CHAPTER 2

Theories and Literature Review

2.1 Economic Theories

2.1.1 Theory of International Trade

International Trade takes place because of the varieties in profitable factors in different nations. The varieties about profitable variables foundation contrasts in cost in different countries and the price differences are the main principle reason for international trade. There are various preferences of international trade accruing to all the participants of trade (Bernard, Jensen, Redding, & Schott, 2007).

Efficient use of productive factors: The biggest advantage of international trade relates to the advantages accruing from territorial division of labor and international specialization. International trade allows the country to specialize in the creation of those commodities in which it enjoys special advantages. All countries are not equally endowed with natural resources and other facilities for the production of goods and services. Some countries would richly spend with land Also and forest resources should need abundant money assets. Some others have abundant supplies about labor power. Without global trade, a nation will must transform every last one of products it obliges regardless of the expenses included. Anyhow international trade empowers a nation to process just the individual's products in a similar playing argument alternately supreme preference. Furthermore import remains starting with different nations. This leads to international specialization or division of labor. This empowers effective utilization of the profitable elements with base consumption. Specialization might also prompt economies of scale might prompt diminish for expense of results Also benefits (Trebilcock & Howse, 2005).

Equality in commodity and factor prices: prompts a fairness of the prices for internationally exchanged goods and productive profitable components on the whole exchanging locales of the world. Trade should be remembered that the additions emerging starting with worldwide exchange should be accessible of the taking interest nations just if profession may be free and unfettered. In the exchange may be subjected to tariff and non-tariff confinements by those exchanging countries, those additions of global exchange get invalidated in the methodology on an expansive augment (Trebilcock & Howse, 2005).

Arguments for Free Trade: The debate about how free a trading system should be is an old one, with positions and arguments evolving over time. Free trade advocates typically argue that consumers benefit from open trade and forward many reasons in support of their theory (Krueger, 1999).

- Free trade and the resulting foreign competition forces US companies to keep prices low.
- Consumers have a large variety of goods and services to choose from in open markets.
- Domestic companies have to modernize plants, production techniques and technology to keep them competitive.
- Any kind of protectionist measures, like tariffs, often brings about retaliatory actions from foreign governments, which may restrict the sale of goods in their markets. This may result in inflation and unemployment in the US as the export industries suffer and prices of imports rise.
- An open trading system creates a better climate for investment and entrepreneurship than one in which there is fear of government cutting off access to certain markets.
- The cost of protection often outweighs the benefits.

International Trade shapes our everyday lives and the world we live in. Almost every time the purchases or sells have been made, we are joining in the global economy. Products and their mechanisms come to our store shelves from all over the world. Goods and services that a country buys from another country are called imports and goods and

services that are sold to other countries are called exports. However, governments and individuals repeatedly purchase and sell goods intercontinentally. Most international trade comprises of the purchase and sale of industrial equipment, consumer goods, oil and agricultural products. Services such as banking, insurance, transportation, telecommunications, engineering and tourism account for one-fifth of the world exports (Kanter, 1997)

According to Adam Smith said that trade between two nations is based on absolute advantage. When one nation is well-organized than another in the production of one product but is less efficient than the other nation in producing a second commodity, then each specializing can gain by both nations in the production of its absolute advantage and exchanging part of its output with the other nation for the product of its absolute disadvantage (Smith, 1937).

Moreover David Ricardo's Theory of Comparative Cost As in the absolute cost advantage theory, this theory also says that international trade is solely due to differences in the productivity of labor in different countries. However, it says that the trade between countries which do not have absolute advantage can be explained by the law of comparative advantage (Ruffin, 2002).The theory is based upon some assumption such as:

- Legacy of resources and all units of each individual resource are identical has fixed by Every country
- The factors of production are perfectly mobile between alternative productions within a country.
- Completely immobile between countries by factors of production
- Labor is the only primary input to production
- The relative ratios of labor at which the production of one good can be traded off for another differ between countries
- Countries use fixed technology
- Hence the supply curve for any goods is horizontal. Production is under constant cost conditions regardless of the quantity produced. There is full employment in the macro-economy.

