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Deconcentration pattern of port system: Case in Southern Vietnam

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항만분산화 현상에 관한 연구: 베트남 남부지역을 중심으로

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Abstract The shortage of research in Vietnam port evolvement is uncontroversial although a huge amount of investment is observed to upgrade both quantity and quality. This study examines the port system performance, in the context of spatially concentration ratio, in Southern Vietnam for the period 2007-2016, by using prevailing indicators for spatially concentration assessment including concentration ratios (CR), the Herfindahl-Hirschman index (HHI), the Gini coefficient, the Lorenz curve and shift-share analysis (SSA), a trend of deconcentration is described in Southern Vietnam port system, since the traditional ports to new deep-water ports. Also, driving forces of this shifting would be discussed in detail. Implications from this study would enable not only port administrators, port operators but also shipping lines, cargo owners, logistics service providers to comprehensively understand the growth of the port system in Southern Vietnam.

Key Words : Concentration, Deconcentration, Southern Vietnam, Port system, Herfindahl-Hirschman index (HHI), Shift-Share Analysis (SSA)

요 약 최근 대규모 투자에 의한 항만의 질적 및 양적 성장에도 불구하고, 베트남 항만의 진화에 대한 연구는 부족하다. 이러한 측면에서 본 연구는 2007-2016 기간 동안 베트남 남부지역 항만의 집중화 및 분산화를 지니지수, 로렌츠커브 및 전이할당분석을 통하여 분석하는 것을 목적으로 하였다. 연구결과 분산화 현상이 관측되었으며, 특히 기존 항만에서 새로 신설된 신항만으로 전이가 관찰되었다. 본 연구는 베트남 남부지역 항만의 진화현상을 종합적으로 제시함으로서 항만관리자, 운영자 및 선사, 화주, 물류서비스 제공자 등에게 시사점을 제공한다.

주제어 : 집중화, 분산화, 베트남 남부, 항만시스템, 허핀달-허쉬만 지수 (HHI), 전이할당분석 (SSA)

1. Introduction

Seaport has been widely evolved together with the increase of international trade and maritime transport. Most of nations with leading economic growth are recognized operating the largest port system such as Rotterdam port (Netherlands), Singapore port (Singapore) or Shanghai port (China). The seaport was conceptualized as a geographical area for mooring vessels to land for cargo loading and discharge, commonly a sheltered deep-water area (Stopford, 1997 [1]); however, being emerged as a major node in a supply chain network, integrating with hinterland through a system of transportation and other nodes

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such as logistics centre or container depot. Port development is a common topic in past years and the major concern of analysing the degree of concentration is irrefutable. Some examined it beyond empirical cases such as Taaffe et al. (1963) [2], Hayut (1981) [3], Slack (1990) [4], Notteboom (1997) [5], Li et al. (2012) [6]. In general, the increasing number of terminals and cargoes leads to the fierce competition within a port system and a tendency of deconcentration as a cargo shifting from traditional to new ports.

In Vietnam, shipping plays a vital role in national economy because 90% of nation's import and export cargo volumes are handled by this sector. Owning a geographical length of around 1,650 kilometres, the availability of Vietnam to approach to an adequate transport and logistics service is undeniable. Vietnam seaport system is located along the coastline, available in all three regions – North, Centre and South. It is a hierarchical system with different sizes and types, featured by geographical location, type of handled cargo, market served and specific ways to integrate with hinterland. Thai (2017) [7] indicated the hinterland accessibility of Vietnamese seaports. In Northern Vietnam, mainland routes from Northern ports to Red River Delta of Vietnam and, to some extent, Yunnan province in China. Cargo throughputs at Central ports such as Da Nang or Quy Nhon are transported to not only Centre Delta but also the highland of Vietnam or Lao PDR meanwhile Southern ports are serving the whole Southern region. Seaport system enormously influences to the economic growth; therefore, port development is a key strategy of Vietnamese government. Vietnamese Prime Minister's Decision 2190/QĐ-TTG about Vietnamese seaport development until 2020, orientation until 2030 divides the seaport system into 6 groups for the regional development. Group 1 is Northern ports from Quang Ninh to Ninh Binh, group 2 constitutes Northern Central ports from Thanh Hoa to Ha Tinh, group 3 includes Central ports from Quang Binh to Quang Ngai, group 4 consists of Southern Central ports from Binh Dinh to Binh Thuan, group 5 is involved by South Eastern ports (including Con Dao island and ports alongside Soai Rap river) and finally, group 6 is Me Kong Delta ports (including Phu Quoc and South-Eastern islands). All the groups were established specific plans for the sustainable development in each single stage.

