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The Estimation of the Ocean Economy and Coastal Economy in South Korea

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Abstract:.

Key words: Ocean Economy, Coastal economy, South Korean national economy

1. Introduction

Over the past 60 years, the South Korean economy has gotten outstanding achievements that would be hard to find around the world. South Korea's real GDP, which was converted to US dollars using 2011 PPPs, in 2010 was 1,506 billion from 3.8 billion in 1960, and real GDP per capita in 2010 was 29,411 from 1,537 in 1960.[1] The successful paradigm of the South Korean economy has clearly benefitted from export-led development and ready access to common sea lanes.[2]

South Korea is surrounded by the ocean on three sides. It has abundant ocean resources, with its 433,000㎢ of territorial water under its jurisdiction, which is about five times the size of its land. It also possesses 1,914㎞ of coastline and 3,167 of island.[3] In addition, South Korea produces 3 million tons of fish per annum, 99.7% of its trade cargo is transported by the ocean. In other worlds, the ocean resources and ocean industries have played a significant role in the national economy.

Under such circumstances, the Ministry of Maritime Affairs and Fisheries (MOMAF) was established in 1996 to realize the integrated ocean governance, which was performed by 13 different ministries and administrations. The Basic Act on Marine and Fishery Development (BAMFD) has also been enacted in 2002 by MOMAF to promote the development of the ocean industry, and protect the ocean environment, ocean resources, and ocean jurisdiction. This law became a basis of integrated ocean policies in South Korea.[4] Besides, the 1st Ocean Korea 21 (OK 21) during 2001-2010 was planned by MOMAF in 2000 as a new vision and strategies to cope with the changes in ocean environment, and improve the international competitiveness in ocean power.

But the MOMAF was disassembled by the previous administration in 2008. The functions of maritime transportation, marine environment policy, and so on were transferred to the Ministry of Land, Transportation and Maritime Affairs (MLTM), and that of fishery to the Ministry for Food, Agriculture, Forestry, and Fishery (MIFAFF). In this situation, the MLTM made the 2nd OK 21 during 2011–2020 in 2010. After then, the present administration reestablished the Ministry of Ocean and Fisheries (MOF) in accordance with demand of the people in 2013.

Otherwise, South Korea's ocean industries including shipbuilding, shipping, offshore platform constructing, and

[1] United States Department of Labor, International Comparisons of GDP per Capita and per Hour, 1960–2011, November 7, 2012 (http://www.bls.gov/ilc/intl_gdp_capita_gdp_hour.htm#table01)

[2] Seoung-Yong Hong, Marine policy in the Republic of Korea, Marine Policy, Volume 19, Issue 2, Pages 97-113, March 1995.

[3] Korea Maritime Institute, The strategy of development the ocean based new national wealth, 2009.

[4] Sung Gui Kim and Hee Jung Choi, The evaluation of the 2nd ocean plan in Korea: focused on the implementing power of the plan, Coastal Management, Volume 41, Issue 6, Pages 470-480, 2013.

fisheries have achieved enormous improvement. According to the MOMAF's report[5], which was written by the Arthur D. Little in 2006, South Korea's ocean power[6] was the 12th among 40 ocean countries. In the case of the ocean industries, its ship and offshore platform building industry was the top in the world, and shipping and port industry had also world class competitiveness.

However, it is difficult to know the scale and status of the ocean industries in the South Korean national economy. That's because Korea has not ocean economy statistics systems, and official agency in charge of estimating the ocean economy. Global ocean countries, such as the USA, China, and EU, have ocean economy statistics systems. In the case of the USA, the National Ocean Economic Program (NOEP) has provided a full range of the most current economic and socioeconomic information available on changes and trends along the USA coast and in coastal waters. Especially, NOEP produced the concept of both the ocean economy and coastal economy. But, in Korea, the ocean economy has been estimated whenever the need arose, and the coastal economy hasn't been estimated yet.

These situations require researchers to provide policy-makers, decision-makers, industry, and general public with reliable information of the ocean economy and coastal economy. So this paper aims to analyze the status of the ocean economy and coastal economy in the South Korean national economy. With these general aims, after this introduction, the second section will introduce the ocean economy and coastal economy, and the cases by country. The third section will analyze the status of the ocean economy in the South Korean national economy, and the fourth section will also show it of the coastal economy. Lastly, the final section will sum up the conclusions.

2. Studies of the ocean economy and coastal economy

2.1 Cases of the ocean economy and coastal economy

After the late 1990s, many countries including the USA and the UK produced the ocean economy. These studies aim to provide the governments with baseline information on the economic contribution from the oceans for national ocean investment, planning and protection strategies.[7] According to the research of countries around the world, the ocean economy or ocean industries produce around from 1% to 5% of their own country's GDP.

In case of the USA, J.T. Kildow et al.[8] divided its ocean economy into six sectors and estimated the value of it. This study reports that the ocean economy in 2004 contributed over $138 billion to its GDP or as 1.2% of Gross Domestic Product (GDP) and comprised over 2.3 million jobs. David Pugh[9] selected 18 categories as the ocean economy and estimated the economics and employment statistics for marine activities in the UK economy. For 2005-2006, direct marine-related activities comprised 4.2% of the total UK GDP to a total value of £46 billion. Of the total UK employment, 890,416 jobs were marine-related, 2.9% of the total. In case of Canada, Gardner Pinfold[10] divided its ocean economy into nine sectors. The Canadian ocean sector activities generated an estimated $17.7 billion in direct GDP in 2006, creating over 171,340 direct jobs. The ocean sector accounted for 1.2% of the Canadian GDP and for 1.1% of total Canadian employment.

Régis Kalaydjian et al.[11] studied a survey of thirteen marine related activities in France and an assessment of their economic weight in terms of value added and employment estimates. In 2007, the French marine economy generated a value added of nearly 27,598 billion euro and nearly 484,548 jobs. The Allen Consulting group[12] provided estimates of the economic contribution of six marine industries in Australia. For 2002-2003, the direct

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[5] MOMAF, The Korea's future ocean strategies, August 2006.

[6] 'Ocean Power' in this report was defined as the total compatibility related to the ocean resources, ocean industries, ocean environment and safety, ocean science and technology, ocean security, and so on.

[7] J.T. Kildow and A. McIlgorm, The importance of estimating the contribution of the oceans to national economies, Marine Policy 34, 367–374, 2010.

