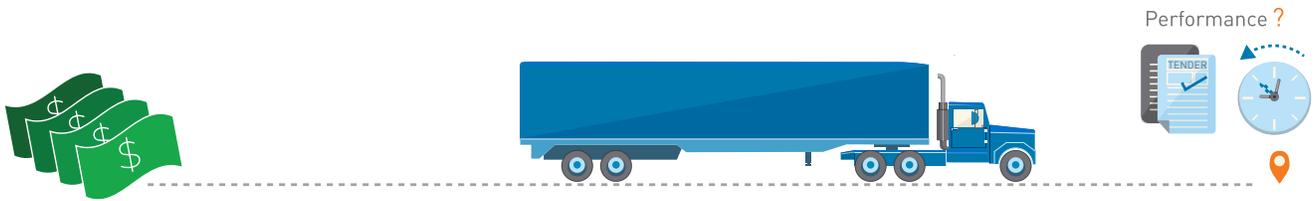
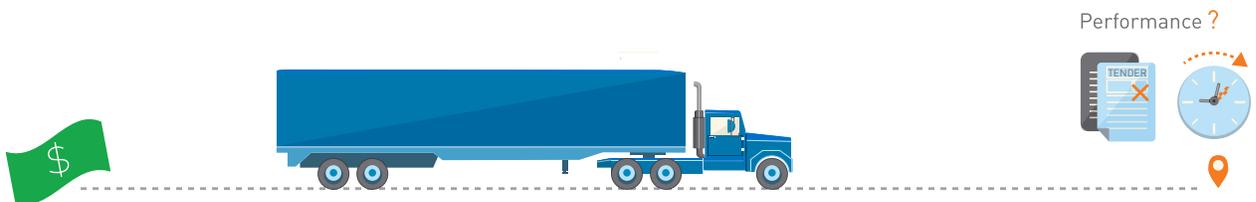


Do Higher Truckload Rates Bring Better Carrier Performance?

WHITE PAPER



Key questions

Does paying higher rates to truckload carriers yield (1) better on time performance and (2) better load tender acceptance? This white paper explores the relationship between service and price in the U.S. truckload transportation sector.

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You've heard the saying, "You get what you pay for." It does seem to be the case that higher quality products and services that cost more often outperform the lower quality, cheaper versions. But does paying higher rates bring better carrier service?

Rates present a constant dilemma between shippers and carriers.¹ Shippers face continual pressures to reduce costs; carriers expect to be paid fairly for their services as their costs, maintenance, and equipment quality continue to increase. Other research projects have shown relationships between various aspects of

transportation and rate paid.² But when a shipper pays higher transportation rates per mile, do they really receive better on time performance and load tender acceptance patterns from their carriers? We asked Nane Amiryany and Sharmistha Bhattacharjee, graduate students at MIT's Center for Transportation & Logistics (MIT CTL), to find out. This white paper provides highlights of their findings about potential correlations between transportation carrier rates and performance.

ABOUT THE STUDY

The research used 27 months (2013–Q1 2015) of tender and shipment records for dry van truckload shipments from TMC, a division of C.H. Robinson, to control for economic cycles. Only single stop loads between 250 miles and 3,000 miles within the continental United States were considered. The dataset included tender information from 40 shippers and 963 carriers, with more than 1.7 million shipment tenders to secure the movement of 807,662 shipments.

"Performance" can include many criteria—transit times, technical competencies, flexibility during emergencies, willingness to share information, freight damage history, carrier financial stability, and so on. For purposes of this study, the researchers defined performance this way:

- Timeliness factors—on time pickup (OTP) and on time delivery (OTD)
- Acceptance ratio (AR)—accepted loads to load tenders to a primary carrier (i.e., the number one and number two carriers in the routing guide)
- Consistency and volume of loads a shipper offers a carrier on a particular lane, and its effect on cost per load and acceptance ratios

¹ For purposes of this white paper, "carriers" is broadly defined as both asset-based motor carriers and non-asset based carriers and brokers.

