

# **Containerized Grain Supply Chain in Western Canada: Opportunities and Regulatory Barriers**

Dr. Barry E. Prentice  
Professor, Supply Chain Management  
I.H. Asper School of Business  
University of Manitoba

## **Synopsis**

The containerization of grain is a growing trend internationally. Many western Canadian grain shippers would like to source-load containers on the Prairies, but most shippers are forced to trans-load at the ports after their grain arrives by other means. The problem is the Revenue Cap. This regulation creates a double disincentive that discourages the railways from moving grain in containers. In addition to the lost marketing opportunities for farmers, this regulatory barrier impedes the use of containers to serve as an elastic supply of storage and transport during demand surges. The removal of the Revenue Cap would encourage development of a contestable market based on a competitive containerized grain shipping supply chain to rival the bulk system, such that shippers could always receive the lowest cost means of reaching foreign destinations and the best customer service options.

## **Introduction**

The most significant innovation in transportation during the past 50 years has been the introduction of containerization. Container shipping has grown rapidly because it reduces the cost of port handling, improves cargo security and permits the establishment of global supply chains. As the volume of world trade carried in containers has increased, ship size and port facilities have grown, creating a virtuous cycle of declining costs and expanding service. This productivity is matched on the land side by double-stacked container trains and drayage trucks that have made containerization the preferred global door-to-door logistical system domestically and internationally.

Once a high-cost option, events over the past decade-and-a-half have strengthened the economic viability of containerized grain shipping. Only 15 years ago, the largest container ship was in the 4,500 TEU range<sup>1</sup>. Such ships are now considered mid-sized, because 8,000 to 10,000 TEU vessels are common, and ships as large as 18,000 TEUs have entered service. Although containers began with the carriage of only high-valued, manufactured goods, many products that were once moved in break-bulk or bulk have shifted over to containers. A common pattern has emerged. Once commodities embrace containerization, these cargoes never return to bulk or break-bulk shipping. This has happened with dimensional lumber, coffee, bananas and now containerization is gaining market share in grain transportation.

The bulk handling of grain has resisted the shift to intermodal container shipping better than most other cargoes. Nonetheless, containerized grain shipments are growing. According to McFarlane and Saul (2014), “Around 12 percent of global trade in agricultural goods such as oilseeds and grains, traditionally shipped in bulk, was shipped via container in 2012”. During 2013, containers were used to transport 10 percent of total U.S. waterborne grain exports<sup>ii</sup>. This is up 2 percentage points from 2012, and 4 percent from the year before. Containerization of grain is also being pursued in Canada and Australia. As much as 17 percent of Canadian grain exports from Port Metro Vancouver have been containerized in some years.

Despite the growth in grain containerization, not much is source-loaded on the Canadian Prairies where most grain is still handled through the bulk handling facilities. Generally, grain is loaded into containers at the ports after arriving there by other means. Given the large volume of containers moving from North America to Asia as empty backhaul, it seems inevitable that grain containerization on this traffic lane will continue to grow. It is the inland transportation of containers that remains puzzling. Empty containers are transported across the Prairies to the west coast ports while at the same time empty hopper cars meet them heading east to the Prairies from these ports. Ordinarily, market forces would eliminate such an obviously wasteful and inefficient use of resources; this begs the question, why?

This paper assesses the prospects for containerized grain shipping from Canada and source-loaded containers on the Prairies. The assessment begins with a review of grain containerization practices in the United States and Canada. Subsequently, the analysis considers the competitiveness of containers versus bulk, before addressing the economic impact of the current regulatory environment. The penultimate section considers the complementary role that the elastic supply of containers could play when grain transport demand surges occur. The paper concludes with policy recommendations.

## **Development of Grain Containerization**

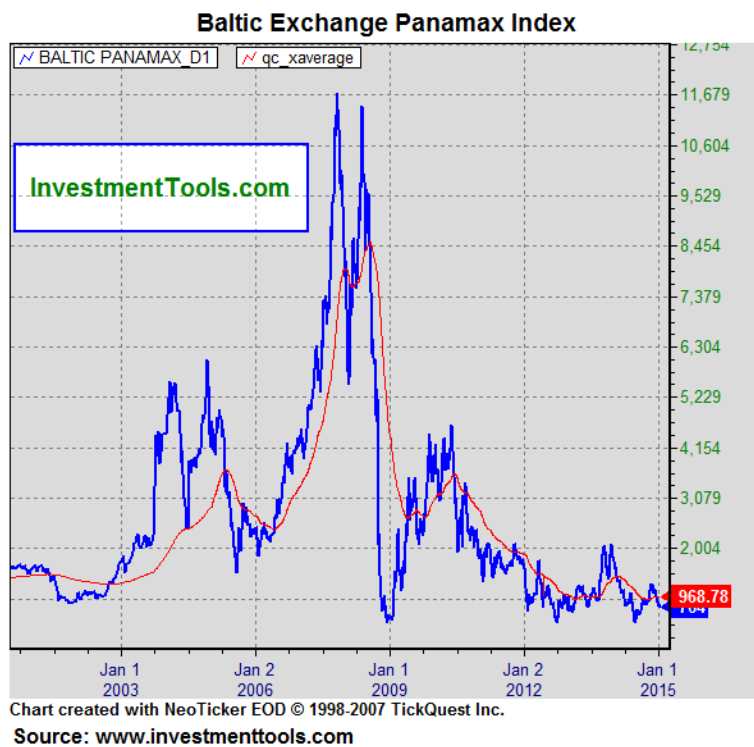
Containerized grain shipping from North America has shown significant growth since the beginning of the 21<sup>st</sup> century. The examination of grain containerization in the U.S. and Canada is presented separately because differences in crop production, container traffic patterns and economic regulation affect the containerized grain supply chain (CGSC).