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- The economy is characterized by perfect competition in the product and market.

- There is no governmental intervention in the form of restriction to free trade.

- Transport costs are zero.

- It is a two-country, two-commodity model.

   (Leamer, 1984)

Last model that describe benefit of international trade is Heckscher-Ohlin model, two Swedish economists, Eli Heckscher and Bertil Ohlin gave one more model of International Trade. This theory says that in reality, trade is not just determined by technological differences, but it also reflects differences in factor endowments across countries. To explain the importance of resources in trade Heckscher and Ohlin, have developed a theory known as the "factor proportion theory". This theory essentially says that countries will export products that use their abundant and low-cost factors of production, and import products that use the countries' scarce factors (Leamer, 1995).

2.1.2 Total Factor Productivity (TFP)

Total Factor Productivity (TFP) is a measuring ability to prepare particular case unit from input could process the extent to how much about outputs. This productivity includes not main those abilities As far as production, as well as people who would part of the production process. Therefore, those benefit might make in the type about an immaterial holding thing for example, such that particular skills, technology, management, economic, social and nature's domain. One Might say that aggregate variable profit will be not best worried about work or money productivity, incorporates at elements that bring helped produce outputs.

Total Factor Productivity Indexes

Productivity will be a pointer that specifies the connection about inputs Also outputs on produce outputs. It will be constantly characterized Likewise those output-input proportion. Let period t, Firm i produces the input and output quantity vector; TFP of firm i in period t would be

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$$TFP_{it} = \frac{Q_{it}}{X_{it}} \qquad \text{Total factor productivity}$$

(2.1)

Where $Q_{it} = Q(q_{it})$ is an aggregate output, $X_{it} = X(x_{it})$ is an aggregate input and $Q(.)$ and $X(.)$ are non-negative, non-decreasing and linearly homogenous aggregator function. (Hoang & Coelli, 2011)

Similarly, using this definition the associated index number that measure the TFP of firm i in period t relative to the TFP of firm h in period s is (O'Donnell, 2011):

$$TFP_{hs,it} = \frac{TFP_{it}}{TFP_{hs}} = \frac{Q_{it}/X_{it}}{Q_{hs}/X_{hs}} = \frac{Q_{hs,it}}{X_{hs,it}} \quad \text{TFP index} \qquad (2.2)$$

Where $Q_{hs,it} = Q_{it}/Q_{hs}$ is an output quantity index and $X_{hs,it} = X_{hs}/X_{it}$ is an input quantity index. Thus, TFP growth can be viewed as index of output growth divided by index of input growth referred to TFP indexes that can be expressed in terms of aggregate quantities as being *multiplicatively-complete*. (C. J. O'Donnell, 2010)

TFP indexes were raised from Distinctive aggregator capacities. That population about non-negative, non-decreasing and linearly homogenous aggregator works incorporates.

$$Q(q) = D_o(x_0, q, t_0)$$

(2.3)

$$X(x) = D_I(x, q_0, t_0)$$

(2.4)

The place $D_o(.)$ and $D_I(.)$ would Shephard (1953) yield Also information separation functions; x_0 and q_0 are vectors about delegate test quantities; t_0 means An delegate test time period. So, $D_o(x_0, q, t_0)$ and $D_I(x, q_0, t_0)$ representable the preparation

of technology. Those aggregative works (2.3) and (2.4) would substitute under (2.1) and (2.2). Then, those Färe-Primont TFP list takes those accompanying form:

$$TFP_{hs,it} = \frac{D_o(x_0, q_{it}, t_0)}{D_o(x_0, q_{hs}, t_0)} \frac{D_I(x_{hs}, q_0, t_0)}{D_I(x_{it}, q_0, t_0)}$$ The Färe-Primont index

(2.5)