² Julia Collins and Ryan Quinlan, "The Impact of Bidding Aggregation Levels on Truckload Rates," MIT's Master of Engineering in Logistics Program thesis; Erik Caldwell and Bryan Fisher, "Impact of Lead Time on Truckload Transportation Rates," MIT's Master of Engineering in Logistics Program thesis; Evan Armstrong and Dick Armstrong, "Carrier Procurement Insights: Trucking Company Volume, Cost, and Pricing Tradeoffs;" Bobby Martens, Ph.D., "Do Favored Shippers' Really Receive Better Pricing and Service?" All white papers are available at www.chrobinson.com/en/us/Resources/White-papers.

#1 Question: ▶

Does paying higher rates to truckload carriers yield better on time performance?

Answers: ▶

- 1 Paying more does not result in better on time pickup (OTP) percentage.
- 2 Paying significantly above market price does not provide notable improvement in on time delivery (OTD).

How is OTD Measured?

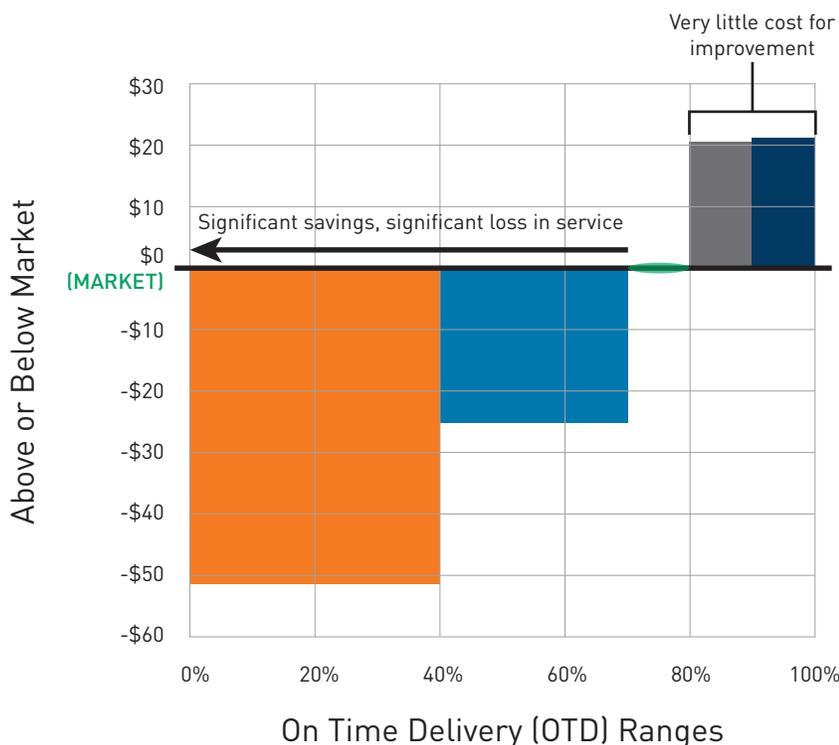
For many companies, OTD is a cleansed figure. In other words, shippers remove shipments from the aggregate OTD score for the facility or carrier if they left late at no fault of the carrier. Some companies remove shipments from the aggregate score if a delayed delivery is due to an extreme weather situation, closed road, or refusal from the consignee. These practices are common, and may inflate a performance score.

The dataset used in this research included [all shipments](#); it reflects influences to delivery that are created from all possible contributors. This resulted in a lower OTD in aggregate than most companies might find acceptable.

There was no relationship found between OTP and freight rate. Rates had more impact on OTD than OTP, but the correlation was weak.

However, when shippers paid below market average, there was a clear decrease in OTD performance (see Figure 1). An average drop of \$50 below the market rate resulted in OTD performance below 40 percent. A rate of \$20 below the market rate led to 40 percent to 70 percent OTD.

FIGURE 1 EFFECT OF RATES ON OTD (ON TIME DELIVERY)



As Figure 1 shows, carriers with OTD percentages below 70 percent charge less for their services. This shows that shippers who always choose the lowest-cost carrier are most likely to get what they pay for. Shippers who had OTD in the 70 percent and 80 percent range paid market rates.

Those with OTD between 80 percent and 90 percent paid just over a \$20 premium. On average, there was almost no additional premium to reach the 90 percent to 100 percent OTD range.

#2 Question:

Does paying higher rates to truckload carriers yield better load tender acceptance?