### United States CGSC

Prior to 2003, containers were mainly restricted to specialty crops, which would not fill a ship’s hold, and feed ingredients like corn gluten meal, bone and meat meal. The containerization of major crops like U.S. corn and soybeans began to pick up significantly in 2004 when backhaul container rates to Asia fell below bulk shipping rates.

The Baltic Exchange Panamax Index (BPI) is a standard indicator of bulk shipping rates worldwide. As presented in Figure 1, from late 2003 through to the autumn of 2008, bulk ocean shipping rates climbed by over 400%. These freight rates shot up because of the growing Chinese demand for steel and other commodities. At the same time, consumer demand surged in North America for imported Asia-Pacific manufactured goods. This led to a surfeit of empty containers being returned to Asia from North America, and consequently low backhaul rates. During the period from 2004 to 2008, grain could be shipped in containers from Chicago at \$35/40 per ton, while bulk rates at the Gulf of Mexico were \$60/70 per ton. As a result, large quantities of commercial bulk grain began to move in containers.<sup>iii</sup>

Figure 1 Baltic Exchange Panamax Index: December 2000 – January 2015.



Since the recession that began in 2008, the cost of bulk shipping has fallen dramatically and today freight rates remain below the levels of 2003. However, the volume of grain shipped in containers has not returned to the bulk system; instead the export share of containerized grain from the U.S. continues to grow. If the containerization of grain has passed a “tipping point”, more grain shipments will be converted from bulk handling to containers when bulk shipping rates recover.

Grain is transloaded into containers on the east and west coasts of the United States and at interior points where empty containers accumulate. A site visit to Chicago in 2012 revealed that three facilities accept truckloads of corn, soybeans and dry distillers grains (DDG – derived from

ethanol plants) for trans-loading into containers. Two of the transloaders are located adjacent to the CenterPoint Intermodal Centre container port, while the third is located at the CN container yard.

DDGs account for about half the grain exported in containers from the United States. This is explained by the surplus of DDG production arising from the ethanol fuel mandate and the difficulty of shipping DDG in bulk. Corn and soybeans are the other major containerized grain exports. Soybeans account for 30 percent of containers and corn represents about 20 percent of containerized exports.

Aside from the movement of identity preserved products, like soybeans for Japan, containerization in the U.S. is treated as a substitute for bulk shipping. DDG, corn and soybeans are transloaded into containers without liners, and shipped. Some concern is expressed about the potential for cross-contamination from prior shipments in the containers, but when the end use is livestock feed, and the amount of potential contamination is small in any case, the risk is considered to be minimal.<sup>iv</sup>

Asia is the top destination for U.S. containerized grain exports. “Approximately 61 percent of U.S. waterborne grain exports in 2013 went to Asia, of which 16 percent were moved in containers.” USDA AMS. Table 1 below lists the shares of containerized grain imports from the United States. The top eight markets are all located in Southeast Asia.

Table 1 Largest Import Market Shares for United States Containerized Grain

<u>Destination</u>	<u>Market Share</u>
China	41%
Taiwan	14%
Indonesia	13%
Vietnam	7%
Malaysia	7%
Korea	5%
Thailand	4%
Japan	4%
Other	12%

Source: USDA AMS

The motive for using containers is almost universally identified as improved logistical economics. McFarlane and Saul (2014) note that the quantity of grain received in containers puts less pressure on the working capital of smaller importers. This has become more important to Asian grain buyers.

When asked whether foreign receivers are willing to pay a premium for the higher quality of grain received in containers, the answer of the transloaders is “generally no”. Buyers acknowledge that quality is better, and they like this aspect of containers. They are willing to pay a small premium for containers of certain products (e.g. Number 1 Soybeans), but not for ordinary grain.

Inbound merchandise transloading practices encourage the loading of grain in containers at the ports. Asian import logistics costs can be reduced by transloading sea containers into 53-foot domestic containers at the North American coasts for shipment to inland distribution warehouses. Approximately three forty-foot, or six twenty-foot, container loads can be moved in two 53-foot domestic units. This reinforces the logic of moving grain in bulk to the coast for transloading into containers, rather than source-loading in the growing areas.

The places where source-loading containers inland works best is at gateway locations with surplus empty backhaul containers, notably Chicago, but Memphis and Kansas City also compete with conventional bulk.

