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REGIONAL SPECIALIZATION AND INDUSTRIAL CONCENTRATION IN THAILAND, 1996-2005

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ABSTRACT

This paper provides a descriptive analysis of the changes in the industrial and spatial concentration that occurred in Thailand from 1996 to 2005. Based on the data from the Department of Industrial Work of the Ministry of Industry and using the Hirschman-Herfindahl index of concentration, the geographical concentration of industries in the study regions was measured. The Hirschman-Herfindahl index has the useful property of being decomposable into sources of changes in the concentration. Moreover, location quotient was also used to measure the regional specialization of the manufacturing industries in Thailand. Results of the analysis indicated that from 1996 to 2005, the decrease in the spatial concentration of manufacturing as well as in the regional specialization in manufacturing in Thailand remained stable to a lesser extent. The results have also indicated that most factories continue to be concentrated in Bangkok and its neighboring areas. It can therefore be best argued that in the case of Thailand, the effect of its trade liberalization policy has been more powerful than its industrial decentralization policy.

Key words: trade liberalization, industrial location policy, industrial concentration, regional specialization, regional development

INTRODUCTION

The industrial agglomeration and concentration phenomena had stimulated renewed interests among economists and economic geographers over the last decade. Such phenomena could be related to the regional integration processes that appeared around the world in the second half of the twentieth century, particularly the economic integration in Europe and the establishment of the North American Free Trade Agreement (NAFTA) [*Paluzie et al.*, 2001; *Sjöberg* and *Siöholm* 2004]. Many theories and models with particular emphasis on international trade, and more recently, the 'new economic geography' of Paul Krugman, were used to explain

the evidences affecting regional specialization, industrial agglomeration and concentration [*Krugman*, 1979; 1980; 1981; 1991; *Krugman* and *Venables*, 1990].

Results of many researches confirmed that the impacts of trade liberalization policies could be the increasing geographical concentration of industries, a phenolmenon which has been examined in the U.S.A and the European countries [*Kim*, 1995; *Brülhart* and *Torstensson*, 1996; *Amiti*, 1999; *Haaland et al.*, 1999; *Paluzie et al.*, 2001]. Some related research works also found out that liberalization of trade could lead to either decrease or increase in spatial concentration, although such circumstance still needs further empirical clarification. Unfortunately however, the necessary and relevant empirical literatures are rather sparse. One of the most relevant and interesting studies was done by *Hanson* [1997; 1998a], which suggested that the formation of the NAFTA has led to an industrial decongestion in Mexico because new firms found it more profitable to locate their industries along the border of the United States, rather than in the old industrial belt centered in Mexico City.

In a related work of *Hanson* [1998b] interpreted that such industrial relocation had conformed to the prediction that trade liberalization could induce the industries to disperse. In the case of Mexico, one factor that must have influenced the shift was the existence of linkages and networking and the impact of transport costs, with the northern part of Mexico benefiting from its short distance from the U.S. markets.

However, it should be noted that the available theoretical frameworks on industrial location and regional growth are not always conclusive, nor are the individual country reports from the developing countries. Additional empirical research works are still needed in order to better understand the patterns and changes of regional specialization and geographical concentration of industrial activities in the developing countries, especially in Asia or even in Africa. Thailand is one of the most interesting countries where trade liberalization and manufacturing restructuring were enforced when the structural adjustment policies were implemented during the financial crisis in 1997. This paper therefore aims to identify and explain the patterns of regional specialization and geographic concentration of manufacturing activities in Thailand considering the country's trade liberalization policy.

Since the World War II, the Government of Thailand has placed great importance in industrial development [*Panpiemras*, 1988; *IFCT*, 1991; *Pansuwan*, 2002]. The Ministry of Industry was established in 1942 to encourage and monitor the development in this sector, with other government agencies participating directly or indirectly in the formulation of industrial policies. These include, for example, the formulation of development strategies by the *National Economic and*

Social Development Board (*NESDB*), tax policies by the *Ministry of Finance* (*MOF*) and investment promotion by the *Board of Investment* (*BOI*) [*Sibunruang*, 1986; *Loha-unchit*, 1990; *Pansuwan*, 2002; 2004].

