Day-Definite Full Container Load Service for Time-Sensitive Shippers: On the Perspective of Total Distribution Cost

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ABSTRACT

The authors quantify the benefits of a newly introduced logistics product, day-definite Full Container-load (FCL), in terms of its cost reduction relative to other existing products – regular FCL and airfreight, from the perspective of a logistic manager in an intercontinental supply chain facing lead-time uncertainties. Numerical examples and sensitivity analysis are provided to illustrate the comparison across the above-mentioned three logistics products and the impact of other factors on the performance of these logistics products.

Keywords: Airfreight, Day-Definite Full-Container-Load, Lead-Time Uncertainty, Logistics Products, Regular Full-Container-Load

INTRODUCTION

The globalization of markets and supply chains driven by proximity to raw materials, cheap labor costs, and access to fast growing emerging economies has been the major force behind the profitability and growth for many North American companies in the last ten years. Faced with saturated markets and increasing cost competition in North America, companies have relied on their offshore operations and outsourcing base in Asia to supply the home market. Importing from China and other Asian countries had been steadily increasing over time from the early 1990’s to the mid 2000s. As reported in the 2005 logistics survey in Clancy and Hoppin (2006), the average annual import growth rate from Asia (calculated based on annual shipment quantities measured in Twenty Foot Equivalent Units, TEU) in the 2000-2005 window was above 10%. The strong growth trend led to an increase of millions of TEU

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shipments per year and strained the existing ocean container transport network, as it was evidently manifested in congested landside ports and other transport and customs processing infrastructures. This overloading of the transport and customs processing network led to increased delivery lead-times and deteriorating delivery service levels to end-customers. The deteriorating delivery reliability was a big problem for many shippers, with the consequences of costly penalties, steep expedited shipment costs, loss of valuable accounts, and hard-to-recover bad will from important customers. However, some of these issues started being addressed by newer transport products, for example, the expedited day-definite shipment services for less than full container loads, offered with transport reliability and lead-time variation reduction in their core.

The global supply chain landscape has changed quickly. In just a few short years, many of the factors driving uncertainty in Asia-originated supply chains have been replaced by a different set of new challenges that logistics managers are faced with. While the lead-time length and variability of ocean transportation will always remain a concern, the challenges for shippers have shifted recently to include new issues. Although the number of sellers and producers across industries that joined the Asia-based outsourcing practices has increased, the total volume of imports from China and other Asian countries are leveling off in a rapidly cooling down global economic environment. Ocean container networks are now less strained and its overall capacity is better aligned with the demand, and will stay that way for the next few years.

However, in this new economic environment of tight credit and price sensitive customers, ability to compete in mature, cut-throat cost competitive product markets with extremely effective working capital uses becomes extremely important. The recent experiences of the Global/US economic slowdown, projected to last at least the next two to three years, and dizzying level fluctuations in fuel and other commodity prices are driving the renewed focus on managing intercontinental supply chain costs for increased profitability and faster cash-to-cash cycles. These developments increased the emphasis on “lean” logistics management practices, which will shorten lead-times and reduce all relevant variations within a better capacity rationalized ocean and customs processing network. At the same time environmental concerns and efforts to move away from carbon fuels have become a top priority on many corporate agendas and started driving the management directions of inter-continental supply chains. Reducing reliance on transportation modes heavily exposed to the negatives of carbon fuel consumption (e.g. air transport) is viewed as an important short term imperative in transportation strategies of global firms.

The challenge of managing “lean” inter-continental supply chains is far from trivial. Inter-continental supply chains, when compared with domestic supply chains, necessitate lengthy hauls that could be 5 to 10 times longer and could often involve shipments that average from 5000-8000 miles, and thus often have a long transit time and a high transport lead-time variability. These complex supply chains often involve multiple parties (suppliers, distributors, transportation providers of multiple modes, customs agents, etc.), each with unique uncertainties in their own operations (yield, schedule reliability, unreliable operators, etc.), and cross national borders with all the added bureaucratic peculiarities and uncertainties in each such crossing. The only constant for logistics managers is that uncertainties still remain significant and the magnitude of exposure to them is as usual correlated to the lead-time length and many others (e.g. demand uncertainty, disruption risk, unauthorized access to shipment, etc.).

Thus, to achieve lean management of complex intercontinental supply chains requires to reduce lead-time variability / improving delivery reliability, balancing transportation costs with inventory carrying costs, and addressing many of the “hidden” costs incurred from transit-time variability, with the ultimate challenge of minimizing total distribution costs without negatively impacting service levels. However, fluctuating transportation
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