In 2012, the Union Pacific (UP) railroad initiated a new “Plant-to-Port” transload service for grain and grain products at a facility in Yermo, CA. A unit train of grain is moved to the transloading facility where it is met with a unit train of empty containers from the Port of Los Angeles. After transloading, the containers are returned to the port for export shipment. The competition between source-loading at Chicago, or sending unit trains to the UP facility is a question of backhaul rates and scale. The Chicago transloaders retained a rate advantage in 2013 because container backhaul rates were lower than the equivalent hopper car tariff<sup>v</sup>. Also, the UP only wants to receive unit trains of grain at Yermo which leaves out smaller container load shippers.

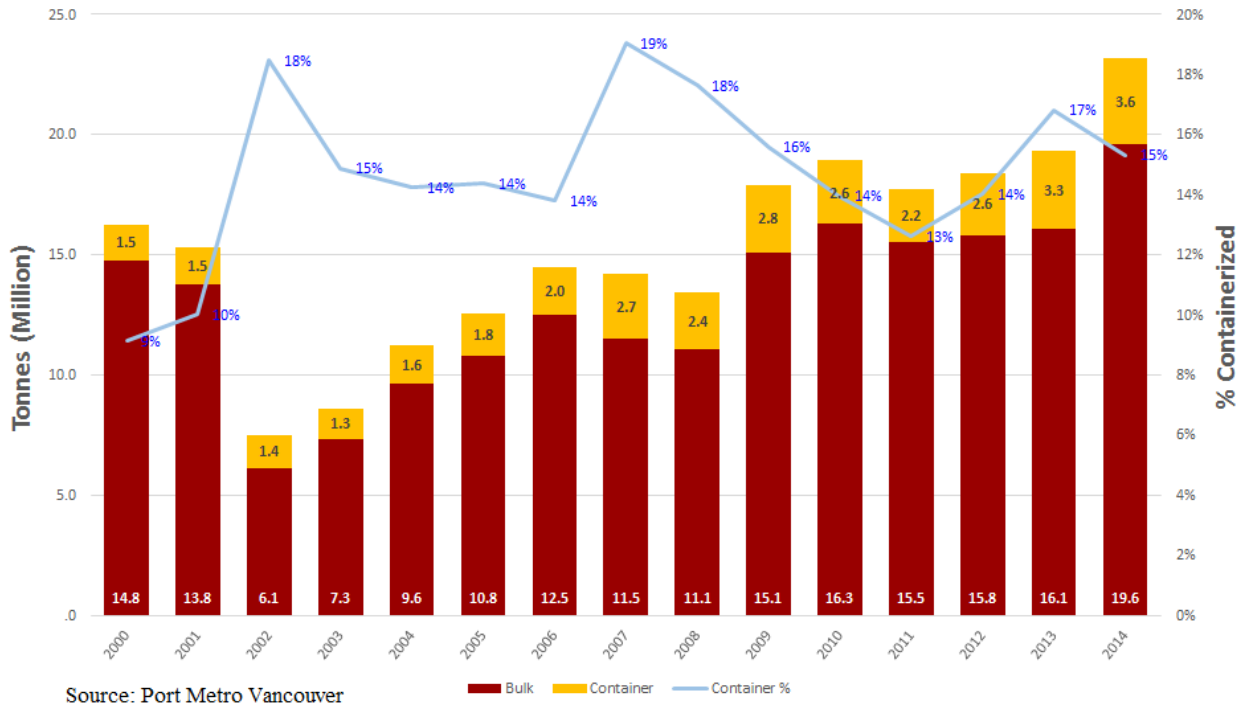
#### Canada: GCSC

The Canadian experience with the containerization of grain is different than the U.S. in several respects. Cereal grains (wheat and barley) and canola dominate Canadian exports. In an effort to diversify, Western Canadian farmers embraced new field crops like red and green lentils, yellow peas, mustard and canary seed. This has led to increased agricultural research directed at developing broader varieties with higher production yields. From small beginnings special crops have grown to represent almost 20% of the crop mix. The seeded area of these crops now averages 5 million to 7 million acres annually in Saskatchewan alone.<sup>vi</sup> As a result, cleaning and processing plants have appeared across the Prairies creating many shippers with small lots.

Figure 2 presents grain export data for Port Metro Vancouver (PMV) by mode of transport from 2000 to 2014. The volume of grain exports in containers through PMV increased over this period from 1.5 to 3.6 million tonnes. The container share of the total grain exports has grown

from 9 percent to between 13 and 17 percent in recent years. It is also worth noting that the variability of containerized shipments appears to be less than grain shipments as a whole.

