An expanding brief

The Panama Canal Authority (ACP) refers to its expansion programme as a 'game changer' for the shipping industry and alludes to the development of many new cross-canal services handling substantial volumes of additional traffic. ***Asaf Ashar** reports.

Work in progress on the Panama Canal

Photo courtesy of Panama Canal Authority

Almost all US east and Gulf coast (USEC/GC) ports believe the expansion of the Panama Canal will deliver them more cargo, especially from Asia.

In the case of Houston, the ACP's own projections suggest that 30%-35% of its future container traffic will come from Asia compared with 15%-16% now. Perhaps this is not surprising given that the new set of locks being constructed on the Canal and which are scheduled to open in 2014, will double its capacity and allow new panamax (NPX) ships of 12,500TEU to transit its waters.

Hence, US Atlantic coast ports are adding terminals and deepening access channels to accommodate the larger ships and expected increased cargo flows (see 'A larger market share' *CI* May 2010, pp81-83).

The main impact of the Canal's expansion is expected to be on the all-important North East Asia/USEC/GC tradelane. In particular, it is widely accepted that the new Canal will trigger a substantial switch of cargo from combined west coast port discharge and intermodal rail routings to all-water services.

While recent years have seen all-water Asia/USEC/GC services via the Suez Canal gain in popularity, this has mainly involved the ASEAN trading bloc and South Asia and not the core China-Japan axis. Hence the larger Panama Canal is expected to have little impact on these services.

Table 1 presents the coastal split of North East Asia imports to the US during the period 2006 – 2009, while Figure 2 presents the same data expressed in market share terms. They reveal that USEC/GC ports have been gaining traffic at the expense of west Coast facilities over this period.

The shift is especially evident between the west and east coast where the overall shift between 2006 and 2009 amounted to about 8%.

Principally, the diversion is the result of changes in shipper preference, which in turn can be explained within the analytical framework of the 'discrete choice' theory.

According to this theory, a shipper's choice of a route is influenced by the combined impact of a route's attributes which are divided into two categories; systemic and specific. When it comes to the transport sector, the main systemic attributes are cost (cash charges, freight rates) and transit time. Both are measurable. All shippers prefer routes with the lowest costs and shortest transit times.

The specific attributes include a long list of factors that are important to some shippers. These include the location of distribution centres, contracts with ocean carriers and marine terminals, and so forth, and are non-measurable.

Accordingly, specific shippers may prefer routes that fit better their distribution network even if these routes may involve higher rates and longer sailing times.

Only the systemic and measurable attributes can be incorporated in a numeric model to predict route selection. Such a model will include the market share of a route as the dependent variable and the route's cost and time as independent variables. However, since cost and time involve different units, specifying such a model is quite complicated.

In my study of the Panama Canal expansion, while interviewing shippers I found an approximate way to model choice-making behaviour using the concept of Premium per Day Saved (PDS), which incorporates cost and time into a single variable.

At the time of my study in 2003, the difference in freight rates between all-water panama and intermodal rail for major USEC ports was USD500/FEU and the difference in time seven days.

This meant on average shippers using intermodal services paid a cost premium of USD75 per saved day. The routing decision was made by comparing the PDS to the opportunity cost per Day Saved (CDS).

Shippers with CDS' higher than USD75/day were better off using intermodal and vice versa. Naturally, shippers of high value and/or time sensitive cargoes had high CDS and therefore preferred the rail option.

There is an implicit assumption in the above choice-making formula: that of no physical constraints. Nevertheless, in my 2003 research and following studies, port capacity, especially for US west coast (USWC) ports, was considered a major constraint.

For the foreseeable future, though, such a constraint has been relaxed given that the recession has resulted in the loss of five years of traffic growth; and the environmental log-jams in issuing permits for new terminal

EXECUTIVE SUMMARY

- **New panamax ships will load up to at least 12,500TEU**
- **Most Asia/USEC cargo that has switched from USWC/Intermodal options to the Canal has already done so**
- **The new Panama Canal will be 'no' game changer**

Table 1: Coastal split of northeast Asia imports to the US (TEU)

	2006	2007	2008	2009
East Coast	2,405,275	2,623,427	3,541,253	3,100,364
Gulf coast	162,328	182656	224,061	196,683
West Coast	8,629,045	8,501,553	8,769,110	7,336,184
Total	11,196,648	11,307,636	12,534,424	10,633,231

Source: JoC

developments has cleared up.

The period included in tables 1 and 2 was distinguished by wide fluctuations in costs and freight rates. On the cost side, there was a sharp increase in rail costs (over USD200/TEU) in 2007 while the Canal's tolls rose by just USD32/TEU.

The fluctuations in ocean freight rates were much wider with the spot rate transpacific sampled by UK-based Drewry Shipping Consultants ranging from a low of USD250/TEU to a high of USD1,000/TEU.

Despite these upheavals, quite surprisingly the freight differentials between intermodal and all-water Panama and the respective PDS have not changed much.

Anecdotal evidence indicates that despite the huge increase in rail rates, the freight differentials have slightly shrunk, presently reaching about USD400/FEU or even lower. Since the time difference remained the same, the current PDS is about USD60. Supposedly, a decline in PDS should result in intermodal services increasing their share, but the opposite has occurred.

