6. CONTAINER PORT VOLUMES

6.1 From container flows to port volumes

The forecasts discussed in previous chapters refer to the volume of containerized cargo that is shipped internationally. This information is difficult to obtain, and the values are subject to considerable measurement error. The most commonly quoted statistics on the size of the global container market refer to the number of container handling movements in ports, which is a more readily observable magnitude.

Port cargo handling volumes differ from the number of container movements because:

- Each container is counted at least twice, once at the port of export and once at the port of import;
- Some containers are transhipped at intermediate ports en route to their destination, in which case the container is counted twice more in port statistics: once as it is taken off the vessel and once as it is put back on;
- Port statistics also include empty containers loaded and unloaded in the port;

In addition, port statistics also include the movement of domestic containers, which are not included in the current study.

6.2 Empty containers

Empty container movements at present constitute approximately 20 per cent of the world total international container port throughputs. Excess capacity is likely to be a feature of liner shipping for the foreseeable future. This will continue to place pressure on operating margins, and provide a strong incentive for shipping lines to minimize logistics costs, of which empty container movements are a major component. At the same time, increasingly sophisticated container tracking and management procedures should provide opportunities for realizing economies in this area.

On the other hand, as discussed in Chapter 4, trade imbalance on the trans-Pacific and Asia-Europe routes is expected to become more pronounced as export growth continues to outstrip line growth of imports. The pattern of increasing imbalances is mirrored in a number of important North-South trades, including the intra-ESCAP routes between Asia and Australasia. Therefore it seems inevitable that carriers are going to be faced with the challenge of managing very large volumes of empty containers.

The MPPM model’s approach is to estimate the volume of empty containers handled in each port. This approach is illustrated diagrammatically in Figure 5-1.

- The major direction for container movements is identified at each port; these may be either import direction, or the export direction.
A percentage of empty containers is added to this major flow. The MPPM models have the ability to adjust this percentage from port to port, however it is difficult to predict with confidence. In this study, we have therefore chosen to apply a global average percentage to most ports of 3.5 per cent.

Thirdly, the number of empty containers in the minor flow direction is estimated by subtracting the number of full containers in the minor flow direction from the total number of containers in the major flow direction. The assumption, therefore is that total flows (full plus empties) are balanced in each port. This assumption is unrealistic with regard to any particular port in any particular year. However, given the challenge of predicting the actual ratio in future years, the minor impact that imbalances have on overall volumes, and the fact that globally a balance must be maintained, the simplifying assumption was justified.

Figure 6-1: Estimation of empty container movements: MPPM models

Figure 6-2 shows the ratio of empty containers to total containers handled in ports over the last 20 years. It can be seen that until approximately 1996 there was a clear declining trend in the ratio of empty to full containers, as increasingly sophisticated container logistics gradually reduced the number of empty container movements. In 1998, the ratio increased to well over 20 per cent. This was due to the emergence of very pronounced imbalance in the two main Asian trades with Europe and North America caused by the Asian currency crisis. This imbalance has persisted though to see present day.
The study estimates suggest that the declining trend that was evident prior to 1998 is unlikely to re-emerge with the proportion of empty containers increasing to nearly 23 per cent in 2015. Carriers will do well to achieve levels which are lower.

6.3 Container port volumes: world and ESCAP region

In 2005, the volume of container traffic handled in the world ports was 386 million TEU. This figure is over three times the total number of full international containers shipped.\(^8\) Our synthesised estimates for traffic in the same year amount to 372 million TEU. As the MPPM estimates exclude purely domestic container movements. The study forecasts that the total volume of containers handled in world’s ports will increase to 795 million TEU by the year 2015. This implies an annual average growth rate over the period of 7.9 per cent.

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\(^8\) Based on port data downloaded from Containerisation International website (www.ci-online.co.uk), 12 Dec 2007.
The ESCAP region will dominate this growth. The total volume of international import/export container handling in the ports of the ESCAP region will increase from 152 million TEU in 2005 to 383 million TEU in 2015 at an annual average growth rate of 9.7 per cent. By 2015, non-transhipment movements through ports of the ESCAP region will account for 63 per cent of the global total.

Figure 6-3 shows forecast container port throughput (including transhipment) of most of the major economies of the ESCAP region. By 2015, the mainland ports of China are expected to handle 216.5 million TEU, or 44 per cent of the total regional volume. In addition, 65 million TEU is expected to pass through the ports of Hong Kong, China and Taiwan Province of China.

**Figure 6-3: Total container throughput of ESCAP economies – 2015 (million TEU)**

(Source: Study estimates)
The rest of the region is expected to account for a total of 207 million TEU, with Singapore by far the largest contributor, with a throughput of around 48 million TEU. Malaysia, Japan and Republic of Korea are each expected to handle between 20 and 25 million TEU, with India’s volume increasing rapidly from current modest levels to over 14 million TEU.

Figure 6-4 shows the growth rates that are implied by these projections. Volumes through the ports of mainland China are expected to continue to grow very strongly, though at rates considerably lower than those experienced during the last decade. The rapid growth of China will be continue to be a major of the driving forces behind the predicted strong growth of port throughput in other economies of the region. But strong growth is also predicted for South Asia, with Bangladesh, India, Pakistan and Sri Lanka all expected to register annual growth rates approaching or exceeding 10 per cent throughout the period.

