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December 2020 Logistics Manager's Index Report®

LMI® at 66.7%
Growth is INCREASING AT A DECREASING RATE for: Inventory Levels, Inventory Costs, Warehousing Utilization, Warehousing Prices, Transportation Utilization, and Transportation Prices
Warehousing Capacity and Transportation Capacity are CONTRACTING AT A DECREASING RATE.

(Fort Collins, Colorado) — The December 2020 reading of the LMI suggests that the logistics industry continues to grow, but at a reduced rate relative to the torrid pace of the last few months. The December LMI reads in at 66.7, down (-4.1) from 70.8 in November. This breaks a streak of three consecutive readings above 70.0. That being said, December 2020's reading is still well above the historic index average of 62.3, and 12.7 points higher than December 2019's reading of 54.0. The decline in growth rates are reflected in slight

declines across all of the metrics of the LMI (except for the two capacity metrics which have increased – although increased capacity really indicates decreased demand). The dip in numbers does not necessarily represent that things are quieting down, merely that the rates of growth are slowing.

December capped a period of record package delivery. Overall volume was up 30%[1], with Amazon alone delivering 1.5 billion items during the holiday season[2]. The strain on logistics networks caused by this increased volume is epitomized in USPS, who handled approximately 6 million packages a day and watched its on-time delivery rates of first-class mail dropping from 95% in December 2019 to 75% in 2020. UPS and FedEx maintained higher levels of service, but were likely helped in this endeavor by placing package caps on multiple shippers to limit volume[3].

This crunch is likely to continue even after the holiday rush subsides. As mentioned in previous reports, online orders are returned at a higher rate than traditional brick and mortar sales. This is being borne out a consumer returns are up 30% from 2018[4]. To decrease the costs of handling these returns, firms like Target have significantly extended the windows consumers have to return their goods – ideally flattening the curve of returned goods coming in[5].

Logistics activity will also be fueled by backlogged inventory coming in from overseas. 2020 Q4 shipments into the Port of Los Angeles were up 28.2% from 2019[6] with up to 20 ships waiting in line to unload goods on some days in December[7]. This backlog is currently squeezing capacity, driving up the tender rejection rates[8] for trucks and container rates for ships. Container rates are particularly elevated, up 174%[9]. Railways were also busier than

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[1] Kickham, V. (2020, December 10). *Carriers hit breaking point as package volume soars*. DC Velocity. https://www.dcvelocity.com/articles/48353-carriers-hit-breaking-point-as-package-volume-soars

[2] Berthiaume, D. (2021a, January 4). *Amazon has record-breaking 2020 holiday season*. Chain Store Age. https://chainstoreage.com/amazon-has-record-breaking-2020-holiday-season

[3] Bogage, J., & Denham, H. (2020, December 21). Millions of Christmas presents may arrive late because of Postal Service delays. *Washington Post*.

[4] DC Velocity Staff. (2020, December 23). *Survey: Retailer mistakes fuel accelerated returns*. DC Velocity. https://www.dcvelocity.com/articles/49066-survey-retailer-mistakes-fuel-accelerated-returns

[5] Berthiaume, D. (2021b, January 4). *Target offers many happy returns for holiday shoppers*. Chain Store Age. https://chainstoreage.com/target-offers-many-happy-returns-holiday-shoppers

[6] The Port of Los Angeles. (2021, January 4). *The Port of Los Angeles Signal*. http://signal.portoptimizer.com/

[7] Frantz, G. (2020, December 24). *For container lines and ports, what a difference a year makes*. DC Velocity. https://www.dcvelocity.com/articles/49067-for-container-lines-and-ports-what-a-difference-a-year-makes

[8] Strickland, Z. (2020, December 27). *2020 closes with plenty (of freight) left in the tank*. FreightWaves. https://www.freightwaves.com/news/2020-closes-with-plenty-of-freight-left-in-the-tank

[9] Page, P. (2021, January 4). *Logistics Report: Shipping's Costly Logjams; Capping Emissions Plans; Post-Pandemic Supply Chains*. Wall Street Journal. http://createsend.com/t/d-645CDB54457B17BC2540EF23F30FEDED

projected in Q4[10]. The unknown factor in this demand is vaccine distribution, which is predicted to ramp up during Q1 and Q2.

