Abstract
Since the mid 1990s, a substantial growth of the containerized traffic along the Eastern Seaboard took place. Even if containerization in theory “levels the playing field” by permitting a standard transport product, its spatial accumulation is far from being ubiquitous. While in prior stages deconcentration prevailed, the trend has reversed with a process of traffic concentration among the largest port gateways. This paper investigates port divergence taking place along the Eastern Seaboard. Hinterland access, the configuration of shipping line networks and supply chain management are the most significant factors driving the process.

Keywords: Freight Transportation, Ports, Containerization, North America, Eastern Seaboard.
Introduction: From Convergence to Divergence

Like all the major maritime ranges around the world, the North American Eastern Seaboard has been transformed by the joint forces of globalization, regionalization and containerization. Extending from Halifax to Miami, the seaboard ports link one of the world’s most extensive consumption markets to global maritime shipping routes. These ports collectively handled 19.4 million TEUs of containers in 2006, but actual volumes are higher due to a substantial amount of containerized traffic carried from the West Coast through the rail landbridge. Thus, the nature and extent of how maritime and inland freight distribution systems are interacting has experienced significant changes that underline the cyclic behavior of growth processes. Investigations looking at economic and technological changes in the 1980s (Hayuth, 1988; Kuby and Reid, 1992; Shashikumar, 1999) underlined that a process of deconcentration was taking place as ports were competing more aggressively over their hinterlands. In such a context, containerization was used as a technical tool to compete beyond established hinterlands, to venture into new market opportunities and capture additional traffic. It was anticipated that containerization would “level the playing field” and thus lead to a form of convergence. However, since then the process has reversed and a concentration of traffic is now taking place among a few major gateways. It is argued that port hinterlands along the North American Eastern Seaboard are going through a phase of divergence.

Divergence is a commercial cycle that involves a concentration of containerized traffic along a maritime facade, implying that the conditions affecting freight distribution are advantaging some ports more than others, notably in terms of traffic capture. It is more than a process where some ports are growing faster than others; it also shapes the setting of hinterlands and long distance transport corridors. In light of growing levels of congestion, conventional geographical factors such as accessibility are reasserting themselves along with changes in liner shipping networks and supply chain management. This leads to differences in infrastructure investments, the performance of transport infrastructures and flows handled by port and inland terminals.

Trade and Port Divergence in North America

Factors of Port Divergence

Divergence implies that even with containerization being a standard and ubiquitous mean of transportation, its functional and spatial diffusion leads to different traffic growth levels. As a force shaping accessibility and economic opportunities containerization has favored the emergence of large gateway complexes which are linked to their hinterlands through corridors. In view of these trends, it is argued the main geographical and functional factors of port divergence are:
• **Port site.** This is the most conventional factor linked with the local geography and particularly concerns location and infrastructures. Port infrastructure serves as one of the key decision-making determinants in port selection by shippers. The divergence effect of the site is reinforced with each new generation of containerships, forcing in many instances dredging efforts to keep the port accessible to greater ship drafts.

• **Ocean carriers.** They have an effect through the selection of port of calls, which is made based on a set of criteria related to market (hinterland) access as well as the quality of port infrastructure. A port gaining or losing a major shipping company call can experience a significant variation of its traffic. The configuration of shipping networks is thus an important factor of port divergence and tends to favor major gateways.

• **Port policy.** Local port policies can have an impact related to the governance and funding. The main difference concerns landlord and operating ports, where the public port authority plays an important role, and private port operators. The major trend has been towards privatization, particularly of terminals. The commitment of a port operator to invest in and/or develop a container terminal is a major sign behind future traffic generation as well as terminal productivity improvements. The outcome can however be marked by differences in productivity between the terminals of the same port, creating an intra-port divergence effect.

• **Hinterland.** With containerization and long distance trade, the setting of high capacity corridors and inland terminals has become of fundamental importance in the capture of port traffic. The future of a port is increasingly decided over its hinterland as an attractor and generator of traffic.