Furthermore, it should be considered that the manufacturing sector of Thailand had passed through various stages of development. The promotion of the Industrial Investment Act of 1960 was the starting point of the import-substitution industrialization, with tariff protection and assistance being provided to the manufacturing sector [*IFCT*, 1991; *Akrasanee*, 1991; *Jansen*, 2001]. The Industrial promotion policy also favored large enterprises, found to be generally more capital intensive and import dependent. As a result, the early industrialization policies were said to have caused the gaping income inequalities to increase. Since import-substituting industries relied heavily on imported materials and capital equipment, the industries continue to locate their plants near the source of supply [*IFCT*, 1991; *Akrasanee*, 1991; *World Bank*, 1993].

Various factors have also contributed to the rapid growth of Thailand's economy, such as low wages, policy reforms that opened the economy to trade, and careful economic management that resulted in low inflation and stable exchange rate [*IFCT*, 1991; *Cuyvers*, 1997; *Glassman*, 2001; 2007; *BOI*, 2006; *Yeung*, 2007]. Foreign and domestic investments have also given rise to rapid growth of the manufacturing sector, especially in the labor-intensive and export-oriented industries, such as those producing clothing, footwear, electronics, and consumer appliances [*IFCT*, 1991; *BOI*, 2006]. These industries have also benefited from a tremendous expansion in the world trade during the 1980s. As the industry expanded, laborers in agriculture started to move to the industrial production sector, and such mobilization led to the sluggish growth of the agriculture sector [*Biggs*, 1990; *Tambunlertchai*, 1990].

Despite the success of the country's industrialization over the years, little emphasis has been placed on the dispersion of industries to the rural areas [*Panpiemras*, 1988; *MOI*, 2006]. Since the industrialization policy and strategy stressed on the importance of import substitution and export oriented industries, industrialization took place mostly in and around the Bangkok Metropolis Region (BMR) as it is the most economically and efficient location for the import substitution and export oriented industries. The concentration of factories in Bangkok then led to mass migration of people into the capital ending up with social ills such as the proliferation of slum dwellings, environmental pollution, traffic congestion, and income disparities [*Hussey*, 1993].

Industrial development in Thailand has resulted in economic imbalance and inequality in certain ways, because of the supremacy of Bangkok, which is also one of the most prime cities in the world and the 22nd largest city in terms of population. As the capital city of Thailand, Bangkok Metropolis has a population of

about 6.4 million, which is about 10% of the country's total population of 64.6 million in 2006. However, with its recent expansion into the Bangkok Metropolitan Region which includes the neighboring provinces of Nakhon Pathom, Nonthaburi, Pathum Thanim Samut Prakan, and Samut Songkram, the population has reached to about 8.4 million.

The Bangkok Metropolitan Region has a land area of about 8327 km^2 of which about 20% (1569 km^2) is the area of the Bangkok Metropolis. Bangkok is the country's center of population, government, and economic activity making it Thailand's premier city. In 1994, Bangkok accounted for 57% of Thailand's urban population and more than 76% of the country's total value added manufacturing industries [*Biggs*, 1990]. One rationale therefore, that motivates and influences the Government of Thailand in initiating and developing various industrial policies, is the need to mitigate the consequences of the economic growth and expansion happening in Bangkok as the center of Thailand's economy.

The premier city's predominance has become a major economic concern for two reasons. Firstly, Bangkok as the premier city has increased the regional inequality in Thailand. Secondly, infrastructure bottlenecks in the city have necessitated the expansion of industries along the perimeters of the capital city. Furthermore, the pattern of the regional expansion appears to be influenced by the investment zoning policy of the BOI. Nevertheless, while considering that Industrial decentralization is an important tool for creating regional equality, the Government of Thailand has continued to actively pursue industrial decentralization since 1987, using several initiatives that include the BOI incentives, establishment of *Industrial Estates* (*IE*) including the *Eastern Seaboard Development Program* (*ESDP*), and related financial incentives.

