration process. All in all, the study documented in this paper supported the theory of industrial agglomeration and provided some support for its existence to promote industrial development in Indonesia.

INTRODUCTION

The Indonesian manufacturing sector transformed rapidly in the past 30 years leading up to the crisis and had become an important source of growth by the mid 1990s. The share of the sector in Gross Domestic Product (GDP) increased from 12 percent in 1975 to 24 percent in 1995. Some other features of industrialization also accompanied this rapid structural change. The share of manufacturing exports in total exports increased significantly from the 1980s to the 1990s and reached about 50 percent at beginning of the 1990s.

Part of this rapid industrial development could be attributed to the industrial agglomeration in the country. As noted in the literature on industrialization, industrial agglomeration is an important process for promoting industrial and economic development. This paper examines this subject for Indonesia.[i]

The study reported in this paper attempted to find the determinants of the industrial agglomeration process in Indonesia. While some studies for this particular subject have been done as reviewed in the next section of this paper, this study gives another value added to the literature by adopting the framework of 'the flowchart approach' (Kuchiki 2005). The analysis of the paper made use of the results of a firm-level mail-survey conducted for the study.

The rest of this paper is organized in the following manner. Section 1 reviews the literature on the development of the industrial agglomeration process in Indonesia. This section aims to derive some stylized facts about the process. Section 2 provides the descriptive statistic analysis of the mail-survey results. Section 3 presents an econometric analysis of the determinants of industrial agglomeration in Indonesia. Section 4 finally summarizes and outlines some policy implications derived from the results.

1. INDUSTRIAL AGGLOMERATION IN INDONESIA: A LITERATURE REVIEW

There have many studies discussing the industrial agglomeration process in Indonesia. To organize the discussion, this paper reviews the literature according to some major topics within the subject. These are (1) geographical concentration; (2) the dynamics and causes for industrial agglomeration; (3) the role of infrastructure in agglomeration; and (4) the role of SMEs in the agglomeration.

1.1. Geographical Concentration of Industrial Agglomeration in Indonesia

Industrial agglomeration in Indonesia was unevenly distributed. Majority of the manufacturing firms were located on Java and Sumatera, two of the five major islands in Indonesia. The other main islands in Indonesia, especially those on the eastern part, played only minor roles in the manufacturing sector,.

Diechmann *et al*. (2005) showed that the formal manufacturing industry in Indonesia is highly concentrated. The simple Gini coefficient calculated in the study reported that about half of all manufacturing employment was located in just 15 districts, while 65 percent of these districts accounted for just 10 percent of the total manufacturing workforce. Figure 1 shows that all manufacturing employment in the footwear industry was located in Java, and the other main islands played only a minor role in the manufacturing sector.

It is interesting to elaborate on the characteristic of industrial agglomeration in Java, given the high concentration of manufacturing operations on this island. The key point is that Java's industrial agglomeration indicates a bipolar pattern, that is, the western (Jakarta and Bandung Greater) and eastern (Surabaya Greater) sides (Hidayati and Kuncoro 2004).

**Figure 1: Distribution of Manufacturing Employment in Footwear and Food
Products Sector**
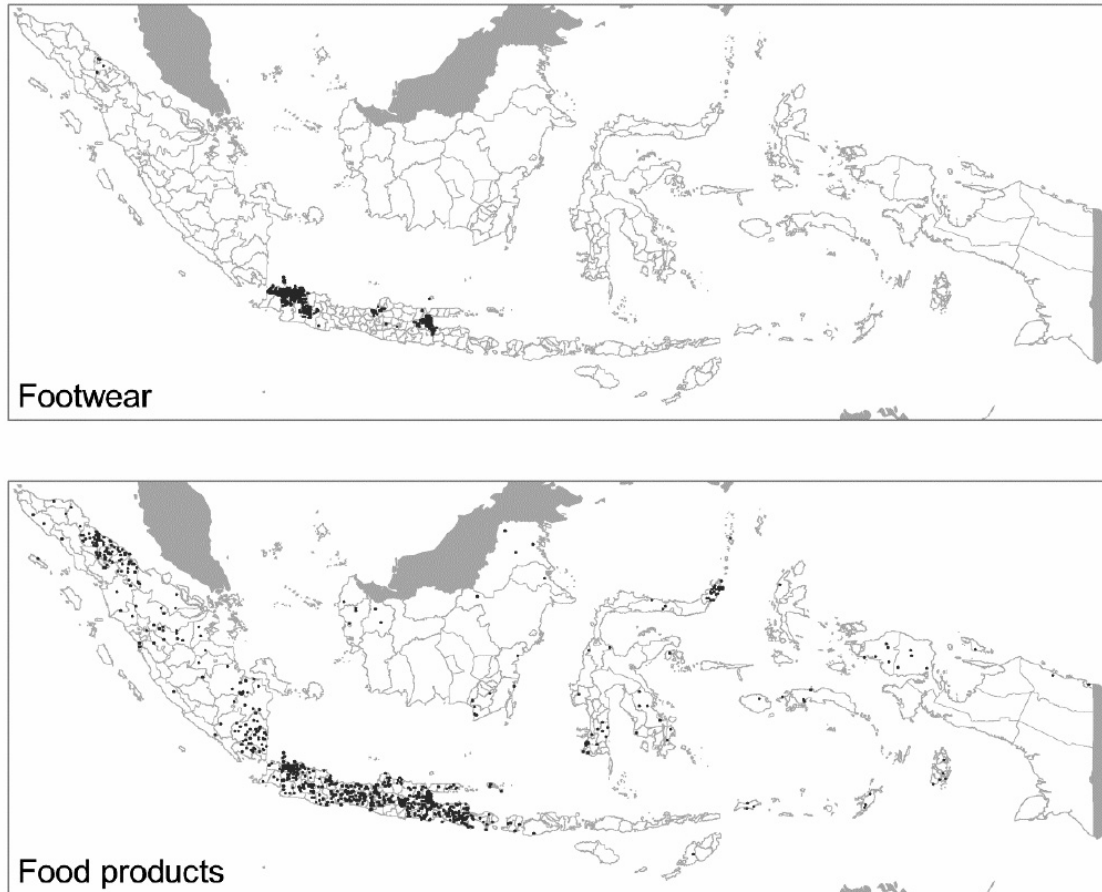
Note: Each dot is randomly placed within a district and represents 500 employees and the data source is
Economic Census and Survey of Industry, 1996.
Source: Deichmann, *et al*., 2005.

Hidayati and Kuncoro (2004) provided additional details on this bipolar industrial
agglomeration using the Geographic Information System (GIS). One such detailed piece
of information concerns the rapid expansion of industrial agglomeration areas (see
Figure 2 and Table 1). In 1980, the agglomeration area was located primarily in Jakarta,
but a decade later, the area in the western part of Java island expanded to Greater
Jakarta and Bandung. The former includes Bogor, Bekasi, Tangerang, while the latter
includes both city and municipals (or *kabupaten*) in the Greater Bandung area. In 2000,
both the Greater Jakarta and Bandung areas expanded more and created a network of
cities.

Figure 2: Industrial Agglomeration in Western Polar, 1980, 1990 and 2000

Agglomeration Area in 1980
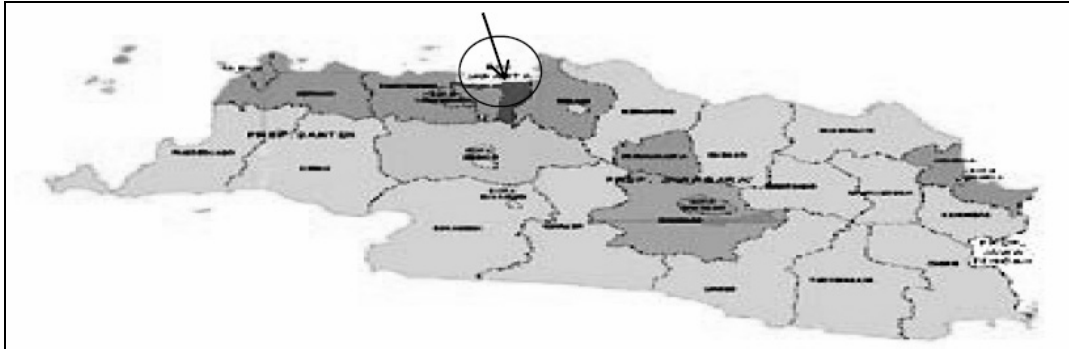
Agglomeration Area in 1990
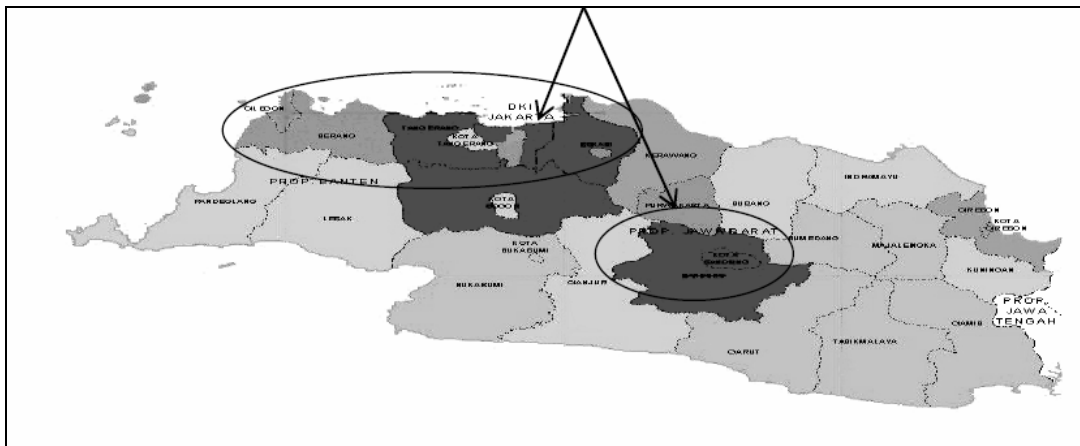
Agglomeration Area in 2000

Source: Hidayati (2004).

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Table 1: Industrial Agglomeration in DKI Jakarta and West Java

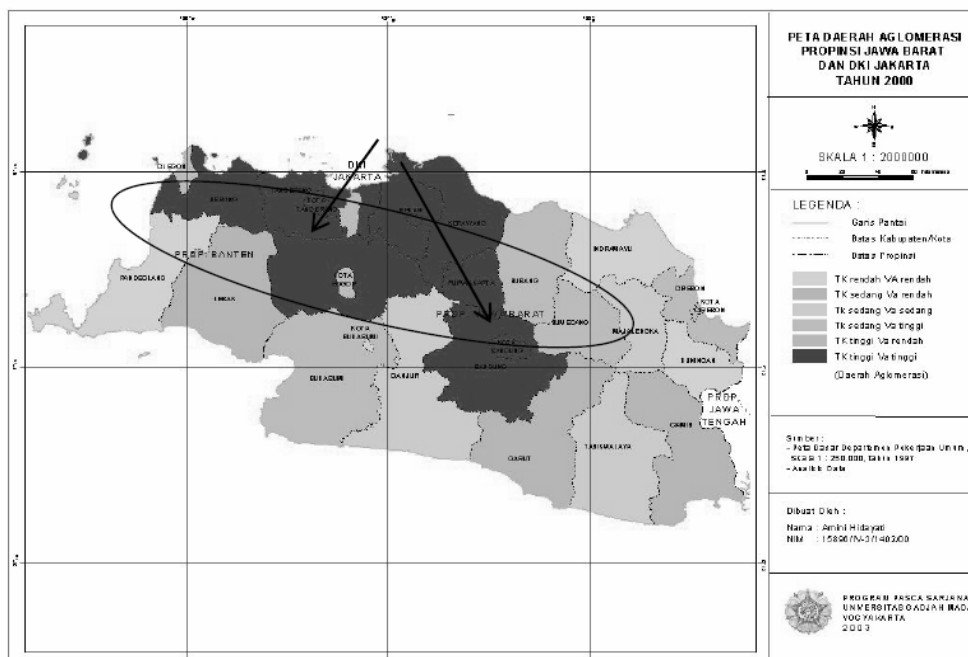| Year	New Industrial Agglomeration Area	Total Industrial Agglomeration Area
1980	North Jakarta East Jakarta	North Jakarta East Jakarta
1990	West Jakarta Bogor Bekasi Tangerang Bandung Bandung*	North Jakarta East Jakarta West Jakarta Bogor Bekasi Tangerang Bandung Bandung City
2000	Bekasi Tangerang Kerawang Purwakarta Serang	North Jakarta East Jakarta West Jakarta Bogor Bekasi Tangerang Bandung Bandung City Bekasi Tangerang Kerawang Purwakarta Serang

Notes: *: city.
Source: Hidayati and Kuncoro (2004).

