



Containerships Carry Inventory for U.S. Retailers

by Matthew Chambers

U.S. retailers depend on the U.S. transportation system and supply-chain infrastructure to stock up and replenish depleted inventories. In particular, they utilize containerships to move intermodal shipping containers filled with goods worth billions of dollars, often from foreign manufacturers, through the global supply-chain from foreign seaports to domestic seaports onto their final destination. This interdependence may continue to grow as U.S. retailers streamline by adopting just-in-time (JIT) or similar inventory management approaches.¹ Such processes allow retailers to maintain the optimal balance between inventory and sales.

U.S. Imports by Containership

Containerships carry shipping containers (measured by twenty-foot equivalent units or TEUs), which are transferred between modes of transportation at dedicated seaports and terminals. In 2011, containerships carried about 29 percent of the U.S. import value.² Shippers move shipping containers domestically by truck or rail to distribution centers and retail stores across the country. With the exception of the recessionary period, the value of U.S. imports carried by containerships has been trending upwards as reliance of their use has increased (as shown in figure 1).

Business Cycles Affect the U.S. Economy and the Transportation System

Business cycles³ affect not only the U.S. economy, but also the U.S. transportation system. For instance, a statistically significant downward level shift in U.S. imports by containership coincides with the last 18-month business cycle (as shown in figure 1), occurring between December 2007 and June 2009.⁴ Time series, such as U.S. imports by containership, are composed of three components:

- trend-cycle component,
- seasonal component, and
- irregular component.⁵

Figure 1 shows the U.S. imports by containership time series and the underlying trend-cycle, which is depicted in red (figure 1).

Figure 2 shows the seasonal component in the U.S. imports by containership time series. A notable change in the seasonal pattern occurred as the peak became less pronounced after the last 18-month business cycle, occurring between December 2007 and June 2009. This may reflect actions by U.S. retailers to control their inventory and sales patterns.

Seasonal Patterns of U.S. Imports by Containership

Seasonal patterns of U.S. imports by containership closely track oscillations in U.S. retailers' inventories and sales (as shown in figure 3). For instance, U.S. imports by containership tend to peak in the 4th quarter and reach a low in the 1st quarter (as shown in figure 2). This may be expected as U.S. retailers stock-up their inventory and make sales during the holidays.

U.S. retailer inventories usually experience the largest increases in October, which precedes the largest increase in U.S. retailer sales in December (figure 3).⁶ However, just-in-time (JIT) or similar inventory management approaches have allowed U.S. retailers to minimize inventories, despite growing sales and container vessel imports as shown below.⁷ Therefore, U.S. retailer inventories have experienced less growth, staying closer to 1 on the index depicted in figure 3.

¹ U.S. Small Business Administration: Management and Planning Series, *Inventory Management*, available at <http://archive.sba.gov/> as of June 2012.

² U.S. Bureau of the Census: Foreign Trade Division; *USA Trade Online*, available at <http://www.usatradeonline.gov> as of April 2012.

³ Business cycles are the periods between growth and decline in economic activity.

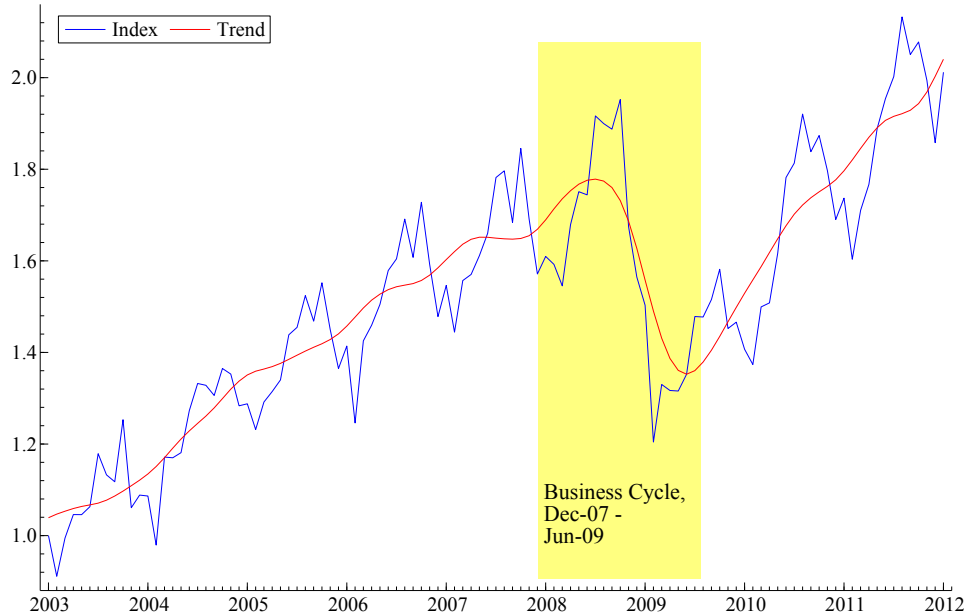
⁴ National Bureau of Economic Research: *U.S. Business Cycle Expansions and Contractions*, available at <http://www.nber.org/> as of June 2012.