[8] J.T. Kildow et al., State of the U.S. ocean and coastal economies, 2009.

[9] David Pugh, Socio-economic indicators of marine-related activities in the UK economy, March 2008.

[10] Gardner Pinfold, Economic impact of marine related activities in Canada 2009.

[11] Régis Kalaydjian et al., French marine economic data 2009, 2009.

[12] Allen Consulting group, The economic contribution of Australia's marine industries: 1995-96 to 2002-03, June 2004.

economic contribution of the marine industries was approximately $26.7 billion in value added, which was around 3.6% of total industry value added in the Australian economy, and was approximately 253,130 persons employed.

All of the marine activities included in the report, which was prepared by Statistics New Zealand[13], were classified into nine categories. The New Zealand ocean economy contributed $3.3 billion towards its economy as 2.9% of total GDP. It also contributed 21,000 filled jobs existed in the New Zealand ocean economy. Ireland's ocean economy is comprised of thirteen categories. According to the Karyn Morrissey et al[14], in 2007, the direct economic value of the Irish ocean economy was €1.44 billion or approximately 1% of GDP, and the sector provided employment for approximately 17,041 jobs.

The China ocean economy is consist of total 28 big classes and has been estimated by the China Marine Information Economic Network (CMIEN). According to the 'Statistical bulletin of China's ocean economy 2011'[15], in 2012, the estimated total production of their ocean sectors was nearly 4,557 billion yuan or as 9.6% of its GDP, and contributed nearly 34 million jobs. For the case of Japan, Nomura Research Institute (NRI)[16] studied thirty three ocean industries in Japan in 2009. In 2005, the Japan ocean industries generated a total value added production of 7,863 billion yen or as 1.6% of its GDP, and approximately 1 million jobs. In South Korea, K.H. Hwang et al.[17] estimated its thirteen ocean sectors in 2011. According to this study, the South Korean ocean economy contributed 13,435 billion won in total value added production or 4.9% of GDP, and 919,314 jobs.

Table 1. The estimation of the ocean economy by country

Country	Author	Date of study	Date of data	$ Ocean sectors GDP/GVA	% of GDP/GVA	Employment
USA	J.T. Kildow et al.	2009	2004	US$138bn	1.2% GDP	2,323,904
UK	David Pugh	2008	2005-2006	GB£46bn	4.2% GDP	890,416
Canada	Gardner Pinfold	2009	2006	CA$17.7bn	1.2% GDP	171,340
France	Régis Kalaydjian et al.	2009	2007	Eur€28bn	1.4% GDP	484,548
Australia	Allen Consulting Group	2004	1996-2003	Au$26.7bn	3.6% GVA	253,130
New Zealand	Statistics NZ	2006	1997-2002	NZ$3.3bn	2.9% GDP	21,000
Ireland	Karyn Morrissey et al.	2010	2007	Eur€1.44bn	1.0% GDP	17,041
China	CMIEN	2012	2011	CNY4,557bn	9.6% GDP	34,200,000
Japan	NRI	2009	2005	JPY7,863bn	1.6% GDP	981,234
South Korea	K.H. Hwang et al.	2011	2008	KRW13,435bn	4.9% GDP	919,314

Source: Report by country

With regard to the coastal economy, the USA has estimated it from 1997 but most countries have not measured up to date. In the beginning, the NOEP in the USA also focused on the ocean economy like other countries. But within a few years, the NOEP became interested in the coastal economy as well as the ocean economy. That's why the coastal economy was recognized as a significant driver of the national economy.

According to the NOEP's website, in 2012, four in five of those Americans living in coastal and Great Lakes states generated 83.5% of the nation's output. The thirty coastal and Great Lakes states had employed 107.3 million people[18], and contributed $11.2 trillion to the national GDP. Shore-adjacent counties, where the real concentration of the USA economic activity occurs, had 108.3 million people, 48.6 million jobs, and contributed $5.7 trillion to the USA economy. With only 18% of the USA land area, these counties accounted for 37.1% of population and 42.5% of the national economic output in 2012. The coastal economy in 2012 was more than two-thirds of the USA, whether measured by establishments, employment, wages, and GDP.

[13] Statistics New Zealand, New Zealand's marine economy: 1997–2002, 2006.
[14] Karyn Morrissey et al, Ireland's ocean economy, December 2010.
[15] China Marine Information Economic Network, Statistical bulletin of China's ocean economy 2012, January 2013.
[16] Nomura Research Institute, The report of Japan marine industry, March 2009.
[17] K.H. Hwang et al., Assessment of gross ocean products in Korea, 2011.
[18] Not including self-employed.

Table 2. The coastal economy components in the USA (2012)

County	Establishments (million)	Employment (million)	Wages ($billion)	GDP ($billion)
All counties	9.1 (100.0%)	131.7 (100.0%)	5,644.0 (100.0%)	13,430.6 (100.0%)
All coastal counties	7.5 (81.9%)	107.3 (81.5%)	4,740.8 (84.0%)	11,219.9 (83.5%)
Shoreline adjacent counties	3.5 (38.6%)	48.8 (37.0%)	2,354.0 (41.7%)	5,709.3 (42.5%)
Coastal zone counties	3.9 (43.1%)	55.2 (41.9%)	2,647.8 (46.9%)	6,418.3 (47.8%)
Watershed counties	4.7 (51.5%)	67.0 (50.9%)	3,118.5 (55.3%)	7,550.7 (56.2%)
Inland counties	2.3 (25.4%)	38.1 (29.0%)	1,480.7 (26.2%)	3,668.7 (27.3%)

Note: All dollar values are converted to year 2005 equivalents.
Source: NOEP Website (http://www.oceaneconomics.org)

2.2. Difference between the ocean economy and coastal economy

Even though the ocean economy and coastal economy has been studied, they have still problems that should be solved. For the case of the ocean economy, as J.T. Kildow et al. explained very well, the differences in the ocean economy as a percentage of the total economy is potentially an indicator of national economic dependence on the ocean and of economic diversity within each nation. Especially, the united definition and scope of them has not been established all over the world yet. As can be seen in cases by country, the definition, classification standard and scope of it are very various. This situation makes it difficult to compare the ocean economy among the countries. With regard to the coastal economy, the USA only estimated it therefore comparisons of it among the countries are not available.