1.2. Causes of Industrial Agglomeration in Indonesia: Previous Studies

Kuncoro and Downing (forthcoming) studied the dynamics and causes of industrial agglomeration in Java. They adopted the framework of a new economic geography and new trade theory on agglomeration.

Their study suggested that spatial concentration in metropolitan areas is led by market forces, both from the supply and demand side. The supply side includes import content, export orientation, scale economies, and labor costs. High coefficients for import content and export orientation, which they found from their econometric exercise, implied that most specialized industries in Java benefited in terms of vertical integration with foreign suppliers and therefore had more access to the global market. The positive and significant coefficient of scale economies means that the manufacturing industry in

Java experience localization economies.

For the demand side, size of market seems to explain spatial concentration in the manufacturing industry. Most firms are likely to be located in densely populated areas because such areas serve as the source of their labor input and the market for their products. Moreover, Java's imperfect competition seems to have caused firms to concentrate geographically in order to optimize the benefit of agglomeration.

Kuncoro and Downing's study also gave empirical evidence on the path dependency hypothesis of Fujita *et al*. (1999). The positive and significant coefficients for firm age across various specifications support the hypothesis, which points to the importance of the history of the firm. Moreover, the specialized industries in Java have better access to infrastructure. This, however, was more important for firms in Greater Jabotabek and Surabaya metropolitan regions, which have superior infrastructure facilities.

Another study which discussed the determinant of industrial agglomeration in Indonesia was conducted by Diechmann, *et al*. (2005). They examined the aggregate and sectoral geographic concentration of Indonesia's manufacturing firms and estimated the impact of factors influencing the decision to locate a firm in a particular area. They differentiated the factors between the natural advantage and production externalities. Natural advantage includes infrastructure endowment, wage rates, and natural resource endowments. These factors are central to the "New Economic Geography" models, where firms tend to locate in areas that have a high demand for the goods they produce and where market access is facilitated by a good transport infrastructure (Krugman 1991a; Krugman 1991b; Fujita and Krugman 1995; and Fujita *et al*. 1999, as cited by Diechmann *et al*. 2005). On the other hand, production externalities are the results of the colocation of firms in the same or complementary industries to benefit from the spill over of technology and information.

Some of the findings from this study are similar to the findings of a study by Kuncoro and Downing where for most sectors, proximity to buyers and suppliers influence location decision at the firm level. Locating a firm in a region with good access to markets will increase demand for the firm's products. One particular factor observed by Diechmann *et.al.* is the impact of predatory local government regulations to the decisions on selecting a firm's location. A negative coefficient on local

government regulations suggested that firms are reluctant to locate their firms in the region. This could be because local governments often apply predatory or nuisance taxation.

1.3. The Role of Infrastructure in the Agglomeration Process

Diechmann *et al*. (2005) found the importance of transportation infrastructure in the industrial agglomeration process in Indonesia. They measured this using two variables: (1) the ease by which goods and people can move locally; and (2) the ease by which goods and people can move to export hubs. The first variable was measured by road density in each municipality while the second variable was measured using the travel time from the firm to the nearest export hub, such as an international sea port or airport. Diechmann *et al*. found that these two variables were positive and statistically significant for many industrial sectors, with large elasticities found in the textiles–and-garment and furniture sector.

Diechmann *et al*. also conducted a simulation by increasing road density in six regions: (i) Greater Jakarta Metropolitan area (100 km belt around DKI Jakarta); (ii) Greater Jakarta Metropolitan area (excluding DKI Jakarta); (iii) municipalities in East Java; (iv) all districts in East Java; (v) municipalities in East Kalimantan and South Sulawesi (Eastern Indonesia); and (vi) all districts in East Kalimantan and South Sulawesi (Eastern Indonesia). Meanwhile, East Kalimantan and South Sulawesi were grouped as one region because these areas were considered as the center of eastern Indonesia's industrial areas. The simulations were based on the assumption that improvements in transport will enhance the attractiveness of the region which, in turn, will increase the profit of existing firms in the region. The super normal profit will attract other companies to relocate their firms to that region until the optimal number of firms in that location is achieved. The movement of firms will cease when congestion costs, such as increases in land and labor costs, are high enough to offset net benefits from industry relocation and the system gets back into equilibrium.

Simulation results show different patterns between eastern Indonesia and other regions. Some firms relocated to peripheral areas after transport improvements. They found that where agglomeration economies are strong, the scope of industry relocations to peripheral areas was much lower than when the agglomeration economies are weak.

Surprisingly, transport improvements only had a small impact on industry relocation, especially to the peripheral areas. This might be because the sectors were already well distributed and, at the same time, served local markets.

However, for eastern Indonesia, which was considered a lagging region, improvements in transport have only limited payoffs in terms of improving regional attractiveness. Firms from other leading regions, particularly in major sectors that have already concentrated, were not interested in relocating their firms.

1.4. The Role of Small and Medium Enterprises (SMEs) in the Industrial Agglomeration

SMEs have an important role in industrial agglomeration in Indonesia. The clustering of SMEs is not only for the development of SMEs in the cluster, but also for the development of villages/towns in Indonesia. More importantly, strengthening SMEs promotes the growth of the manufacturing industry because a lot of subcontracting activities emerge within the clusters.

Clusters in Indonesia can be classified into four types, according to their level of development. Each of these has their own characteristics (Sandee and Wingel 2002):

1) "Artisinal:" mainly micro enterprises (MIIs); low productivity and wages; stagnated (no market expansion); increased investment and production; improved production methods; management, organization and production development; local market (low-income consumers) orientation; use primitive or obsolete tools and equipment; many producers are illiterate and passive in marketing (i.e., producers have no idea about their market); the role of middlemen/traders is dominant (i.e., producers are fully dependent on middlemen or traders for marketing); low degree of interfirm cooperation and specialization (i.e., no vertical cooperation among enterprises); no external networks with supporting organizations.

2) "Active;" use higher-skilled workers and better technology; supply national and export markets; active in marketing; high degree of internal and external networks

3) "Dynamic:" extensive overseas trade networks; pronounced internal heterogeneity within clusters in terms of size, technology, and served markets; leading/pioneering firms played a decisive role

4) "Advanced:" the degree of interfirm specialization and cooperation is high; business networks between enterprises with suppliers of raw materials, components, equipment and other inputs; providers of business services, traders, distributors, and banks are well developed; cooperation with local, regional, or even national government as well as with specialized training and research institutions such as universities is good; many firms are export-oriented (mainly through trading houses or exporting companies)

The fourth type is more developed and complex than those in the third type. Advanced clusters often overlap and interlink with other clusters in the same region. Such cluster agglomerations or industrial districts (the Italian term) are the most complex form of clustering where different sectors or subsectors mutually depend on, and benefit from, each other. One example of this type of cluster agglomeration is the Yogyakarta–Solo area (Central Java), where tourism, furniture and interior decoration, metal processing, leather goods, and textile/clothing clusters are all mutually benefiting from one other.

However, in general, the performance of SME clusters in Indonesia is still far below the performance of SME clusters in developed countries. Most of the SME clusters in Indonesia are "artisinal" clusters characterized by low productivity and very small size or self-employments units. They produce inferior goods meant only for local markets and do not have linkages with large domestic enterprises or large international enterprises. Many of these clusters have been in existence for a long time, but they can not improve their performance in terms of productivity, technology, and market expansion.

This situation is related to problems faced by the SMEs in less developed countries, which can be categorized into three groups: infrastructure, institution, and economic issues. Infrastructure does not only cover the lack of infrastructure, but also the low quality of existing infrastructure. Institution relates to the lack of access to formal training and financial system, excessive government regulation on business licensing, lack of price and market information, and noncompliance with international standards.

The 2003 survey on Small and Medium Enterprises from the Central Bureau of Statistics (BPS) Indonesia mentioned that the main problems faced by the majority of SMEs are the lack of capital and marketing skills. Although the government has provided various government-sponsored SME credit schemes, most of the SMEs, especially in rural/backward areas, never received any credits from banks or other financial institutions. They are heavily dependent on their own savings.

2. DESCRIPTIVE ANALYSIS OF THE FIRM-LEVEL MAIL SURVEY.

This section and the one after this both report and analyze the results of the firm-level mail-survey. As previously noted, this study conducted the survey to derive some basic facts and conduct an analysis on the determinants of industrial agglomeration in Indonesia.

The questions formulated in the survey adopted the flowchart approach of industrial agglomeration (Kuchiki 2005). The questions were categorized into four groups: (a) current profile of business operation in the area targeted for the survey; (b) factors that influenced the firm's decision to establish its production; (c) some details about the firm's current operation and plans for future operation; and (d) the profile of the parent companies of the respondent firm.

The questionnaires were sent to about 1,000 firms in greater Jakarta, Bandung, and Surabaya in November 2007. As previously noted, there is a large concentration of industrial agglomeration activities in these three areas. The survey received 121 valid responses, making for a 12.1 percent response rate (see Table 2).

Table 2: Basic Information about the Valid Responses

Dispatch	Valid Response	Respond Rate
1,000	121	12.1%

Source: Author.

2.1. The Characteristics of the Respondents

Table 3 provides the distribution of respondents by the year of establishment. About

60 percent of the respondents were established during the 1990s and early 2000s. This likely reflects the policy and major economic events in Indonesia during that period.[ii] As noted, the 1990s was a period of rapid trade liberalization during which many deregulation packages were introduced. The 2000s was characterized by strong growth due to recovery from the 1997/98 crisis.[iii]

Table 3: Number of Respondents by Year of Establishment

	#	% of total
Before 1970	17	14.0
1970 - 1974	8	6.6
1975 - 1979	6	5.0
1980 - 1984	7	5.8
1985 - 1989	12	9.9
1990 - 1994	20	16.5
1995 - 1999	14	11.6
2000 - 2004	29	24.0
2005 - 2007	7	5.8
not answering	1	0.8
Total	121	100.0

Source: Author.

In terms of ownership, about 76 percent of the respondents are local firms while about 20 and 4 percent of the respondents constitute joint-venture firms and wholly foreign firms, respectively. This is indicated by the distribution of the respondents by type of ownership given in Table 4.

The distribution is also consistent with the policy episodes in Indonesia, indicated by the rather large number of joint venture firms. The deregulation of ownership rule in the 1990s indeed encouraged more foreign presence in a firm's ownership structure. The government gradually removed the restriction of equity and the rule for divestment over the period 1986 to 1995 and, in addition to this, also undertook quite extreme reforms to respond to the perceived decline in the investment climate in Indonesia (Pangestu 1996).

The number of wholly foreign firms, however, is rather small for Indonesia. For example, the number of wholly foreign firms in Indonesian manufacturing is about 9 percent, on average, during the early 2000s. Again, this is considering a quite liberal investment policy in the 1990s. Nonetheless, this might simply reflect a weakness of the mail survey whereby the extent of valid responses were much smaller for the group of

wholly foreign firms compared to that for the group of local and joint venture firms.

Table 4: Ownership Structure of the Respondents

	#	% of total
Local	92	76.0
Foreign	5	4.1
Joint-venture	24	19.8
Total	121	100.0

Source: Author.

As for size, the bulk of the respondents can be categorized as small-to-medium-sized firms. This is when size was measured by the number of employees, as shown by Table 5a for the distribution of current size. Only about 10 percent of the respondents fall into the group of large firms.

Table 5: Size of the Respondents, by Number of Employees

(a) Size at the Year of Survey (i.e. 2007)		
Groups	#	% of total
1. 1-49 persons	62	51.2
2. 50-99 persons	15	12.4
3. 100-199 persons	14	11.6
4. 200-299 persons	5	4.1
5. 300-399 persons	1	0.8
6. 400-499 persons	5	4.1
7. 500-999 persons	10	8.3
8. 1,000-1,499 persons	6	5.0
9. 1,500-1,999 persons	3	2.5
10. 2,000 persons and above	0	0.0
Not responding	0	0.0
Total	121	100.0

Source: Author.