Researchers at Arizona State University, Colorado State University, Rochester Institute of Technology, Rutgers University, and the University of Nevada, Reno, and in conjunction with the Council of Supply Chain Management Professionals (CSCMP) issued this report today.

Results Overview

The LMI score is a combination of eight unique components that make up the logistics industry, including: inventory levels and costs, warehousing capacity, utilization, and prices, and transportation capacity, utilization, and prices. The LMI is calculated using a diffusion index, in which any reading above 50 percent indicates that logistics is expanding; a reading below 50 percent is indicative of a shrinking logistics industry. The latest results of the LMI summarize the responses of supply chain professionals collected in December 2020. As we have seen for most of the last seven months, December's LMI displays continued, if somewhat subdued, rates of growth.

Overall, the LMI is down (-4.1) from November's reading of 70.8. It is important to remember that this is a rate of growth, and not overall growth, so the logistics industry still expanded significantly in November, albeit at a slightly slower pace. However, this still represents a significant rate of growth and is 12.7 points higher than last December's overall index. The unprecedented rates of growth seen from September-November may not have been sustainable. Warehousing and Transportation Capacity could not have continued contracting at the rates we saw earlier in Q4 without every warehouse and truck disappearing entirely. Interestingly, prices are the most resilient metric we're tracking in December, as they continue their rapid climbs.

These price increases are most visible with Transportation Prices, which read in at 85.1, down marginally (-0.7) from November. This rate is well above the historical average of 62.8, and *much* higher than last December, when prices were barely increasing – reading in 32.4 points lower at 52.7. Prices will remain elevated as long as capacity continues to contract. Transportation Capacity read in at 39.0, up (+3.9) from November , but 16.9 points. In a reverse from November, upstream respondents are reporting tighter transportation capacity, possibly reflecting the tightness discussed in the container market discussed above. Transportation Utilization continues to grow quickly at a rate of 65.1, down slightly (-4.3) from November's reading.

Warehouse Capacity is up (+8.9) to 46.9. However, this is still below 50.0 (where it was at this time last year) indicating capacity is still contracting. Warehouse Utilization is similar, down (-7.5) but still growing at a level of 63.6. As observed with the transportation indices, Warehouse Prices remain high, down slightly (-1.5) to 76.9 – indicating robust levels of growth. It will be interesting to continue watching the warehousing metrics through 2021 in order to observe whether or not capacity can begin to catch up to demand and offer some relief in terms of costs.