The Southern Vietnamese ports (Group 5 and 6) are widely discussed in this study. There are many ports in this region, located at three main regions: Ho Chi Minh City – Dong Nai – Binh Duong, Cai Mep – Thi Vai complex and Me Kong Delta. According to statistics from The World Bank (2014) [8], Southern ports constituted 63% cargo throughputs of the whole country in 2011 with the average growth index of 14% during the period 2000-2011. So far in Vietnam, only the port system in Cai Mep – Thi Vai complex can handle over 100,000 DWT vessel so it enables a huge amount of cargo to transport directly to Vietnam, without transhipment through major Asian hubs. Therefore, the Southern ports are recognized as leading the whole Vietnam port system, compared to those from Central and Northern side. By the abundant and increasing amount of investment into this area, this position is expected to be unchanged in further years.

Methodologies used to describe the level of port concentration are concentration ratio, Herfindahl-Hirschman Index, Lorenz curve & Gini coefficient and shift-share analysis. Findings would bring out both conceptual and practical implications, improving the awareness of the port development in a developing country.

Following the introduction, the next part will provide theoretical perspectives about the expansion of port development including the context of spatially concentration pattern. After introducing methodologies utilized, there is one section to analyse the results corresponding with each. The last two sections are respectively discussions about the issue and conclusions.

2. Literature review

Nowadays, port is well-known as a dynamic

interlinkage and major node in the logistics chain. Not only to berth vessel, port is the gateway to hinterland. Hence, the review of port system optimization is preliminary to shipping evolution. Earlier, the model of port system development is described as a part of port system dynamic. Notteboom (2010) [9] characterizes the model of port system under aspects established in different times. First, port system development is captured to develop as path dependency at a regional scale, which means port system would follow identical development path. An investigation of Notteboom (2009) [10] revealed that contingency is reflected by the port development because this process was enormously influenced by market players such as shipping lines, forwarders and intermodal operators. Both path dependency and contingency demonstrate that port systems do not follow identical lines or same stages. The second model of port development was shown by Rimmer and Comtois (2009) [11] that port system should be incorporated with realities from maritime space, not only the size of hinterland and the simple role of port as a natural gateway to evaluate traffic volumes. Factors captured as regional integration and port competition as well as shaping liner service network would tremendously influence to the capacity of each port in the region. Thirdly, container port system is caught up as a trend in maritime transportation. With regards to economies of scale, liner service network would limit the operation of many load centres, that reflects the form of port concentration. Port system development under the lack of political and institutional factors is reflected in the fourth existing model.

Notteboom and Rodrigue (2005) [12] discussed about a new term, port regionalization. Regionalization is argued to integrate with the hinterland approach and the interaction between port system and freight distribution centre is considerably consolidated. The integration between ports and inland freight distribution centre is established by numerous strategical links, that poses a certain assertion to this definition.

Notwithstanding that numerous studies have examined the evolvement of port system through structure of maritime services or function of intermediary transhipment hubs meanwhile concern of spatially concentration and dispersion is non-widely discussed. Strategically, geographical proximity would lead to the development of a 'cluster' or 'industrial districts' which is defined as the combination of geographical concentration and sectoral specialization. Marshall (1890) [13] examined that growth of firm would be gained by the dynamic of geographical concentration which leads firm to the advantages of economies of scale. The definition of concentration was emerged by Taaffe et al. (1963) [2], who accommodated the necessity of geographically port proximity as well as certain hinterland routes, shifting the poorly connected port system into a consolidated network between gateway ports and urban logistics centres. Meanwhile, the term deconcentration was discussed by Barke (1986) [14] and Hayut (1981) [3] with the concern of the increasing level of former non-hub ports and new ports. A certain cargo volume is moved to smaller and new ports or a reduction is appeared in large load centres (Notteboom, 2010) [9]. Concentration is described as the 'path-dependency of large agglomerations' (Ducruet et al., 2009) [15] whereas deconcentration is the result of different causes 'new port development, carrier selection, global operation strategies, governmental policies, congestion, and lack of space at main load centres' although there is a shortage of investigation with detailed driving forces. Following such a trend of containerization, Notteboom (1997) [5] examined his suspicions about the further spatially concentration for European port system though former analysed that after reaching the limit and inverts, concentration would shift into deconcentration. He argued that the future trend of European port system would be affected by technological and organizational evolutions and governmental policies. The diffusion of container technology and door-to-door service of port operator