An interesting – but rather surprising result – can be derived by comparing Table 5a with Table 5b, which is the distribution of size by initial size at the time of the firm's establishment. The key point is that the respondents did not seem to grow that fast. The distribution did not really change when moving from Table 5b to Table 5a (i.e., from the initial to the current size). Reading the information from Table 5a, only about 10 percent of the respondents 'graduated' from small-medium to large firms over the course of the

respondent-firms' life. Nevertheless, this finding is consistent with the situation after the 1997/98 economic crisis. Aswicahyono *et al*. (2007), for example, indicated that the growth of manufacturing firms in Indonesia had been much slower during the period after the crisis compared to the period before the crisis. This finding, however, does not really agree with the situation before the crisis where the growth of firms in Indonesia tended to be very high.

Table 5: Size of the Respondents, by Number of Employees

(b) Size at the Initial Year of Establishment		
Groups	#	% of total
1. 1-49 persons	81	66.9
2. 50-99 persons	17	14.0
3. 100-199 persons	10	8.3
4. 200-299 persons	4	3.3
5. 300-399 persons	1	0.8
6. 400-499 persons	1	0.8
7. 500-999 persons	2	1.7
8. 1,000-1,499 persons	0	0.0
9. 1,500-1,999 persons	1	0.8
10. 2,000 persons and above	0	0.0
Not responding	4	3.3
Total	121	100.0

Source: Author.

Meanwhile, the distribution of size based on other measurements (i.e., assets and capital) also show a similar picture and even show a quite large degree of persistency in the size over the course of life of the respondents (see Tables 6 and 7).

Table 6: Size of the Respondents, by Number of Assets

(a) Size at the Year of Survey (i.e. 2007)

Groups	#	% of total
1. Less than 10,000	36	29.8
2. 10,000-24,999	14	11.6
3. 25,000-49,999	6	5.0
4. 50,000-74,999	6	5.0
5. 75,000-99,999	3	2.5
6. 100,000-499,999	17	14.0
7. 500,000-999,999	9	7.4
8. 1-4.9 million	14	11.6
9. 5-9.9 million	9	7.4
10. 10 million and above	0	0.0
Not responding	7	5.8
Total	121	100.0

(b) Size at the Initial Year of Establishment

Groups	#	% of total
1. Less than 10,000	41	33.9
2. 10,000-24,999	11	9.1
3. 25,000-49,999	8	6.6
4. 50,000-74,999	8	6.6
5. 75,000-99,999	5	4.1
6. 100,000-499,999	13	10.7
7. 500,000-999,999	7	5.8
8. 1-4.9 million	11	9.1
9. 5-9.9 million	5	4.1
10. 10 million and above	0	0.0
Not responding	12	9.9
Total	121	100.0

Source: Author.

Table 7: Size of the Respondents, by Number of Capital

(a) Size at the Year of Survey (i.e. 2007)

Groups	#	% of total
1. Less than 10,000	35	28.9
2. 10,000-24,999	12	9.9
3. 25,000-49,999	10	8.3
4. 50,000-74,999	6	5.0
5. 75,000-99,999	6	5.0
6. 100,000-499,999	13	10.7
7. 500,000-999,999	7	5.8
8. 1-4.9 million	12	9.9
9. 5-9.9 million	4	3.3
10. 10 million and above	0	0.0
Not responding	16	13.2
Total	121	100.0

(b) Size at the Initial Year of Establishment

Groups	#	% of total
1. Less than 10,000	43	35.5
2. 10,000-24,999	15	12.4
3. 25,000-49,999	7	5.8
4. 50,000-74,999	6	5.0
5. 75,000-99,999	5	4.1
6. 100,000-499,999	9	7.4
7. 500,000-999,999	4	3.3
8. 1-4.9 million	10	8.3
9. 5-9.9 million	4	3.3
10. 10 million and above	0	0.0
Not responding	18	14.9
Total	121	100.0

Source: Author.

The survey indicated that most of the respondents are in manufacturing. Table 8 shows that about 40 percent of the respondents are categorized under the manufacturing sector. The respondents in the services sector, notably in finance and insurance, hotel and restaurants, IT and software, and construction, are also quite big. Those in the finance and insurance sectors, in particular, made up about 20 percent of the total respondents. This finding provides some early evidence of the extent of industrial agglomeration in the three regions covered by the survey. In particular, it may suggest that quite a number of financial firms in the surveyed areas were actually created to fulfill the demand of the rapidly growing manufacturing sector. As in theory, these

financial firms are likely to act as intermediaries of (public) funds, which the manufacturing firms need to undertake investments.

Table 8: Main Business Activities of the Respondents

Groups	#	% of total
1. Manufacturing	47	38.8
2. Primary products	1	0.8
3. Utilities	0	0.0
4. Construction	7	5.8
5. Wholesale	4	3.3
6. Retail	6	5.0
7. Hotels, Restaurants	9	7.4
8. Transportation	4	3.3
9. Telecommunications	2	1.7
10. Finance, Insurance	23	19.0
11. Real estate	0	0.0
12. IT services, Software	5	4.1
13. Other business services	6	5.0
14. Personal services	2	1.7
15. Other	5	4.1
Total	121	100.0

Source: Author.

A rather skewed distribution is also presented in Table 9, which show the distribution of activities of respondents that operate in manufacturing sector. A large number of respondents operate in textile and garments, food and beverages, paper and paper products, and the automotive and auto parts sectors.

While it is not the focus of this subsection, it is worth mentioning here that the number of respondents from the automotive and auto parts sector provide another support for the incidence of industrial agglomeration. This sector can rely quite heavily on subcontracting arrangement, either in the automotive assembly industry or auto part industries, and the fact of this high dependency obviously could trigger the proliferation of many subcontractors in a region with some big automotive assemblies or auto parts companies. For example, it is well known that there are clusters of medium-sized auto parts companies in the greater Bandung and West Java area. Many of these companies supply their output to either assembly plants—there are quite many in the area, including greater Jakarta, which is quite close to the greater Bandung region--or to other

auto parts companies that produce higher-level and -quality automotive parts and components. Companies that produce these kinds of products also export them.[iv]

Table 9: Main Products of Manufacturing Companies

	#	% of total
Food, beverages, tobacco	5	10.0
Textiles, apparel, leather	13	26.0
Wood, wood products	4	8.0
Paper, paper products, printing	6	12.0
Chemicals, chemical and plastic products, rubber	4	8.0
Iron, steel	1	2.0
Metal products	2	4.0
Other electronics, electronic components	1	2.0
Automobile, auto parts	8	16.0
Other	6	12.0
Total	50	100.0

Source: Author.

Target market of respondents does not appear to vary so much. As presented in Table 10, many of the respondents, that is, about 80 percent, sell their output to the domestic market. As for the export market, respondents seem more focused on the Asian market rather than U.S. and European markets. In total, 12.4 percent of respondents sell their output to the ASEAN member countries and other Asian countries, which is higher than the number of respondents that export to the U.S. and European markets (i.e., only 4 percent of the total respondents).

This finding could be attributed to the fact that many of the respondents are small-to-medium-sized firms. Presumably, this is also because the competitive pressure in terms of product quality is less for the Asian region than it is for the U.S. and European markets. And because firms that are able to meet the more rigorous quality requirements for the U.S. and European markets are likely to be large or very large firms, it is not surprising that the result was heavily skewed in favor of the domestic market as the main target market for the respondents. Large firms are able to compete in a more exacting global market because of their efficient operations, which stem from economies of scale.

All in all, this finding as well as the possible explanation for the finding jibes with the "self-selection hypothesis," which postulates that only the most productive firms are

able to survive in the highly competitive global market. According to Bernard and Jensen (1999), this hypothesis is based on the presumption that there are additional costs for participating in export, and because these costs are usually very high, only very efficient firms, and hence large firms, are able to compete. Given the finding from the survey, we can thus infer that small- and medium-sized firms in Indonesia are "selected" to be able to compete in the Asian market. On the other hand, large Indonesian firms, or perhaps Indonesian joint-venture firms, are "selected" to compete in U.S. and European markets, which are presumed to be more competitive than the Asian market.

While further investigation of this argument is clearly needed, other studies have established the relationship between size and the ability to compete in terms of quality in the global market. For example, Sjoholm and Takii (2003) observed that exporting plants in the Indonesian manufacturing sector are larger and more productive than nonexporting plants.

Table 10: Main Target Market of Respondents

	#	% of total
1. Domestic	97	80.2
2. ASEAN	6	5.0
4. Other Asia	9	7.4
5. United States	3	2.5
6. Europe	2	1.7
7. Other	1	0.8
Not answering	3	2.5
Total	121	100.0

Source: Author.

Approximately 78 percent of the total number of respondents (see Table 11) buy their inputs from domestic sources. Meanwhile, for importing inputs, the respondents do not seem to acquire much of their inputs from U.S. and European sources compared to Asian sources (i.e., sources from the ASEAN and other Asian countries). This bears a very strong similarity to the picture painted by the previous finding except that now the subject is input instead of output. We, therefore, infer that the high level of skewness in Table 11 could be attributed to the fact that most of the respondents were small-to-medium-sized firms.

Table 11: Main Sources of Inputs of Respondents

	#	% of total
1. Domestic	94	77.7
2. ASEAN	4	3.3
3. China	2	1.7
4. Other Asia	10	8.3
5. United States	1	0.8
6. Europe	2	1.7
7. Other	1	0.8
Not answering	7	5.8
Total	121	100.0

Source: Author.

Meanwhile, the role of the respondents in the cluster areas did not seem to change much during the year of the survey when compared to their role during the year of the firms' establishment. About 30 percent of the respondents produce the final product while about 20 percent are suppliers of raw materials. Therefore, about half of the respondents undertake a production role in the cluster areas; the other half operate in the services sectors. The respondents that undertake logistic operations are quite large--about 15 percent of the total respondents. This indicates a quite active industrial agglomeration process in the areas covered by the survey. The relatively high number of respondents that operate in consulting services and human-resource development, which amounted to about 17 percent of the total number of respondents, also supports the inference about active industrial agglomeration activities.

Table 12: Functions Carried Out in the Cluster

(a) At the Year of Survey (i.e. 2007)

	#	% of total
1. Retail/ Wholesale trade	28	19.9
2. Production (raw-material processing)	22	15.6
3. Production (components and parts)	6	4.3
4. Production (final products)	41	29.1
5. Purchasing/ Procurement/ Logistics	20	14.2
6. R&D/ Consulting	14	9.9
7. Human resources development	10	7.1
Total	141	100.0

(b) At the Initial Year of Establishment

	#	% of total
1. Retail/ Wholesale trade	25	19.7
2. Production (raw-material processing)	21	16.5
3. Production (components and parts)	8	6.3
4. Production (final products)	36	28.3
5. Purchasing/ Procurement/ Logistics	16	12.6
6. R&D/ Consulting	13	10.2
7. Human resources development	8	6.3
Total	127	100.0

Source: Author.

2.2. Some Early Evidence of Industrial Agglomeration

This section continues the presentation of the survey results. It aims to find some indication of the extent of the agglomeration process.

There seems to be early evidence of the industrial agglomeration process in the areas covered by the survey. This is indicated by the list of important factors for establishing business according to the respondents (see Table 13). In particular, according to the table, the respondents consider the following factors as the most important factors:

a. all kinds of infrastructures and supporting activities, including the "hard/physical" infrastructures (e.g., roads, ports, telecommunication, and utilities) and "soft" infrastructures (e.g., financial and legal system, living condition)

b. the availability of skilled labour and professionals

c. size of domestic markets

Table 13: Important Factors for Establishing Business

Groups	#	% of total
1) Investment incentives including tax incentives	79	65.3
2) Liberal trade policy	46	38.0
3) Customs procedures	40	33.1
4) Local content requirements, rule of origin	62	51.2
5) Physical infrastructure (roads, highways, ports, airports, etc.)	105	86.8
6) Infrastructure (telecommunications, IT)	111	91.7
7) Infrastructure (electricity, water supply, other utilities)	109	90.1
8) Government institutional infrastructure	86	71.1
9) Financial system	109	90.1
10) Legal system	99	81.8
11) Protection of intellectual property rights	78	64.5
12) Size of local markets	97	80.2
13) Access to export markets	57	47.1
14) Proximity to suppliers/subcontractors	73	60.3
15) Request by large/related company	78	64.5
16) Availability of low-cost labor	75	62.0
17) Availability of skilled labor and professionals	103	85.1
18) Other companies from the same country are located here (synergy)	50	41.3
19) Access to cutting-edge technology and information	95	78.5
20) Living conditions	102	84.3
Average of the frequency		68.3

Note: the frequencies were computed based on the answer of "somewhat important" and "very important."
Source: Author.