The Färe-Primont index in equation (5) was first proposed by O'Donnell (2011). There will be economically-ideal in the feeling that they fulfill all economically-relevant axioms and tests from index number theory, including a character aphorism and transitivity test. This can use to correlations from claiming TFP and effectiveness, it might measure eventually utilizing a lot of people period Furthermore a large number firm. (C. J. O'Donnell, 2010)

Measures of Efficiency

Hence, the *multiplicatively-complete* TFP indexes can be break down into any number of measures of technical change and efficiency change (O'Donnell, 2015). Those measures from effectiveness incorporate input- and output-oriented technical, mix, Furthermore remaining scale effectiveness.(C. O'Donnell & Nguyen, 2013) In this the event study, the creator kept tabs with respect to an yield orientation, that the extension will be the most elevated extent of a vector outputs process a situated for inputs. It communicated As far as aggravator quantities, thus the effectiveness measures situated decay for TFP change are:

$$OTE_{it} = \frac{Q_{it}}{\bar{Q}_{it}}$$ Output-oriented technical efficiency

(2.6)

$$OSE_{it} = \frac{\bar{Q}_{it}/X_{it}}{\tilde{Q}_{it}/\tilde{X}_{it}}$$ Output-oriented scale efficiency

(2.7)

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$$OME_{it} = \frac{\bar{Q}_{it}}{\hat{Q}_{it}} \qquad \text{Output-oriented mix efficiency}$$

(2.8)

$$ROSE_{it} = \frac{\hat{Q}_{it}/X_{it}}{TFP_t^*} \qquad \text{Residual output-oriented scale efficiency} \qquad (2.9)$$

$$RME_{it} = \frac{\tilde{Q}_{it}/\tilde{X}_{it}}{TFP_t^*} \qquad \text{Residual mix efficiency}$$

(2.10)

Where $\bar{Q}_{it}$ is the maximum aggregate output possible using x_{it} to produce a scalar multiple of q_{it}; $\hat{Q}_{it}$ is the maximum aggregate output possible using x_{it} to produce output vector; and $\tilde{Q}_{it}$ and $\tilde{X}_{it}$ are the aggregate output and input at the point where TFP is maximized subject to the constraint that the output and input vectors are scalar multiples of q_{it} and x_{it}. TFP_t^* denotes the maximum TFP possible using the technology available in period t. (C. J. O'Donnell, 2010)

Total Factor Productivity Efficiency

The TFP efficiency of firm *i* in period *t* follow as:

$$TFPE_{it} = \frac{TFP_{it}}{TFP_t^*} \text{TFP efficiency}$$

(2.11)

TFP Efficiency (TFPE) measures the difference between TFP and the maximum TFP possible using the available technology.

Figure 4, Those TFP of the firm work toward side of the point A. The curve passing through side of the point C and V is a production possibility frontier. Those output-oriented specialized foul effectiveness (OTE) will be a proportion measure of the vertical distance starting with perspective with purpose C: $OTE = Q_t/\bar{Q}_t$ on the restricted frontier. The output-oriented mix efficiency (OME) Measures those expand On