would lead to the scenario of deconcentration whereas the concentration is originated from the technological and economic requirements (e.g. economies of scale). Additionally, Wilmsmeiner and Monios (2013) [16] argued that 'the effect of private sector strategies as currently experienced in various forms, e.g. inland terminal development or port-centric logistics strategies' should be also reached into. In the context of locating in multi-port gateway regions, Notteboom (2010) [9] found out a gradual deconcentration process in European port system, in which container cargo remains the highest level of concentration, compared to others, with the intensive support from market-concerned driving forces.

The utilisation of research indicators in empirical investigations is referred in the following part. Analysis about US port system by Hayut (1998) [17] was applied by Lorenz Curve and the Gini coefficient. Notteboom's studies from 1997 to 2010 about the European port system concentration assessment are supported by the HHI, Gini coefficient and shift-share analysis. In 2009, Sys [18] utilized concentration ratio, HHI, the Gini coefficient and the Lorenz curve to measure the concentration of containerized shipping industry and a new publication of Cusano et al. (2017) [19] was used HHI to evaluate the concentration degree of Mediterranean ports. HHI seems to be favoured by most of scholars when approaching this issue.

Until now, there have been few studies about spatially concentration assessment of Vietnam port system. Pham et al. (2016) [20] analysed the concentration development of container terminals in Northern Vietnam meanwhile Dang et al. (2016) [21] generally examined the geographical pattern of container terminals in Vietnam, as a part of Southeast Asia port system. Dang's research; however, only pointed out superior terminals in Southern Vietnam such as Tan Cang Sai Gon, Sai Gon instead of a great number as the following study. Both also utilized the identical methodologies including concentration ratio, HHI, SSA, additional to the Gini coefficient and the Lorenz curve of Pham's. Deconcentration [20] is the conclusion of both scholars because of the sharp development of emerging port in recent years, gradually replacing traditional ports. However, there has been not a deep approach into port system from Southern side which is dedicating to 63% of the total country cargo volume and expected to keep heading in further years. In this paper, the assessment is conducted with general cargo instead of container cargo as a common type handled in Vietnam terminals. A broader accessibility is essential with the background of Southern Vietnam seaport because other type of cargo such as bulk or agricultural products estimates a substantial proportion in total cargo throughputs of many seaports in the region. To conclude, a comprehensive analysis about geographical pattern would clarify whether the Southern Vietnam seaports become concentrated or deconcentrated and the relationship of the level of concentration level and the establishment of new ports.

3. Methodology

3.1 Concentration ratio

The prevailing methods of measuring concentration level are concentration ratio, the HHI and the Gini coefficient illustrated by the Lorenz curves meanwhile shift-share analysis would examine the cargo volume shifting among ports in a system. Fig. 1 generalizes the process of analysing the spatially concentration pattern in this paper.

The measure termed CR(k) would estimate the percentage of market share of largest companies in an industry. Depending on the number of companies, the level of concentration ratio is calculated as:

$$CR_{(K)} = CR_{(K)} = \sum_{i=1}^{k} s_i \quad (1)$$

In which, s_i represents the percentage port market shares of the ith largest ports (i = 1, 2…k).

3.2 The Herfindahl–Hirschman Index (HHI)

The Herfindahl-Hirschman Index (HHI) is a favoured measure to evaluate the concentration level which equals the sum of squared market share of firms in a market (Le and Leda, 2009) [22]. Not only addressing to top companies as the aforementioned indicators, the HHI covers the indices of contributing factors as the following formula:

$$H = \frac{\sum_{i=1}^{n} TEU_i^2}{(\sum_{i=1}^{n} TEU_I)^2} and \frac{1}{n} \leq H \leq 1 \qquad (2)$$

with H is the concentration index for the system and n is the number of terminals in the system. The value of the HHI describes the concentration level of port system in a certain area. The higher concentration ratio is revealed if the HHI is closer to 1 (the monopolist's market share) and in contrast, there is a deconcentration trend with the port system if the HHI reaches into 1/n (perfectly balanced).