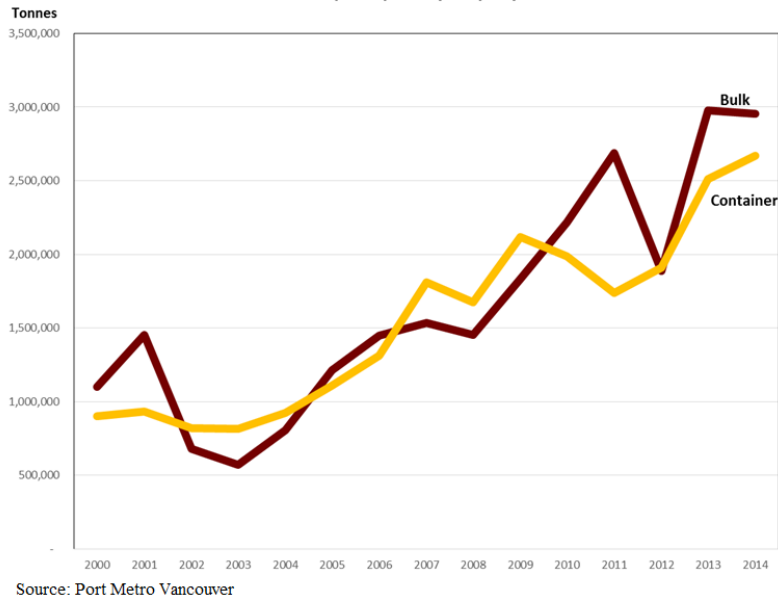
Figure 2 Grain Exports via Vancouver, BC: Containerized versus Bulk, 2000-2014.



During this 15 year period, the predominant area of container growth was in special crops, pulses in particular. Containers work well for global markets looking to purchase Canadian pulse products in small lot volumes or bagged products. Also, special crops that are easily damaged, e.g. lentils, are better shipped in containers.

A number of special crops can also be handled in bulk if the terminals are equipped with “soft handling” technology (flat belts, minimal drops, etc.). Special crops shipments through PVM are reported for both bulk and container exports. Figure 3 contains the data for container and bulk exports of special crops from 2000 to 2014. The share moved in containers has remained fairly consistent at about half of total exports, but the volumes have tripled over this period.

Figure 3 PMV - 2000 to 2014 Export Specialty Crops (In Metric Tonnes).



### Containerization versus Bulk

The driving force behind the competition between bulk and containerized grain has been transportation costs. As the differential between ocean freight rates narrowed, or moved in favour of containerization, more grain has shifted from the bulk system. But this does not tell the whole story. Many studies of logistical systems fall into the trap of sub-optimization - too much focus is placed on one cost component at the expense of the total supply chain cost (Ballou, 1992). In addition to transportation, the costs of storage, handling, inventory carrying costs and product damage associated with the supply chain need to be considered as part of the total logistics package. (Kosior, Prentice and Vido, 2002)

#### Handling costs

Bulk handling systems have large pipeline inventories because of the quantities required to load unit trains and bulk ships. Commercial grain storage at country elevators and port terminals adds cost to bulk shipment that is avoided in containers. At the destination, more commercial storage is required to support the ultimate delivery of the product to the end user. In container shipping the heavier tare weight of the container has to be moved, but the container can also act as the storage bin throughout the supply chain to the final destination.

While containers have to be lifted on and off trucks, trains and ships, the product is never touched. This ensures the security of the product and avoids the direct and indirect costs of physically handling the product. Continuous handling causes breakage that opens the

commodity to quality deterioration and insect damage. Containerization eliminates handling damage that reduces the product's value or makes it unsalable.

Finally, containers move much more quickly through the logistical system meaning that less inventory in-transit needs to be financed. The average time in-transit from Prairie farms to loaded ships is about two months (Quorum Corporation, 2014). No data are available for container shipping, but it should be no more than a few weeks. As previously mentioned, minimizing the carrying cost of the receiver is an important consideration, especially for smaller importers (Kosior and Strong, 2006).

### Marketing Costs

Transactions costs are an important advantage for bulk handling. A 10,000 ton shipment requires the same amount of paperwork (letter of credit, B13, ocean bill of lading) as a single container. When the bulk rates are less per ton than shipping in containers, the economics favour large shipments that are split up at destination. When the bulk rates move up, container shipping increases because so many more buyers become accessible<sup>vii</sup>.

The increase in the number of buyers intensifies competition. As markets become contestable, the alternative supply chains are forced to be more efficient and cost-competitive. A bulk shipment in a Panamax ship may be handled by 5 or 6 large import buyers, who split up the cargo to supply many smaller domestic buyers. When the product goes in containers, the number of buyers available expands to hundreds. This creates opportunities to establish niche markets and form new loyalties. Containerization also offers small lot purchasers the opportunity of buying at source as opposed to a local broker where the broker's storage, overhead and profits get added to the price.

Inspection and grading costs, like the cost of transactions, favour conventional bulk handling. Grading is redundant for containerized grain because it is never mixed and can be traced back to its origin. The reason for grading is generally a case of the buyer and seller wishing a third party to adjudicate the quality. Depending on the number of containers, the inspections in Canada cost approximately \$100 for 3.5 containers. In the U.S., the inspection fees are \$1.50 to \$2 per ton. This is about 10 times more than the equivalent inspection costs for bulk shipping.

### Segregation Costs and Benefits

Some agricultural markets operate with "bulk sales" of generic quality at low prices, and segregated sales of precise quality at very high prices. The beverage market (wine and whiskey) operates this way, but this is less common in the grain market. Some notable exceptions are organic wheat, and soybeans for the Japanese noodle production. In these cases the product is containerized.