• **Supply chain management.** Logistics and commodity chains are dependent on the reliability of freight distribution. An important dimension of this reliability concerns delays and disruptions to the scheduling of transportation. A port, including its linked maritime and inland services, that offers a superior reliability and value added services is likely to secure additional traffic. Supply chain management appears to be an emerging factor of port divergence.

Overall, port competition for market share including hinterland market is determined not by a single factor, but by several; port infrastructure, liner service (frequency of services), the availability of modern distribution centers, and the market size that can be reached within 24 hours (Biederman, 2007). Like any competitive market, some ports will endure and prevail while others will have to address stagnation or even a decline in traffic. In recent years the growth of trans-pacific trade, the expansion of the North American intermodal network, supply chain requirements, port logistics infrastructure, hinterland markets, and liner service have played a role in the cyclic dynamics of port convergence and divergence.

**Containerized Traffic Trends**
The last decade was characterized by a cycle where containerized trade surged, particularly along Pacific Asia – North America trade routes. From 1997 to 2006, American container volume handled by its ports almost doubled, from 14.9 to 27.4 million TEUs. One particular and well acknowledged driver of this growth has been Asian imports, the outcome of outsourcing manufacturing activities, particularly to China (Figure 1; Marad, 2007). For instance, China’s total share increased from 12.4% in 1997 to 37.4% in 2006 and its share of total imports also grew from 55% to 65% for the same period. The issue not only concerns the growth in volume, but also the growth in the imbalances of the transpacific container flows, which accounted for 9.3 million TEUs in 2006. Transatlantic trade shows a similar, albeit less extensive imbalances with imports to the U.S. growing 6.1% annually for the same period and exports to Europe growing at a much lower rate, 3.5% annually. On the U.S. – Latin America trade, which is dominated by commodities, imports to the U.S. and exports to Latin America grew at 8.1% and 6.3% annually respectively (MergeGlobal, July 2007). It remains to be seen to what extent past growth trends will endure in the future since containerization has achieved prevalence within the majority of supply chains. It is expected that container traffic growth has peaked and will likely decline until macroeconomic conditions, namely those linked with trade imbalances, are corrected.

![Figure 1. U.S. Container Volume from 1997 - 2006](image)

The trend in traffic concentration, both at the facade at gateway level is evident. The Pacific Coast now accounts for 55% of the total container volume handled, up from 50% in 1990, placing intense

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1 When the volume of Hong Kong is included, China’s share increased from 20% in 1997 to 41.3% in 2006
pressures on its main gateways. The share of the Los Angeles / Long Beach port cluster of the total U.S. container traffic grew from 32.4% in 1997 to 37.8% in 2006; during the same period, New York/New Jersey’s share increased slightly from 11.2% to 13.2% (Marad, 2007). Essentially, traffic doubled every decade, an indication of a rapid growth of international trade as well as the diffusion of containerization as a privileged mode of transportation. The extent to which this trend will endure is highly questionable.

**Ranges of the Eastern Seaboard**

Because of its geographical setting the maritime / land interface of the Eastern Seaboard is characterized by a set of ranges each having its own divergence dynamics (Figure 2). Each range represents a natural economic region with its specific hinterland and transport system. From an analogical perspective, the seaboard can be seen as a set of sinks where containers “percolate” into the hinterland through the path of least resistance. In theory, this should be the deepest part of the sink but regional conditions are obviously modifying this assumption.

![Figure 2. A Schematic Representation of the Eastern Seaboard](image)

The Eastern Seaboard can thus be divided into four major ranges:

- **The St. Lawrence.** In simple terms, the St. Lawrence is a “funnel” where all the traffic goes straight to the bottleneck, which is Montreal. On each side of the funnel, the hinterland is excessively poor, except for a variety of resource export ports (e.g. Sept Iles). Any maritime services venturing into the funnel does not make any other port call in North America, with
the exception of Halifax, being close enough. The Ports of Halifax and Montreal are thus in direct competition, with Montreal having a much better hinterland access but a weaker maritime access. The only way that Halifax may stand out would be as an offshore hub with activities linked with its “first port of call” Atlantic advantage as well as its deep harbor facilities, able to accommodate the largest containerships. The opportunity to use the St. Lawrence / Great Lakes system for inland containerized distribution is very limited, mainly because of the seasonal shut down of the system which is incompatible with a constant frequency of services required by container distribution.