⁵ U.S. Bureau of the Census: Statistical Research Division; *X-12-ARIMA Reference Manual*, available at <http://www.census.gov/srd/www/x12a/> as of July 2012.

⁶ U.S. Census Bureau: Manufacturing and Trade Inventories and Sales, *Monthly U.S. Retail Inventories and Sales* (percent change), available at <http://www.census.gov/mtis/> as of June 2012.

⁷ U.S. Small Business Administration: Management and Planning Series, *Inventory Management*, available at <http://archive.sba.gov/> as of June 2012.

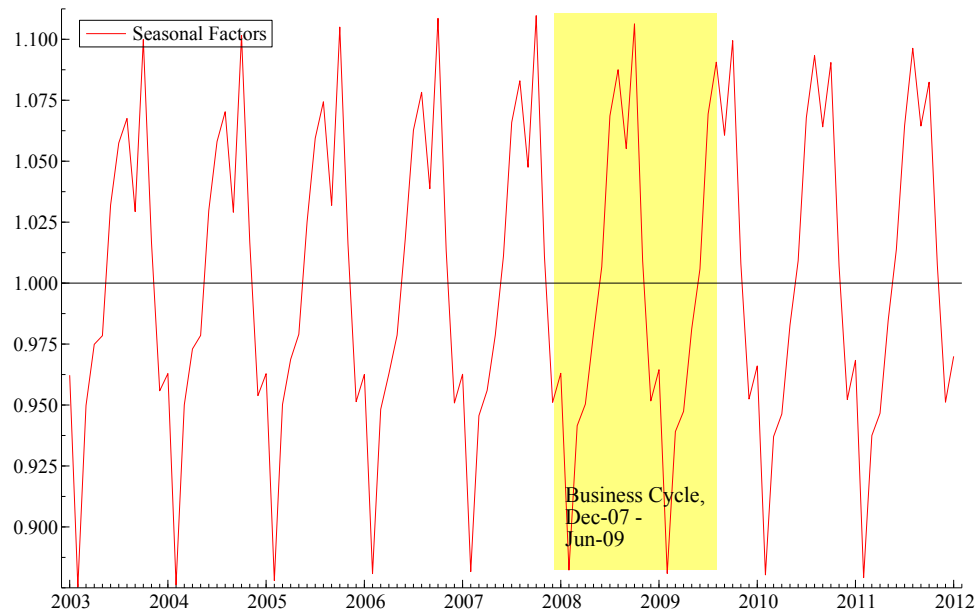
Figure 1: U.S. Import Container Vessel Value Index and Trend, January 2003–January 2012
 Index, Not seasonally adjusted: January 2003=1.0



NOTE: Based on the value of U.S. container imports, RITA/BTS indexed the series and then calculated the trend using X-12-ARIMA (Seasonality, F-value 36.336, present at 0.01 percent level). For additional information on this software package, please visit the X-12-ARIMA website at <http://www.census.gov/srd/www/x12a/>.

SOURCE: *Index and Trend:* U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics calculations based on U.S. Bureau of the Census: Foreign Trade Division, *USA Trade Online*, available at <http://www.usatradeonline.gov/> as of April 2012. *Business Cycle:* National Bureau of Economic Research: *U.S. Business Cycle Expansions and Contractions*, available at <http://www.nber.org/> as of June 2012.

Figure 2: U.S. Import Container Vessel Value Seasonality, January 2003–January 2012



NOTE: RITA/BTS calculated the statistical decomposition of the time series using the Structural Time Series Analyzer, Modeler and Predictor (STAMP). For additional information on this software package, please visit the STAMP website at <http://www.stamp-software.com/>.