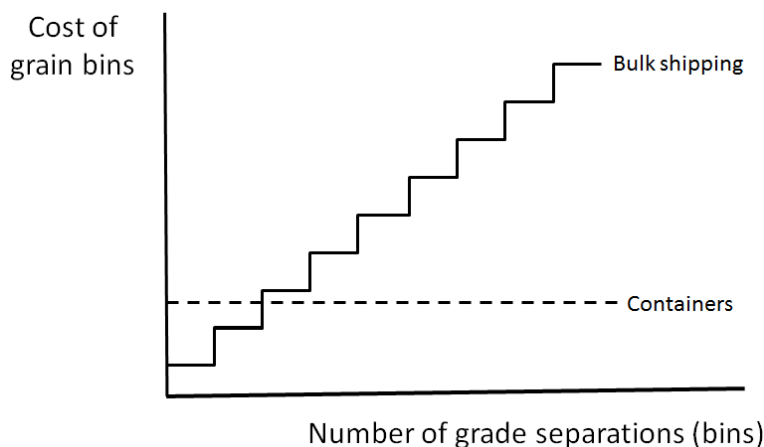


The ability to differentiate the product allows farmers to obtain higher prices. As the sophistication of buyers' increases and the varietal differences provided by crop breeders expands, the number of products entering the grain handling system is amplified. Handling small quantities of crops with specific attributes in containers assures that specialized products, such as certain pulse and wheat varieties can move with their specific identity intact. Buyers may not be willing to pay more for generic products just because they are shipped in containers, but if precise quality is important e.g. organic wheat, or security is a concern, then premiums are available (Prentice, Kosior and Thomson, 1997).

Containerization of grain is unlikely to replace the bulk handling system for lower value or generic products. Oilseeds and feed grains do not require segregation to maintain purity because they are further processed in systems that have broad quality tolerances. The principal concern of oilseed crushing plants and cattle feedlots is logistics cost. In cases where a bulk handling system can achieve acceptable quality consistency and economies of size, it will continue to dominate.

Where the bulk handling system begins to lose its advantage is when segregation becomes important. Variety multiplies the number of bins required to maintain product integrity. Figure 4 illustrates the economies of size with regard to binning products. The bulk handling system has to utilize a separate bin for each segregation, while the cost of segregating products in containers is constant because each container is a separate bin.

Figure 4 Economies of handling of multiple grain segregations.



### Impact of the Maximum Grain Revenue Entitlement (Revenue Cap) Regulation

The growth in containerized grain shipments has already been spurred by the availability of low cost backhaul rates on the Pacific traffic lanes and the growth of special crops in Western

Canada. Shippers prefer to load at source because of greater control over damage, security, etc., but the costs are unfavourable (MariNova, 2006). Repositioning charges (providing empty containers to Prairie shippers) make source-loading of containers in Western Canada more expensive than transloading in containers at Port Metro Vancouver after the grain arrives by other means (e.g. truck or bulk rail). As observed earlier, empty containers are travelling across the Prairies to the ports, meeting empty hopper cars returning from the ports. Economic theory would predict that such backhaul situations should not exist. Such is the power of the disincentive to move grain in containers created by the Revenue Cap regulation.

When the Revenue Cap was established costs were based on a system that had very few containerized grain movements. Consequently, containerized grain was simply lumped in with the bulk grain volumes and revenues. Over time as the demand for containerized grain has increased, the Revenue Cap input cost adjustments did not consider the costs associated with containers relative to bulk handling. Effectively the Revenue Cap discriminates against the containerization of grain in favour of bulk shipping.

Railway costs are higher for container movement than bulk. A covered hopper car can carry 100 tons of grain, while the same container space on a train could carry between 60 and 80 tons. Given that containers have to be lifted on and off the train, while bulk grain is transferred at the expense of the elevator companies, the cost of transporting grain in containers is significantly higher than similar volumes moved in hopper cars. Container shipping raises the railways' average cost that reduces their margin allowable under the Revenue Cap. When the railway's revenue is based on the average tonne-kilometres, the extra cost of moving grain in containers is a large disincentive.

If a shipper of special crops were willing to pay the price of getting access to an empty container for source-loading, any higher revenue earned by the railway for shipping the grain in a container would simply eat up the Revenue Cap faster. The railway would have to charge less on a subsequent bulk shipment to stay within the Revenue Cap. This creates a second disincentive for the railways to source-load containers for grain farmers.