An explanation for the substantial shift to Panama Canal routings cannot, therefore, be attributed to the PDS but to the CDS. Indeed, the main change during this period was a substantial reduction in shippers' opportunity cost of time. Essentially, this means that shippers' willingness to pay for the time gains offered by intermodal rail has been declining.

The reason for this so-called 'devaluation of time' is the development of integrated supply chains by shippers/consignees, principally the main retailers). This has led to tight control being exercised over the entire import process from production to the shop shelf.

When the logistics process is well-organised and involves large inventories, several additional days of sailing time have little value except for the inventory cost, which for most waterborne cargoes is quite small.

For example, the majority of the Asian imports are valued at about USD30,000/TEU. Assuming 10% cost of capital, the inventory cost, which is the CDS in this case, would only amount to USD8/day (30,000 x 0.1:365), far smaller than the USD60/day PDS. Hence, for most import cargoes all-water Panama is preferential to intermodal rail.

Moreover, due to the increase in reliability of the supply chain, retailers do not even need to increase their inventory because of the longer transit time of all-water Panama services as they can simply consider the cargo on-board ships as if it is held in a floating warehouse ("inventory in motion").

In this scenario, the actual CDS is much smaller than the above-calculated USD8/day. The only justification for using the faster intermodal routing for most cargoes would be unexpected delays and the risk of lost sales, which may result in losing 20-50% of the total value of the cargo due to discounts.

These importers have a high CDS and a preference for a combined USWC/intermodal routing. The restructuring of the US market, with smaller importers being replaced by major retailers has resulted in an overall downward adjustment in time valuation (devaluation) and growing preference for all-water links. This time devaluation also explains the decline in the freight differentials between intermodal and all-water despite the sharp increase in rail costs. What is the point in pricing intermodal services highly if there are no buyers?

So what will be the impact of a bigger Panama Canal?

Table 3 reveals the savings in voyage costs due to deployment of different sized post-panamax ships. The differentials are quite small, between USD25-USD65/TEU. These are minor changes, similar to the past increases in the Panama Canal tolls, and equivalent to an increase of between USD3 and USD9 (25:7; 65:7) in the PDS.

Moreover, these savings may be partially offset by cost savings on intermodal rail services due to a parallel increase in ships deployed on USWC services.

For most cargoes, there is already a wide gap of USD50 plus/TEU between the PDS and CDS, increasing this gap by a further USD3-USD9/TEU due to savings in voyage cost is expected to only have a limited impact.

Hence, it seems unlikely that the ACP expansion programme will set off a massive further diversion of cargo from USWC port discharge/intermodal routings.

Nevertheless, a real 'game changer' may happen if the new Panama Canal is accompanied by carriers' devising totally new service patterns ('Revolution #4', *CI*, December 2006, pp46-49). It involves carriers replacing direct all-water Panama/USEC/GC services with feeder links over a Caribbean hub.

The main advantage is the ability of carriers to call at a larger number of ports, resulting in substantial savings in inland trucking. Another saving is the avoidance of ports/terminals in the US having to invest in facilities to accommodate large ships.

Given that most of the traffic that could switch from intermodal to all-water Panama has already done so, any future shifts would have to involve cargo destined for hinterlands inland from USEC/GC ports, such as Atlanta, or cargoes of a much higher value and/or time sensitivity.

Such far away cargoes require 'reverse bridge' services and additional land transport, which adds costs raising the price of all-water Panama versus intermodal rail via the USWC. The resulting lower PDS renders the diversion of this traffic as quite difficult.

Moreover, any further diversion of higher value cargoes from rail to all-water would face growing competition from west coast ports, which recently formed a collaborative organisation with the US' western railroads, and Canadian and Mexican-based intermodal options.

Hence, a 'game change' is not expected to take place from the opening of the larger locks, but rather a small upward 'bump' in the all-water Panama share of the trade with growth in the total market being the driving factor.

While this may pose a financial problem for the ACP since earlier forecasts were based on 'substantial cargo diversions following expansion, any shortfall in revenues could be covered by modest rises in Canal tolls. Based on the wide gap between the PDS and CDS for most import cargoes, such an increase will not affect market share.

Table 2: Coastal split of northeast Asia imports to the US (%)

	2006	2007	2008	2009	2009 - 2006
East Coast	21.5%	23.2%	28.3%	29.2%	7.7%
Gulf coast	1.4%	1.6%	1.8%	1.8%	0.4%
West Coast	77.1%	75.2%	70.0%	69.0%	-8.1%
Total	100.0%	100.0%	100.0%	100.0%	–

Source: JoC, A. Ashar

Table 3: Differentials in voyage cost for AWP rounting

Ship Capacity	TEU	4,800	6,000	8,000	12,500
Voyage Cost	USD/TEU	495	47	405	325
Differentials	USD/TEU	–	25	65	80

Source: A. Ashar

** Dr Asaf Ashar is Professor-Research with the National Ports & Waterways Institute, a programme of The University of New Orleans, US. Ashar has more than 30 years' experience with ports, shipping and multimodal transport systems. He was team leader in the study of the Panama Canal's expansion for the containerised segment.*