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TFP At the greater part yield blend of the firm would relax restrictions. Those firms could extend its aggravator yield starting from point. C to point V: $OME = \bar{Q}_t/\hat{Q}_t$ where the curve passing through point V is an unrestricted production frontier (Arjomandi, Valadkhani, & O'Brien, 2014)
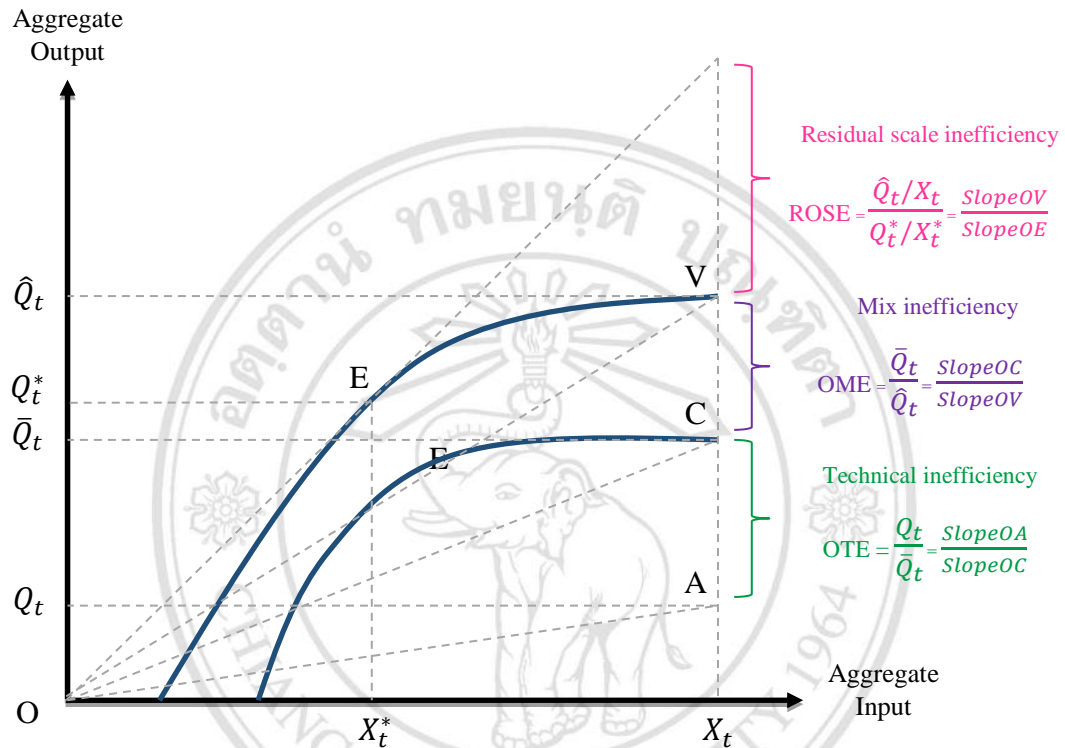
Source: Analyzing banks' intermediation and operational performance using the Hicks–Moorsteen TFP index (Arjomandi et al., 2014)

Figure 4: The output-oriented measures of efficiency (a)

$$TFPE_{it} = \frac{TFP_{it}}{TFP_t^*} = \frac{SlopeOA}{SlopeOE} = \frac{SlopeOA}{SlopeOC} \times \frac{SlopeOC}{SlopeOV} \times \frac{SlopeOV}{SlopeOE}$$

$$TFPE_{it} = \frac{TFP_{it}}{TFP_t^*} = OTE_{it} \times OME_{it} \times ROSE_{it}$$

(2.12)

Improvements in technical and mix effective need aid a development from point A with point V. TFP will be not maximized toward side of the point V and the

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firm might arrive at those greatest TFP, thereabouts firm can boost benefit by moving starting from point V to point E. Point E will be the point of the greatest benefit.(Medal-Bartual, Molinos-Senante, & Sala-Garrido, 2015) The output-oriented residual scale efficiency (ROSE) measures the difference between TFP at a technically and mix efficient point and TFP at the point of optimum productivity (C. J. O'Donnell, 2010) This measure of efficiency is a movement from point V to point E.

