



# Impacts of Ocean Carrier Alliances on U.S. Containerized Exports (Summary)

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This is a summary of “Impacts of Ocean Carrier Alliances on U.S. Containerized Exports,” by Jake Wagner, Adam Wilson, and Eric Jessup.<sup>1</sup> This research and analysis received funding from USDA’s Agricultural Marketing Service (AMS) through cooperative agreement number 23-TMTSD-WA-0012. The opinions and conclusions expressed are the authors’ and do not necessarily reflect the views of USDA or AMS. The full report is available online at: <https://ses.wsu.edu/impacts-of-ocean-carrier-alliances-on-us-exports/>.

## WHAT IS THE ISSUE?

Ocean shipping is not subject to the antitrust laws that preclude cooperation between market participants in most industries. In ocean shipping, ocean carrier alliances (alliances) are sanctioned under the assumption that the cost efficiencies they achieve allow ocean carriers to improve the quality and/or cost of service. However—given that alliances represent roughly 90 percent of global container shipping capacity—some industry observers are concerned that alliance members may exercise market power to the detriment of shippers.

An alliance is an operational agreement between two or more ocean carriers that enables them to share space on each other’s vessels, set service types and schedules, coordinate vessel maintenance and repair, and even co-charter vessels. As such, alliances enable cost efficiencies through consolidating freight on larger vessels, using capacity more intentionally, and reducing redundancy within specific lanes. Yet, few empirical studies have measured the impacts of alliances on the maritime freight economy.

This study empirically evaluates how ocean carrier alliances impact rates and service for U.S. containerized exports. It is particularly relevant for U.S. agricultural shippers, as containerized agricultural exports represent approximately 25 percent of total waterborne agricultural exports by volume, and nearly 55 percent of total waterborne agricultural exports by value. Containerized shipping is essential for exporting temperature-sensitive products—such as meat, poultry, fruits, and vegetables.

<sup>1</sup> Wagner is an assistant research professor, Wilson is a research associate, and Jessup is a research professor in the School of Economic Sciences at Washington State University.

## **WHAT DID THE STUDY FIND?**

### ***The share of containerized export volumes carried by alliances has grown in recent years.***

U.S. waterborne containerized export volumes exhibited considerable growth in the early 2010s—peaking in 2015, at 12 million 20-foot-equivalent units (TEUs). Since 2015, export volumes have fallen, plateauing at approximately 9 million TEUs per year.

During roughly the same time (since 2011), alliance carriers have steadily increased their share of total U.S. waterborne containerized exports, currently accounting for over 70 percent by volume. Alliances have also become more concentrated. In 2015, six alliances accounted for about 50 percent of total waterborne export volumes. By 2023, just three alliances accounted for over 70 percent of total waterborne export volumes.

### ***Alliances are relatively inconsequential to containerized export service levels and rates.***

The authors estimate that the median shipping lane has an approximate market split of 50:45:5. That is, the market has three alliances: one with a 50-percent market share; one with 45 percent; and one with 5 percent. The authors model the impacts to service and rates from a 1-standard-deviation change in market structure: a 1-standard-deviation increase in lane-level concentration would involve consolidating from a 50:45:5 market split to a 75:25 market split. That is, the market has two alliances: one with a 75-percent market share and the other with 25 percent.

Although a 1-standard-deviation change represents a significant evolution of market structure (moving from a 50:45:5 market split to 75:25 market split), in practical terms, the authors view the effects of lane-level concentration as being *economically* insignificant. For example, the authors estimate that a 1-standard-deviation increase in market concentration (from the median) would reduce calls at port (for a given lane) by about 10 percent per month; reduce lane capacity by about 7 percent per month; and raise rates by 1 percent (about \$20 per TEU). The authors also evaluated alliance effects at the carrier level and vessel level, but the effects are less evident at these levels than at the lane level.

While holding total TEUs constant, the authors find that increased lane-level concentration (i.e., fewer alliances sharing the same lanes) lowers calls at port for a given lane and reduces lane capacity.<sup>2</sup> In order for total TEUs to remain the same, with fewer ships and less total lane capacity, the finding suggests that more concentrated lanes are able to better utilize slack vessel capacity. Still, these changes are relatively small.