As mentioned in chapter 1, the NOEP explained the ocean economy and coastal economy very well. The difference between the ocean economy and coastal economy is shown in Fig.1. They have something in common but are not the same.

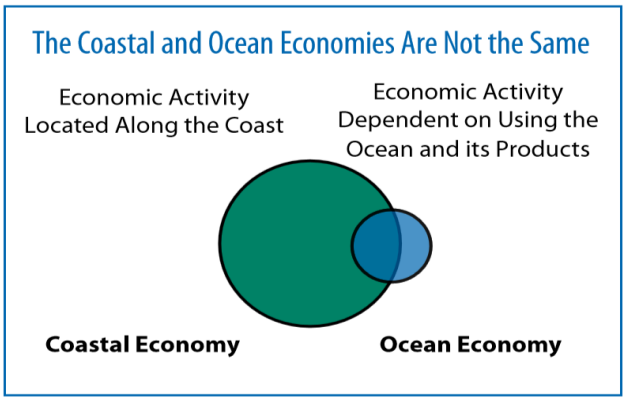

Fig.1. Difference between the ocean economy and coastal economy

Charles S. Colgan (2007),[19] who is chief market economist in the NOEP, explains that two concepts underlie the data on economic activity associated with the ocean, and the two are related but not identical:

- 'The ocean economy' consists of all economic activity which derives all or part of its inputs from the ocean or Great Lakes. The definition of the ocean economy is a function of both industry and geography and is described in detail below. While most of the ocean economy is located in coastal regions, some of the ocean economy (for example, some boat building and seafood retailers) is located in non-coastal regions.
- 'The coastal economy' consists of all economic activity in the coastal region, and is thus the sum of employment, wages, and output in the region. Some of the coastal economy is the ocean economy, but the coastal economy incorporates a broader set of economic activity.

[19] Charles S. Colgan, A guide to the measurement of the market data for the ocean and coastal economy in the national ocean economics program, January 2007.

Otherwise, K.S. Park (2013) on the ocean economy and Charles S. Colgan (2007) on the coastal economy can be regarded as the examples for this paper. K.S. Park (2013) provided concrete practical proposals on the definition, classification standards and scope of the ocean economy from a global perspective. According to this paper, the ocean economy is defined as the economic activities that directly or indirectly take place in the ocean, use ocean's outputs, and contribute to inputs to ocean activities.

To determine the scope of the ocean economy, nearly 50 common words are extracted from the case of ten ocean countries, and three characteristics of the scope of the ocean economy are inferred from them. These are 'in the ocean', 'from the ocean', and 'to the ocean'. After then, common words were integrated or separated according to the supply chain and the relationship among the ocean economies. Through this logical basis, twelve sectors are rebuilt with the newly proposed classification standard as shown in Table 3.

Table 3. Rebuilding the classification system of the ocean economy

Sectors	Definition and categories
Fisheries	The economic activity related to production, processing and distribution of seafood.
Marine mining	The economic activity related to production, extraction and processing of non-living resources in seabed or seawater, but it doesn't include offshore oil & gas.
Offshore oil & gas	The economic activity related to exploration and production of offshore oil and gas, includes operating and maintaining equipment related to this activity, but excludes building them.
Shipping and port	The economic activity related to transportation of freight and passengers through the ocean and river, and related to operation and management of port.
Marine leisure & tourism	The economic activity related to marine and coastal leisure and tourism, which includes eating & drinking places, hotels & lodging places, marinas, marine sporting goods retailers, zoos, aquarium, recreational vehicle parks & campgrounds and so on.
Marine construction	The economic activity which includes construction in the ocean and related to the sea.
Marine equipment manufacturing	The economic activity which includes manufacturing of marine equipment and materials, such as various machinery, valve, cable, sensor, ship materials and so on (no building, repair and/or conversion and supply services).
Ship building & repair	The economic activity related to building, repair and maintenance of ships, boats, offshore platforms, and OSVs.
Marine business services	The economic activity related to services to support ocean industry like insurance and finance.
Marine R&D and education	The economic activity which related to research and development, education, training.
Marine administration	The economic activity related to defense, coast guard, security, navigation and safety, coastal & marine environmental protection by government and public or private organization.
Others	The economic activity which not be included in another ocean economy, and also includes economic activity related to development of the ocean resources, which are ocean renewable energy, marine living resources, seawater and spatial but just enter into the early commercial stage.

For the coastal economy, Charles S. Colgan (2007) shows us the definition of the coastal economy very well. The coastal economy relies on a tiered approach of geography extending inland from the shorelines of the ocean or Great Lakes. The definitions of tiers are based on zip code and county boundaries. The following categories are used starting with the shore-line and proceeding in an inland direction:

- Near-Shore: establishments or population located in a zip code that is immediately adjacent to an ocean, Great Lake, or included river or bay.
- Shore-Adjacent Coastal Zone County: a county touched in whole or in part by a state's coastal zone for purposes of the Coastal Zone Management Act of 1972 as defined by that state and which is adjacent to an ocean, Great Lake, or included river or bay. This includes near-shore zip codes.
- Non–shore-Adjacent Coastal Zone County: a county touched in whole or in part by a state's coastal zone for purposes of the Coastal Zone Management Act of 1972 as defined by that state and which is not adjacent to an ocean, Great Lake, or included river or bay.
- Coastal Zone Counties: counties comprised of shore-adjacent plus non-shore adjacent counties. For Illinois, which does not have a Federal Coastal Zone Management program, the coastal zone counties are defined as Cook and Lake counties. Both are shore-adjacent.
- Non-Coastal Zone Watershed County: a county that is located outside of the coastal zone, but within a

coastal watershed.

- Coastal Watershed County: a county located within a coastal watershed as defined by the USA. Geological Survey. Watershed counties include all coastal zone counties and non-CZ watershed counties.
- Inland County: a county located outside a coastal watershed.