The location incentives in the government policies may have also promoted the de-concentration of industrial activities within the BMR. Moreover, deconcentration of industries away from central Bangkok has also been promoted by constructing and making available effective and efficient infrastructures in other areas outside Bangkok. Thus, the industry sector has generally started to move to areas with heavy government investments in terms of infrastructures [*Kraas*, 1998; *Kittiprapas*, 1999]. Most of the government's investment in infrastructures for the industry has been in the form of industrial estates. However, it has been noted that the method of distributing the infrastructures could in a way influence the decentralization effort. In certain cases, the distribution appeared bias against decentralizing the industrial growth due to various reasons.

Firstly, only larger firms can afford to locate or relocate their industries in industrial estates because land prices are comparatively high. A major factor that could work against the smaller firms and small-scale entrepreneurs especially those

located in the remote or rural areas. Secondly, industrial estates could only be confined to limited areas since the existence of excessive number of estates could put heavy burden on the country's public sector and could lead to a cut-throat competition among the estate owners [*Loha-unchit*, 1990].

The BOI and the *Industrial Estate Authority of Thailand* (*IEAT*) are the primary government agencies shaping the country's industrial location policies. While the IEAT oversees the government sponsored industrial estates, the BOI provides incentives based on the type and location of the firms. In October 1987, the BOI incentive zoning policy was drastically changed with the establishment of three promotional zones, namely: Zone 1 which included Bangkok and Samut Prakarn, Zone 2 included the remaining inner ring provinces (Nakhon Pathom, Nonthaburi, Pathum Thani, and Samut Sakorn), and Zone 3 comprised all the remaining provinces. With this change, firms in Zone 1 received no corporate income tax holiday unless their export or employment targets are met [*Biggs*, 1990]. This new scheme was aimed to change the trend from decentralization to de-concentration. The implicit de-concentration incentive was then intensified in 1989 with the revised coverage of the *Industrial Promotional Zones* (*IPZ*), where Zone 1 was expanded to include Bangkok Metropolis and its vicinities, Zone 2 to include the ten provinces surrounding Zone 1 or the outer ring, while Zone 3 included all the remaining provinces. Nonetheless, the IPZ scheme has basically remained unchanged [*BOI*, 2006].

In 1993, the BOI took a more progressive stance towards industrial de-concentration after updating its Criteria in Approving Investment Promotion and Providing Tax Privileges. Specifically in 1993, sectoral restrictions became much more stringent. Under such updated criteria, firms that intend to seek and avail of the benefits are evaluated based on the proposed location of their manufacturing industries. For the first time, it was declared that certain industries would no longer be promoted or supported if they are located in Zone 1, even if such industries are primarily exporters. For example under the revised criteria, only textile producers located in Zone 3 are entitled to promotion and support, although electronics firms in either Zone 2 or Zone 3 could also be supported. Many types of resource-based industries, light industries, metal products and machinery, electronics, and chemical, paper and plastics industries can only receive the BOI support if these are located in Zone 2 or Zone 3. Considering however, that there appeared to be exceptions for some exporting firms located in industrial estates in Zone 1, the IPZ scheme was revised again in 2000 (Fig.1) [*BOI*, 2000].

Investment zones have long been used in Thailand to support its goals in decentralizing the country's industrial base. With regards to the government policy on decentralization from the Bangkok Metropolitan Region (BMR), the Board of Investment (BOI) has declared since 2000 the new "Policies and Criteria for

Investment Promotion", creating the three Investment Promotion Zones throughout Thailand as follows:

1) Zone 1: includes Bangkok, Samut Prakan, Samut Sakhon, Nakhon Pathom, Nonthaburi and Pathum Thani (Bangkok and 5 provinces or BMR).
2) Zone 2: includes Ang Thong, Ayutthaya, Chachoengsao, Chon Buri, Phuket, Kanchanaburi, Nakhon Nayok, Ratchaburi, Rayong, Samut Songkhram, Saraburi, and Suphanburi (12 provinces).
3) Zone 3: encompasses the remaining 58 provinces Zone 2: includes Ang Thong, Ayutthaya, Chachoengsao, Chon Buri, Phuket, Kanchanaburi, Nakhon Nayok, Ratchaburi, Rayong, Samut Songkhram, Saraburi, and Suphanburi (12 provinces). Zone 3: encompasses the remaining 58 provinces.