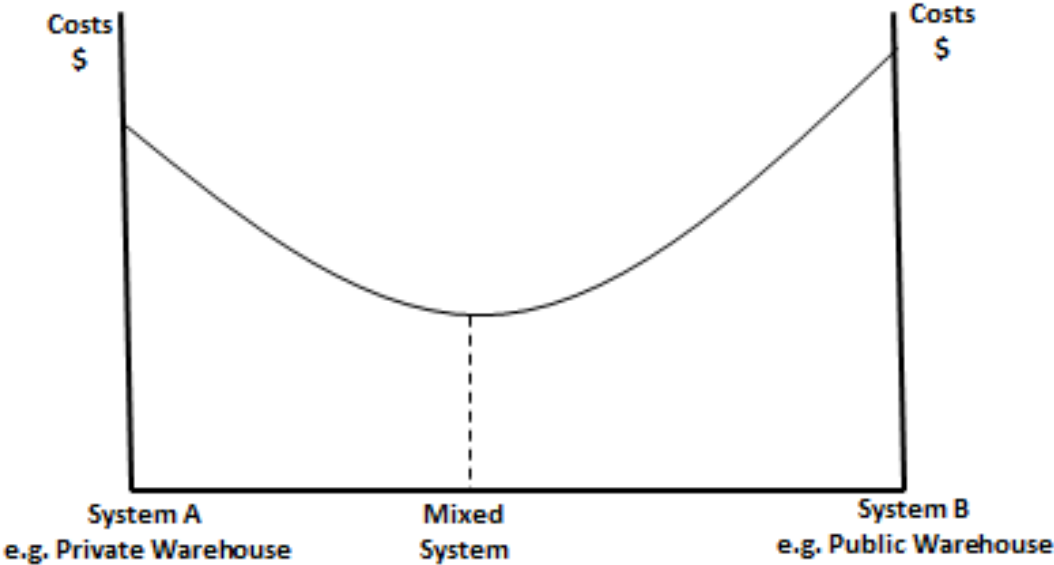
Given the financial deterrents of the Revenue Cap, the railways are discouraged from developing a program for repositioning empty containers on the Prairies. Accordingly, the increasing numbers of grain shippers that wish to use containers to export grain and special crops are forced to move their product to the ports by other means and transload at the coast rather than source-load in the country.

### **Containerization and Demand Surges**

Mixed systems are usually superior to pure systems because the different strengths of each system can be complementary in lowering costs. This is illustrated in Figure 5 that illustrates the

logistics trade-off of two systems with complementary attributes. An example often used in the logistics literature is the use of private and public warehousing. Public warehousing costs more per square metre than the cost of owning a private warehouse, but this depends on utilization. If a private warehouse sits half empty for two or three seasons, it may be less expensive to own a smaller warehouse and rent public warehousing space for the season when inventories peak (e.g. Christmas).

Figure 5 Logistics Trade-off of Pure versus Mixed Systems

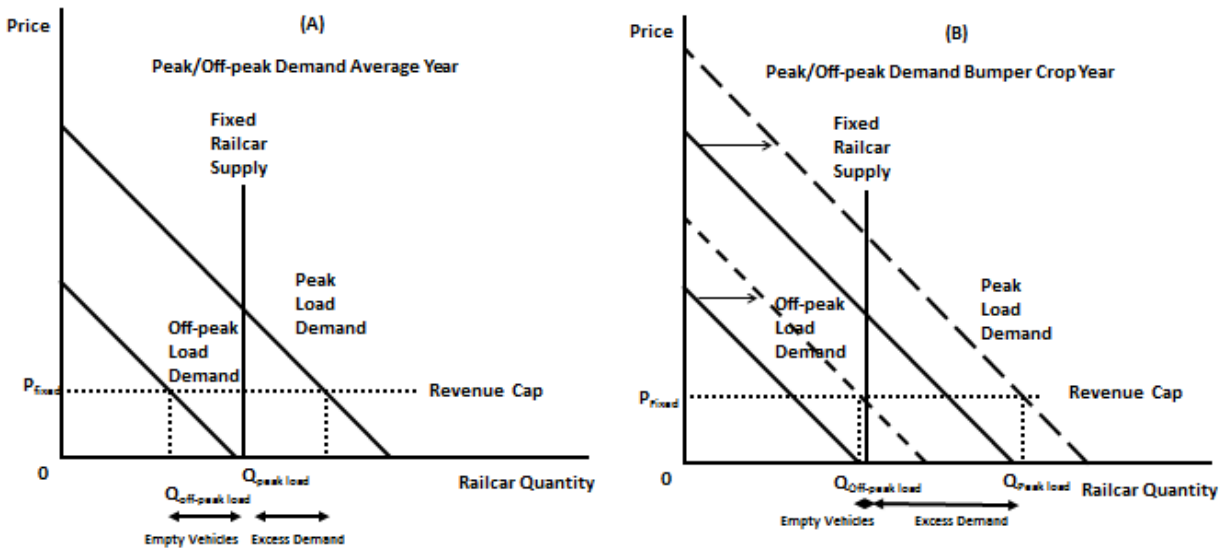


The benefits of a mixed strategy become greater, the larger the fluctuations in the volume handled. In the Northern Hemisphere, the volume of grain entering the bulk handling system surges as the harvest commences and does not peak until the end of the fall months. Volumes then decline, with a few bumps, until the next harvest. A mixed system with a containerized handling option could lower total cost and address the demand surge that occurs after harvest each year (Prentice and Craven, 1980). Containers would enable the bulk system to achieve higher utilization over the course of the year because when not needed for grain, the containers would be deployed for the carriage of other goods.