The information shown in Table 13 indicates the important factors for all respondents at the time of their establishment. Table 14, meanwhile, reflects the respondents' views on the important factors at the time of the survey. The survey results show an almost identical list of factors. The only difference is that the respondents consider incentive for investment as another important factor at the time of survey. This finding could be related to the worsening investment climate in Indonesia after the 1997/98 economic crisis. Nonetheless, the high degree of similarity of the factors, which also implies persistency, provides a robustness check for the support of the flowchart approach.

Table 14: The Important Factors for Establishing Business, Present Time

Groups	#	% of total
1) Investment incentives including tax incentives	90	74.4
2) Liberal trade policy	65	53.7
3) Customs procedures	66	54.5
4) Local content requirements, rule of origin	60	49.6
5) Physical infrastructure (roads, highways, ports, airports, etc.)	109	90.1
6) Infrastructure (telecommunications, IT)	111	91.7
7) Infrastructure (electricity, water supply, other utilities)	112	92.6
8) Government institutional infrastructure	94	77.7
9) Financial system	106	87.6
10) Legal system	104	86.0
11) Protection of intellectual property rights	83	68.6
12) Size of local markets	99	81.8
13) Access to export markets	65	53.7
14) Proximity to suppliers/subcontractors	82	67.8
15) Request by large/related company	87	71.9
16) Availability of low-cost labor	81	66.9
17) Availability of skilled labor and professionals	106	87.6
18) Other companies from the same country are located here (synergy)	62	51.2
19) Access to cutting-edge technology and information	107	88.4
20) Living conditions	107	88.4
Average of the frequency		74.2

Source: Author.

Detailing Table 13, Table 15 provides the ranking, the first to the third in ascending order, of the importance of the factors. The results show that infrastructures are the most important factor. The legal system was also considered as a substantially important factor. Meanwhile, the size of market and availability of labour input are considered less important by the respondents. This finding is rather surprising considering that it is rather difficult for an industrial agglomeration to exist without economies of scale as well as the situation of increasing return to scale (Fujita *et al.* 1999).

Table 15: The Three most Important Factors for Establishing Business

Groups	1st #	1st % of total	2nd #	2nd % of total	3rd #	3rd % of total
1) Investment incentives including tax incentives	9	7.4	1	0.8	6	5.0
2) Liberal trade policy	1	0.8	2	1.7	1	0.8
3) Customs procedures	4	3.3	7	5.8	1	0.8
4) Local content requirements, rule of origin	0	0.0	1	0.8	0	0.0
5) Physical infrastructure (roads, highways, ports, airports, etc.)	23	19.0	8	6.6	10	8.3
6) Infrastructure (telecommunications, IT)	10	8.3	13	10.7	6	5.0
7) Infrastructure (electricity, water supply, other utilities)	2	1.7	6	5.0	9	7.4
8) Government institutional infrastructure	1	0.8	5	4.1	0	0.0
9) Financial system	12	9.9	7	5.8	7	5.8
10) Legal system	7	5.8	10	8.3	11	9.1
11) Protection of intellectual property rights	1	0.8	8	6.6	3	2.5
12) Size of local markets	9	7.4	8	6.6	11	9.1
13) Access to export markets	4	3.3	3	2.5	4	3.3
14) Proximity to suppliers/subcontractors	2	1.7	4	3.3	6	5.0
15) Request by large/related company	5	4.1	2	1.7	2	1.7
16) Availability of low-cost labor	4	3.3	4	3.3	6	5.0
17) Availability of skilled labor and professionals	4	3.3	8	6.6	14	11.6
18) Other companies from the same country are located here (synergy)	3	2.5	5	4.1	0	0.0
19) Access to cutting-edge technology and information	3	2.5	6	5.0	9	7.4
20) Living conditions	11	9.1	7	5.8	8	6.6
Not answering	6	5.0	6	5.0	7	5.8
Total	121	100.0	121	100.0	121	100.0

Source: Author.

All in all, Tables 13 to 15 provide support for the flowchart approach of industrial agglomeration (Kuchiki 2005). The factors for establishing business that were chosen by the respondents accord to two of the three groups of determinants of industrial agglomeration according to the flowchart approach; namely, domestic demand and capacity building (e.g., infrastructures, availability of human resources, and social factors—including living conditions). The survey results, however, do not support the export variable of the industrial agglomeration determinant. The analysis of the subsequent tables provides some insight on why the results do not support the export determinant.

Different from the previous three tables, Table 16 lists the factors that restrain the growth of the respondent-firms. According to the respondents, these factors are mainly all kind of infrastructures, the legal system, protection of intellectual rights, financial

system, size of the local market, access to export, availability of skilled labour and professionals, access to information and technology, living condition, and incentives for investment. While it might be too early to infer, this finding is consistent with many studies that reflect the weakening real sector in Indonesia and, in particular, the worsening situation of the general investment climate in Indonesia.

It is important to note here that the lack of access to export markets is one of the respondents' complaints. This might explain the earlier finding of the lack of export markets' importance. Thus, the earlier finding does not necessarily mean that the size of the market, including here the size of export markets, is not an important determinant of industrial agglomeration. In fact, the size of the market and the export market might be important. It might be the case that that the importance of market size did not come out as an important factor in the survey because it was eclipsed by some problem in the infrastructure and other supporting facilities for the firms' exporting activities.

Table 16: The most Problematic Factors for Establishing Business

Groups	#	% of total
1) Investment incentives including tax incentives	79	65.3
2) Liberal trade policy	46	38.0
3) Customs procedures	40	33.1
4) Local content requirements, rule of origin	62	51.2
5) Physical infrastructure (roads, highways, ports, airports, etc.)	105	86.8
6) Infrastructure (telecommunications, IT)	111	91.7
7) Infrastructure (electricity, water supply, other utilities)	109	90.1
8) Government institutional infrastructure	86	71.1
9) Financial system	109	90.1
10) Legal system	99	81.8
11) Protection of intellectual property rights	78	64.5
12) Size of local markets	97	80.2
13) Access to export markets	57	47.1
14) Proximity to suppliers/subcontractors	73	60.3
15) Request by large/related company	78	64.5
16) Availability of low-cost labor	75	62.0
17) Availability of skilled labor and professionals	103	85.1
18) Other companies from the same country are located here (synergy)	50	41.3
19) Access to cutting-edge technology and information	95	78.5
20) Living conditions	102	84.3
Average of the frequency		68.3

Source: Author.

Nonetheless, as showed by Table 16, the lesser importance of the export determinant in the flowchart approach might also be caused by very weak infrastructures. As noted in the literature on firm-exporting behaviour, the role of infrastructures is very important for firms to access export markets (Aitken *et al*. 1997). The significant constraint imposed by weak infrastructures is consistent with the situation that currently exists in Indonesia and is not a surprise. After the 1997/98 economic crisis, public investment in physical infrastructures declined substantially, compared to the period before the crisis (Soesastro and Atje 2005).

It is also interesting to note that the financial system is another important constraint according to the respondents. This might suggest some problem in the intermediary function played by financial institutions. However, this inference is rather counterintuitive given the fact that we have already seen earlier the important role of financial institutions in the business activities of firms in the areas covered by the survey. This is shown by the large number of financial institutions in the respondent-firms, which could reflect the true situation in the population of firms. Nonetheless, the suggestion could actually also reflect the real situation given that most of the respondents are small-to-medium-sized firms. It is well known that small firms usually do not have good access to banks mainly because the financial system of small- and medium-sized firms is not modernized enough to meet banks' requirements for loans.

Table 17 shows the type of activities that the respondents considered for their expansion in the past and for their expansion plans in near future. For those who have expanded, demand was the most important driver for the expansion. About 67 percent of the respondents chose the "introduction of new goods" and "opening of new markets" as the activities they did in their expansion (see Table 17a). This picture does not change when we move to the activities the respondents plan to undertake for expansion in the next three years after the survey. The only difference is that quite many of the respondents now include "adoption of new method of production." This finding indicates a potentially quite active technological upgrading that will be done by the respondents. Again, this provides some support for the incidence of industrial agglomeration and suggests that the process of industrial agglomeration should be sustainable at least for a short period of time in the future.

Table 17: Activities and Plans for Upgrading

(a) Respondents who Upgraded in the Last Three Years

	Yes		No	
	#	% of total	#	% of total
1. Introduction of new goods	80	66.1	38	31.4
2. Adoption of a new method of production	59	48.8	59	48.8
3. Opening of a new market	80	66.1	38	31.4
4. Acquisition of a new source of supply of raw materials	39	32.2	79	65.3

(b) Respondents who Plan to Upgrade in the Next Three Years

	Yes		No	
	#	% of total	#	% of total
1. Introduction of new goods	90	74.4	24	19.8
2. Adoption of a new method of production	76	62.8	38	31.4
3. Opening of a new market	90	74.4	25	20.7
4. Acquisition of a new source of supply of raw materials	51	42.1	63	52.1

Source: Author.

Table 18 details the method used by firms who expanded or plan to expand in the near future. The decision of the respondents in choosing the method provides some more support for the extent of the agglomeration process. This inference, in particular, was derived from the fact that quite many of the respondents chose to upgrade by transferring technology from companies that had already been established in the area where the respondents operate. The transfer of technology does not only come from local companies, but also from foreign companies. The table shows that about 50 percent of the respondents did or will transfer technology from multinational companies. This strengthens the support for industrial agglomeration process. It is well documented in the literature on foreign ownership (e.g., Dunning 1993) that technology spillover from foreign firms do happen.

Table 18 also points to the important role played by either local government or local business organizations (e.g., local office of business associations) in moderating industrial agglomeration. About 45 and 60 percent of the respondents mentioned the importance of local government and business organizations, respectively, for their upgrading plan and activities.

Table 18: The Methods Used by Firms for Upgrading

	Yes		No	
	#	% of total	#	% of total
1. Technology transfer from multinational companies	59	48.8	42	34.7
2. Technical assistance from foreign agencies (including ODA)	43	35.5	57	47.1
3. Technical cooperation with (or assistance from) local government	55	45.5	46	38.0
4. Technical cooperation with (or assistance from) local business organization	75	62.0	26	21.5
5. Technical cooperation with (or assistance from) local university or R&D institutes	50	41.3	51	42.1
6. Technology transfer from or cooperation with local companies	73	60.3	27	22.3

Source: Author.

Tables 19 to 22 describe the decision of the respondents in expanding their business. The big picture is more or less positive. Many of the respondents planned to expand. As shown in Table 19, about 85 percent of the respondents planned to expand their business in the same area or in the cluster that they are operating now. Meanwhile, Table 20 indicates that about half or 53 percent of the respondents plan to expand their business out of the region that they are operating in at the moment.

It is worth noting that the big picture rather contradicts the popular belief of weak and unsupportive investment climate in Indonesia as noted earlier. Here we propose at least two possible explanations for this. First, the big picture might be somewhat misleading because, as shown, most of the respondents are firms which are small or medium in size. According to the literature on firm size, small- and medium-sized firms have some benefit that make them quite "nimble," and hence, less likely to be affected by factors that create a weak investment climate. For example, small- and medium-sized firms do not have to produce large output and tend to have much smaller cost than large firms in undertaking expansion.

The other possible explanation is that many of the respondents rely on domestic markets, and this is quite a sensible argument given that most of respondents are small- and medium-sized firms which presumably do not export much. In addition, the Indonesian economy actually has performed quite well in the past three years or so, with about 5 to 6 percent of annual economic growth. It could also be the case that many of the respondents might also operate in sectors with a very large domestic demand. This is

clearly true for food and beverage and garment industries, which are the sectors that quite many of the respondents operate in.