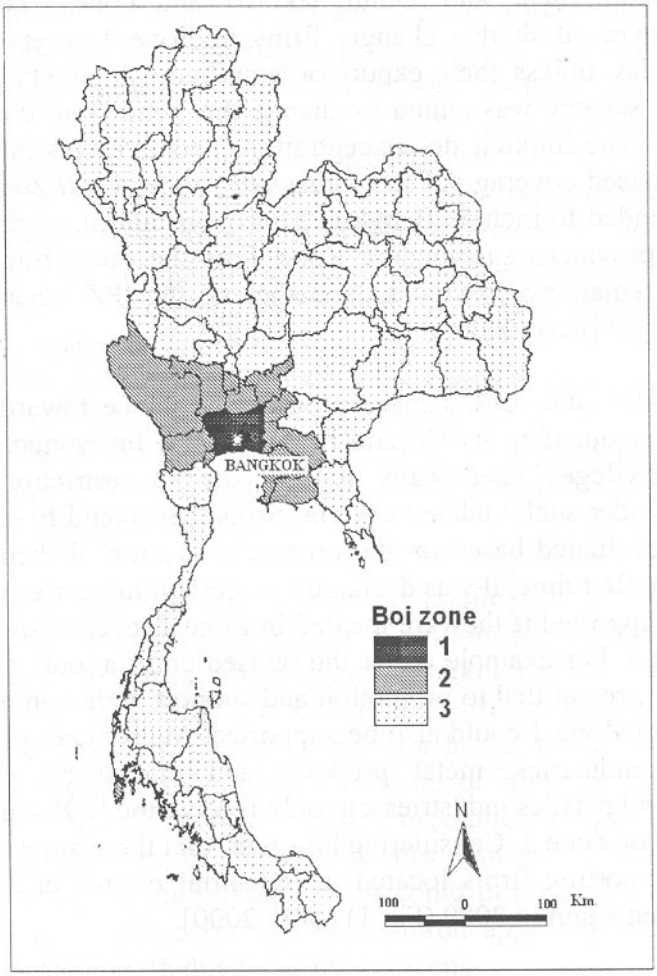

Figure 1. The Map of Board of Investment, Thailand since 2000

THE METHODS

The data set used for the analysis came mainly from the industrial database provided by the *Department of Industrial Work* (DIW) of the Ministry of Industry of Thailand. The database includes relevant information of the country's 76 provinces and 11 manufacturing sectors registered directly by the DIW.

Methodological Considerations: *Hirschman-Herfindal index* and *Location quotient index*

In order to evaluate whether industry concentration and specialization has increased in Thailand, regional specialization indices were constructed for each province while geographical concentration indices were developed for each Industrial sector. The regional specialization index is a measure of the degree of industrial specialization (or diversification) of a region. Changes in such indices could indicate certain transformation of the industrial structure in an area.

The geographical concentration indices could also indicate where the Industries are most concentrated. In addition, movements in these indices could also indicate changes in the spatial distribution of the industries. In measuring the geographical concentration of manufacturing in Thailand, the Hirschman-Herfindahl index was used, which is described by the following formula:

$$\textit{Hirschman-Herfindahl index} = \sum_{i=1}^{M} x_i^2$$

Where χ is the region's share of the total manufacturing industries and that the higher value of the index indicates more concentration of the manufacturing industries.

Location Quotient (*LQ*) index, sometimes called coefficient of localization or specialization, is a ratio that approximates the relative position of an activity in an area as compared to the same activity occurring in a broader region. The Lq index was also used in determining the area or region in Thailand where concentration of the manufacturing industries could be located.