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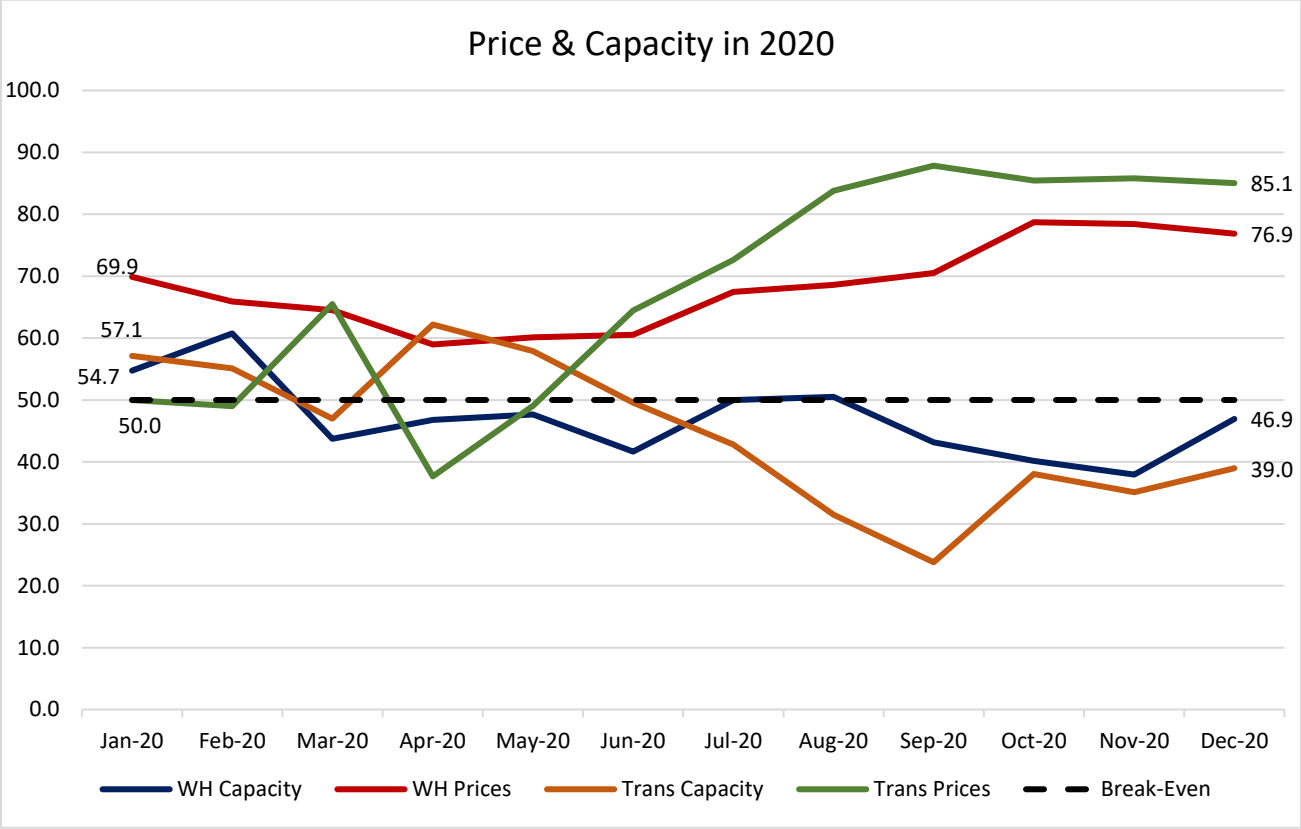
[10] Stiffel. (2020). *Rail Industry Update: Growth Returned in 4Q20, Expect Leverage in 2021; Rail Quarterly* (pp. 1–42). Stiffel.

The movements in Transportation Prices (green line) and Capacity (orange line) and Warehouse Prices (red line) and Capacity (blue line) throughout 2020 are presented in the figure below.