- **The Upper Range.** Also referred as the “empty sink” since the range handles a very low containerized volume. The traffic that could be handled by this range has “overflowed” (been captured) either in the “funnel” or into the Mid range. The hinterland is poor, particularly in the northern part of the range. The two major ports of the range, Halifax and Boston, can be qualified as “weak handles” since they have shown very limited growth in traffic (actual decline for Halifax in recent years).

- **The Mid Range.** Complex and rich hinterland corresponding to a large accumulation of economic activities, mainly along the Boston-Washington corridor. It is a “full sink” in the sense that the center has limited potential to accommodate additional traffic (e.g. Baltimore) not because of capacity issue, but because of difficult maritime access. The range has two strong handles, New York and Hampton Roads, each having experienced a strong traffic growth. Each handle is attempting to establish regionalization strategies to capture the traffic of the center.

- **The Lower Range.** An emerging port range complex, implying that the “sink is filling up” at the point of least resistance, which corresponds to the Savannah / Charleston port cluster. They offer a relatively uncongested access to their hinterland. The lower Florida handle with is port cluster has some potential to act as an offshore hub, although this function has been captured by nearby Caribbean ports (e.g. Freeport), particularly because of lower labor costs and deeper access channel.

**Port Hierarchy**

The geographical growth of containerized traffic is very specific (Figure 3). It is concentrated at both “handles” of the mid range – New York and Hampton Roads – and at the center of the lower range – Savannah and Charleston. The “empty sink” has experienced a mere growth of about 40,000 TEU between 2000 and 2006. The largest growth rates, both in absolute and relative terms, are observed in the diverging ports underlining that the recent growth cycle is based upon different premises.
Figure 3. Change in Container Traffic at Eastern Seaboard Ports

An overview of the rank-size distribution of port traffic reveals a four tier grouping where each tier has roughly double the traffic of the previous (Figure 4). This distribution underlines a divergence threshold roughly at 1 million TEU where above this threshold there is strong growth:

- **First tier**: New York is the most prominent East Coast port, essentially acting as a continental articulation gateway, a role it has played for more than a century.

- **Second tier**: Major gateways of the East Coast, each accessing a significant hinterland and commanding an economic region. Although the traffic of Montreal may place it as a third tier port it is the only significant East Coast Canadian port and thus has a more pronounced gateway function than many of its counterparts.

- **Third tier**: Smaller regional gateways that conventionally have been competing with first and second tier ports but mainly due to less efficient hinterland access are gradually filling a niche role. Still, changing market conditions and the decision of a shipping line to call one of these ports could significant change its traffic profile and place it in the diverging group.

- **Fourth tier**: Small niche ports servicing a specific market and often of specific function.
Figure 4. Container Traffic at Eastern Seaboard Ports, 2007

The Lorenz curve underlines the shift from port convergence to divergence around 1995 (Figure 5). While the top 5 ports accounted for 74% of the TEU handled in 1985, this share went down to 62% in 1995. This process linked with the diffusion of containerization among new ports, challenged the primacy of existing ports, such as New York. Additionally, numerous trucking services were taking shape, mostly in an un-congested setting. The 1980s also marked an era of deregulation, permitting ports to compete outside their regulated hinterlands and capture market share. From 1995, the process reversed as the share of the top 5 ports climbed to 71% in 2006. The mid 1990s correspond to an acceleration of the forces of globalization in North America, particularly with the setting of NAFTA and the corresponding offshoring of manufacturing activities. Paradoxically, the diffusion of production outside the United States lead to a traffic concentration around the major gateways providing better hinterland access.
Several factors can be brought forward to explain this divergence. First, major ports undertook a wave of investment in new infrastructures, including on dock rail facilities. Second, hinterland rail access became a better option in view of growing road congestion levels, which privileged gateways connecting inland corridors such as landbridge services. Shipping companies are thus increasingly allocating port calls with the capacity and efficiency of hinterland access into consideration. Third, the North American economy shifted towards a consumption-based economy, which placed a preponderance on large population centers to a greater extent than a production-based economy. Ports having a substantial consumption (import-based) hinterland were more advantaged.