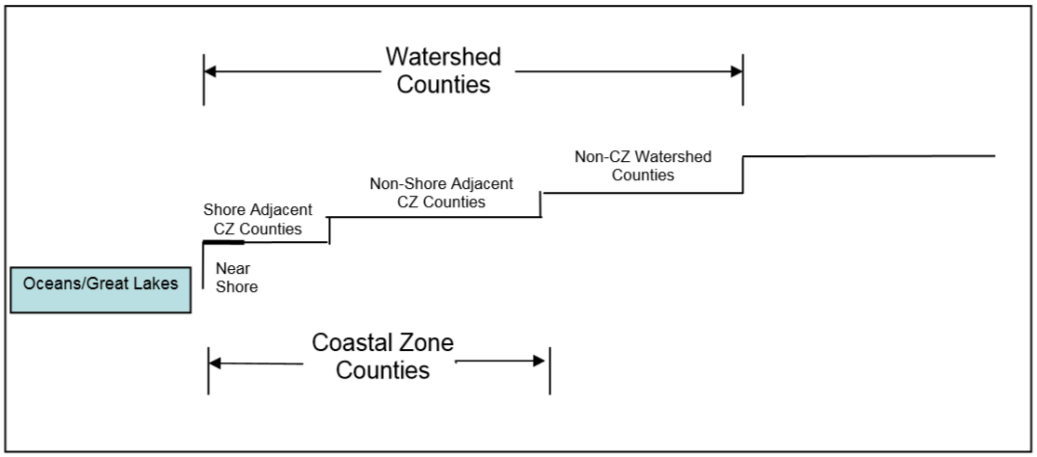

Fig.2. Definition of the coast in the coastal economy by the NOEP

3. Estimation of the ocean economy in South Korea

3.1 Introduction

There is no statistical classification for the ocean economy as a distinct category in Korea. Therefore, the ocean economy data needs to be compiled in accordance with indicators which have been categorized as the ocean economy.

3.2 State of the ocean economy in Korea

3.2.1. Fisheries

3.2.2. Marine mining

3.2.3. Offshore oil & gas

3.2.4. Shipping and port

3.2.5. Marine leisure & tourism

3.2.6 Marine construction

3.2.7. Marine equipment manufacturing

3.2.8. Ship building & repair

3.2.9. Marine business services

3.2.10. Marine R&D and education

3.2.11. Marine administration

3.2.12. Others

3.2.13. Sub-summary

4. Estimation of the coastal economy in South Korea

4.1. Introduction

As can be seen Chapter 2.2, Colgan divided the counties within thirty coastal states in the USA into four categories, which are shore adjacent counties, non-shore adjacent coastal zone (CZ)[20] counties, non-CZ watershed counties, and inland counties, according to a geographical adjacency from the shorelines. Both shore adjacent counties and non-shore adjacent CZ counties are categorized into the coastal zone counties, and watershed counties include coastal zone counties as well as non-CZ watershed.

Otherwise, as South Korea is a peninsula country, it also could be called as a coastal country. That's because its total land area is 100,033㎢, and all areas could be drove in a day. Besides, it is approximately one quarter of California in the USA, which is classified as a coastal state. So South Korea economy could be regarded as the coastal economy. However, when the definition of the coastal economy is applied to South Korea, it must be rearranged unlike the USA.

In South Korea, with regard to the definition of the coast, it is divided into coastal water zone and coastal land zone. Especially, the coastal land zone is defined as land areas within 500m from shoreline (in the cases of port, fishing port, and industrial complex within 1km) including uninhabitable islands by Coastal Management Act (CMA). According to CMA, there aren't non-shore adjacent CZ counties in South Korea because the counties within 1km from shoreline represent just shore adjacent counties, which are touched in whole or in part by a coastal zone as defined by CMA and which are adjacent to an ocean. The number of shore adjacent counties is 75.

With regard to coastal watershed, MOF defines watershed as surrounding areas where river flows and gathers, and coastal watershed that touched in whole or in part by a coast. The National Fisheries Research and Development Institute (NFRDI), which is one of the governmental organization, divided coastal watershed into 66 zones, and these zone included 123 counties.[21] However, this paper just regards 23 counties as non-CZ watershed counties excluding 100 counties, as follows; 1) 7 counties which are out of coastal provinces, 2) 75 counties which are shore adjacent counties, and 3) 18 counties which the number of low level divisions of the county are under half of them.[22]

Table 4.1 shows the basic information by county in South Korea. In 2010, the number of all counties is 230, the population is over 50 million, and the house is 14.7 million. Among them, coastal zone counties are 75, and 32.6% of all counties. The population of the coastal zone counties accounted for 26.9%, and the house accounted for 32.9%. Within 98 watershed counties, the population accounted for 43.9%, and the house accounted for 51.8%.

Table. 4.1. The basic information of the counties by type in South Korea (2010)

Counties by type				Number	Population(1,000)	House(1,000)
Coastal counties	Watershed counties	Coastal zone counties	Shore adjacent counties	75	13,569	4,802
			Non-shore adjacent CZ counties	-	-	-
		Non-CZ watershed counties		23	8,590	2,803
	Inland counties			77	11,025	2,480
Non-coastal counties				55	17,332	4,592
All counties				230	50,516	14,677

Source: Korean Statistical Information Service (KOSIS)

[20] With regard to the coastal zone (CZ), the inland boundaries of the coast for economic and demographic analysis are even less clear than the offshore boundaries. In the case of the USA, definitions have included arbitrary distances such as 100km from the shore, or a "days drive" from the shore, which could easily change depending on transportation systems and their capacity.

[21] The National fisheries research and development institute, A study on the management policy of land based pollution sources, January 2009.

[22] Although coastal watershed is smaller than inland, if 18 counties are included, the coastal economy could be overestimated.

Otherwise, this paper will focus on two years, which are 2005 and 2010, because of limits of time series data. The indexes for the coastal economy are 'Gross Regional Domestic Products (GRDP)', 'Employment', and 'Company' on reference to the NOEP. But 'Wage' is excluded unlike the NOEP because of absence of data. These data come from mainly the Korean Statistical Information Service (KOSIS), and partially the statistical yearbook by region. Otherwise, the amount of money that used in this paper are deflated into 2005 constant prices, and are converted KRW into US$ at the year average exchange rate.

4.2 State of the coastal economy in South Korea

4.2.1. GRDP

In 2010, total GRDP in South Korea amounted to $922 billion, up 7.6% from 2005. Among them, the GRDP of 11 coastal provinces was $617 billion, and 66.9% of total GRDP. Within coastal provinces, the coastal counties contributed $323 billion, non-CZ watershed counties $131 billion. The coastal counties contributed 35.0% to the South Korea economy and 52.3% to the coastal provinces.