Figure 5, the curve passing through point D will be An mix-restricted frontier that is the extension of the set from the sum technically-feasible aggravator input and output mix Similarly as those firm operating at purpose A and the curve passing through point E will be an unhindered production frontier that is growth of the handling possibilities situated which may be accessible should organizations At know mix confinements are relaxed follow from.(C. J. O'Donnell, 2010)
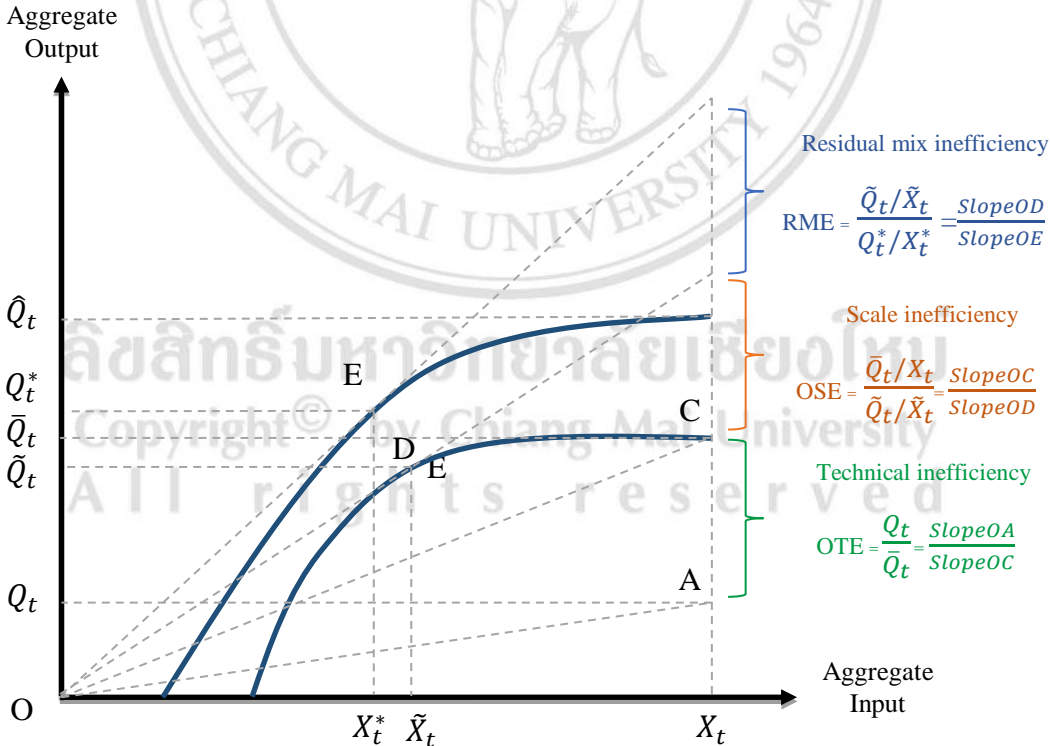
Source: Analyzing banks' intermediation and operational performance using the Hicks–Moorsteen TFP index (Arjomandi et al., 2014)

Figure 5: The output-oriented measures of efficiency (b)

$$TFPE_{it} = \frac{TFP_{it}}{TFP_t^*} = \frac{SlopeOA}{SlopeOE} = \frac{SlopeOA}{SlopeOC} \times \frac{SlopeOC}{SlopeOD} \times \frac{SlopeOD}{SlopeOE}$$

$$TFPE_{it} = \frac{TFP_{it}}{TFP_t^*} = OTE_{it} \times OSE_{it} \times RME_{it}$$

(2.13)

Same as figure 4, TFP start moving from point A to point C, firm can maximize its productivity by moving to point D when the input and output mixes fixed. O'Donnell (2008) refers to point D as the point of *mix-invariant optimal scale (MIOS)*. The Output-oriented Scale Efficiency (OSE) measures the increase in TFP at a technically-efficient from point C to point D. At point D, TFP is not maximized, so firm would achieve the maximum TFP to point E which is the point of maximum productivity. The Residual Mix Efficiency (RME) measures the difference between TFP at a mix-restricted frontier and TFP at the point of optimum productivity on the unrestricted frontier (C. J. O'Donnell, 2010)

Decomposing Total Factor Productivity Change

According (C. J. O'Donnell, 2010) there are several ways to decompose TFP efficiency. The easiest way to decompose TFP indexes is to rewrite equation (11) for firm *i* in period *t* as $TFP_{it} = TFP_t^* \times TFPE_{it}$. In the same equation holds for firm *h* in period *s* is $TFP_{hs} = TFP_s^* \times TFPE_{hs}$. It follows that

$$TFP_{hs,it} = \left(\frac{TFP_t^*}{TFP_s^*}\right)\left(\frac{TFPE_{it}}{TFPE_{hs}}\right)$$