**Shifts in Cargo and Shipping Services**

*Cycles of Convergence and Divergence*

Maritime shipping companies are ultimately making the decision to establish their port call configurations. There are several factors that affect port selection (Slack, 1985; Murphy and Daley, 1994); the deciding factors are port infrastructure, frequency and diversity of carrier options, port’s strategic vision and development planning, port costs, room to grow, strategic location and port-dependent cargo, and lastly, logistics infrastructure in the proximity of the port.
Along the American East Coast ports, two ports stand out in terms of the extent of their divergence, Savannah and New York, by showing a consistent growth over the past decade (Figure 6). New York still has the commanding lead and its growth seems to be very consistent, coming full circle after a phase of decline that endured until the early 1990s. Because of its large population base and consumer market, 33 million people live within one hour drive from the port (Tirschwell, 2008), New York continues to dominate the East Coast market. Savannah has the fastest growth rate over the past decade, illustrating the importance of economic forces of the South Atlantic region. At the same time, the competition for hinterland market intensifies.

Due continuing demographic shift southward, a large volume of cargo that was traditionally moved through Northeast and mid-Atlantic ports are now moving through South Atlantic ports. For Savannah, the combination of infrastructure, transit time, delivery costs, and population proximity has contributed to port growth (Marchand, 2007). Also, the establishment of several major retail distribution centers in its proximity helped to boost volume as well as intermodal facility development, terminal expansion, and operational improvement were important factors to maintain and improve its competitiveness.
New York has maintained its leading position due to its vast captive-consumer market, mainly the port-dependent cargo, and infrastructure improvement implemented since 2000. During the late 1990’s, the lack of port infrastructure improvement created inadequacies and at one point Maersk Sealand threatened to leave the port. Since then port authority underwent major capital improvement programs coupled with significant reductions in labor costs, which improved competitiveness. The labor cost reduction mainly came from a steep decline of container royalties paid to longshore labor displaced by containerization.

Norfolk, due to its intermodal connection and its natural deep harbor with a 50 foot channel, attracted shippers and carriers. Its infrastructure improvement plan in terminal expansion and equipment upgrade helped boost cargo volume. For Charleston, despite its reputation of high productivity, its cargo volume growth lacks behind Savannah a port it has traditionally been intensively competing with since both are sharing essentially the same hinterland. It faced capacity constraints at its current container terminal. However, opposition from local resident and environmental groups forced the port authority to scale back its Daniel Island expansion plan. Instead, it chose to develop a former naval base into a new container terminal, which will take time to complete.

For the ports of Halifax and Montreal a strong divergence is observed from 1990 (Figure 7), which is mainly due to the landbridge effect as well as the size of the regional market. Maritime shipping lines are reluctant to call a port that has limited local market potential as very few container demand would be generated, which is compounded with an uncertain hinterland (particularly for Halifax). As a matter of fact, there are no all water services from Asia to Halifax (though OOCL is considering it). Additionally, shipping companies prefer to have their maritime containers bound to nearby consignees so they can be placed back promptly on the maritime circuit. Again, this undermines ports that have limited immediate hinterlands.
Figure 7. Strong Divergence: Montreal and Halifax

The growth rates for Halifax and Montreal indicate a shift from convergence to divergence. While both ports were in convergence until the early 1990s, the correspondence has shifted. The initial divergence appears to involve a zero sum game where Montreal’s gain became Halifax’s loss. Then, the hinterland factor became more prevalent in spite of Montreal being a less suitable maritime site.