3.3 The Gini coefficient and the Lorenz curve

Another indicator to access with the degree of port concentration is the Gini coefficient depicted by the Lorenz curve to address the trend of concentration in a period. The Gini coefficient is commonly applied to measure the percent departure of an ideally uniform distribution. The Lorenz curve is used to graphically illustrate the level of concentration. If sizes of all terminals are the same, the Gini coefficient equals zero and the diagonal of equal distribution illustrates the Lorenz Curve. If one port estimates the whole cargo volume as known as full concentration, the Gini coefficient equals unity is identified by the space below the diagonal of equal distribution. Beneath is calculation of Gini coefficient:

$$G = \frac{n+1}{n} - \frac{2\sum_{1}^{n}(n+1-i)x_i}{n\sum_{1}^{n}x_i} \qquad (3)$$

n is explainable as the number of terminals meanwhile x_i is the cumulative market share regarding the throughput of container terminals from the lowest to the highest. The Gini coefficient index is 0 if there is no concentration and 1 for the whole trend of concentration. The Lorenz curve varies the cumulative size of n largest firms in an industry with the range of n from 1 to n (Lipczynski et al., 2005) [23].

3.4 Shift–share analysis

Shift-share analysis is a prevailing tool to reflect the volume of cargo transfer among ports. Notteboom (1997) clarified it as to segregate the growth or weakening of a variable into two sectors – the 'share' effect and the 'shift' effect. The expected growth of cargo traffic in a seaport is specified in 'share' effect which indicates the maintenance of port in market share, resulting in its same development as the port range. The total shift indicates the total number of cargo (in this research 'ton') a port has gained or been left to other competitors in the same range, with a reference as the expected cargo traffic (share effect). The 'shift' effect aims to evaluate the ports' competitive position because of eliminating the development of the whole sector (i.e. only net volume of ton shifts between ports remains).

$$SHARE_I = (\frac{\sum_{i=1}^{n} TEU_1}{\sum_{i=1}^{n} TEU_0} - 1).TEU_0 \qquad (4)$$

$$SHIFT_i = TEU_1 - \frac{\sum_{i=1}^{n} TEU_1}{\sum_{i=1}^{n} TEU_0}.TEU_0 \qquad (5)$$

$$ABSGR_i = TEU_1 - TEU_0 = SHARE_i + SHIFT_i \qquad (6)$$

In which, SHAREi is the share effect in ton of terminal i for the period t1 – t0,, SHIFTi is the shift effect in ton of terminal i for the period t1–t0, ABSGRi

is the absolute growth in ton of terminal i for the period t1-t0, toni is the throughput volume of terminal i and n is the number of terminals.

4. Case study

Currently, Southern Vietnam is owning a system of many ports divided into three regions: Ho Chi Minh City - Dong Nai - Binh Duong, Cai Mep - Thi Vai and Me Kong Delta. The majority is located alongside Soai Rap river which flows through Ho Chi Minh City and its linked rivers Sai Gon and Dong Nai river. These ports are distant from the waterfront, so the port accessibility takes long time, fuel and particularly fits with medium-sized and small vessels[24-30]. Cai Mep - Thi Vai ports are lying close to the mouth of Thi Vai river so ports take advantage of deep channel and wide waterway. Geographical benefits enable these ports to accommodate with large vessels. Meanwhile, Me Kong Delta ports are far from above port systems and alongside Hau river. In each system, every single port can accommodate with a variety of cargoes, commonly container cargo because of its advanced functions. Other ports enable different type of cargo such as Saigon port in Ho Chi Minh City with general, container and bulk cargo or in Cai Mep - Thi Vai, Interflour Cai Mep port owns berth for handling agricultural products. Fig. 1 illustrates the geographic pattern of Southern port system.