In comparison of 2005, the coastal counties showed the highest growth of 15.6% compared with 10.5% of coastal provinces and 7.6% of all counties. The growth of GRDP in non-CZ watershed counties also showed the higher growth of 11.2% than all counties. This implies that the growth of coastal areas was faster than non-coastal areas.

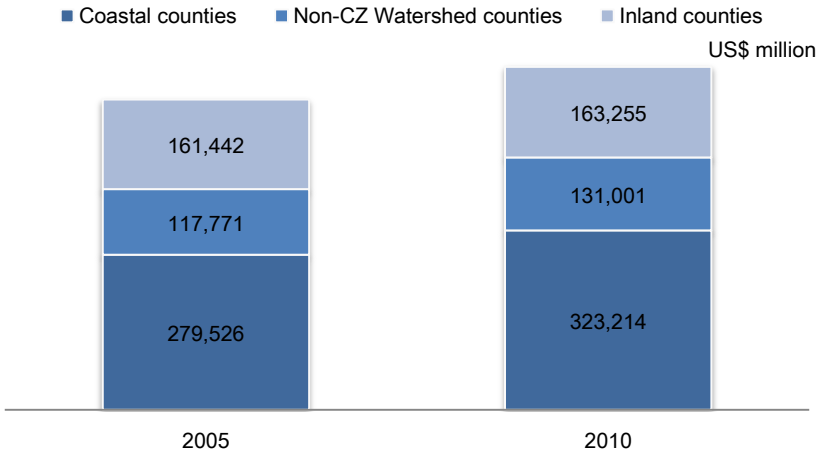

Fig 4.1. GRDP by county within coastal provinces (2005, 2010)

Table 4.2 shows us the GRDP by coastal province, coastal county, and non-CZ watershed county in 2010. In the case of the coastal provinces, the GRDP of Gyeonggi, which amounted to $197 billion and accounted for 31.9% of coastal provinces' GRDP, was the biggest among the coastal provinces. The GRDP of Chungnam and Gyeongnam, which followed Gyeonggi, accounted for more than 10%. With regard to the GRDP of the coastal counties, Gyeonggi also was the biggest. The GRDP of the coastal counties within Gyeonggi accounted for 7.6 times more than it of Cheju, which was the smallest. The GRDP of coastal counties within Ulsan, Chungnam and Chunnam, which followed Kyunggi, accounted for more than 12%. Especially, in case of the GRDP of the non-CZ watershed counties, Gyeonggi accounted for more than half of total GRDP within them. The GRDP of non-CZ watershed counties within Chungnam, Jeonbuk, and Gyeongnam accounted for more than 10%.

However, with regard to the proportion of the GRDP within coastal counties, Cheju was the biggest because Cheju is totally classified as coastal counties. The coastal counties within Ulsan, which followed Cheju, accounted for 96.6% of its GRDP. In case of Gyeonggi, Kangwon, Jeonbuk, and Gyeongbuk, the proportion of the GRDP within coastal counties was about 30% of its GRDP.

Table. 4.2. GRDP by county within coastal provinces (2010)

	Coastal provinces		Coastal counties			Non-CZ Watershed counties		
	$ million	% of total	$ million	% of total	% of province	$ million	% of total	% of province
Total	617,470	100.0%	323,214	100.0%	52.3%	131,001	100.0%	21.2%
Busan	46,190	7.5%	27,929	8.6%	60.5%	9,626	7.3%	20.8%
Incheon	44,855	7.3%	35,804	11.1%	79.8%	2,890	2.2%	6.4%
Ulsan	40,141	6.5%	38,766	12.0%	96.6%	1,375	1.0%	3.4%
Gyeonggi	196,893	31.9%	60,577	18.7%	30.8%	70,697	54.0%	35.9%
Kangwon	22,859	3.7%	7,377	2.3%	32.3%	557	0.4%	2.4%
Chungnam	65,389	10.6%	39,007	12.1%	59.7%	18,338	14.0%	28.0%
Jeonbuk	25,986	4.2%	8,435	2.6%	32.5%	14,184	10.8%	54.6%
Jeonnam	44,370	7.2%	39,059	12.1%	88.0%	260	0.2%	0.6%
Gyeongbuk	59,416	9.6%	20,084	6.2%	33.8%	-	0.0%	0.0%
Gyeongnam	63,467	10.3%	38,272	11.8%	60.3%	13,076	10.0%	20.6%
Jeju	7,904	1.3%	7,904	2.4%	100.0%	-	0.0%	0.0%

Otherwise, Figure 4.2 shows us the change of the GRDP by coastal province and county. From 2005 to 2010, the GRDP growth of the coastal counties (15.6%) generally was higher than it of coastal provinces (10.5%). In addition, the GRDP growth of coastal counties within 7 coastal provinces, which excluding Kangwon, Jeonnam, Gyeongbuk, and Jeju, exceeded its GRDP growth. Especially, in case of Gyeonggi and Chungnam, the change of the coastal counties GRDP accounted for more 50%, which was over 3 times higher than average for the coastal provinces.

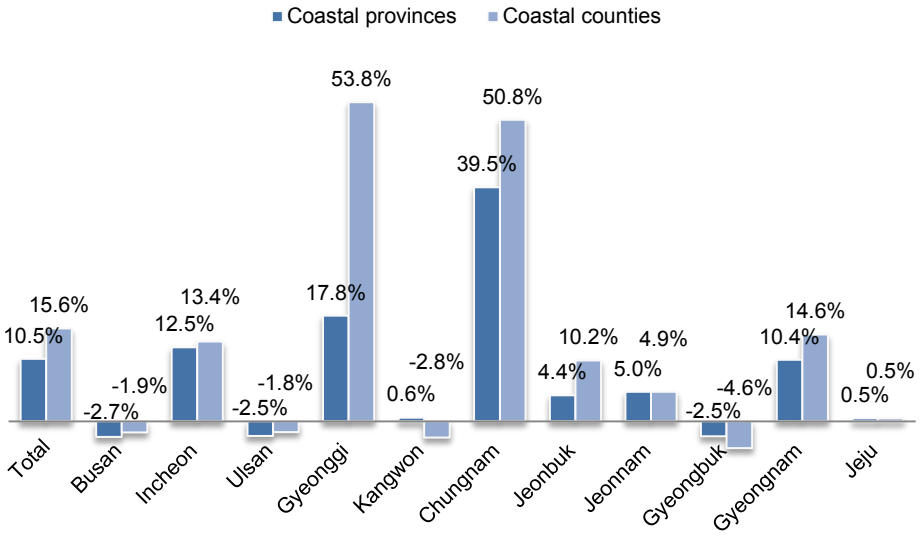

Fig 4.2. Comparison of the change of the GRDP growth by coastal province (2005-2010)

4.2.2. Employment

In 2010, total employment in South Korea amounted to 17.5 million, up 16.5% from 2005. Among them, the employment of 11 coastal provinces was 10.9 million, and 61.5% of total employment. Within coastal provinces, the coastal counties employment amounted to 4.9 million, non-CZ watershed counties 2.7 million. The coastal counties contributed 27.5% to all provinces, 44.8% to the coastal provinces.