RESULTS AND DISCUSSION

The changes in the structure of the manufacturing industry in Thailand between 1996 and 2005, based on the employment patterns is presented on Table 1. The analysis showed that from 1996 to 2005, the employment rate of the manufacturing industry of Thailand as a whole has grown at an annual average rate of 4.52%, with an increase of more than 1.0 million employees (i.e., 2.46 million to 3.47 million). The motor vehicle and other transport equipment industries recorded

the highest positive growth rate at 16.13%, with employment from this group increasing by 217,000 employees, and accounting for 25% of the total increase in the country's manufacturing employment. Meanwhile, its employment share substantially increased from 6.07% to 10.58% during the same period. This could be mainly due to the fact that the Government of Thailand has planned to transform the country into a hub for auto-mobile production. In fact Thailand has been dubbed as the 'Detroit of Asia' since the early 1990s. On the other hand, the textile, wearing apparel and leather products still had the largest employment share in 2005 at 20.97%, followed by the food, beverages and tobacco products (16.55%), and the machinery, electrical equipment and supplies industries (13.26%).

Table 1: Changes in the structure of manufacturing industry in employment

Sector	1996		2005		Growth	Growth
	Number	% Share	Number	% Share	1996-2005	(%)
Food, Beverages and Tobacco	442,343	17.93	574,412	16.55	132,069	3.32
Textiles, Wearing Apparel, Leather Products	558,520	22.64	727,919	20.97	169,399	3.37
Paper and Paper Products, Printing	60,672	2.46	98,504	2.84	37,832	6.93
Chemicals and Chemical Products	68,631	2.78	106,595	3.07	37,964	6.15
Rubber and Plastic Products	195,447	7.92	333,688	9.61	138,241	7.86
Non-Metallic Mineral Products	146,587	5.94	193,099	5.56	46,512	3.53
Basic Metals and Fabricated Metal Products	191,299	7.76	231,793	6.68	40,494	2.35
Machinery, Electrical Equipment and Supplies	285,493	11.57	460,307	13.26	174,814	6.80
Motor Vehicles and Other Transport Equipment	149,809	6.07	367,299	10.58	217,490	16.13
Furniture	168,665	6.84	226,337	6.52	57,672	3.80
Other Manufacturing Industries	199,191	8.08	150,832	4.35	-48,359	-2.70
Total	2,466,657	100.00	3,470,785	100.00	1,004,128	4.52

Source: [*DIW*, 2007].

Furthermore, the pattern of change in the geographical distribution of the manufacturing industry by region (Table 2) indicated that between 1996 and 2005 certain significant changes in the country's geographical distribution had occurred. Among the three IPZ, two zones presented above average annual growth rates. Specifically, Zone 2, which includes Chon Buri and Rayong Provinces, which has become the center of petro-chemical, auto-mobile industries and business ventures in the eastern region of Thailand, recorded very high positive growth rate (more than twice of the national total).

Table 2: Changes in the geographical distribution of the manufacturing industry in terms of employment by BOI zone

Zone	1996		2005		Growth	Growth rate
	Number	% Share	Number	% Share	1996-2005	(%)
1	1,352,470	54.83	1,656,697	47.73	304,227	2.50
2	447,693	18.15	819,984	23.63	372,291	9.24
3	666,494	27.02	994,104	28.64	327,610	5.46
National Total	2,466,657	100.00	3,470,785	100.00	1,004,128	4.52

Source: [*DIW*, 2007].

In 2005, Zone 2 accounted for about 23.63% of the country's total manufacturing employment from 18.15% in 1996. Its employment increased by about 372,000 during the ten-year period. Although the trend for Zone 1 which includes the BMR also increased, its employment rate grew very slightly (2.5%). Moreover, the analysis further showed that only Bangkok lost its share of the total manufacturing employment from 21.70% to 14.41% during the same period (Table 3), recording a negative growth rate of about -0.72%. Meanwhile, its vicinity showed positive growth rates in terms of manufacturing employment specifically Samut Prakan and Samut Sakhon Province, which showed increased employment by 151,000 and 94,000, respectively.