Answer:

No correlation was found between acceptance ratios and carrier pricing in a lane.

The data suggests consistently giving tenders to a carrier at the lane level leads to better rates. Freight consistency—tendering at least one load per week to a carrier in a given lane—is a measure that carriers increasingly seek. In the case of truckload transportation, tender acceptance ratios of carriers rise when shippers offer consistent load volumes on a particular lane. No correlations were found between acceptance ratios and carrier pricing in a lane.

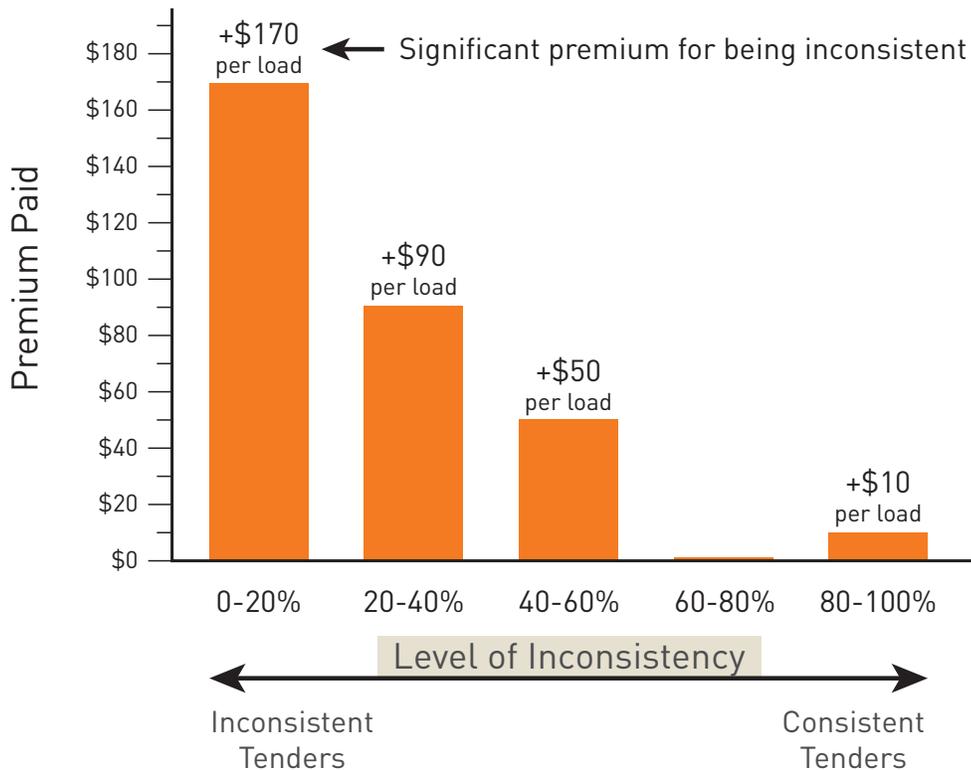
However, shippers who are highly inconsistent in their tenders in a lane over the course of a year (i.e., tendering less than one load per week more than

80 percent of the time) pay about \$170 more per load (see Figure 2). The research also found that shippers who are highly consistent—tendering at least 1 load per week more than 80 percent of the time—pay a slight premium of \$10 per load. This data seems to reinforce other research conclusions on lane aggregation—that low volume, point-to-point lanes can be combined to improve consistency.

Carriers need to optimize their networks. Consistently receiving loads on a particular lane allows them to develop a sustainable network plan and increase the utilization of the fleet. Previous research in lane aggregation supports this

finding, showing that when lanes are aggregated—when low volume lanes are bundled within larger origin/destination pairs—the shipper sees better tender acceptance and more attractive pricing (meaning the demand/tender pattern is smoothed to the carrier).²

FIGURE 2 SHIPPER CONSISTENCY RANGES



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² Julia Collins and Ryan Quinlan, "The Impact of Bidding Aggregation Levels on Truckload Rates," MIT's Master of Engineering in Logistics Program thesis; Erik Caldwell and Bryan Fisher, "Impact of Lead Time on Truckload Transportation Rates," MIT's Master of Engineering in Logistics Program thesis; Evan Armstrong and Dick Armstrong, "Carrier Procurement Insights: Trucking Company Volume, Cost, and Pricing Tradeoffs;" Bobby Martens, Ph.D., "Do Favored Shippers' Really Receive Better Pricing and Service?"