In comparison of 2005, the coastal provinces employment showed the higher growth of 17.3% compared with 16.5% of all counties. But the coastal counties showed the lower growth of 15.9% compared with all counties as well as coastal provinces. Otherwise, the non-CZ watershed counties showed the highest growth of 21.5%. This implies that the employment growth of 11 coastal provinces for last 5 years exceeded the total employment in South Korea, and it was mainly caused by the growth in non-CZ watershed counties.

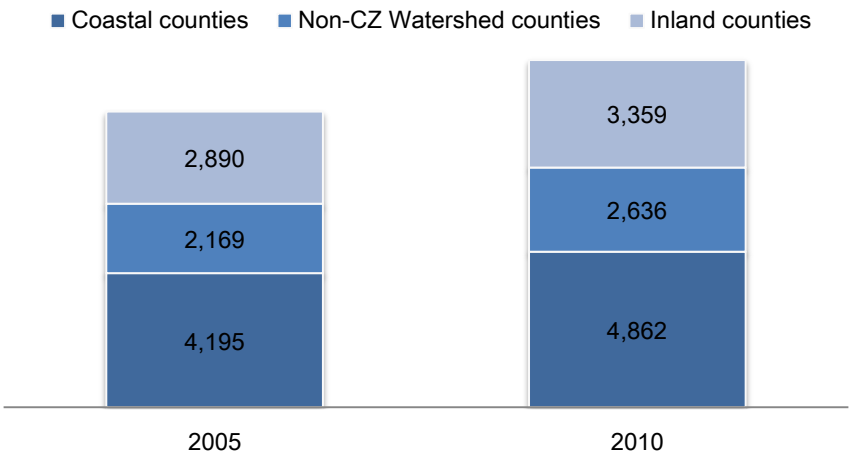

Fig 4.3. Employment by county within coastal provinces (2005, 2010)

As can be seen in Table 4.3, in 2010, the employment of Gyeonggi, which was the biggest among the coastal provinces, amounted to around 3.8 million and accounted for 34.6% of coastal provinces employment. Both Busan and Gyeongnam, which followed Gyeonggi, accounted for more than one million. With regard to the coastal counties, Gyeonggi also was the biggest. The coastal counties within Gyeonggi was 6.2 times more than it of Jeonbuk, which was the smallest. The employment of coastal counties within Busan, Incheon, and Gyeongnam accounted for more than 0.6 million. For both Jeonbuk and Kangwon, the employment of coastal counties was less than one-third of these provinces. In the case of the non-CZ watershed counties, Gyeonggi accounted for 1.3 million, and 49.7% of these counties.

However, with regard to the proportion of the employment within coastal counties, Cheju and Ulsan was the biggest like the case of GRDP. In the case of Gyeonggi, the employment within coastal counties was the biggest (nearly 1 million), but the proportion of the employment was the smallest (25.5%).

Table. 4.3. Employment by county within coastal provinces (2010)

	Coastal provinces		Coastal counties			Non-CZ Watershed counties		
	thousand	% of total	thousand	% of total	% of province	thousand	% of total	% of province
Total	10,856	100.0%	4,862	100.0%	44.8%	2,636	100.0%	24.3%
Busan	1,205	11.1%	644	13.2%	53.5%	285	10.8%	23.6%
Incheon	828	7.6%	609	12.5%	73.6%	71	2.7%	8.6%
Ulsan	434	4.0%	390	8.0%	89.7%	45	1.7%	10.3%
Gyeonggi	3,758	34.6%	958	19.7%	25.5%	1,310	49.7%	34.9%
Kangwon	490	4.5%	171	3.5%	34.9%	16	0.6%	3.3%
Chungnam	702	6.5%	302	6.2%	43.0%	261	9.9%	37.2%
Jeonbuk	566	5.2%	153	3.2%	27.1%	352	13.3%	62.2%
Jeonnam	570	5.2%	476	9.8%	83.5%	7	0.3%	1.2%
Gyeongbuk	927	8.5%	319	6.6%	34.4%	-	0.0%	0.0%
Gyeongnam	1,173	10.8%	637	13.1%	54.3%	289	11.0%	24.6%
Jeju	203	1.9%	203	4.2%	100.0%	-	0.0%	0.0%

Otherwise, Figure 4.4 shows us the change of the employment by coastal province and county. From 2005 to 2010, the employment growth of the coastal provinces (17.3%) was higher than it of all provinces (16.5%). However, the coastal counties (15.9%) were lower than coastal provinces. For 5 years, the employment growth of the coastal provinces was mainly caused by it of non-CZ watershed counties, which was 21.5%.

For the coastal counties, the employment growth of Jeonbuk and Chungnam shows us a significant change, which was each up 40.0% and up 25.2% compared with 2005. But, in the case of Incheon, Gyeonggi, Kangwon, and Gyeongnam, the employment growth of coastal counties was lower than it of coastal provinces.