The growth of cargo throughput in the whole port system is depicted through the Fig. 2. As seen, the growth trend is illustrated in different ways for each individual region. Ho Chi Minh City - Dong Nai - Binh Duong terminals dominated in total cargo throughputs with 60% raising during the period 2007-2016, understood as the cargo concentration into Tan Cang Cat Lai port. Meanwhile, Cai Mep - Thi Vai port complex achieved the same amount from 2007 to 2016 though in fact, only Phu My port was operated in the first two years in this period. The potential expansion of Cai Mep - Thi Vai terminals is unquestionable although this port system has been operated for a short time. Among all, cargo volume of Me Kong Delta ports were observed stable in this period except the period 2008-2009. It can be explained by their minor role in the Southern supply chain because most of inland container depots (ICD), depots or logistics centres are located at Binh Duong or Dong Nai, neighbours with Ho Chi Minh City.

Fig. 1. Geographic pattern of Southern Vietnam ports

Note: Me Kong Delta (1: An Giang port, 2: Tra Noc-Can Tho port, 3: Can Tho port), Ho Chi Minh City - Binh Duong - Dong Nai (4: Binh Duong port, 5: Dong Nai port, 6: Tan Cang Cat Lai port, 7: Vietnam International Container Terminal (VICT port), 8: Ben Nghe port, 9: Sai Gon port, 10: Rau Qua port, 11: Bong Sen port, 12: Tan Cang Hiep Phuoc port, 13: Saigon Premier Container Terminal (SPCT port)), Cai Mep - Thi Vai (14: Saigon International Terminal Vietnam (SITV port), 15: Phu My port, 16: SP - PSA port, 17: Interflour Cai Mep port, 18: International Container Terminal Tan Cang - Cai Mep (TCIT port), 19: Cai Mep International Terminal (CMIT port), 20: Tan Cang - Cai Mep - Thi Vai Terminal (TCTT port), 21: SP-SSA International Terminal (SSIT)).

Fig. 2. Cargo throughputs of Southern Vietnam port system (2007-2016)

Table 1. Concentration ratio of terminal system in Southern Vietnam (2007-2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1stterminal	TCCL	TCCL	TCCL	TCCL	TCCL	TCCL	TCCL	TCCL	TCCL	TCCL
2ndterminal	SG	SG	SG	SG	SG	SG	SG	SG	TCIT	TCIT
3rdterminal	VICT	VICT	CT	PM	PM	TCIT	TCIT	TCIT	SG	SG
CR1	0.40	0.42	0.42	0.48	0.48	0.46	0.45	0.42	0.41	0.37
CR3	0.75	0.71	0.69	0.72	0.67	0.65	0.62	0.61	0.60	0.54

Note: TCCL: Tan Cang Cat Lai, SG: Sai Gon, TCIT: Tan Cang - Cai Mep International Terminal, VICT: Vietnam International Container Terminal, CT: Can Tho, PM: Phu My

As seen from Table 1, the one-terminal and three-terminal concentration ratio fluctuates in different ways. The CR1 index grew up from 0.40 in 2007 to the peak of 0.48 in 2011 then kept stable in the next year. However, this index gradually dropped in the next years until 0.37 observed in 2016. This period captures a constant domination of Tan Cang Cat Lai port in cargo throughputs. It remained such a high ratio of concentration, even significantly growing in later years (0.67 compared to 0.54). From the perspectives of three-terminal figure, there was a slight fluctuation in this period; however, sharply decreased from 0.75 in 2007 to 0.54 in 2016. The highest and lowest CR3 were witnessed in these years. In the contrast with a growing trend of concentration in CR1, the 2nd and 3rd position heading cargo throughputs varies frequently in this period with the 3rd position alternatively occupying by five ports VCIT, Can Tho, Phu My, TCIT and Sai Gon. After tying up with the 2nd position in eight consecutive years, Sai Gon port was replaced by TCIT in the past 2 years 2015 and 2016.

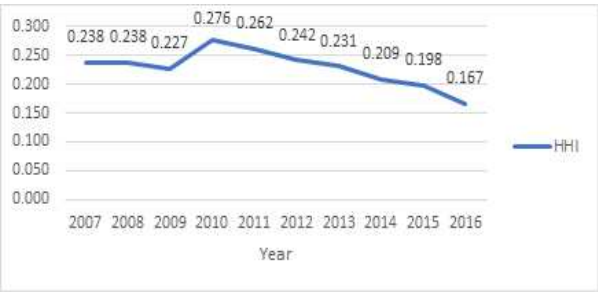

Fig. 3. HHI index of terminal system in Southern Vietnam (2007-2016)

From Fig. 3, it is witnessed that there is a downward trend in concentration level of Southern seaports during this period. Beginning with 0.238 in 2007, the HHI index went down until 0.227 in the next two years before achieving a dramatic growth one year later to 0.276. The peak was recorded in 2010 from which the de-concentration was such a trend in later years and finalized at the lowest index with 0.167 in 2016.