While the annual pattern of fluctuation is predictable, the peak demand for grain transport depends on prices and weather conditions. The advent of a bumper crop is when the mixed system truly shines. This is shown theoretically in Figures 6 that presents a peak-load demand model as it applies to Canada’s regulated grain handling system. The Revenue Cap yields the equivalent of an average tonne-kilometre price, as it is now structured. Under this system the

fixed supply of railcars must be rationed. Excess demand occurs in an average year (A), but in a bumper crop year (B), the excess demand is extreme.

Figure 6 Peak-load Demand for Covered Grain Hopper Cars Under the Revenue Cap



The bulk handling system never has enough capacity to accommodate the peak harvest demand because at the regulated price buyers will always request more railcars than the fleet can supply (Figure 6A). In any year the excess demand for service can generate complaints, but during a bumper crop the bulk handling system is subject to extreme complaints about inadequate customer service (Figure 6B). An example of this occurred in the 2013/14 crop year, when the harvest was 35 percent higher than average. It took over a year for the bulk handling system to catch up to the excess demand for railcars.

Clearly, it is uneconomic to have 35 percent additional capacity on standby in case of an unexpected demand surge. A better alternative is to provide a system of flexible capacity increase using containers. Containerized grain movements in the supply chain would more easily and effectively provide surge capacity because they operate outside the bulk handling system. The world supply of sea containers that could be made available to move grain is very elastic. ISO containers could be rented from the world market on a short term basis and positioned on farms as temporary storage. Subsequently they would be moved via container trucks, trains and terminals without adding congestion to the remaining bulk grain system. After being used for grain, these containers could be returned to the world market rather than coming back to Canada.

In order to have this surge capacity in place, contingencies would be needed to permit the loading and handling of grain in containers, but this infrastructure is not overly expensive. The

problem is the Revenue Cap that does not encourage investment in containerization and creates a disincentive for the railways to move containerized grain.

Removing the shipment of grain in containers from the Revenue Cap calculation would be very helpful in developing the alternative container shipping system that could deal with demand surges. However, the complete repeal of the Revenue Cap is even better because it would remove the administered rationing of the railcars and encourage efficient use of resources. Although shippers would no longer have a reason to complain about a lack of service, if they are willing to pay the going rate, concerns about freight rates would likely persist. Under an unregulated scenario, the containerization of grain would put a limit on freight rate increases during the peak demand period.

Figure 7 presents the same scenario as Figure 6A, but under an unregulated pricing system. During the normal peak demand prices rise to clear the market, and no excess demand occurs. If only the bulk handling system is available, then peak load price ( $P_{PL}$ ) rises to the market clearing rate. However, as this begins to happen, the container alternative would become more economic because it operates outside the bulk handling system. In other words, the limit on the freight rates for bulk transport (and all the other bulk handling fees and charges) would be created by the containerized alternative.

Figure 7 Peak-load Demand for Covered Grain Hopper Cars Unregulated System

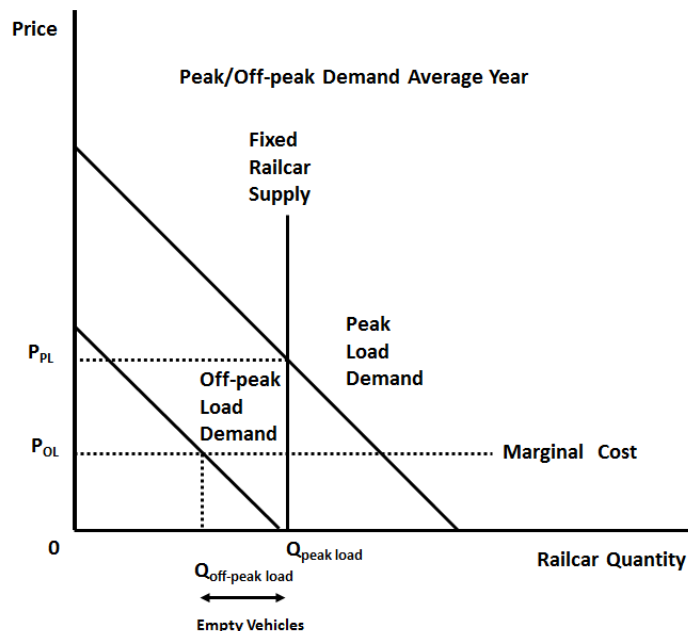
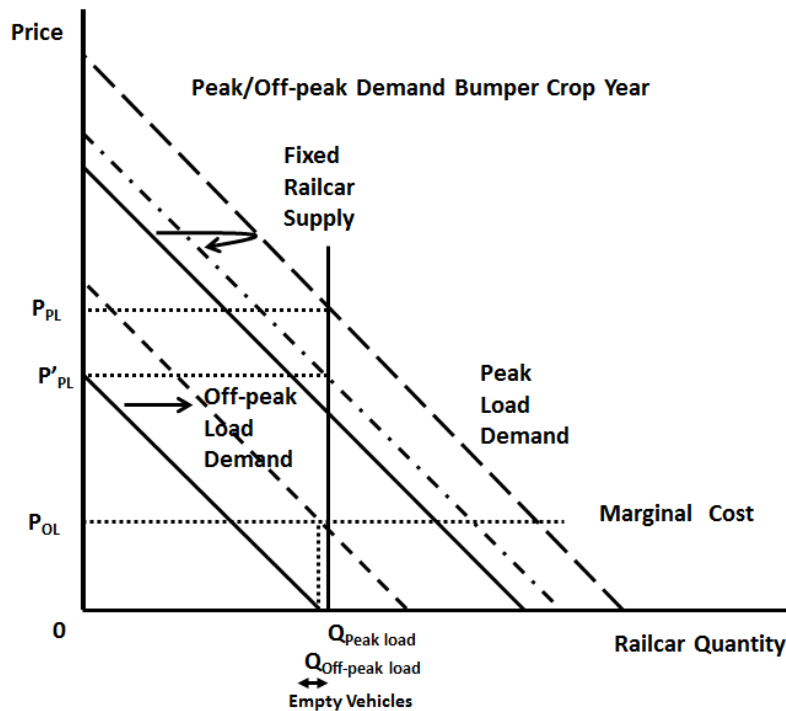