The Resurgence of All Water Services to the East Coast

In general, there are three routes for cargo coming from Asia and bound to the American East Coast can take; the landbridge route, the all water route via the Panama Canal, and the all water route via the Suez Canal. The landbridge route has two segments. The maritime segment from an Asian port to a West Coast port in North America and the inland segment from a West Coast port to destinations in the hinterland and regions along the East Coast (Figure 8). Since the setting of double-stack long distance rail corridors in the 1980s, the landbridge route dominated for the transpacific trade. However, this dominance is being challenged by changes in the shipping environment with the resurgence of all water services between Pacific Asia and the East Coast, which provides an additional explanatory layer for the port divergence thesis. The main factors behind these changes are the following:
• **Transpacific trade.** The growth of transpacific trade is well documented with the “China effect” being the main driver. Containerized exports bound to North America have consequently surged with a corresponding growth in maritime services, port calls and inland freight distribution.

• **West coast and landbridge congestion.** The West Coast is increasingly perceived as unreliable due to congestion, environmental regulations and sometimes labor disputes. For instance, in 2002 a longshoreman strikes resulted in a lock-down of most West Coast ports, incurring significant costs and delays. The Landbridge is the most favorable route from East Asia to East Coast due to its short transit time. East Coast Ports are in an unusual situation since they not only compete among themselves, but also with West Coast ports due to Landbridge. The landbridge takes about 5-7 days in addition to transpacific crossing which takes about 9-12 days. However, rail transportation in North America is reaching serious bottlenecks. Growing capacity constraints over rail infrastructure, with Chicago and St. Louis becoming major bottlenecks in the rail distribution system. Recognizing its value and the growing volume of landbridge volume, railroads have raised freight rates by 25 to 40% between 2005 and 2007. In addition, the return on intermodal shipment is lower than on other commodities for railroads because intermodal contracts are established on the long term. Therefore, with near-double digit growth of international shipments, apparently more capacity is needed and rate increase is an obvious option (Ferrulli, 2007). This incites maritime shippers and freight forwarders to explore alternatives.

• **New East Coast gateways.** The Southeast coast, particularly the Charleston / Savannah port cluster and Hampton Roads, has experienced a significant growth. In addition to offer rather uncongested port and inland distribution infrastructures, general costs related to labor and land are also lower than the majority of other ports along the West Coast and in the Northeast. This has led many actors related to distribution to set up of several large retail distribution centers in Savannah and Virginia.
Figure 8. Factors behind the Resurgence of All Water Services to the East Coast

Service Routes and Transit Times

Table 1 provides a snapshot of the various origin-destination pairs between several major Pacific Asian ports and American East Coast ports. Except for Singapore, all the transit times are based on the Panama Canal route. The differences of transit times between the all water and land bridge routes illustrate a distinctive pattern.

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Table 1. Transit Time (in days) between Selected Pacific Asian and East Coast Ports


For New York, the difference between landbridge and all water services from North Asian ports such as Busan, Tokyo, Shanghai, and Kaohsiung is about 7 days. Therefore, high value goods in particular are most likely to be routed through landbridge services. However, as the load port origin moves westwards, the difference narrows markedly. For cargo from Hong Kong, the difference is about 4 days. From Singapore onward, the all water service confers a slight advantage. Similarly for services to Norfolk, the difference between landbridge and all water service is slightly to the advantage of the former. However, from Hong Kong westwards, the all water service is almost identical to the landbridge.

Figure 9 demonstrates that all water services to Southeast Coast ports (e.g. Savannah) become more competitive from Shanghai southwards. The most significant time difference concerns ports among the Middle coast of China, including Kaohsiung. They fall in the 3-4 days difference, which starts to be close to the threshold of indifference from a shipping time perspective. Under such circumstances, reliability in distribution can play an important role in the balance.
Singapore appears to be the equilibrium point time-wise; the point of indifference. There is however a zone of contestability that includes most of Southeast Asia and up to Hong Kong. This zone is crucial as it includes several established manufacturing clusters (namely the Pearl River Delta) as well as emerging economies such as Vietnam and Malaysia. For services to Savannah, the zone of contestability could even be expanded a bit further to include Shanghai. Since Singapore is the major transshipment hub for Southeast Asia, it may actually capture additional traffic for the All Water Route to the East Coast. So, “capturing” Singapore with a differential service time confers a significant advantage for East Coast ports.