(2.14)

The TFP relative index number of firm *i* in period *t* compared with the TFP of firm *h* in period *s* (Farid U Khan and Ruhul Salim, 2014), it can decompose in form of

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equation (14). Thus, the output-oriented decomposition from equation (12) and (13) are defined as

$$TFP_{hs,it} = \frac{TFP_{it}}{TFP_{hs}} = \left(\frac{TFP_t^*}{TFP_s^*}\right)\left(\frac{OTE_{it}}{OTE_{hs}} \times \frac{OME_{it}}{OME_{hs}} \times \frac{ROSE_{it}}{ROSE_{hs}}\right)$$

(2.15)

$$TFP_{hs,it} = \frac{TFP_{it}}{TFP_{hs}} = \left(\frac{TFP_t^*}{TFP_s^*}\right)\left(\frac{OTE_{it}}{OTE_{hs}} \times \frac{OSE_{it}}{OSE_{hs}} \times \frac{RME_{it}}{RME_{hs}}\right)$$

(2.16)

To begin with part in section those right-hand side about mathematical statement (15) Also (16) measures specialized technical transform which compares those maximum TFP done in period t and period s. In the different words, it measures the contrast the middle of those greatest TFP time permits utilizing those innovation organization clinched alongside period t and the maximum TFP time permits utilizing innovation to period s: TFP_t^*/TFP_s^* (C. J. O'Donnell, 2010)

Finally, equation (2.15) and (2.16) can be written as

$$TFP_{hs,it} = \frac{TFP_{it}}{TFP_{hs}} = \left(\frac{TFP_t^*}{TFP_s^*}\right)\left(\frac{OTE_{it}}{OTE_{hs}}\right)\left(\frac{OSME_{it}}{OSME_{hs}}\right)$$

(2.17)

Where $OSME_{it}$ is combined a measure of scale and mix efficiency change defined by (C. J. O'Donnell, 2010) The output-oriented scale-mix efficiency (OSME) measures overall productive performance which is an increasing in TFP movements from the technical efficiency at point C to the maximum productivity point E in both figure 4 and 5. (C. J. O'Donnell, 2010)

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2.2 Literature Review

The followings indicate literature on port efficiency using DEA.(Ha, 2009) investigated an efficiency of 35 ports in USA and North-East Asia from 2005 to 2007 through Creedence Clearwater Revival (CCR) and BCC analysis. Park (2010a) Analyzed the effectiveness from claiming 45 ports for east Asia, Europe Also north America. Enter components incorporates the amount for berth, aggregate compartment length, container yard (CY) size, the number for cranes Furthermore profundity. Output factor includes of twenty-foot equivalent units (TEUs) and the number about shipping liners to boat calls. In addition, Park (2010b) Proposed the effectiveness of 11 compartment terminals to transshipment including Busan and Kwangwang port. Enter elements for example; container yard (CY) size, those amounts for holder crane, the amount from yard crane and the amount of yard tractor were utilized. It designated the number from transshipment TEU (Twenty Foot Equivalent Unit) as a yield component with explore the effectiveness. Roll and Hayuth (1993) evaluated ports in created nations utilizing Creedence Clearwater Revival (CCR) model in Data envelopment analysis (DEA) basically keeping tabs ahead An hypothetical investigation as opposed genuine provision since no data were analyzed. They contributed to firstly employing Creedence Clearwater Revival (CCR) model, based on constant returns to scale, in the maritime and port sector. Notteboom (2000) verified the efficiency of 36 terminals done European ports through Bayesian stochastic Frontier Model and likewise analyzed 4 terminals done Asia for An benchmark. They utilized compartment length, terminal size and the amount of cranes as input variables Also TEU (Twenty Foot Equivalent Unit) Likewise, an output variable, and contended that each compartment terminal's most extreme effectiveness can't exceed 0. 85.