### ***Alliances do not affect containerized agricultural exports more negatively than other containerized exports.***

To evaluate how lane-level market concentration affects containerized agricultural exports vs. other types of containerized exports, the study classifies lanes according to the percentage of agricultural volumes that transit them, as follows: 0-25, 26-50, 51-75, 76-100. Among these percentage categories, the impacts of lane-level concentration differ statistically in several service metrics, but these differences are not economically significant to shippers (for example, negligible changes to rates, vessels, lane capacity, and regions served). The various percentage categories are also broadly consistent with the main results. Thus, there is no evidence that increased lane-level concentration affects agricultural shipments more adversely than other types of shipments.

### ***Impacts of carrier alliances on containerized imports warrant further study.***

Despite concluding that alliances have minimal effects on containerized exports, the authors also surmise alliances may have greater impacts on containerized *imports*, and they suggest further research in this area. Containerized imports to the United States are typically of higher value and greater volumes than containerized exports. As such, containerized imports, with higher demand, may be more vulnerable than containerized exports to carrier and alliance market power. Most often, containerized exports are backhaul movements, which typically leverage excess vessel capacity and lower rates.

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<sup>2</sup> “Total TEUs” refers to the volumes a lane actually handles, while “lane capacity” refers to the maximum volumes a given lane can handle (when utilized at full capacity).

## HOW WAS THE STUDY CONDUCTED?

### Data Sources

The primary data source for the study is S&P Global's Port Import/Export Reporting Service (PIERS), which provides detailed trade data from individual bills of lading.<sup>3</sup> This dataset specifies the types and quantities of each commodity being shipped, the ocean carrier, vessel identification code, and other shipment-specific characteristics. In sum, the PIERS dataset provides data on every shipment (either imported or exported from the United States via maritime ports) from January 2006 through March 2024—representing more than 247 million unique shipments.

In addition to PIERS, the study uses the Foreign Traffic Vessel Entrances and Clearances database from the U.S. Army Corps of Engineers. This dataset provides vessel specifications (such as total capacity) as well as port entry and exit dates for each vessel. Lacking access to proprietary freight rate data, the authors instead use average rates (by shipping lane and month) from Drewry's *Container Freight Rate Insight* reports to measure the impacts of alliance activities on container rates. Lacking access to data on vessel ownership, the authors infer that the vessel's owner is the carrier with the highest volume of cargo on a particular voyage.

### Methodology

The authors use a regression model to evaluate the impacts of increased alliance concentration on container rates and service metrics—including the number of calls at U.S. ports (to load cargo), lane capacity, calls at foreign ports (to unload cargo), and the number of foreign countries/regions serviced by each U.S. port. The impacts of alliances are evaluated at the levels of vessels, carriers, and lanes.

At the lane-level, alliance concentration is measured using the Herfindahl-Hirschman Index.<sup>4</sup> Because vessels are not designated as "alliance-operated," the authors evaluate vessel-level impacts by assuming that vessels are "alliance-operated" when over 90 percent of a vessel's cargo is attributed to a single alliance, and when the vessel carries cargo for at least two alliance members.

To better understand the impacts to agriculture, specifically, the authors run an additional lane-level model where lanes are categorized by their shares of total volumes that are agricultural exports. Additionally, because agricultural exports can vary seasonally, the authors estimate lane-level impacts for each month.

## PREFERRED CITATION

Hunt, P. Austin, September 2025. *Impacts of Ocean Carrier Alliances on U.S. Containerized Exports* (Summary). U.S. Department of Agriculture, Agricultural Marketing Service. Web. <<http://dx.doi.org/10.9752/TS480.09-2025>>

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<sup>3</sup> A bill of lading is issued by a carrier to acknowledge receipt of cargo for transport.

<sup>4</sup> The Herfindahl-Hirschman Index (HHI) is a commonly used measure of market concentration. It is computed as the sum of squared volumes shares carried by each alliance, including non-alliance carriers. The HHI ranges from zero to 10,000 with higher levels representing increased concentration.