Currently, the West Coast landbridge route accounts for more than 75% of the cargo from Asia destined for New York. With the Panama Canal expansion and the increase in all water routes, the share of the landbridge is expected to decrease to 60%. As a result, the Port of New York is expecting a shift of 2.5 million TEUs from West Coast ports to All Water Services to the East Coast by 2020. The planned expansion of the Panama Canal to accommodate about 12,000 TEU ships, makes any traffic distribution forecasting extremely hazardous, but it can be assessed with relative confidence that the share of all water routes to the East Coast is very likely to increase.
The number of all water services increased from 17 in 2002 to 26 in 2007. While the Panama Canal route accounts for the vast majority of all water routes, the Suez route is gaining new attention as it can employ bigger ships beyond the current 4,500 TEUs Panamax restriction. However, traffic volume is not yet high enough to justify the usage of the larger containerships capable of fully taking advantage of the scale economies of the Suez route. Still, the long sequence of offshore hubs along the Asia-Suez-Gibraltar route (e.g. Singapore, Colombo, Salaha, Jeddah, or Algeciras) confers significant scale economies opportunities by connecting different markets along the same route (South Asia, Middle East, Southern Europe). As a result, there are emerging East Coast hubs and calling configurations where the first port of call is Savannah and New York depending on the service configuration.

**Transit Time and Reliability**

Since the vast majority of retail good shipments are containerized, corporations are using supply chains to gain a competitive advantage through distribution strategies (Hesse and Rodrigue, 2004). Lower logistics costs and time are key factors in the distribution process (Mongelluzzo, 2008). In a typical supply chain, there are three major cost components: transportation costs, in-transit inventory costs, and warehouse inventory costs. To manage the supply chain effectively, reliability tends to be more important than price. According to a survey conducted by MergeGlobal, transit time reliability was ranked as the number one importance among all logistics service attributes; price came in second. Transit time reliability has a direct bearing for in-transit inventory carrying costs (just-in-time) and safety stock costs (just-in-case). High transit time variability and unreliability impose additional costs during peak season resulting in lost sales and potential inventory write downs (MergeGlobal, 2007).

Since 80% of the American population lives east of a line drawn from Chicago through Dallas, shippers tend to favor all-water service over the landbridge service via the West Coast ports. The underlying reason is reliability and most functions related to transshipment are deemed increasingly risky (Ambruster, 2007).
Even if East Coast all water services from Asia are a few days longer than a Transpacific / Landbridge segment, reliability makes this service comparatively attractive from a supply chain perspective (Figure 10). Both segments are facing the same problems of port congestion along pendulum routes, which can often compound delays. If offshore hubs are used (such as Singapore, Pusan or Algeciras) some additional delays may incur, but at the benefit of generating more traffic.

Even if the landbridge involves a shorter service, there are additional delays and risks involved with its use. This includes port congestion along the West Coast which has gotten worse in recent years. Rail capacity along major long distance corridors is also a problem since many rail segments are running close to capacity. The average train speed is impeded due to limited rail line capacity, which in turn delays train departures from intermodal terminals and cause backups cascading up the entire network. Ultimately, congestion impacts maritime terminals by causing port congestion delaying ship schedules. Drayage operation in Chicago may also add additional delay since containers have to be trucked across town from one railroad terminal to another, adding a day or more (Rodrique, 2008). Congestion along the East Coast transport system, particularly if a truck service is elected between Chicago and East Coast distribution centers, will compound additional delays.

For all water services there may be delays related to the usage of the Panama or Suez canals, but these tend to be well known entities that are mitigated by booking passage in advance. Consequently, several distribution activities related to retail may find it less risky to trade a few extra days of transit time (which can be easily mitigated with frequency) for a better time reliability (Figure 10).

**Figure 10. Service Time Reliability to the East Coast: All Water Services vs. Transpacific / Landbridge**
10). Since many retailers work from a just-in-time perspective, the reliability factor is particularly important. The location of several new distribution centers in the vicinity of Savannah in recent years is an indication of these factors at play. Therefore, transit times to East Coast ports not only reflect geographical distances, but more importantly, are driven by product value and supply chain strategies. The short transit time from Japan and Korea to East Coast ports caters to the supply chain requirement of minimizing inventory carrying cost for high value products.