Table 2. Gini coefficient index of terminal system in Southern Vietnam (2007-2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gini index	0.59	0.57	0.55	0.57	0.52	0.50	0.49	0.45	0.43	0.36

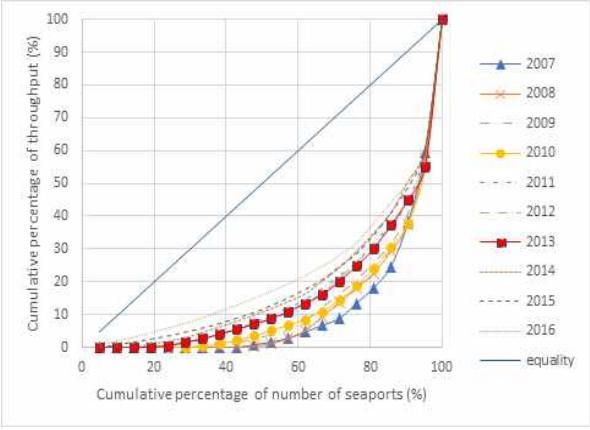

Fig. 4. Lorenz curve of terminal system in Southern Vietnam (2007-2016)

Table 2 and Fig. 4, respectively, illustrate the Gini coefficient and Lorenz curves. The graphic model describes the Gini coefficient as the space between the Lorenz curve and a diagonal line which is covered by the massive area (the entire right triangle created by the right and bottom axis and the diagonal line linking the top left corner and the bottom right corner). The Gini coefficient is illustrated to follow a trend of deconcentration in the observed period with the highest index in 2007 (0.59) and lowest in 2016 (0.36). In regard of the Lorenz curve, this trend is described with a great amount of cargo throughputs handled by a minor number of dominant sea ports. The Lorenz curves

describe the trend of coincidence in the later part with 5% major sea ports corresponding with 45% cargo throughputs, meanwhile the small and medium-sized ports improved their market share through every single year, approximately two times.

From the perspective of shift-share analysis, the performance of individual port is described in detail. The ABSGR is the raising number of cargo volume in this period meanwhile the gain of volume from the total system is assigned to the shift index. It is observed that TCIT port is leading the shift effect index with 16,6 million ton captured from others though being at the 2nd position in the volume growth index. Tan Cang Cat Lai port, reversely, lies in the 1st position considered the volume increase; however, loses 5,6 million ton into other ports of the system during this period. Many ports in Ho Chi Minh City - Binh Duong - Dong Nai are observed the loss of cargo into others except Binh Duong, Rau Qua, SPCT and Tan Cang Hiep Phuoc. Among those who drop, a substantial amount is lost from Sai Gon and VICT with 22,3 and 11 million ton, respectively. Overall, terminals in Ho Chi Minh City are among who lose, as opposed to the trend of achievement from Cai Mep - Thi Vai ports, with only a decrease of 1,9 million ton from Phu My. It means that the cargo volume follows a trend of moving to Cai Mep - Thi Vai terminals since the port cluster was instructed here. During this time, the port system in Me Kong Delta is witnessed a loss of market share in general.

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Table 3. Shift-share analysis for seaports in Southern Vietnam (2007-2016)