Table 19: Plan to Expand Business in the Cluster

	#	% of total
Yes	103	85.1
Not sure	18	14.9
Total	121	100.0

Note: "Yes" refers to the answers of "Yes" and "Probably Yes." "Not sure" refers to the answers of "Not sure," "Probably Not," and "Not."
Source: Author.

Table 20: Plan to Start New Operations Somewhere else in Indonesia

	#	% of total
1. Yes	64	52.9
2. Not	35	28.9
3. Not sure	22	18.2
Total	121	100.0

Source: Author.

The two alternative explanations above are consistent with the picture given in Table 21, where only about 15 percent of the respondents planned to expand in other countries. While further investigation is needed, it could be the case that these respondents are large firms. It is worth noting, however, that there are many respondents that are not sure whether to expand in Indonesia or other countries. This, perhaps, reflects the weak investment climate that most analysts believe to be happening in Indonesia at the moment.

Table 21: Plan to Start New Operations in Countries Other than Indonesia

	#	% of total
1. Yes	19	15.7
2. Not	71	58.7
3. Not sure	28	23.1
Not answering	3	2.5
Total	121	100.0

Source: Author.

For the respondents that do plan to expand to other countries, Asian countries are the favourite destination for expansion. This, of course, is somewhat predictable. Indonesia has been ranked much lower than other neighboring countries for investment destination and this, in fact, supports the situation of a weak investment climate. This matches the finding of Aswicahyono *et al*. (2007) who found from their fieldwork that firms in Indonesia tend to choose other countries if they have to make a greenfield investment. Firms in Indonesia still consider investing in Indonesia, but only for the expansion of the current operating plants. It is also worth noting that the fieldwork done by Aswicahyono *et al*. indicate that it is only big firms who can afford to invest in other countries, which support some of the arguments and analysis from the result of the survey done by this study.

Table 22: Likely Location of the New Operations outside Indonesia

	#	% of total
1. ASEAN outside CLMV	5	26.3
2. CLMV	2	10.5
3. China	0	0.0
4. Other Asia	4	21.1
5. Others	1	5.3
Not answering	7	36.8
Total	19	100.0

Source: Author.

3. THE DETERMINANTS OF INDUSTRIAL AGGLOMERATION: AN ECONOMETRIC ANALYSIS

This subsection presents an econometric analysis to gauge the determinants of industrial agglomeration in Indonesia. The analysis focuses on factors such as policy measures and the economic environment which contribute to, or are required for, agglomeration and innovation. The econometric analysis used the data from the response of the mail-survey.

3.1. Factors of Agglomeration

Before presenting the econometric results, we first identified factors that attract

firms to particular areas. Question 1 in the questionnaires asks the year of the company's establishment in each country. For analytical simplicity, we focused on the accumulated number of established companies in Indonesia, shown in Figure 3. Since firms have different reasons for establishing offices in each country, the year of establishment is also different among firms. For simplicity, we divided the whole period into three, according to the trend in accumulation.[v] The following three periods in the trend can be identified: (1) before 1989; (2) 1990-2001; and (3) after 2002. The year of establishment of the firm or business activities was taken as a dependent variable. The firms established in the earlier period are referred to as "first movers," and those that came in the later period as "latecomers." Independent variables, on the other hand, which explain why they were attracted to these regions, are selected from among the questionnaires from the following characteristics: (1) firm size; (2) attracting factors; and (3) functions of offices when they were established.

Figure 3: Accumulated Number of Offices Established in Indonesia
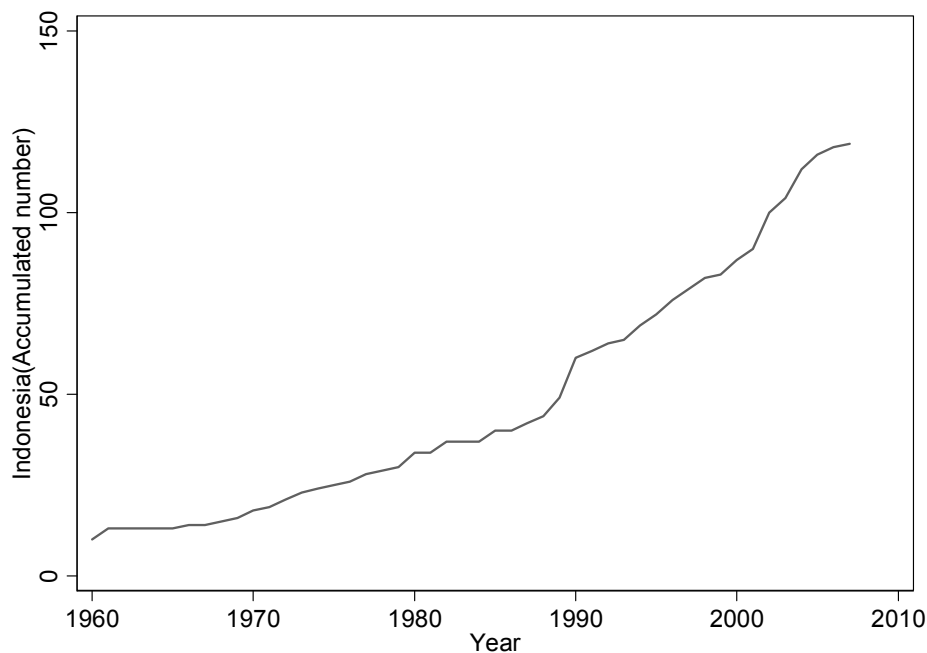
Source: Author.

As for firm size, the relationship between the year of establishment and the size of firms was examined. That is, whether the agglomeration is triggered by large or small

firms, either local or foreign. This is related to the "flowchart approach," Kuchiki (2007), Kuchiki and Tsuji (2005), (2008), and Tsuji *et al* (2006).[vi] Three categories of firm size are asked in Question 3, namely, (i) number of full-time employees; (ii) total assets; and (iii) paid-up capital. Three models were used to follow these definitions.

The attracting factors of establishing offices are asked in Question 7, which consist of 20 items that influenced the company decision to establish operations in each country at the time the operation was begun, as shown in Table 23. Finally, there is no need to explain (3). The summary statistics are presented in Table 23.

Table 23 : Summary Statistics

		Variable		Obs	Mean	Std. Dev.	Min	Max
Dependent Variable								
Q1)		Agglomeration		119	0.832	0.795	0	2
Q9)		Innovation : Goods		116	0.681	0.468	0	1
		Methods		116	0.509	0.502	0	1
		Markets		116	0.681	0.468	0	1
		Suppliers		116	0.328	0.471	0	1
Independent Variable								
Q1)		Establishment Year		119	1975.104167	28.5703	1859	2007
Q3)	1)	Full-time Employees :	50 – 99	119	0.134	0.343	0	1
			100 - 199	119	0.084	0.279	0	1
			200 - 299	119	0.034	0.181	0	1
			300 - 399	119	0.008	0.092	0	1
			400 - 499	119	0.008	0.092	0	1
			500 - 999	119	0.017	0.129	0	1
			1,000 - 1,499	119	0.000	0.000	0	0
			1,500 - 1,999	119	0.008	0.092	0	1
			2,000 & above	119	0.000	0.000	0	0
Q3)	1)	Total Assets (US$) :	10,000-24,999	119	0.092	0.291	0	1
			25,000-49,999	119	0.067	0.251	0	1
			50,000-74,999	119	0.067	0.251	0	1
			75,000-99,999	119	0.042	0.201	0	1
			100,000-499,999	119	0.109	0.313	0	1
			500,000-999,999	119	0.059	0.236	0	1
			1 million-4.9 million	119	0.084	0.279	0	1
			5 million-9.9 million	119	0.042	0.201	0	1
			10million & above	119	0	0	0	0
Q3)	1)	Paid-UP Capital (US$) :	10,000-24,999	119	0.126	0.333	0	1
			25,000-49,999	119	0.059	0.236	0	1
			50,000-74,999	119	0.050	0.220	0	1
			75,000-99,999	119	0.042	0.201	0	1
			100,000-499,999	119	0.076	0.266	0	1
			500,000-999,999	119	0.034	0.181	0	1
			1 million-4.9 million	119	0.084	0.279	0	1
			5 million-9.9 million	119	0.034	0.181	0	1
			10million & above	119	0	0	0	0
Q6)	1	Retail/ Wholesale trade		112	0.214	0.412	0	1
	2	Production (raw-material processing)		112	0.179	0.385	0	1
	3	Production (components and parts)		112	0.063	0.243	0	1
	4	Production (final products)		112	0.321	0.469	0	1
	5	Purchasing/ Procurement/ Logistics		112	0.143	0.351	0	1
	6	R&D/ Consulting		112	0.116	0.322	0	1
	7	Human resources development		112	0.071	0.259	0	1

		Variable	Obs	Mean	Std. Dev.	Min	Max
Q7)	1)	Investment incentives including tax incentives	117	3.718	1.082	1	5
	2)	Liberal trade policy	115	2.852	1.384	1	5
	3)	Customs procedures	117	2.624	1.437	1	5
	4)	Local content requirements, rule of origin	115	3.409	1.304	1	5
	5)	Physical infrastructure (roads, highways, ports, airports, etc.)	116	4.345	0.952	1	5
	6)	Infrastructure (telecommunications, IT)	116	4.474	0.774	1	5
	7)	Infrastructure (electricity, water supply, other utilities)	117	4.504	0.827	1	5
	8)	Government institutional infrastructure	117	3.897	1.062	1	5
	9)	Financial system	118	4.322	0.886	1	5
	10)	Legal system	118	4.161	1.004	1	5
	11)	Protection of intellectual property rights	114	3.860	1.104	1	5
	12)	Size of local markets	117	4.103	1.102	1	5
	13)	Access to export markets	116	3.129	1.282	1	5
	14)	Proximity to suppliers/subcontractors	114	3.544	1.198	1	5
	15)	Request by large/related company	111	3.811	1.195	1	5
	16)	Availability of low-cost labor	115	3.730	1.062	1	5
	17)	Availability of skilled labor and professionals	115	4.383	0.874	1	5
	18)	Other companies from the same country are located here (synergy)	115	3.174	1.194	1	5
	19)	Access to cutting-edge technology and information	116	4.164	1.087	1	5
	20)	Living conditions	115	4.304	0.797	2	5
Q8)	1)	Investment incentives including tax incentives	110	3.036	0.995	1	5
	2)	Liberal trade policy	109	3.028	0.833	1	5
	3)	Customs procedures	112	2.857	1.003	1	5
	4)	Local content requirements, rule of origin	109	3.211	0.851	1	5
	5)	Physical infrastructure (roads, highways, ports, airports, etc.)	112	2.884	1.137	1	5
	6)	Infrastructure (telecommunications, IT)	111	3.541	1.085	1	5
	7)	Infrastructure (electricity, water supply, other utilities)	111	3.351	1.050	1	5
	8)	Government institutional infrastructure	111	2.883	1.007	1	5
	9)	Financial system	109	3.468	0.939	1	5
	10)	Legal system	110	2.745	1.096	1	5
	11)	Protection of intellectual property rights	109	2.908	0.996	1	5
	12)	Size of local markets	111	3.495	0.952	1	5
	13)	Access to export markets	112	3.009	0.885	1	5
	14)	Proximity to suppliers/subcontractors	109	3.367	0.868	1	5
	15)	Request by large/related company	109	3.450	0.855	1	5
	16)	Availability of low-cost labor	112	3.268	0.977	1	5
	17)	Availability of skilled labor and professionals	110	3.473	1.002	1	5
	18)	Other companies from the same country are located here (synergy)	111	3.171	0.841	1	4
	19)	Access to cutting-edge technology and information	109	3.541	0.967	1	5
	20)	Living conditions	112	3.393	1.043	1	5

3.2. Estimation Results: Agglomeration

After determining the dependent and independent variables, three models were estimated according to the definition of firm size. The method of Ordered Logit Estimation was adopted, and we estimated the full and the selected model. The former took all variables into account while the latter selected variables which are considered to influence the dependent variables.[vii] A summary of estimations is provided in Table 24, which shows the signs of estimated coefficients and their significance levels.

3.2.1. Estimation of Full-time Employees Model

It should be noted that in these Ordered Logit Models, latecomers were taken to be standard by the normalization and, accordingly, a positive (negative) sign of estimated coefficients indicated that they influence only latecomers (first movers).