Table 3: Changes in the manufacturing employment in selected provinces of Thailand

Province	1996		2005		Growth	Growth rate
	Number	% Share	Number	% Share	1996-2005	(%)
Bangkok	535,155	21.70	500,284	14.41	-34,871	-0.72
Chachoengsao	66,697	2.70	146,044	4.21	79,347	13.22
Chiang Mai	36,652	1.49	41,672	1.20	5,020	1.52
Chon Buri	105,229	4.27	201,669	5.81	96,440	10.18
Nakhon Pathom	80,034	3.24	134,874	3.89	54,840	7.61
Pathum Thani	175,084	7.10	200,763	5.78	25,679	1.63
Phra Nakhon Si Ayutthaya	74,452	3.02	156,264	4.50	81,812	12.21
Rayong	52,758	2.14	123,098	3.55	70,340	14.81
Samut Prakan	323,256	13.11	474,478	13.67	151,222	5.20
Samut Sakhon	176,207	7.14	270,698	7.80	94,491	5.96
Country's Total	2,466,657	100.00	3,470,785	100.00	1,004,128	4.52

Source: [*DIW*, 2007].

Table 4 presents the Hirschman-Herfindhal indices for the geographical concentration of the industries in Thailand in 1996 compared with those in 2005. The data shows that in 1996, the paper industry was the most geographically concentrated industry, followed by the textile, basic metals and chemical industries. The ranking of the industrial sectors in terms geographical concentration is also shown in Table 4. Out of the 10 sectors, only two sectors, namely: the food,

beverages and tobacco and the non-metallic mineral products industries, showed an increase in their geographical concentration, although the increase was quite minimal. The data also showed that the ranking of 6 sectors had changed.

Based on the employment data, the most highly concentrated manufacturing industries in 2005 were the paper and paper products, chemical and chemical products, and motor vehicles and other transport equipment industries, while the least concentrated were the furniture industries. Moreover, the paper and paper products, and the textile, wearing apparel and leather products industries also became more dispersed during the study period. It is interesting to note that, only three out of the top 5 geographically concentrated industries in 2005 (chemical and chemical products, motor vehicles and other transport equipment, and machinery, electric and electrical appliances industries) are heavy and assembling industries while the paper and paper products industry which is the most concentrated is categorized as light industry.

Table 4: Hirschman-Herfindhal indices of the geographical concentration of industries

Sector	1996	Rank	2005	Rank
Food, Beverages and Tobacco	0.034	10	0.036	9
Textiles, Wearing Apparel and Leather Products	0.157	2	*0.103*	5
Paper and Paper Products	0.256	1	*0.162*	1
Chemicals and Chemical Products	0.138	4	*0.121*	2
Rubber and Plastic Products	0.108	7	0.087	7
Non-Metallic Mineral Products	0.048	8	0.060	8
Basic Metals and Fabricated Metal Products	0.152	3	*0.111*	4
Machinery, Electric and Electrical Appliances	0.108	6	0.098	6
Motor Vehicles and Other Transport Equipment	0.125	5	*0.118*	3
Furniture	0.039	9	0.038	10

Source: [*Pansuwan et al.*, 2009]

The location quotients of the regional specialization analysis are shown in Figure 2 and Figure 3. In 1996, the data showed that 12 of the 20 provinces with specialization in the manufacturing industry, were located in the core region (Zone 1 and 2). In 2005, Bangkok still had the highest specialization although such specialization quotient had decreased.

Only 12 of the 76 provinces showed an increase in the specialization quotient, and most of them were also located in the core region (Table 5). Specifically, increased in the specialization quotient were recorded in the vicinity of Bangkok and in the inner ring area, such as in Nakhon Pathom, Nonthaburi, Samut Sakhon, Chachoengsao, Phra Nakhon Si Ayutthaya, and Rayong Provinces, the locations for food processing as well as for the production of electronic appliance, auto-

mobiles and chemicals. Furthermore, while five of the 58 provinces of the BOI promotional area also showed increased specialization quotient, the magnitude of change was rather very small.