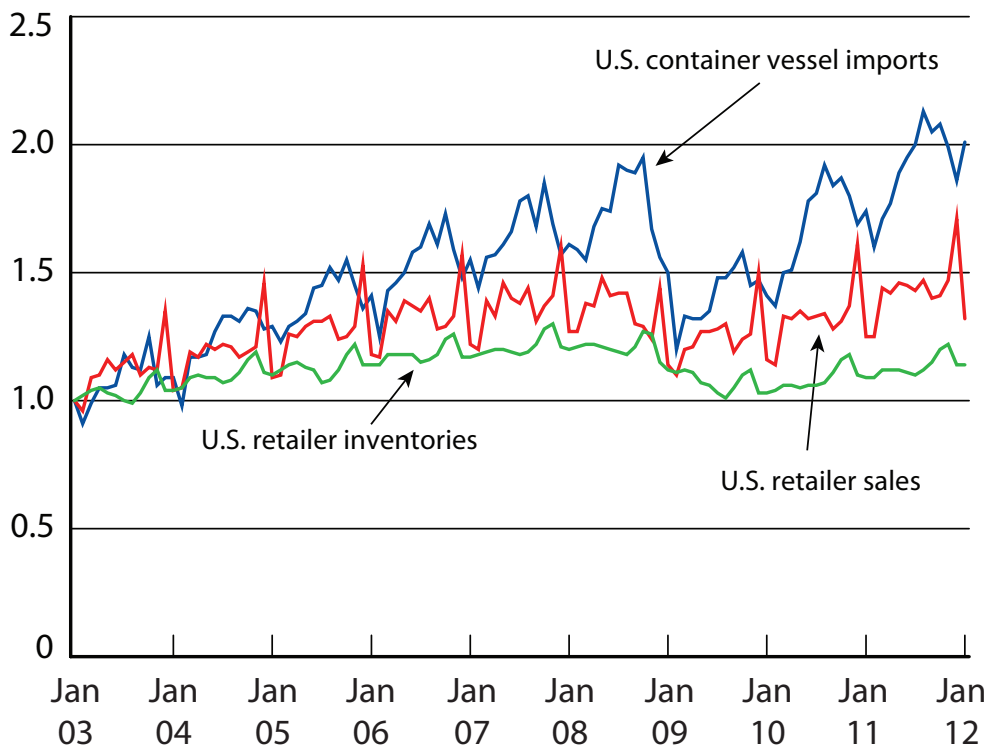
SOURCE: *Seasonal Factors:* U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics calculations based on U.S. Bureau of the Census: Foreign Trade Division, *USA Trade Online*, available at <http://www.usatradeonline.gov/> as of April 2012. *Business Cycle:* National Bureau of Economic Research: *U.S. Business Cycle Expansions and Contractions*, available at <http://www.nber.org/> as of June 2012.

U.S. imports by containership lead U.S. retail sales by about 2-months, peaking in October before the holiday season begins. The seasonality in U.S. retailer sales peaks in December, during the holiday season. U.S. retailer inventories typically go through their largest decrease in December as they are depleted by seasonal holiday sales. U.S. retailer sales undergo their largest decrease in January.

U.S. imports by containership rebounded from the last 18-month business cycle at a faster rate than that of U.S. retailer sales (figure 3). This helped replenish U.S. retailer inventories, which had reached a record low in December 2008.

FIGURE 3: U.S. Imports Container Vessel Value, U.S. Retailer Inventories and Sales, January 2003–January 2012

Index, not seasonally adjusted: January 2003=1.0



SOURCE: *Vessel*: U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics calculations based on U.S. Bureau of the Census: Foreign Trade Division, USA Trade Online, available at <http://www.usatradeonline.gov/> as of April 2012. *Inventory and Sales*: U.S. Census Bureau: Manufacturing and Trade Inventories and Sales, *Monthly Inventories and Sales*, available at <http://www.census.gov/mtis/> as of June 2012.

About this report

This trends report examines the underlying trend and seasonal patterns in U.S. imports by containership. Further, it explores the interrelationship between U.S. container vessel imports, U.S. retailer inventories, and U.S. retailer sales.

Matthew Chambers, a Senior Transportation Specialist, in the Bureau of Transportation Statistics (BTS) prepared this report. BTS is a component of the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA).

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