Let us summarize the results, beginning with the estimation using the number of full-time employees as the variable which presents the firm size. In the full model, which utilizes all dependent variables in the estimation, firms with 100 to 199 employees represent the only significance level, and there is no other significant firm size. It can be said that these smaller companies are first movers, but in general there was no significant relationship between firm size and the year of business establishment.

Regarding factors which attracted firms to come to Indonesia, "Investment incentives including tax incentives," "Government institutional infrastructure," and "Size of local markets," have negative signs and are at the 5 percent significance level. "Access to cutting-edge technology and information" is also negative and at the 10 percent significance level. These four factors influenced first movers to agglomerate in Indonesia. On the other hand, "Availability of skilled labor and professionals" and "Infrastructure (electricity, water supply, other utilities)" are positive and at the 10 percent significance level, which implies that these factors influenced latecomers.

Regarding the function of offices in Indonesia, "Production (final products)" and "Production (raw-material processing)" have negative signs, but the former is at the 5 percent significance level while the latter is at 10 percent. These two influenced first movers. "Retail/wholesale trade" and "R&D/Consulting" have positive sign with 5 percent significance level, which exerted influence on latecomers. These results for Indonesia are consistent with the situation in recent years, namely, that agglomerates

form in particular regions for R&D activities and skilled labor.

In sum, first movers were influenced by investment incentives, physical and government institutional infrastructures, size of local market, and access to new technology and information, while latecomers were influenced by infrastructure related to utilities and skilled labor and professionals. The latecomers' activities are R&D/consulting, and they are interested in skilled labor. This is consistent with the reality of Indonesia.

In Table 24, we also show the results of the Selected Model, in which the number of independent variables is reduced by eliminating irrelevant ones in order to increase the accuracy of the estimation in terms of log likelihood, for instance. There is no essential difference between the two models, but "Size of local market" has become not significant, whereas "Protection of intellectual property rights" is more significant.

Table 24: Results of Estimations: Agglomeration

			Employees		Assets		Capital	
			Full model	Selected model	Full model	Selected model	Full model	Selected model
Q3)	2	50 - 99persons/10,000-24,999(US$)/10,000-24,999 (US$)	[+]				+	*
	3	100 - 199/25,000-49,999/25,000-49,999	[*]	[*]				
	4	200 - 299/50,000-74,999/50,000-74,999			+			
	5	300 - 399/75,000-99,999/75,000-99,999			+		+	+
	6	400 - 499/100,000-499,999/100,000-499,999			**	**	**	**
	7	500 - 999/500,000-999,999/500,000-999,999			+			
	8	1,000 - 1,499/1 M-4.9M/1M-4.9M			[**]	[*]	[**]	[*]
	9	1,500 - 1,999/5M-9.9 M/5M-9.9M						
	10	2,000 & above/10M & above/10M & above						
Q7)	1	Investment incentives including tax incentives	[**]	[**]	[**]	[**]	[**]	[**]
	2	Liberal trade policy						
	3	Customs procedures						
	4	Local content requirements, rule of origin			[+]			
	5	Physical infrastructure (roads, highways, ports, airports, etc.)			[**]		[+]	
	6	Infrastructure (telecommunications, IT)						
	7	Infrastructure (electricity, water supply, other utilities)	*		+		+	
	8	Government institutional infrastructure	[**]	[**]	[**]	[**]	[**]	[**]
	9	Financial system					*	+
	10	Legal system						
	11	Protection of intellectual property rights		[*]				[*]
	12	Size of local markets	[**]		[**]		[**]	
	13	Access to export markets						
	14	Proximity to suppliers/subcontractors						
	15	Request by large/related company						
	16	Availability of low-cost labor						
	17	Availability of skilled labor and professionals	*	**	**	**	**	**
	18	Other companies from the same country are located here (synergy)						
	19	Access to cutting-edge technology and information	[*]	[*]	[**]	[**]	[*]	[*]
	20	Living conditions						
Q6)	1	Retail/ Wholesale trade	**	**	**	**	**	**
	2	Production (raw-material processing)	[*]	[+]	[**]	[**]	[**]	[**]
	3	Production (components and parts)					*	
	4	Production (final products)	[**]	[**]	[**]	[**]	[**]	[**]
	5	Purchasing/ Procurement/ Logistics						
	6	R&D/ Consulting	**	**	**	**	**	**
	7	Human resources development	[+]	[*]	[**]	[+]	[*]	[**]
Nob			102	106	102	107	102	107
Log likelihood			-80.656	-92.56	-68.979	-86.948	-69.048	-86.948
Pseudo R2			0.269	0.195	0.375	0.251	0.374	0.251

3.2.2. Estimation of Total Assets and Paid-up Capital Model

Let us examine the factors of agglomeration by taking the amount of total assets and capital as representing the firm size. Since these two models have the almost same results, we present them together. The results are summarized according to four categories of factors, as follows:

(a) Firm size

Firm size 8, which represents US$1-4.9 million as the amount of assets and capital, had only a negative sign with a 5 percent significance level. In contrast, firms of size 6, with $100-499 thousand, were positive with a 5 percent significance level. It can be said that larger (smaller) firms tend to have negative (positive) signs, and this implies that large (small) firms come first (late). This result for Indonesia was consistent with that obtained by the Flowchart Approach.

(b) Attracting factors

The results in Table 24 indicated that "Investment incentives including tax incentives," "Government institutional infrastructure," and "Size of local markets," had negative signs and were at the 5 percent significance level. "Access to cutting-edge technology and information" is also negative and is at the 10 percent significance level. These four factors influenced first movers to agglomerate in Indonesia. On the other hand, "Availability of skilled labor and professionals" is positive and at the 5 percent significance level, and "financial systems" is also positive with 10 percent, which influenced latecomers.

(c) Function(s) of offices in Indonesia

"Production (final products)," "Production (raw-material processing)," and "Human resources development" had negative signs with the 5 percent significance level. "Retail/Wholesale trade" and "R&D/Consulting" had positive signs with a 5 percent significance level, which exerted influence on the latecomers. These findings indicate that the major objectives of first movers are the production of final and raw materials while wholesale/retail and R&D are the latecomers' objectives.

The above results for the Full Models of these two were basically the same as those for the employment model. The same comparison is applicable to the results of the Full and Selected Models.

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3.3. Result of Estimation II: Industrial Upgrading and Innovation

Here, we examined the current situation of industrial upgrading and innovation in Indonesia. As a result of agglomeration, technology and know-how have been transferred to local firms from large and advanced firms such as multinational corporations (MNCs). Likewise, the flow of denser information among them and the nurturing of human resources have created endogenous forces of industry upgrading and the innovation process for all firms in the region. In order to examine this industry upgrading or innovation, four categories of upgrading or innovation are defined according to Schumpeter's concepts, namely, (1) introduction of new goods; (2) adoption of a new technology; (3) opening a new market; and (4) acquisition of a new source of raw materials. Question 9 was included and asks "*What upgrades has your company carried out in the last 3 years, and what upgrades do you intend to achieve in the next 3 years?*" Respondents are asked to reply either "yes" or "no." We estimated these four models by taking the replies of "yes" or "no" to Q9 as dependent variables, while the independent variables consisted of (1) satisfaction with Indonesian economic circumstances such as policy measures and economic conditions, as enquired about in Q8[viii]; (2) function(s) carried out at the time of establishment of the first office, as enquired about in Q6; and (3) year of establishment of offices, as enquired about in Q1. These variables are shown in the summary statistics of Table 23. The results of four estimations were presented in Table 25 in the same way as in Table 24. Let us now discuss factors promoting upgrading or innovation in each model.

3.4. Estimation of New Goods Model

Let us first examine the New Goods Model in the Full Model. In the same way as in Table 24, only significant variables are indicated, with stars indicating significance levels, and variables having a negative (positive) sign written with (without) brackets. It should be noted that factors with positive (negative) signs indicate that they encourage (discourage) innovation.[ix] Table 3 shows that "Liberal trade policy" (10 percent significance level)," "Legal system (5 percent)," "Proximity to suppliers/subcontractors (10 percent)," "Investment incentives including tax incentives (20 percent)," and "Other companies from same countries are located here (synergy) (20 percent)," are positive,

and accordingly encourage industry upgrading and innovation. On the other hand, "Physical infrastructure (roads, highways, ports, airports, etc.)" (5 percent)," "Financial system (5 percent)," and "Access to export markets (5 percent)" are negative signs, which discourage upgrading and innovation; that is, they are obstacles to upgrading and innovation. Regarding functions at the time they opened, no significant variables are found. Further, functions of offices and the year of establishment do not influence upgrading and the innovation of new goods.

The Selected Model provides closely similar results, and raises the significance level of "Proximity to suppliers/subcontractors," but lowers that of "Finance system."

3.5. Estimation of New Technology Model

Here, we examine the model of the adoption of a new technology. Only a few factors are identified, namely "Legal system (5 percent significance level)" and "Request by large/related company (10 percent)." These variables are positive and thus encourage innovations. On the other hand, "Availability of skilled labor (10 percent)" has a negative sign, and thus discourages innovation.

Regarding the functions of the offices at the time they were established, "Production (raw-material processing) (5 percent)" and "Purchasing/Procurement/Logistics" encourage innovation in Indonesia.

The Selected Model shows closely similar results, but it raises the significance level of "Production (components and part)" and "R&D/consulting" while reducing that of "Availability of skilled labor and professionals."

In sum, innovation in Indonesia was promoted by the legal system and by clustering, but is discouraged by the shortage of skilled labor.

3.6. Estimation of New Market Model

Here, we examine the model of the opening of a new market. According to Table 25, factors encouraging upgrading or innovation in Indonesia are "Government institutional infrastructure (5 percent significance level)" and "Legal system (5 percent)," whereas those which discourage upgrading are "Customs procedures (5 percent)" and "Access to export market (5 percent)." As for the functions of offices, "Purchasing/Procurement/Logistics (5 percent)" and "R&D consulting (20 percent)"

have less relationship with upgrading and innovation. The negative result regarding "Purchasing/Procurement/Logistics" is clearly related to obstacles to upgrading such as customs procedures and access to export markets.

The Selected Model identifies new two factors, namely "Availability of skilled labor and professionals (10 percent)" and "Access to cutting-edge technology and information (10 percent). The former encourages the opening of new markets while the latter is an obstacle to it. This model also finds that "When did your company establish its first office? (5 percent)" has a negative sign, which implies that firms established at the early stage of agglomeration tend to be more positive to the opening of the new market.

In sum, industrial upgrading related to the opening of new markets in Indonesia was promoted by the legal system and government institutional infrastructure. However, customs procedures and access to export markets are obstacles to such opening of new markets.

Table 25: Results of Estimations: Upgrading and Innovation

			New goods		New method		New market		New input	
			Full model	Selected model	Full model	Selected model	Full model	Selected model	Full model	Selected model
Q8)	1	Investment incentives including tax incentives	+						**	**
	2	Liberal trade policy	*	*						
	3	Customs procedures					[**]	[**]		
	4	Local content requirements, rule of origin								
	5	Physical infrastructure (roads, highways, ports, airports, etc.)	[**]	[**]					**	**
	6	Infrastructure(telecommunications, IT)							[+]	
	7	Infrastructure (electricity, water supply, other utilities)							[+]	[**]
	8	Government institutional infrastructure					**	**	[*]	[*]
	9	Financial system	[**]	[*]						
	10	Legal system	**	**	**	**	*	*	[+]	[**]
	11	Protection of intellectual property rights								
	12	Size of local markets								
	13	Access to export markets	[**]	[**]			[**]	[**]		
	14	Proximity to suppliers/ subcontractors	*	**						
	15	Request by large/ related company			*	*			*	**
	16	Availability of low-cost labor			+					
	17	Availability of skilled labor and professionals			[*]			*	[+]	
	18	Other companies from the same country are located here (synergy)	[+]							
	19	Access to cutting-edge technology and information						[*]	[**]	[**]
	20	Living conditions								
Q6)	1	Retail/ Wholesale trade								
	2	Production (raw-material processing)			**	**			**	**
	3	Production (components and parts)				**				**
	4	Production (final products)							+	**
	5	Purchasing/ Procurement/ Logistics			*	*	[**]	[**]	**	**
	6	R&D/ Consulting			+	**	[+]		*	**
	7	Human resources development					+		*	+
Q1)		When did your company establish its first office?						[**]		
		_cons				[**]		**		
Obs			87	94	92	103	92	100	92	100
Log likelihood			-29.367	-44.711	-32.894	-50.736	-34.975	-48.445	-27.024	-32.342
Pseudo R2			0.455	0.25	0.484	0.289	0.412	0.244	0.55	0.505

3.7. Estimation of New Input Model

In this section, we examine the model of the acquisition of a new source of supply of raw material. Table 25 identifies the following factors with positive signs: "Investment incentives including tax incentives (5 percent)"; "Physical infrastructure (roads, highways, ports, airports, etc.) (5 percent)"; and "Request by large/related company (10 percent)." Thus, these promoted upgrading and innovation related to new input in Indonesia. On the other hand, "Infrastructure (electricity, water supply, other utilities) (5 percent)," "Government institutional infrastructure (10 percent), "Legal system (20 percent)," and "Access to cutting-edge technology and information (5 percent)" are obstacles to industrial upgrading. In this upgrading category, Indonesia has more obstacles requiring improvement. Finally, the acquisition of input innovation is more actively conducted by firms such as those in "Production (raw-material processing) (5 percent)," "Purchasing/Procurement/Logistics (10 percent)," and "Human resources development (5 percent)."