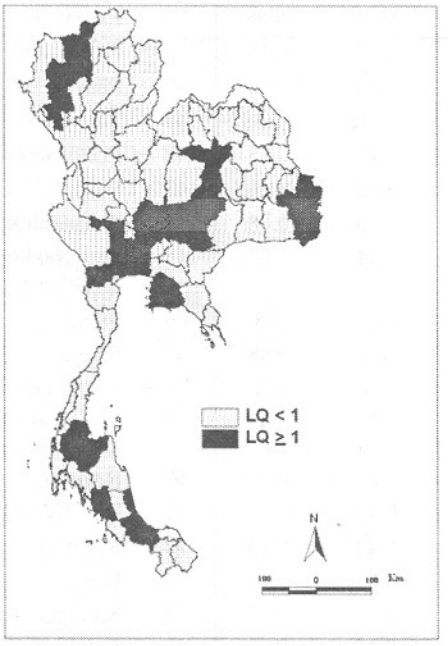

Figure 2.The Map of Regional Specialization in Manufacturing Industry, 1996

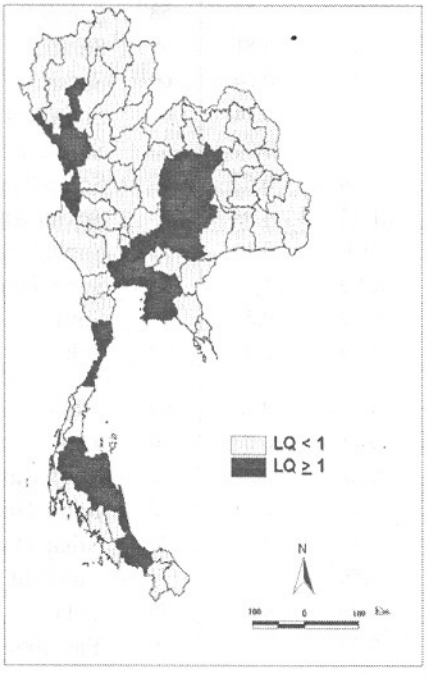

Figure 3. The Map of Regional Specialization in Manufacturing Industry, 2005

Table 5: Location Quotient of Regional Specialization in Manufacturing Industry between 1996 and 2005

No	Province	1996	2005	No	Province	1996	2005
1	Amnat Charoen	0.07	0.18	39	Phatthalung	0.11	0.12
2	Ang Thong	0.44	0.18	40	Phayao	0.16	0.46
3	Bangkok	46.52	36.38	41	Phetchabun	0.46	0.81
4	Buri Ram	0.15	0.55	42	Phetchaburi	0.34	0.46
5	Chachoengsao	0.22	1.9	43	Phichit	0.29	0.31
6	Chai Nat	0.13	0.08	44	Phitsanulok	0.92	0.43
7	Chaiyaphum	0.32	1.07	45	Phra Nakhon Si Ayutthaya	2.84	4.33
8	Chanthaburi	0.27	0.8	46	Phrae	0.48	0.85
9	Chiang Mai	1.5	0.88	47	Phuket	0.77	0.25
10	Chiang Rai	0.1	0.23	48	Prachin Buri	0.96	0.96
11	Chon Buri	7.22	5.42	49	Prachuap Khiri Khan	0.24	1.55
12	Chumphon	0.23	0.26	50	Ranong	0.08	0.13
13	Kalasin	0.79	0.42	51	Ratchaburi	4.08	0.14
14	Kamphaeng Phet	0.13	0.24	52	Rayong	1.6	3.27
15	Kanchanaburi	0.53	0.45	53	Roi Et	0.19	0.22
16	Khon Kaen	1.71	1.79	54	Sa Kaeo	0.2	0.09
17	Krabi	0.17	0.69	55	Sakon NaKhon	0.17	0.2
18	Lampang	0.39	0.55	56	Samut Prakan	16.14	6.25
19	Lamphun	0.7	1.35	57	Samut Sakhon	6.23	9.77
20	Loei	0.13	0.11	58	Samut Songkhram	0.91	0.06
21	Lop Buri	1.23	0.81	59	Saraburi	1.45	2.45
22	Mae Hong Son	0.05	0.04	60	Satun	0.06	0.13
23	Maha Sarakham	0.49	0.14	61	Si Sa Ket	0.21	0.12
24	Mukdahan	0.07	0.04	62	Sing Buri	0.61	0.22
25	Nakhon Nayok	0.08	0.52	63	Songkhla	4.68	3.22
26	Nakhon Pathom	1.75	4.33	64	Sukhothai	0.24	0.25
27	Nakhon Phanom	0.4	0.13	65	Suphan Buri	1.45	0.48
28	Nakhon Ratchasima	1.89	1.32	66	Surat Thani	1.23	1.01
29	Nakhon Sawan	0.92	0.31	67	Surin	0.27	0.08
30	Nakhon Si Thammarat	0.49	1.31	68	Tak	0.26	1.51
31	Nan	0.1	0.12	69	Trang	1.08	0.28
32	Narathiwat	0.11	0.07	70	Trat	0.06	0.09
33	Nong Bua Lam Phu	0.26	0.24	71	Ubon Ratchathani	1.67	0.23
34	Nong Khai	0.15	0.11	72	Udon Thani	0.35	0.66
35	Nonthaburi	1.47	3.89	73	Uthai Thani	0.12	0.09
36	Pathum Thani	9.56	6.75	74	Uttaradit	0.21	0.13
37	Pattani	0.29	0.81	75	Yala	0.48	0.08
38	Phangnga	0.22	0.35	76	Yasothon	0.26	0.23