Within South-East, growth is expected to be led by the least developed economies, with Cambodia and Vietnam both expected to grow at rates in excess of 10 per cent throughout this period.

(Source: Study estimates)
6.4 Patterns of transhipment

6.4.1 Transhipment growth

Historical trend

Figure 6-5 shows estimates made by Drewry Shipping Consultants (2007) of the historical trend in the growth of transhipment volumes since 1990. According to these estimates during the 1990s, transhipment volumes, as a proportion of the total container volume handled in the world’s ports, increased steadily, rising from 18 per cent in 1990 to 25 per cent in 2005. Since then, however, transhipment volumes increasing at roughly the same rate as total port volumes.9

![Figure 6-5: Trends in Transhipment](image)

Source: Drewry Shipping Consultants, 2007

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9 The MPPM estimates of global transhipment volumes in 2005 are considerably lower than those of Drewry (85 million compared to 100 million TEU). The shares shown in Figure 6-5 are therefore not strictly compatible with the shares quoted in the next subsection, which are taken from the MPPM study.
Drivers

While containership size has increased, and container volume has grown, shipping networks have increased in complexity as well as in scale. The key development has been the evolution of hub-and-spoke systems (with cargoes are carried from tributary ports by feeder vessels) loaded on to large mainline vessels calling at major transhipment hubs.

However, using a hub and spoke system means incurring the costs of feeder services and of extra handling movements in the hub port. In many cases, it means longer transit times, and, where common carrier feeder services are used, a less visible presence in the port of origin (or destination) of the cargo.

Shipping lines are therefore required to constantly balance the benefits of transhipping over a hub port against those calling directly at the port of origin (or destination) of the cargo. For any particular market, this will change over time — as volumes increase, making direct calls becomes more attractive. From Figure 6-5, it appears that during the 1990s, the momentum was clearly in favour of increased use of transhipment hubs. Over the past five years, however, the tow opposing forces appear to have been almost in equilibrium.

Transhipment cargoes offer port authorities and terminal operators an opportunity to develop their businesses at a faster rate than the development of their economic hinterlands permit. Therefore it is not surprising that competition for transhipment business is fierce, and volumes can be very volatile. It is therefore useful to obtain some assessment of both the overall scale of this important market sector, and the extent to which individual ports are likely to be successful in it. The study has attempted to explore these issues. It should be kept in mind, however, that it is possible to do so only in so far as the competitive position of individual ports is determined by their quantifiable characteristics, such as location and cost structure. Policy variables, such as the priority that a terminal is willing to accord a shipping line or willingness to make dedicated terminals available to shipping lines, are likely to have an equally important bearing on eventual outcomes.

6.4.2 Global transhipment volumes

The study estimates that the world total transhipment volume of containers will increase from around 85 million TEU in 2005 to 184 million TEU in 2015 at an average growth rate of 7.6 per cent per annum. At that time, the share of transhipment in total port volume is expected to be approximately 23.1 per cent of the total volumes handled in the world’s ports, as shown in Figure 5-5. This is virtually unchanged from the MPPM estimates of transhipment shares in 2005 (22.9 per cent of the global total).10

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10 As noted previously, this differs from the Drewry estimate of the global transhipment share at 26.1 per cent in 2005.
**Figure 6-6: Total container volume by movement type – 2015 (million TEU)**

(Source: Study estimates)

**6.4.3 Global distribution of container volumes**

**Figure 6-7: Transhipment volumes by global region**

(Source: Study estimates)
Asia has led the world in the development of transhipment operations. Singapore emerged in the late 1980s as the first port in the world that was dependant primarily on transhipment cargoes for its existence. Since then it has been joined by other ports in Asia, including Colombo, several ports in the Persian Gulf, and the new ports of Salalah, Aden, Tanjung Pelepas and Gwangyang. In addition, a number of ports that have substantial volumes of hinterland cargo also play a major role in the transhipment system: these include ports of Hong Kong, Kaohsiung, Busan, and Port Klang.

Figure 6-7 suggests that this dominance is expected to continue — if fact, to increase — throughout the forecast period. The total volume of containers transhipped in ports of the ESCAP region is expected to reach 109 million TEU by the end of the forecast period. This is almost 60 per cent of the total expected global transhipment volumes.

6.4.4 Major transhipment centres

Figure 6-8 shows the MPPM's estimates for transhipment volumes by economy within the ESCAP region. The forecasts emphasise the rise of the Malaysian ports of Port Klang and Tanjung Pelepas as alternatives to the traditional South-East Asian hub of Singapore. However, the figure also shows that, despite the increasingly important role of these ports, Singapore is likely to remain the premier transhipment port of South-East Asia.

Figure 6-8: Asian transhipment throughput distribution (2015)

(Source: Study estimates)
All three of these ports are likely to gain significantly from the continued increase in the number of very large ships operating on highly streamlined routes, as well as from continued economic growth in the countries in the neighbouring economies.

In East Asia, Shanghai will play an increasing role in the consolidation and transhipment of cargoes from mainland China. However, ports of the Republic of Korea play the leading role in the transhipment system. The study estimates show that despite the emergence of Shanghai as a major transhipment hub, both Busan and Gwangyang will continue to play an important role in transhipment business. The share of the ports of Hong Kong and Kaohsiung in regional shipment is likely to decline, as these ports face increased competition from direct calls at the ports of China. Nevertheless, they will continue to play an important role.