In this category of upgrading, the Selected Model identifies more factors to be significant, namely, "Infrastructure (electricity, water supplies and other utilities) (5 percent)" and "Legal system (5 percent)." It also raises the significance level of "Request by large/related company" from 10 percent to 5 percent. This model also finds functions such as "Production (components and parts) (5 percent)" and "(final products) (5 percent)" which are related to upgrading of new input. It raises the significance level of "R&D/consulting" but lowers that of "Human resources development."

3.8. Summary of the Econometric Results

3.8.1. Agglomeration

With regard to firm size, no clear results are found, but larger firms in terms of assets and capital tend to be first movers and smaller ones to be latecomers, which is consistent with the "Flowchart Approach." For first movers, factors attracting firms to establish offices in Indonesia are those such as investment incentives, government institutional infrastructures, and access to the cutting-edge technology and information. The size of the local market, which is thought to be important, is found significant only in the Full model. As for latecomers, the availability of skilled labor is identified as an attracting factor by all models. As for the functions of operation, first movers are

involved in production related to raw-material processing and final products, and human resources development, while latecomers are firms involved in wholesale/retail and R&D/consulting.

The agglomeration process in Indonesia can be described in such a way that since Indonesia possesses rich natural resources such as petroleum, metals, and timber, larger firms related to raw materials as well as to final products were established at the early stage, attracted by tax incentives for investment, institutional infrastructures, new technology and information. The size of the local market and large population are other factors among first movers. Smaller firms related to the distribution sector, such as retail/wholesale, as well as purchasing/procurement/logistics are attracted by skilled labor.

3.8.2. Upgrading and Innovation

Factors related to industrial upgrading are different among the different categories of upgrading; moreover, some are encouraging in one category but discouraging in another, and thus it is rather difficult to derive a unified conclusion. Nevertheless, no conflict with upgrading categories is seen regarding encouraging factors such as investment incentives, liberal trade policy, and request by related companies. The legal system is a positive factor, except with regard to upgrading related to new supply. It can be said that these contribute to upgrading. The identified obstacles, on the other hand, are access to export markets, customs procedures, access to cutting-edge technology and information, and infrastructure related to utilities and telecommunications. Policy measures should be promulgated with a focus on overcoming these problems.

4. SUMMARY AND POLICY IMPLICATIONS.

Industrial agglomeration in Indonesia is mainly located in the Java island and led by natural market forces. Infrastructures is one important factor in the agglomeration process. In addition, the role of the small and medium enterprises is important to accelerate industrial development. However, the dynamics of agglomeration in the eastern part of Indonesia is different where the availability of good infrastructure is not

enough to attract agglomeration to that region.

Therefore, the government should carefully formulate a policy to improve industrial development in Indonesia, taking into account the difference between:

1. the western and eastern part of Indonesia
2. level of development of SME clusters existing in a particular area
3. level of integration between Indonesia's industry and the international market

Although the government has prepared the National Strategy for Industrial Development, the strategy is still far from perfect, and many issues and concerns are still not discussed in the strategy.

Therefore, this study recommends some policies that should be taken by the government to improve industrial agglomeration in Indonesia as follows:

1. For the western part of Indonesia, including Sumatera, Java, and Bali region: improving the infrastructure is necessary to attract agglomeration to a particular area. Therefore, the government should take measures to improve public infrastructure, such as road, electricity, water supply, and ports.

2. However, for the eastern part of Indonesia, the policy to improve both supply and demand side will have a bigger impact than improving infrastructure. Therefore, improving the labor condition, domestic distribution, and local government regulations is a priority.

3. To develop the SME cluster, government intervention for SMEs should be carefully formulated. Government should carefully select the SME cluster to be assisted with some criteria, such as their potential for increasing their output markets domestically or overseas and a secure supply of raw materials and other necessary inputs.

In order to support the ASEAN Economic Community which shall establish the ASEAN as a single market and production base, the government of each ASEAN member-country should have same paradigm on the issues. Diversity of character of the ASEAN industrial clusters should be used as an opportunity by each ASEAN country to find its niche in the global production network.

The ASEAN has adopted a Common Effective Preferential Tariff (CEPT) since

1992, which scheduled the elimination of all tariffs among ASEAN countries by 2010. However a study conducted by Rosengarden *et al.* (2006) showed that the implementation of CEPT is not effective since the CEPT tariff is not beneficial for importers. The cost of obtaining the CEPT is higher than the Marginal of Preference (difference between the preferential tariff and MFN tariff).

Some policy recommendations for the development of industrial clusters in the ASEAN countries to achieve one single market and production base are:

1. The elimination of tariff barriers among ASEAN countries should be conducted sooner rather than later to stimulate freer flows of goods especially input goods among the ASEAN countries. The freer flow of goods will then stimulate the formation of industrial agglomeration in several countries.

2. Freer flows among the ASEAN countries are not only for goods but also for services and investment. Therefore, the ASEAN countries should expedite trade liberalization in service sectors and simplify their investment procedures to attract more investment to each country.

3. To increase the involvement of small and medium enterprises in industrial agglomeration – not only in one country but across countries – capacity building for small and medium enterprises is key. Exchange of skilled labor between the ASEAN countries is one way to improve capacity building in addition to the dispatch of experts from anchor firms' headquarters in developed countries such as Japan, U.S., and EU to the ASEAN countries.

4. As suggested in the Flowchart Approach, the industrial cluster policy should be in line with the value chain management. Therefore, each ASEAN country should involve private sector as the decision maker of the value chain management in formulating the industrial cluster policy.

5. Networking among private sectors in the ASEAN countries is also important as a medium of information and knowledge exchanges among them which, in turn, will improve the quality of industrial cluster in each country.

The quantitative analysis based on the results from the mail survey provides some indication on the existence of the industrial agglomeration phenomenon. At the same time, it also provides some support for the flowchart approach of industrial

agglomeration. These inferences, however, need to be confirmed by more results from the econometric exercise.

There are a couple of points worth highlighting from the quantitative results, and this is for the purpose of giving policy recommendations. Among others, few of the most important points can be listed as follows:

- Improvement in the infrastructure and legal system, including the protection of intellectual rights, is really necessary for furthering industrial agglomeration. Improvement in infrastructure, particularly physical infrastructure and utilities, is important to boost firm expansion in export markets. Earlier, the results show that based on the respondents' responses, export demand was not an important determinant in Indonesia.

- Infrastructure improvement seems to be the most important policy action that Indonesia needs to undertake, and this is to bring back the high-growth era in the 1990s which was mainly contributed by exports of manufacturing products. The main justification for the improvement is that both the descriptive and econometric analysis indicated that access to export facilities/infrastructure is one of the reasons why the size of export markets did not promote industrial agglomeration.

- Improving investment climate is also another important policy action that needs to be immediately undertaken by the Indonesian government. The econometric analysis clearly indicated this, where a group of variables that can be categorized as investment incentives proved to affect the establishment of first-mover companies, which promote the development of industrial clustering or activities in a region.

- The government might need to provide some fiscal incentives to promote investment. This policy suggestion, however, needs to be implemented with great caution. This is because giving incentives without careful consideration could create misallocation of resources and, as a result, it could result in net loss – instead of net benefit – in terms of industrial agglomeration for promoting economic development. In other words, giving incentives for investment has to be 'right' in the sense that it can promote industrial

agglomeration, and hence the overall economic development, with very minimal loss for the economy.

NOTES

i. It is part of a big study on the subject for the country in East Asian Economies, commissioned by ERIA and sponsored by IDE-JETRO, Japan.

ii. See, for example, Hill (1996) for an exposition of the major policy episode in Indonesia before the crisis, and Thee (2006) for the economic policy after the crisis.

iii. It is important to note that unlike what usually happens in a country in deep recession, the number of firms in Indonesia does not seem to have changed much. See Narjoko (2006) for this.

iv. It is worth mentioning here that Indonesian export performance of auto parts has actually been quite well. As documented in SENADA (2007, p.6), Indonesian auto parts exports to Asian countries (e.g., Japan, Malaysia, and Thailand) grew more than 30 percent over the 2004 to 2005 period.

v. In order to identify the years of transformation, the stepwise Chou test is usually utilized.

vi. The Flowchart Approach captures the nature of the East Asian model of agglomeration, which asserts that large MNCs are established first in special economic zones and then smaller firms follow to be near them. This process eventually leads to industrial clusters.

vii. The variable used for estimation is usually selected by making use of the Akaike Information Criterion [AIC] in the OLS estimation. Here, however, the ordered Logit model is used and the above method cannot be utilized. In this paper, we selected variables one by one according to significance level.

viii. Q8 asks respondents' degree of satisfaction with each question, accordingly it does not directly relate to factors of upgrading and innovation. It can be interpreted to mean however, that since the dependent variable is whether they experienced upgrading or not, firms with affirmative replies to factors are considered to be promoting, or supportive of, upgrading and innovation.

ix. In this estimation, the Ordered Logit Model is also used, and normalization results in replies of "yes" being taken as standard.

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APPENDIX

Here detailed results of estimation are presented. Table 26 and 27 are those of agglomeration, and Table 28 and 29 are upgrading and innovation.