Moreover, they declared the followings. First, a container terminal in Europe for the most part, demonstrates a marginally higher degree for effectiveness over the individuals than southern Europe. Second, the expansive size of terminals presentable higher levels of effectiveness over little terminals. However a little terminal of mega ports could accomplish a secondary degree about effectiveness toward learning to effect. Third, terminals for a center port have a larger amount about the individuals done a feeder port. Fourth, there is no connection the middle of proprietorship types for terminals and effectiveness. Barros (2003) revealed motivation regulation Also

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effectiveness to five Portuguese Port power. Input measures employed are those amounts of workers and value of listed asset. Output measures embraces An number of factors for example, such that the number about ship, load throughput, terrible tonnage obligation for ships, business stake rate, greater part load handling, TEU (Twenty Foot Equivalent Unit), break heft volume, fluid load volume and net income. Cullinane (2004) Investigated a level of efficiency about 25 holder ports in the planet Eventually Tom's perusing utilizing Data envelopment analysis (DEA) Windows Investigation. Information variables receive compartment length, terminal size, the number of cranes for berth, the number about yard cranes. TEU (Twenty Foot Equivalent Unit) might have been utilized concerning illustration a yield variable. Al-Eraqi (2008) studied 22 cargo ports in Middle East and East Africa employing cross-sectional data and Window Model.

The advantage of model transportation is to boost the discriminatory power by dynamically increasing the total number of DMUs so that it is easier to track port performance and stability over time. Chudasama (2008) investigated sources of inefficiency of port authorities of 12 ports in India, which is an emerging market, adopting both DEA-CCR and DEA-BCC. Cheon (2009) Discovered that worldwide port upgrades and R&D might need an impact ahead degrees of container ports starting from 1991 to 2004. They identifier both effectiveness transforms and the reason of efficiency fluctuation by translating Malmquist productivity index, and contended followings. First, they have seen economies of scale similarly as an important element without unconditional power. Second, because of worldwide competition, possible for ports to overcome external weakness by changing governance and increasing capital .Third, hostility venture with respect to R&D scarcely assumes a vital part over port rivalry because of simple imitability. Munisamy & Singh (2011) theory following efficiency analysis began with the works of Koopmans (1951), Debreu (1951) and Farrell (1957) who made the first attempts at estimating efficiencies for a set of observed production units. Charnes et al. (1978) and Banker et al. (1984) popularized the DEA linear programming with the Creedence Clearwater Revival (CCR) model and BCC model with impositions of constant (CRS) and variable returns to scale (VRS) assumptions respectively on the production frontier. DEA is a technique for measuring the relative efficiencies of homogeneous decision-making units that use similar inputs

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to produce similar outputs where the multiple inputs and outputs are incommensurate in nature. The technique attempts to trace out a production frontier based on observed input and output levels for individual ports and a port's technical efficiency is evaluated relative to the frontier.

It has been found that size of sea-port has positive effects on its efficiency. Also, it has been shown that ports with larger throughput seem to have certain performance advantage over those with smaller throughput. In Yang, Lin, Kennedy and Ruth (2011) research on 15 sea-ports showed that port efficiency has no clear relationship with its size and function (hub or feeder). Relative experiment Jajri (2007)Export growth rate also positively influence the TFP growth. As export grows, the higher will be the TFP growth. This is presumably because of the pressure from international competition and benefits of economic of scale. This shift from domestic market dependence to production for export market will necessitate firms to venture into large scale operations and increase production capacity in order to enjoy the benefits of economic of scale. Large scale production will induce greater utilization of technology and skilled manpower and through these; efficiency and productivity enhancements will be obtained that will bring about lower unit costs of production. Seo,Ryoo and Aye (2012) In their conclusion, study contributes to following Asian aspects. Firstly, acquiring ports data in ASEAN is quite difficult since there is little data port authorities published and they are reluctant to disclose it.