**Port Regionalization and Port Hinterland Divergence**

*Port Logistics Infrastructure Development and Intermodal Services*

The overall growth of the American East Coast ports indicates the need for infrastructure development. Furthermore, the volume growth leads another issue of traffic congestion especially in New York metropolitan area. The need for intermodal solutions is becoming increasingly important. Port regionalization underlines that ports are following a hinterland strategy with the setting of inland terminals and corridors linking them to the main marine terminals (Notteboom and Rodrigue, 2005). Successful port regionalization creates a context promoting divergence by leveraging inland accessibility. All major ports along the East Coast have been undertaking infrastructure improvement projects to accommodate growing demand for port capacity. This includes not only the major ports, but also a variety of capital improvements projects to accommodate additional cargo at smaller ports. Still, the most ambitious projects are both concerning the harbor and hinterland access, underlining the divergence thesis of port regionalization (Figure 11).
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**Figure 11. Port Infrastructure Development at Selected Main Ports: The Harbor / Hinterland Duality**

In addition to maritime related infrastructure, the availability of modern distribution centers in the port proximity is another determinant to affect carrier/shippers’ choice of port selection. As distribution centers are part of the supply chain network, the locations of distribution centers are of importance. Currently, shipping lines are reluctant to serve inland markets because of the repositioning of empty containers they entail, particularly since the costs of repositioning are not always recoverable from shippers. Further, it complicates the management of their container fleet as it is sometimes uncertain when containers shipped inland will be available again within maritime pendulum services. A growth of inland flows is often accompanied by a decline in container turnovers. Therefore, shipping lines prefer to turn containers around as quickly as possible. From a shipper’s perspective, it is preferable to locate distribution centers near the port so they can conveniently perform warehousing activities.
and distribute merchandises accordingly. Therefore, port logistics parks have become very attractive to shippers. For instance, Savannah developed the first American master planned logistics park with 1,700 acres of land. As a result, the metropolitan area hosts more than 18 import distribution centers totaling more than 15 million square feet (Biedeman, 2007). This further increases the port attractiveness as shippers benefit from supply chain integration.

The Hinterland Factor

Containerization had a wide array of impacts over the port landscape, one of which has been a standardization of the equipment and facilities, which should point towards convergence. Port expansion can be perceived as a matter of capital investment valorizing a favorable site with the accumulation of infrastructure, flows and logistical activities (Notteboom and Rodrigue, 2007). Although suitable sites are not common, particularly in light of the new generation of post-panamax containerships, a maritime façade such as the East Coast offers several alternatives. Pressures have also been made to dredge port channels to deeper drafts, such as for New York, Charleston and Savannah, which again underlines that investments can be a factor of convergence. To reconcile the theoretical convergence framework with a contradictory reality the “hinterland factor” remains, which in the context of long distance trade, congestion and rising energy prices, has become the dominant vector of port divergence.

Figure 12. The Reemergence of the “Hinterland Factor”: Inland Corridors

For North American freight distribution, the hinterland system is articulated by a set of major long distance rail corridors dotted by inland freight distribution clusters and load centers. In light of the substantial growth in rail traffic, all the major rail operators have undertaken since 2000 a phase of substantial investments aimed at strengthening strategic corridors (Figure 12). Outside the Transcon
corridor which links the San Pedro port cluster to Chicago, the spatial pattern of the investments underline a strategy at better linking the Southeast to the continental system (e.g. the Meridian Speedway, the Southeast Corridor and the Crescent Corridor). It illustrates the growing hinterland importance of the Southeast maritime facade. One particular project, the Heartland Corridor, links directly the Hampton Roads gateway to the Chicago hub.