Table A1: Estimation of Agglomeration (Indonesia): Full Model

		Full-time Employees		Total Assets		Paid-UP Capital	
		Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Q3)	2 50 - 99persons/10,000-24,999 (US$)/10,000-24,999 (US$)	-1.158	-1.48 +	-0.294	-0.34	1.22	1.29 +
	3 100 - 199/25,000-49,999/25,000-49,999	-2.285	-1.75 *	-0.016	-0.02	-1.19	-0.94
	4 200 - 299/50,000-74,999/50,000-74,999	0.328	0.25	1.582	1.42 +	0.739	0.63
	5 300 - 399/75,000-99,999/75,000-99,999			2.384	1.49 +	1.792	1.34 +
	6 400 - 499/100,000-499,999/100,000-499,999			3.112	2.91 **	4.254	2.61 **
	7 500 - 999/500,000-999,999/500,000-999,999			-2.288	-1.49 +	-0.569	-0.32
	8 1,000 - 1,499/1 million-4.9 million/1 million-4.9 million			-3.613	-2.69 **	-4.045	-2.76 **
	9 1,500 - 1,999/5 million-9.9 million/5 million-9.9 million			-1.361	-1.06	-1.663	-1.22
	10 2,000 and above/10million and above/10million and above						
Q7)	1) Investment incentives including tax incentives	-0.658	-2.45 **	-0.821	-2.37 **	-1.048	-3.21 **
	2) Liberal trade policy	0.088	0.34	-0.045	-0.17	-0.004	-0.01
	3) Customs procedures	-0.159	-0.62	-0.097	-0.32	-0.301	-1.00
	4) Local content requirements, rule of origin	-0.17	-0.68	-0.393	-1.31 +	-0.282	-1.12
	5) Physical infrastructure (roads, highways, ports, airports, etc.)	-0.189	-0.6	-0.812	-2 **	-0.533	-1.40 +
	6) Infrastructure (telecommunications, IT)	-0.219	-0.5	0.056	0.11	0.043	0.08
	7) Infrastructure (electricity, water supply, other utilities)	0.833	1.88 *	0.755	1.55 +	0.71	1.54 +
	8) Government institutional infrastructure	-0.691	-2.27 **	-1.338	-3.7 **	-0.894	-2.50 **
	9) Financial system	0.276	0.68	0.087	0.18	0.881	1.83 *
	10) Legal system	0.028	0.08	0.512	1.19	0.024	0.05
	11) Protection of intellectual property rights	-0.345	-1.04	-0.03	-0.08	-0.258	-0.69
	12) Size of local markets	-0.54	-2.07 **	-0.786	-2.54 **	-0.862	-2.79 **
	13) Access to export markets	-0.224	-0.8	-0.322	-1.13	-0.189	-0.67
	14) Proximity to suppliers/subcontractors	0.171	0.58	0.231	0.75	0.373	1.16
	15) Request by large/related company	0.127	0.47	0.068	0.25	0.079	0.29
	16) Availability of low-cost labor	0.234	0.88	-0.018	-0.06	0.157	0.54
	17) Availability of skilled labor and professionals	0.799	1.96 *	1.399	2.68 **	0.976	2.04 **
	18) Other companies from the same country are located here (synergy)	-0.071	-0.3	-0.058	-0.21	0.068	0.26
	19) Access to cutting-edge technology and information	-0.587	-1.67 *	-0.814	-1.99 **	-0.676	-1.72 *
	20) Living conditions	0.124	0.37	0.166	0.41	-0.098	-0.26
Q6)	1) Retail/ Wholesale trade	1.396	2.1 **	1.701	2.27 **	1.462	2.03 **
	2) Production (raw-material processing)	-1.245	-1.8 *	-1.995	-2.45 **	-1.925	-2.36 **
	3) Production (components and parts)	0.358	0.32	0.554	0.5	1.969	1.76 *
	4) Production (final products)	-1.663	-2.64 **	-2.022	-2.87 **	-1.759	-2.36 **
	5) Purchasing/ Procurement/ Logistics	-0.01	-0.01	0.489	0.65	0.33	0.40
	6) R&D/ Consulting	1.751	2.15 **	3.682	3.34 **	2.781	2.99 **
	7) Human resources development	-1.677	-1.56 +	-2.763	-1.97 **	-2.238	-1.74 *
	/cut1	-4.877		-8.405		-6.814	
	/cut2	-2.521		-5.613		-3.905	
	Number of observations	102		102		102	
	Log likelihood	-80.656		-68.979		-69.048	
	Pseudo R2	0.269		0.375		0.374	

Note 1: **, * and + indicates that coefficient is at the 5, 10 and 20% significant level, respectively.

Table A2: Estimation of Agglomeration (Indonesia): Selected Model

	Full-time Employees		Total Assets		Paid-UP Capital	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Q3)						
2 50 - 99persons/10,000-24,999 (US$)/10,000-24,999 (US$)	-1.441	-1.65 *			1.166	1.8 *
3 100 - 199/25,000-49,999/25,000-49,999						
4 200 - 299/50,000-74,999/50,000-74,999						
5 300 - 399/75,000-99,999/75,000-99,999						
6 400 - 499/100,000-499,999/100,000-499,999			2.656	3.6 **	1.48	1.39 +
7 500 - 999/500,000-999,999/500,000-999,999					3.814	3.35 **
8 1,000 - 1,499/1 million-4.9 million/1 million-4.9 million			-1.517	-1.73 *	-1.589922	-1.68 *
9 1,500 - 1,999/5 million-9.9 million/5 million-9.9 million						
10 2,000 and above/10million and above/10million and above						
Q7)						
1) Investment incentives including tax incentives	-0.514	-2.4 **	-0.475	-2.23 **	-0.75	-3.18 **
2) Liberal trade policy						
3) Customs procedures						
4) Local content requirements, rule of origin						
5) Physical infrastructure (roads, highways, ports, airports, etc.)						
6) Infrastructure (telecommunications, IT)						
7) Infrastructure (electricity, water supply, other utilities)						
8) Government institutional infrastructure	-0.499	-2.05 **	-0.779	-3.16 **	-0.612	-2.37 **
9) Financial system					0.496	1.39 +
10) Legal system						
11) Protection of intellectual property rights	-0.396	-1.67 *			-0.427	-1.77 *
12) Size of local markets						
13) Access to export markets						
14) Proximity to suppliers/subcontractors						
15) Request by large/related company						
16) Availability of low-cost labor						
17) Availability of skilled labor and professionals	0.901	2.73 **	0.891	2.78 **	0.714	2.25 **
18) Other companies from the same country are located here (synergy)						
19) Access to cutting-edge technology and information	-0.445	-1.7 *	-0.563	-2.16 **	-0.531	-1.9 *
20) Living conditions						
Q6)						
1) Retail/ Wholesale trade	1.16	2.09 **	1.366	2.43 **	1.271	2.24 **
2) Production (raw-material processing)	-0.882	-1.59 +	-1.233	-2.16 **	-1.338	-2.23 **
3) Production (components and parts)						
4) Production (final products)	-1.041	-2.13 **	-1.414	-2.77 **	-1.125	-2.17 **
5) Purchasing/ Procurement/ Logistics						
6) R&D/ Consulting	1.821	2.74 **	2.063	2.97 **	2.437	3.28 **
7) Human resources development	-1.527	-1.9 *	-1.136	-1.4 +	-1.918	-2.26 **
/cut1	-4.184		-4.062		-4.538	
/cut2	-2.158		-1.764		-2.145	
Number of observations	106		107		107	
Log likelihood	-92.56		-86.948		-85.119	
Pseudo R2	0.195		0.251		0.267	

Note: **, * and + indicates that coefficient is at the 5, 10 and 20% significant level, respectively.

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Table A3: Results of Industrial Upgrading and Innovation (Indonesia): Full Model

		New goods		New method		New market		New input	
		Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Q8)	1) Investment incentives including tax incentives	1.074	1.45 +	-0.043	-0.08	-0.12	-0.25	2.398	2.27 **
	2) Liberal trade policy	1.146	1.68 *	0.101	0.17	0.343	0.67	-0.383	-0.48
	3) Customs procedures	-0.552	-1.02	0.38	0.66	-1.196	-2.16 **	0.085	0.14
	4) Local content requirements, rule of origin	0.722	1.11	0.189	0.29	0.44	0.75	0.45	0.44
	5) Physical infrastructure (roads, highways, ports, airports, etc.)	-2.394	-2.87 **	0.588	1.08	-0.621	-1.06	2.471	2.47 **
	6) Infrastructure (telecommunications, IT)	0.246	0.41	0.341	0.61	0.258	0.51	-1.102	-1.49 +
	7) Infrastructure (electricity, water supply, other utilities)	0.722	1.02	-0.222	-0.36	-0.482	-0.9	-0.996	-1.6 +
	8) Government institutional infrastructure	-0.683	-1.07	-0.624	-1.23	1.408	2.73 **	-1.54	-1.96 *
	9) Financial system	-1.657	-2.2 **	0.767	1.2	-0.393	-0.84	-0.231	-0.33
	10) Legal system	1.678	2.59 **	1.157	1.99 **	0.854	1.96 *	-1.039	-1.55 +
	11) Protection of intellectual property rights	0.294	0.54	-0.562	-1.12	0.327	0.79	-0.57	-0.82
	12) Size of local markets	0.289	0.55	0.111	0.2	0.253	0.5	0.118	0.13
	13) Access to export markets	-1.644	-1.99 **	-0.409	-0.53	-1.757	-2.34 **	0.836	0.79
	14) Proximity to suppliers/subcontractors	1.336	1.89 *	-0.237	-0.32	0.184	0.29	-0.742	-0.81
	15) Request by large/related company	0.565	0.92	1.138	1.77 *	0.39	0.54	2.514	1.89 *
	16) Availability of low-cost labor	0.189	0.38	0.75	1.5 +	0.193	0.45	-0.381	-0.57
	17) Availability of skilled labor and professionals	0.129	0.23	-0.928	-1.79 *	0.526	1.2	-0.829	-1.37 +
	18) Other companies from the same country are located here (synergy)	-1.125	-1.41 +	-0.184	-0.33	0.337	0.59	-0.843	-0.76
	19) Access to cutting-edge technology and information	0.057	0.08	0.48	0.85	-0.735	-1.2	-2.053	-2.29 **
	20) Living conditions	-0.036	-0.05	-0.518	-0.92	-0.193	-0.35	0.272	0.38
Q6)	1 Retail/ Wholesale trade	0.618	0.52	-1.589	-1.27	-0.5	-0.5	0.594	0.38
	2 Production (raw-material processing)	1.683	1.02	6.145	3.01 **	-0.434	-0.38	7.548	3.03 **
	3 Production (components and parts)			2.781	1.49	-1.325	-0.86	5.272	1.94
	4 Production (final products)	1.067	1.05	-0.754	-0.83	0.554	0.59	2.149	1.51 +
	5 Purchasing/ Procurement/ Logistics	-0.751	-0.69	2.238	1.85 *	-3.164	-2.61 **	3.917	2.32 **
	6 R&D/ Consulting	-1.676	-0.88	2.297	1.3 +	-2.232	-1.42 +	3.601	1.68 *
	7 Human resources development	1.88	1.05	0.656	0.36	2.769	1.34 +	4.11	1.92 *
Q1)	When did your company establish its first office?	-0.006	-0.25	-0.036	-1.25	-0.014	-0.53	-0.021	-0.84
	constant	11.007	0.22	62.135	1.08	28.616	0.56	41.524	0.84
	Number of observations	87		92		92		92	
	Log likelihood	-29.367		-32.894		-34.975		-27.024	
	Pseudo R2	0.455		0.484		0.412		0.55	

Note: **, * and + indicates that coefficient is at the 5, 10 and 20% significant level, respectively.

Table A4: Results of Industrial Upgrading and Innovation (Indonesia): Selected Model

	New goods		New method		New market		New input	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Q8)								
1) Investment incentives including tax incentives	0.661	1.75 *					1.427	2.52 **
2) Liberal trade policy								
3) Customs procedures					-0.647	-1.99 **		
4) Local content requirements, rule of origin								
5) Physical infrastructure (roads, highways, ports, airports, etc.)	-0.977	-3.4 **					1.345	2.58 **
6) Infrastructure (telecommunications, IT)								
7) Infrastructure (electricity, water supply, other utilities)							-0.99	-2.19 **
8) Government institutional infrastructure	-0.598	-1.79 *			0.798	2.53 **	-0.848	-1.79 *
9) Financial system								
10) Legal system	0.89	2.9 **	0.592	2.45 **	0.609	1.95 *	-1.023	-2.03 **
11) Protection of intellectual property rights								
12) Size of local markets								
13) Access to export markets	-1.2	-2.82 **			-0.738	-2.03 **		
14) Proximity to suppliers/subcontractors	0.933	2.44 **						
15) Request by large/related company			0.511	1.65 *			1.129	2.05 **
16) Availability of low-cost labor								
17) Availability of skilled labor and professionals					0.6	1.93 *		
18) Other companies from the same country are located here								
19) Access to cutting-edge technology and information					-0.65	-1.91 *	-1.804	-3.29 **
20) Living conditions								
Q6)								
1 Retail/ Wholesale trade								
2 Production (raw-material processing)			3.273	3.84 **			5.512	4.06 **
3 Production (components and parts)			2.364	1.99 **			4.829	3.02 **
4 Production (final products)							2.181	2.26 **
5 Purchasing/ Procurement/ Logistics			1.312	1.81 *	-1.398	-2.08 **	2.824	2.65 **
6 R&D/ Consulting			2.151	2.66 **			3.113	2.33 **
7 Human resources development							2.397	1.61 +
Q1) When did your company establish its first office?					-0.041	-2.13 **		
constant	1.828	1.04	-4.398	-3.39 **	83.45	2.15 **	-1.663	-0.73
Number of observations	94		103		100		100	
Log likelihood	-44.711		-50.736		-48.445		-32.342	
Pseudo R2	0.25		0.289		0.244		0.505	

Note: **, * and + indicates that coefficient is at the 5, 10 and 20% significant level, respectively.