Nonetheless, this study manages to obtain data from direct contact with port authority in Myanmar, academics in Thailand and so forth as well as Korea government reports. Secondly, inefficient ports can improve their port facilities and port performance by benchmarking DMUs, which have similar structure and size. In general, ASEAN ports have low port efficiency except for a few ports such as Singapore port, port of Tanjung Pelepas and port of Kota Kinabalu. Therefore, in order to improve maritime transport networks as an whole in ASEAN, for example, a port that has low levels of efficiency should benchmark efficient DMUs. This leads to facts that inefficient ports can plan to develop by benchmarking efficient ports as a blueprint for their future .Thirdly, port managers are capable of improving port operations according to information of slacks without constructing new port facilities. Fourthly, from the perspective of Korea, these results can be utilized to determine potential ports and

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countries for an international port development co-operation programed such as ODA with Korea by referencing objective data in order to help ASEAN to achieve better port networks by developing the infrastructures of ill-equipped ports. Lastly, to authors' the best knowledge, there is few research on analyzing container port efficiency in ASEAN, while co-operation of the trade and maritime transport between Korea and ASEAN has being strengthened. Therefore, the current study can be viewed as the outset of port research in ASEAN.

Table 2: Summary of involve

Author	Variables		Target area
	Inputs	Outputs	
Tongz on 2001	-Number of cranes -Number of container berths -Number of tugs -Delay time -labor	-TEU -Ship working rate	4 Australian & other 12 international port
Rios & Maçada 2006	-The number of cranes -Berth length -The number of employees -The number of yard equipment -CY size	-TEU -Average number of containers per hour per ship	23 MERCOSUR ports
Al-Eraqi et al 2007	-Berth length -Storage area -Handling equipment	-TEU -Ship calls	22 ports in Middle East and East Africa
Jajri (2007)	-capital per GDP -Total factor productivity growth -Export + Import per GDP or trade ratio to GDP	-TFP growth	Malaysia over the 1970 – 2004

Table 2: Summary of involve (continued)

Author	Variables		Target area
	Inputs	Outputs	
Park (2010a)	-Number of berth -Total berth length -CY size -Number of cranes -Depth	-TEU -Ship calls	45 ports in East Asia, Europe and North America
Park (2010b)	-CY size -Number of container crane -Number of yard crane -Number of yard tractor	-Number of transshipment -TEU	. 11 terminals in Busan & Kwangwang port
Wu & Goh 2010	-Terminal area -Total quay length -pieces of equipment	-TEU	22 ports in BRIC, the Next-11 and G7
Munisamy & Singh (2011)	-Berth length (m) -Terminal Area (m2) -Total Refer Points -Total Quayside Cranes -Total Yard Equipment	-Total Throughput (TEU)	71 major Asian container(2007)

Table 2: Summary of involve (continued)

Author	Variables		Target area
	Inputs	Outputs	
Yang, Lin, Kennedy and Ruth (2011)	-Quay Length (km) -Terminal Area (hectares) -No. of Quay cranes	-Total Throughput (TEU)	5 Asia port
Seo,Ryoo and Aye (2012)	-Number of Berths -Berth Length -Total Area	TEU	ASEAN port

2.3 Research Gap

There are some limitations on earlier literature. First, they are merely concerned with huge ports, which have a large number of TEU (Twenty Foot Equivalent Unit) handled or ranked high in terms of TEU (Twenty Foot Equivalent Unit) handling so they tend to overlook ports in emerging markets, having great potential for new value-added establishment. Second, although some studies use cross-sectional analysis, simply calculating variation compared to previous year it hardly contributed to

comprehensive outcomes in regards to efficiencies. Third, prior research only focus on specific port or include a lot of port unexpected about area and human or cover variable that effect port efficiency, resulting in a fact that they hardly suggested difference inefficiencies according to port characteristics such as an economic scope or country size.

Recognizing both holder port benefit and effectiveness together for intensity for compartment terminals, those creator found a greater amount learning looking into port execution which each investigations pointed to assess port effectiveness of planet port and their country's port in Contrast methodology. In this study use The Färe-Primont index defined by O˙ Donnell to measure aggregate component benefit. This kind of Investigation need never been utilized within the port benefit productivity literature.