In an effort to capitalize on the growing traffic by offering a new corridor available to double stack rail train, Norfolk Southern expects by 2009 to complete a major rail project that will initially connect the new port terminal facilities of Maersk in Portsmouth, Virginia, with rail lines through West Virginia and end in Columbus, Ohio. At this point the corridor will link up with western rail networks or with the double-stack rail corridor to Chicago. Currently, double-stack trains heading towards the Port of Virginal must go through Harrisburg, Pennsylvania because of insufficient tunnel clearance. Through an increase of the clearance of 28 tunnels at a cost of about $266 million, the Heartland Corridor project will bypass this loop, cutting 233 miles and 36 hours off the present route from Virginia to the Midwest. This setting is thus likely to increase hinterland competition at the margin of the BostWash corridor and offer a new alternative to long distance transcontinental freight distribution.

In 2008, Hanjin Shipping reached an agreement with the Jacksonville Port Authority for a new 170-acre container terminal facility, which could handle 2 million TEU. The rail operator CSX will provide connectivity to its Southeast Corridor to Birmingham and Chicago (Figure 12). In the case the hinterland factor in terms of rail accessibility was very important.

Conclusion

After more than 50 years of containerization and intermodal transport developments, the North American Eastern Seaboard is going through a phase of divergence where major ports are capturing a greater share of the traffic. It corresponds to the acceleration of globalization, notably with the setting of NAFTA and the emergence of China as a manufacturing cluster. The diffusion of production abroad and its corresponding traffic growth has thus been associated with traffic concentration along large gateways. The five largest ports accounted for the bulk of the absolute growth, leaving smaller ports with essentially niche market growth. This is a significant shift from the trend that has endured up to the mid 1990s where smaller ports tended to grow at a faster rate, which implied convergence. Since 1995, a clear divergence has emerged advantaging ports above the 1 million TEU threshold. Although no unique factor fully explains this reversal, this paper underlined a few at play.

In light of larger containerships and the higher volume they imply, the number of suitable port sites appears limited. Additionally, the terminal facility must provide the capacity to handle the associated container volumes. It is thus not surprising that smaller ports are a risky proposition compared with large established terminals having access to nearby consumption markets. The emergence of all water services represents a new configuration for port calls where supply chain management
practices are playing a significant role. In spite of longer transit times, all water services tend to have a more reliable time window, which fits well the freight distribution strategies of large retailers. For the Eastern Seaboard, this has favored growth for Savannah, Charleston and Hampton Roads.

The hinterland is also playing a growing role in port divergence, particularly in light of growing levels of congestion. While containerization has leveled the playing field for port competition and enabled new players the possibility to capture a market share, particularly if containers were moving inland by truck, the growth of container flows in the hinterland eventually reached a phase where conventional “natural” accessibility factors are reasserting themselves. The development of long distance rail corridors and major inland freight distribution centers also tend to reinforce the accumulation of infrastructure at specific high volume gateways. Indirectly, the strategies pursued by rail companies in terms of investment in corridors and terminals reinforce convergence along a specific number of gateways.

At this point there is little evidence that would indicate that the ongoing divergence could be reversed in a new cycle. The expansion of the Panama Canal, scheduled to open in 2014, may be the next paradigm triggering a wave of changes along the Eastern Seaboard. The setting of a new Panamax standard around 12,000 TEU and a draft of 15 meters (50 ft) is likely to become an important norm in shipbuilding, but the most important impact will involve the setting of a circum-equatorial ring of circulation (Notteboom and Rodrigue, 2008). Since the Suez and Panama canals will be “on par” in terms of capacity, an equatorial highway serviced by high capacity ships becomes a tangible reality with a set of major offshore hubs, each being the regional point of convergence.

The emergence of direct high capacity all water routes from Pacific Asia to the East Coast where a few port calls would be performed is much a possibility in this new context. This would place Southern East Coast ports at an additional advantage for distribution activities as considerable volume would be shifted from the landbridge route to the all water route (through the Panama Canal and Suez Canal). The reinforcement of transshipment activities at offshore hubs in the Caribbean can also be expected with some of the East Coast traffic serviced by short sea shipping services to offshore hubs such as Nassau, San Juan or Kingston with connection opportunities to the east coast of Latin America. The configuration of such networks will be the outcome of the strategies of maritime shipping companies that will try to reconcile economies of scale, frequency of service, energy prices as well as the usage of specific gateways and offshore hubs.

References