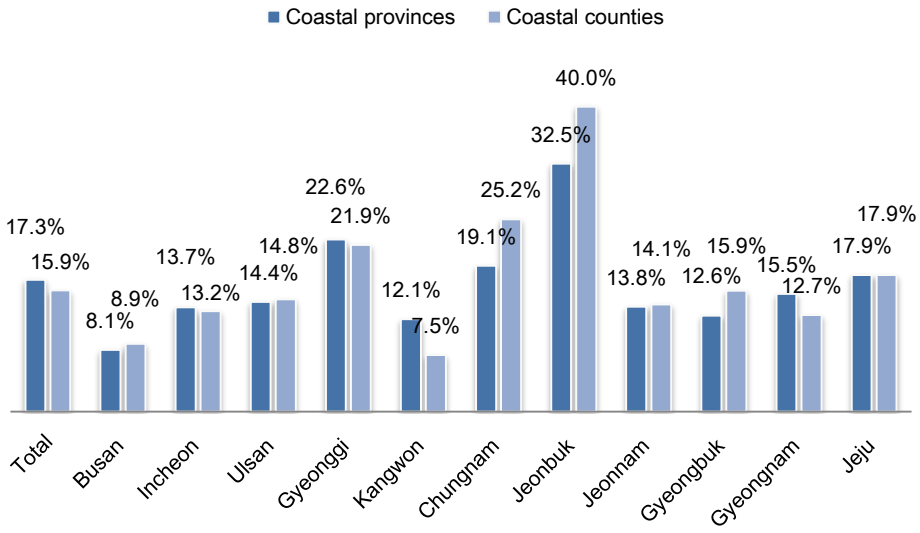

Fig 4.4. Comparison of the change of the employment growth by coastal province (2005-2010)

4.2.3. Companies

For the number of companies, in 2010, total company in South Korea amounted to about 3.4 million, and up 4.6% from 2005. Among them, the company of 11 coastal provinces was 2.1 million, and 63.8% of company within all provinces. Within coastal provinces, the company of the coastal counties amounted to 0.9 million, non-CZ watershed counties 0.5 million. The coastal counties contributed 27.7% to all provinces, 43.4% to the coastal provinces.

In comparison with 2005, the companies of the coastal provinces showed the higher growth of 6.9% compared with 4.9 of all counties. However, the coastal counties showed the higher growth of 6.3% compared with all counties, but showed the lower growth compared with the coastal provinces. Otherwise, the non-CZ watershed counties showed the highest growth of 9.3%. This implies that the company growth of coastal provinces for last 5 years exceeded the non-coastal areas, and it was mainly caused by the growth in the non-CZ watershed counties.

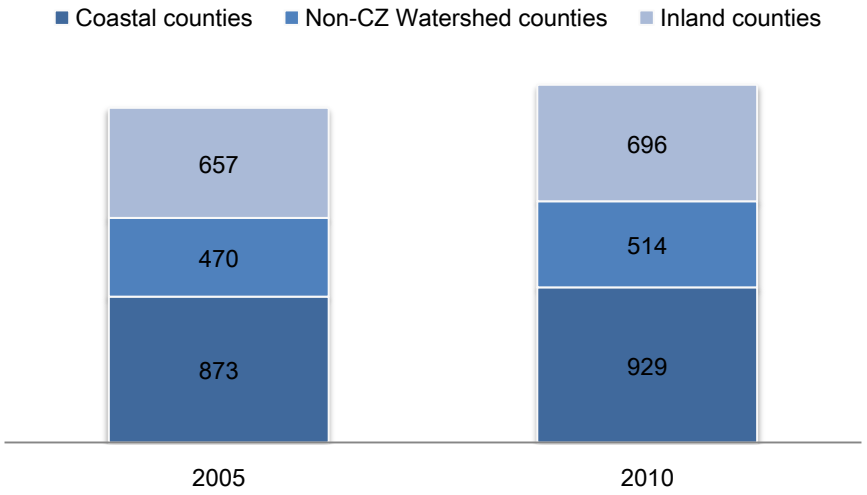

Fig 4.3. Company by county within coastal provinces (2005, 2010)

Table 4.2 shows us the company by coastal province, coastal county, and non-CZ watershed county in 2010. In the case of Gyeonggi, the company amounted to around 0.7 million, and accounted for 32.1% of coastal provinces. Busan and Gyeongnam, which followed Gyeonggi, accounted for more than 0.2 million. With regard to the coastal

counties, Gyeonggi also was the biggest. The company of the coastal counties within Gyeonggi was 4.5 times more than it of Jeonbuk, which was the smallest. The company of coastal counties within Busan, Incheon, Jeonnam, and Gyeongnam, accounted for more than 0.1 million. In case of the non-CZ watershed counties, Gyeonggi accounted for 0.2 million, and 46.3% of these counties.

However, with regard to the proportion of the company within coastal counties, 4 provinces such as Incheon, Ulsan, Jeonnam, and Cheju, accounted for more 70% of its provinces. Otherwise, Gyeonggi and Jeonbuk showed that the proportion of the company within coastal counties was less than 30%.

Table. 4.3. Company by county within coastal provinces (2010)

	Coastal provinces		Coastal counties			Non-CZ Watershed counties		
	thousand	% of total	thousand	% of total	% of province	thousand	% of total	% of province
Total	2,138	100.0%	929	100.0%	43.4%	514	100.0%	24.0%
Busan	260	12.2%	132	14.3%	50.9%	66	12.8%	25.3%
Incheon	164	7.7%	117	12.6%	71.4%	16	3.1%	9.9%
Ulsan	71	3.3%	56	6.0%	79.3%	15	2.9%	20.7%
Gyeonggi	687	32.1%	158	17.0%	23.0%	238	46.3%	34.7%
Kangwon	118	5.5%	44	4.8%	37.4%	4	0.8%	3.4%
Chungnam	134	6.3%	57	6.1%	42.3%	47	9.1%	34.8%
Jeonbuk	125	5.8%	35	3.8%	27.9%	75	14.5%	59.8%
Jeonnam	122	5.7%	104	11.2%	84.7%	2	0.4%	1.7%
Gyeongbuk	187	8.7%	64	6.9%	34.5%	-	0.0%	0.0%
Gyeongnam	225	10.5%	115	12.4%	51.3%	52	10.1%	23.1%
Jeju	46	2.1%	46	4.9%	100.0%	-	0.0%	0.0%

From 2005 to 2010, the company growth by county shows us the similar pattern with the case of the employment. The company growth of the coastal provinces (6.9%) was higher than it of all provinces (4.6%). However, the company growth of coastal counties (6.3%) was lower than it of coastal provinces. For 5 years, the company growth of the coastal provinces was mainly caused by it of non-CZ watershed counties, which was 9.3%.

The coastal counties within Gyeonggi showed the highest growth (20.6%). Ulsan and Chungnam accounted for more than 10%. However, Busan accounted for just 0.2%, and Jeonnam showed even negative growth.