Source: [Pansuwan *et al.*, 2009]

This study had examined the effects of the trade liberalization policy which is one of the major factors that contributed to the industrial distribution pattern in Thailand. The results have clearly manifested the fact that most factories continued to be located in Bangkok and its surrounding areas specifically after the adoption of the industrial promotion policies particularly starting from the export-promotion regime in 1980s. Among the reasons for the choice of Bangkok as the best optimum location for industrial investment could include the fact that first and foremost, Bangkok being the capital city is the center of the country's government. Secondly, it has the biggest and the center of the country's domestic market. The last but perhaps the most important, is the fact that major transportation and communication infrastructures and facilities are in the BMR that include the two international airports and one sea port, the major factors that provide the necessary import and export support.

From the result of the analysis of the geographical concentration of the Industry sector in 1996, most of industries that import raw materials were located in the BMR such as the paper and paper products, textile and the metal products industries, and that most of the products of such industries were also exported to the world market. For these industries, the BMR is considered the best location to reduce expenditures on transport costs. However, the manufacturing employment trend from 1996 to 2005 seemed to have shifted from the industrial core to the inner ring area, even though the BMR still accounted for 47.73% of the country's total manufacturing employment. Such trend could have been influenced by the relocation of factories during the late 1990s and the early 2000s, corresponding closely to the rise and collapse of the country's bubble economy [*Dhanani* and *Scholtès*, 2002; *Glassman*, 2007].

In the early 1990s, many financial institutions especially in the BMR had increased their loans for investment in stocks and real estate, following the deregulation and liberalization of the financial sector in Thailand. As a result, the prices of stocks and real estate increased conspicuously, and the respective capital gains had brought huge wealth to the investors [*Bhongmakapat*, 2006]. However, the collapse of the country's bubble economy in 1997 coupled with the drastic fall in the prices of stocks and real estate, which was also called the 'Tom Yam Kung disease', had driven the Thai economy to enter into a period of recession. Indeed, the financial crisis was associated with the rise and fall of the geographical concentration in the BMR. Meanwhile, the top three industries that demonstrated high levels of geographical concentration were the target industries under the industrial promotion policies, specifically the chemical products and motor vehicle industries in the ESDP areas, where two new deep sea ports have been constructed in Chonburi and Rayong Provinces.

CONCLUSION

The results of this study confirmed that the impact of the country's trade liberalization policies has been the industrial concentration and spatial concentration in the BMR. Although the Government of Thailand has also been attempting to promote industrial decentralization policies, still there has been no real and significant evidence of increased regional specialization of manufacturing between 1996 and 2005 in the IPZ specifically in Zone 3. However, many firms have already relocated their industries from the BMR to its surrounding areas covered in Zone 2, more particularly in the IE by IEAT. Meanwhile, it should also be noted that the trade liberalization policy during the financial crisis has not affected the geographical concentration of industries in Thailand. Therefore, it can be concluded that the privileges offered under the BOI scheme may have not been really sufficient to subsidize the agglomeration economies in the new economic geography model.

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