Shippers have the opportunity to benefit from lower pricing by offering a carrier consistent loads on a lane for 30 to 35 weeks in a year or more. There is value to the shipper to keep carriers engaged on a lane so they can scale up when needed. This research supports using a ratio tendering strategy, awarding loads to a group of carriers, week in and week out, instead of using a primary carrier and a backup.

Finally, researchers found a relationship between consistent shipment tenders and a greater likelihood that the primary carrier would accept that tender.

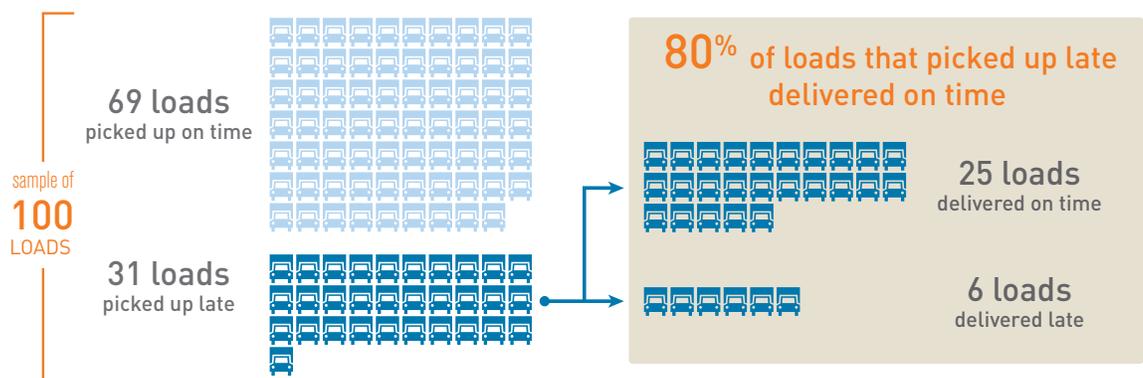
ADDITIONAL INSIGHTS

The research did not ask specifically about the relationships between OTP and OTD, but the data showed an unexpected correlation.

First, 80 percent of loads that pick up late deliver on time as shown in Figure 3. (i.e., more than 80 percent of the time, carriers make up for delays in OTP and deliver on time).

There is usually some extra time built in between the time of the required pickup and delivery. The time between origin and destination cannot be planned too close to the actual time it takes to drive from one location to the other because there are too many factors that cannot be planned for: traffic and weather delays, equipment breakdowns, etc. In addition, carriers use the buffer of time to maximize their drivers' hours of service (HOS). Some carriers choose to be a little late at pickup, because it enables them to more closely match the driver's HOS and distance with delivery schedules to boost efficiency.

FIGURE 3 RELATIONSHIP: LATE PICK UP TO ON TIME DELIVERY

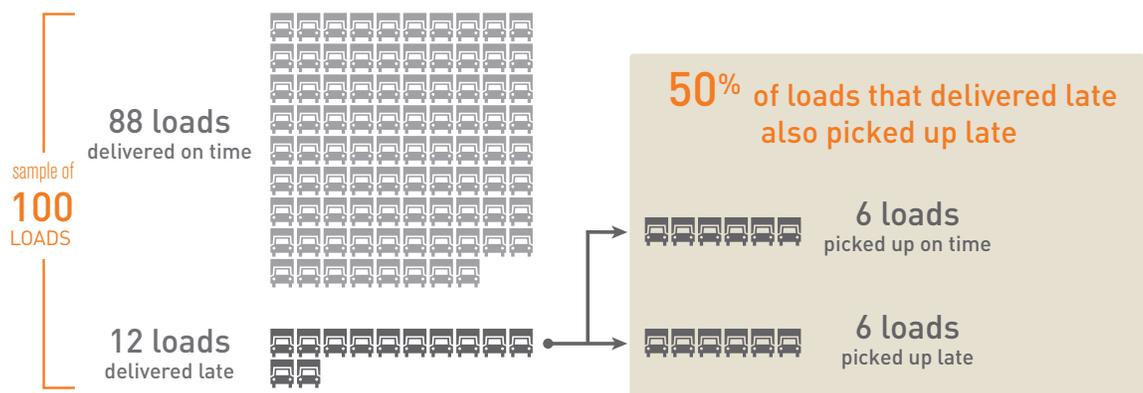


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However, 50 percent of loads that delivered late also picked up late as shown in Figure 4. This points to a need for shippers to be aware of late pickups and to make sure carriers have an action plan to correct the situation.