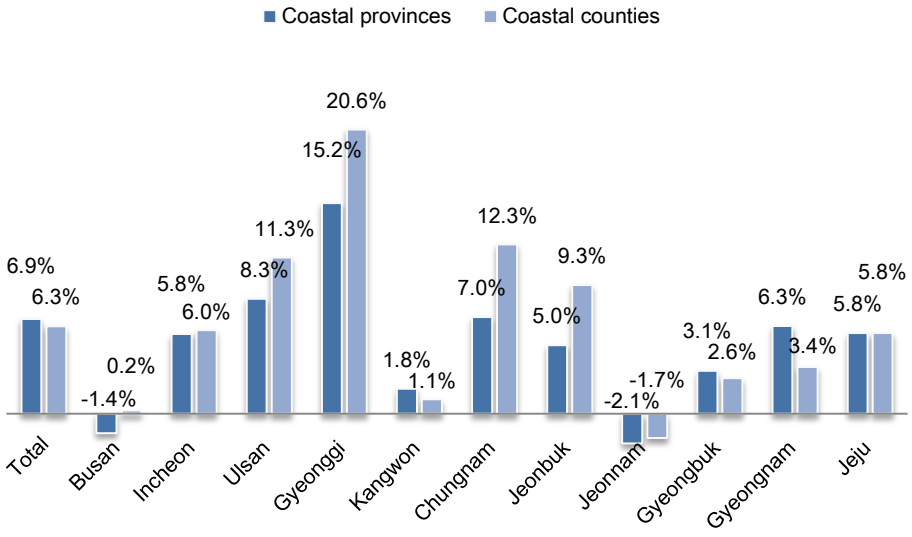

Fig 4.6. Comparison of the change of the company growth by coastal province (2005-2010)

4.2.4. Sub-summary

In South Korea, the coastal economy has made valuable contributions to its economy, whether measured by GRDP, employment, or company. 11 coastal provinces' share of them accounted for more than 60%, and GRDP even touched to nearly 67%. In the case of watershed counties, which include coastal counties and non-CZ watershed counties, the contribution ratio was 49.2% in the GRDP, 42.5% in the employment, and 43.0% in the company. Coastal counties contributed 35% to South Korea economy in the GRDP.

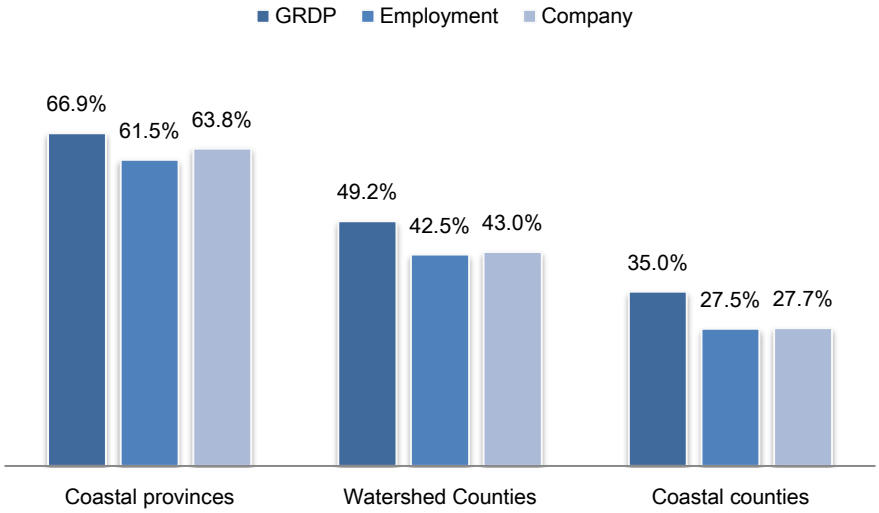

Fig 4.7. Comparison of the contribution by county (2010)

From 2005 to 2010, the change of growth in the coastal provinces has generally higher than all counties. The change of growth in the coastal provinces accounted for 10.5% in the GRDP, 17.3% in the employment, and 6.9% in the company. Otherwise, the employment and company growth in the coastal counties was less than them in all counties. This implied that the employment and company growth in the coastal provinces were mainly caused by them of non-CZ watershed counties.

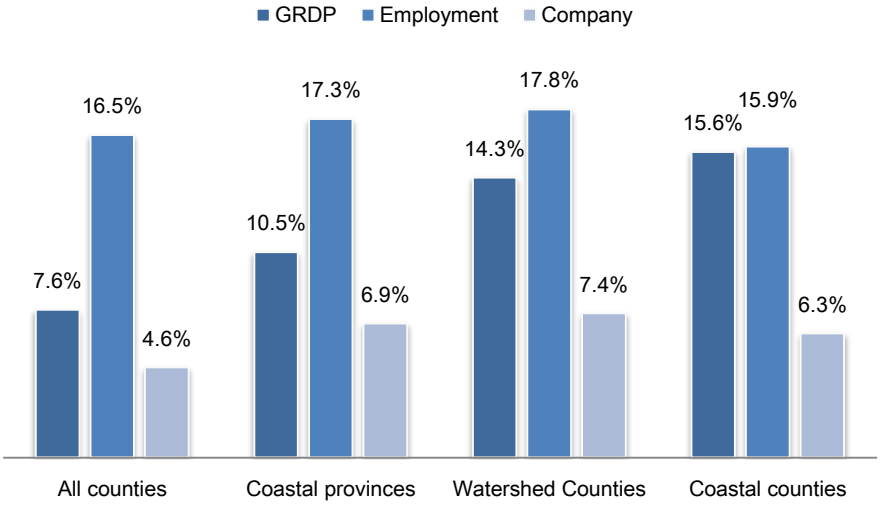

Fig 4.8. Comparison of the change of growth by county (2005-2010)

5. Conclusions

<Appendix>

Status of the counties by provinces in South Korea (2010)

Provinces		All counties	Coastal counties (Shore adjacent CZ counties)	Non-CZ watershed counties
Total		230	75	23
Metropolitan city	Seoul	25		
	Busan	16	10	3
	Daegu	8		
	Incheon	10	8	1
	Gwangju	5		
	Daejeon	5		
	Ulsan	5	4	1
Metropolitan province	Gyeonggi	31	5	7
	Kangwon	18	6	1
	Chungbuk	12		
	Chungnam	16	7	3
	Jeonbuk	14	4	4
	Jeonnam	22	17	1
	Gyeongbuk	23	5	
	Gyeongnam	18	7	2
	Jeju	2	2	