Figure 8 illustrates the impact of a bumper crop on a handling system with prices determined by supply and demand that also has a container supply chain alternative. The shift to the right of the peak demand would send railcar rates much above normal ( $P_{PL}$ ), but they would not

remain there. As indicated by the arrow, the peak demand for railcars would shift back to the left as shippers substituted containers for railcars. This would return the peak load price for railcars back to  $P'_{PL}$ .

Figure 8 Peak-load Demand for Covered Grain Hopper Cars Unregulated System in a Bumper Crop year with a Container Supply Chain Alternative



### Policy Consideration

Farm support for the continuation of the Revenue Cap is likely to be based on the suspicion that the railways have too much market power. While this view is not necessarily founded on fact, the perception cannot be ignored. The development of a containerized grain supply chain would enhance competition within the entire bulk handling supply chain. The argument here is that contestable markets reinforce competition. If farmers have a choice of shipping grain through a bulk handling system or a containerized grain handling supply chain, then they are going to be able to choose the one that delivers the best returns for them. If the bulk handlers try to raise rates, or the demand for railcars pushes up the bid price for hopper cars, then farmers could switch to the container alternative. Rather than employing a blunt instrument, like the Revenue Cap, to attempt to regulate “fairness”, contestable markets would continuously adjust to demand and supply to guarantee that farmers would always have the lowest cost means to reach their overseas customers.

It is also clear that the current bulk handling system cannot provide the excess capacity necessary to serve unexpected surges in demand. The only way that surges can be accommodated is with the use of containers. They can be drawn from a very elastic international supply, without making long-term investments that leave stranded assets when the surge passes. For this reason alone, containerization of grain in Canada should be embraced.

Finally, the greater availability of containers for source-loading on the Prairies would provide farmers with the opportunities to serve higher paying niche markets that demand specific qualities. In the age of the Internet, bar codes, electronic funds transfers and other communications strategies, there are no reasons why farmers could not deal as directly with their overseas customers as eBay or any other decentralized marketing system. The benefits to farmers of a free and competitive market warrant the repeal of the Revenue Cap.

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<sup>i</sup> Container capacity is measure in twenty-foot equivalent units (TEU). A forty-foot long container counts as two TEUs.

<sup>ii</sup> Data on US grain exports by container can be obtained at the USDA AMS website: <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateA&navID=AgriculturalTransportation&leftNav=AgriculturalTransportation&page=ATGrainTransportationReport&description=Grain%20Transportation%20Report%20%28GTR%29&acct=graintransrpt>

<sup>iii</sup> Personal interviews were conducted with two U.S. transloaders: Mr. Bo DeLong, DeLong Co. Inc. and Mr. John Roetter, International Transload Logistics

<sup>iv</sup> This casual approach to food grade containers is not shared in Australia where Shipping Australia Limited publishes a factsheet Number 10-2012, *Industry Standard For Packing Of Grain In Containers*. October 2012. This document identifies proper loading procedures, and identifies the Australian Department of Agriculture, Forestry and Fisheries regulations for inspection of containers to be used for grain, and the use of liners.

<sup>v</sup> "It costs about \$70 a ton to ship Midwest grain exports to Asia in bulk vessels from Gulf Coast ports. Grain exports for Asia loaded into containers in Joliet, Ill, and shipped via intermodal rail to Los Angeles-Long Beach costs \$72 ton, but shipping the grain in hopper cars to Southern California and transloading the product into containers there costs \$90 a ton." Bill Mongelluzzo. "High Rail Costs Restrict Grain Exports From West Coast." *Journal of Commerce*. September 05, 2013 [http://www.joc.com/rail-intermodal/intermodal-shipping/high-rail-costs-restrict-grain-exports-west-coast\\_20130905.html](http://www.joc.com/rail-intermodal/intermodal-shipping/high-rail-costs-restrict-grain-exports-west-coast_20130905.html)

<sup>vi</sup> *2011 Special Crop Report: Statistics*. Saskatchewan Ministry of Agriculture. [www.agriculture.gov.sk.ca](http://www.agriculture.gov.sk.ca)

<sup>vii</sup> Personal interview with Brian Atkins, Western Transloaders