To improve performance scores, shippers must first understand OTP and OTD performance statistics and the relationship between them. A lane level analysis can show patterns of particular carriers, locations, or times of the day for pickup and delivery appointments to identify problem areas that can be corrected. Findings from this sort of analysis might reveal that the performance of a facility is overall satisfactory except during certain times of the day or a certain day(s) of the week. Meaning, there may not be a wholesale issue, but rather a specific process or planning strategy that if amended, can improve performance where it is faltering and not negatively influence the broader facility performance.

FIGURE 4 RELATIONSHIP: LATE DELIVERY TO ON TIME PICK UP



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ACTION ITEMS SUGGESTED BY THIS RESEARCH

- 1**  **Find the right carrier.** The best carrier for a lane is neither the cheapest nor the most expensive, but the one whose service network complements the shipper's freight. This research suggests that paying market rate yields the best on time delivery. When shippers pay below market, they see a significant drop in OTD; those who paid just over a \$20 premium had OTD between 80 percent and 90 percent.
- 2**  **Monitor performance for on time delivery.** Good customer relationships depend on reliable carrier service levels. Shippers can use a transportation management system to obtain OTD levels for each carrier used and determine how often carriers perform as expected.

About C.H. Robinson

C.H. Robinson helps companies simplify their global supply chains and understand their landed costs. To help build smarter, more competitive supply chains, skilled supply chain engineers and logistics professionals combine a deep knowledge of market conditions, practical experience, and proven processes. From local truck transportation to global supply chain management systems, from produce sourcing to consulting to logistics outsourcing, C.H. Robinson supplies a competitive advantage to companies of all sizes.

For more information, please visit www.chrobinson.com or our Transportfolio® blog at www.chrobinson.com/blog.

About TMC

TMC is a division of C.H. Robinson, one of the world's largest third party logistics (3PL) providers. TMC offers Managed TMS®, which combines a global transportation management system (TMS), managed services, and consulting. Through six Control Tower locations around the globe in Amsterdam, Chicago, Mumbai, São Paulo, Shanghai, and Wrocław, clients can access cloud-based, proprietary TMS technology, logistics experts, and supply chain engineers to manage their day-to-day operations and optimize supply chain performance. TMC manages over 4.2M shipments and handled \$2.7B in freight under management for clients around the world.

Learn more at www.mytmc.com.



Nane Amiryan received her B.A and M.A. in Economics from Yerevan State University, Armenia. Before coming to MIT, she worked in a small manufacturing company and an auto transportation company in Pennsylvania.



Steve Raetz, director of supply chain integration at C.H. Robinson, has 26 years of logistics experience. He holds a B.S. in Mathematics and Teaching from Minnesota State University, Mankato, and serves on two university supply chain advisory boards.



Sharmistha Bhattacharjee received a B.E. in Electronics and Telecommunications Engineering and a Post Graduate Diploma in Industrial Management. Before the Supply Chain Management program at MIT, she worked for three years as supply chain manager with Unilever in India. Today, she is a senior program manager at Amazon.



Glenn Koepke, director of operations for TMC, a division of C.H. Robinson, has worked globally with shippers in Europe, the Middle East, and Africa (EMEA), responsible for both operational excellence and supply chain engineering. A graduate of the University of South Carolina in Columbia, Glenn also opened TMC's EMEA global Control Tower in Amsterdam.



Kevin McCarthy works for C.H. Robinson as a director of Consulting Services. Kevin has over 27 years of experience in the logistics industry. Kevin has an MBA from the University of Minnesota Carlson School of Business with an emphasis in Management Information Systems and an undergraduate business degree with an emphasis in Marketing.