	Shift effect				Share effect				
	07~09	10~12	13~15	07~16	07~09	10~12	13~15	07~16	ABSGR
Ho Chi Minh City + Dong Nai + Binh Duong									
Đồng Nai	-1334	-15	276	-2478	778	429	832	4069	1591
Bình Dương	-99	-172	615	1700	147	97	110	769	2469
Tân Cảng Sài Gòn (CL)	1240	-2283	-5289	-5619	6817	6553	13938	35649	30030
Sài Gòn	-3236	-3526	-2940	-22372	3626	2161	3131	18964	-3408
Bến Nghe	-787	-1175	-52	-3801	1081	807	1262	5654	1853
VICT	-7565	470	388	-11040	2285	575	1633	11948	908
Rau quả	-315	-106	-73	1824	129	38	57	675	2499
Bông Sen (Lotus)	-393	327	-547	-1030	320	156	489	1671	641
SPCT	880	857	-758	2225	0	212	685	0	2225
Tân Cảng Hiệp Phước	0	0	1563	3340	0	0	0	0	3340
Ba Ria - Vung Tau									
SITV	0	1200	394	2448	0	0	421	0	2448
Phú Mỹ	-668	-1482	-1130	-1944	799	953	1488	4180	2236
SP-PSA	1056	-3361	-126	1924	0	645	306	0	1924
TCIT	0	6522	4531	16684	0	0	2405	0	16684
CMIT	0	3674	-889	9773	0	0	2274	0	9773
TCTT	0	0	1195	3360	0	0	0	0	3360
SSIT	0	0	1800	4005	0	0	0	0	4005
Interflour Cái Mép	272	307	1185	3408	0	146	533	0	3408
Me Kong Delta									
Cần Thơ	5878	-736	927	-1049	348	233	476	1819	770
Trà Nóc Cần Thơ	3510	-202	-578	-575	189	207	355	989	414

Note: VICT (Vietnam International Container Terminal), SPCT (Saigon Premier Container Terminal), SITV (Saigon International Terminals Vietnam), TCIT (Tan Cang - Cai Mep International Terminal), CMIT (Cai Mep International Terminal), TCTT (Tan Cang - Cai Mep Thi Vai Terminal), SSIT port (SP-SSA International Terminal).

million ton into other ports of the system during this period. Many ports in Ho Chi Minh City - Binh Duong - Dong Nai are observed the loss of cargo into others except Binh Duong, Rau Qua, SPCT and Tan Cang Hiep Phuoc. Among those who drop, a substantial amount is lost from Sai Gon and VICT with 22,3 and 11 million ton, respectively. Overall, terminals in Ho Chi Minh City are among who lose, as opposed to the trend of achievement from Cai Mep - Thi Vai ports, with only a decrease of 1,9 million ton from Phu My. It means that the cargo volume follows a trend of moving to Cai Mep - Thi Vai terminals since the port cluster was instructed here. During this time, the port system in Me Kong Delta is witnessed a loss of market share in general.

5. CONCLUSION

In Vietnam, port operation plays a major role and tremendously influences to the harmonization of cargo transport. This study, to some extent, discusses the trend of spatially concentration of port system in Southern Vietnam, a strategically geographical region for not only domestic, regional but also international shipping routes. The trend of deconcentration is characterized by utilising prevailing measures including concentration ratio assessment, the HHI, the Gini coefficient combined with Lorenz curve and the SSA. The concentration level is determined beyond different perspectives and specifications. Except the period 2009-2010, deconcentration is such a trend during the period 2007-2016. The cargo volume in Ho Chi Minh City - Dong Nai - Binh Duong port system gradually decreased meanwhile the growth was observed in Cai Mep - Thi Vai ports though Tan Cang Cat Lai port has been dominating the Southern Vietnam cargo volume. The concentration level is influenced by a variety of factors including geographical location, governmental administration and strategic planning. These factors, individually or conjunctly, reflect not only the degree of concentration but also the operation of national port system. Vietnam has geographical and natural advantages of developing an advanced port system with a long coastline and geographical location to integrate with the international shipping network. However, poor administration and inconsistent strategical planning apparently constrain the development. Being a developing country, Vietnam poses many troubles and the shortage of advanced facility and labour force is existed in maritime sector. A long-term strategy in macro level for a sustainable development is essential and even when the master development plan was established for an overall port system landscape, the thinking of 'localized ideology' and 'group benefit' of administration levels should be demolished to create a competitive environment and attract investors.

This research provides both theoretical and practical viewpoints. In terms of theoretical implication, this paper encourages discussions of Slack and Wang (2002) [31] that peripheral ports are emerged in Asian countries with the cargo volume shift from the traditional to the new terminals and Vietnam is one of the most outstanding cases. Practically, this paper enables policymakers and shipping involvers gain a comprehensive understanding for the trend of port system development in upcoming year. The establishment of port authority is an effective solution for a sustainable and orientated development. Currently, the pattern of port authority does not work in Vietnam although it is very popular in other port cities in the world.

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