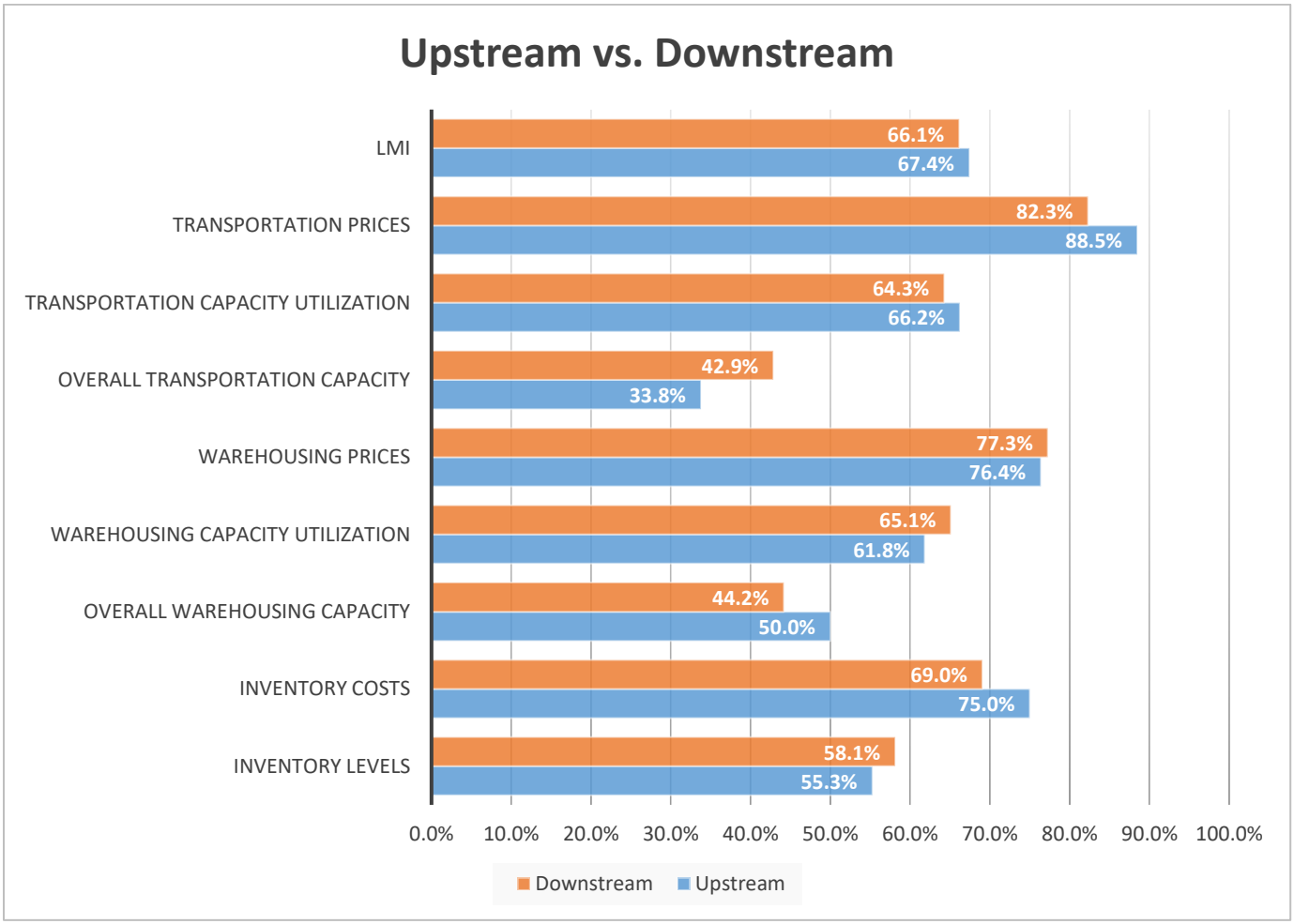
Any data point beneath the dotted black breakeven line indicates contraction, anything above indicates growth. Transportation Prices are up 35.1 points since the beginning of the year and Warehousing Prices are up 7.0 points (it should be noted that, due to contract lengths, warehousing metrics often move more slowly than transportation metrics. Through 2020 Warehousing capacity dropped 7.8 points, and Transportation Capacity ended 16.1 points lower. The contraction rates for both transportation and warehousing reached their nadir in August and November respectively, and have ticked back up in December. It is interesting to note that despite the rates of contraction slowing, the rate of price growth has remained high. This demonstrates the difficulty firms are likely to have as they attempt to dig themselves out of the “capacity hole” they found themselves in during the back half of 2020.

Finally, we observe Inventory Levels and Inventory Costs increasing, but at decreasing rates to 56.8 (-5.2) and 71.8 (-1.3) respectively. Inventory levels often drop in December as retailers have cleared out inventory over the holidays. It is worth noting though that we are still showing growth, especially compared to December of 2020 when Inventory Levels were contracting, reading in 14 points lower at 42.3. Inventory Costs are also up 8.4 points over the same period last year. It will be interesting to see if these levels and costs come back up over the next few months as firms work through the backlogs currently clogging ports all over the world.

The index scores for each of the eight components of the Logistics Managers' Index, as well as the overall index score, are presented in the table below. Six of the eight metrics show signs of growth, with both capacity metrics actively contracting at increasing rates. While the growth rate has slowed for every LMI metric, we are still observing significant growth in the industry.

LOGISTICS AT A GLANCE					
Index	**December 2020 Index**	**November 2020 Index**	**Month-Over-Month Change**	**Projected Direction**	**Rate of Change**
LMI®	66.7	70.8	-4.2	Growing	Decreasing
Inventory Levels	56.8	62.0	-5.3	Growing	Decreasing
Inventory Costs	71.8	73.1	-1.3	Growing	Decreasing
Warehousing Capacity	46.9	38.0	+9.0	Contracting	Decreasing
Warehousing Utilization	63.6	71.1	-7.5	Growing	Decreasing
Warehousing Prices	76.9	78.4	-1.5	Growing	Decreasing
Transportation Capacity	39.0	35.1	+3.8	Contracting	Decreasing
Transportation Utilization	65.1	69.4	-4.2	Growing	Decreasing
Transportation Prices	85.1	85.8	-0.7	Growing	Decreasing

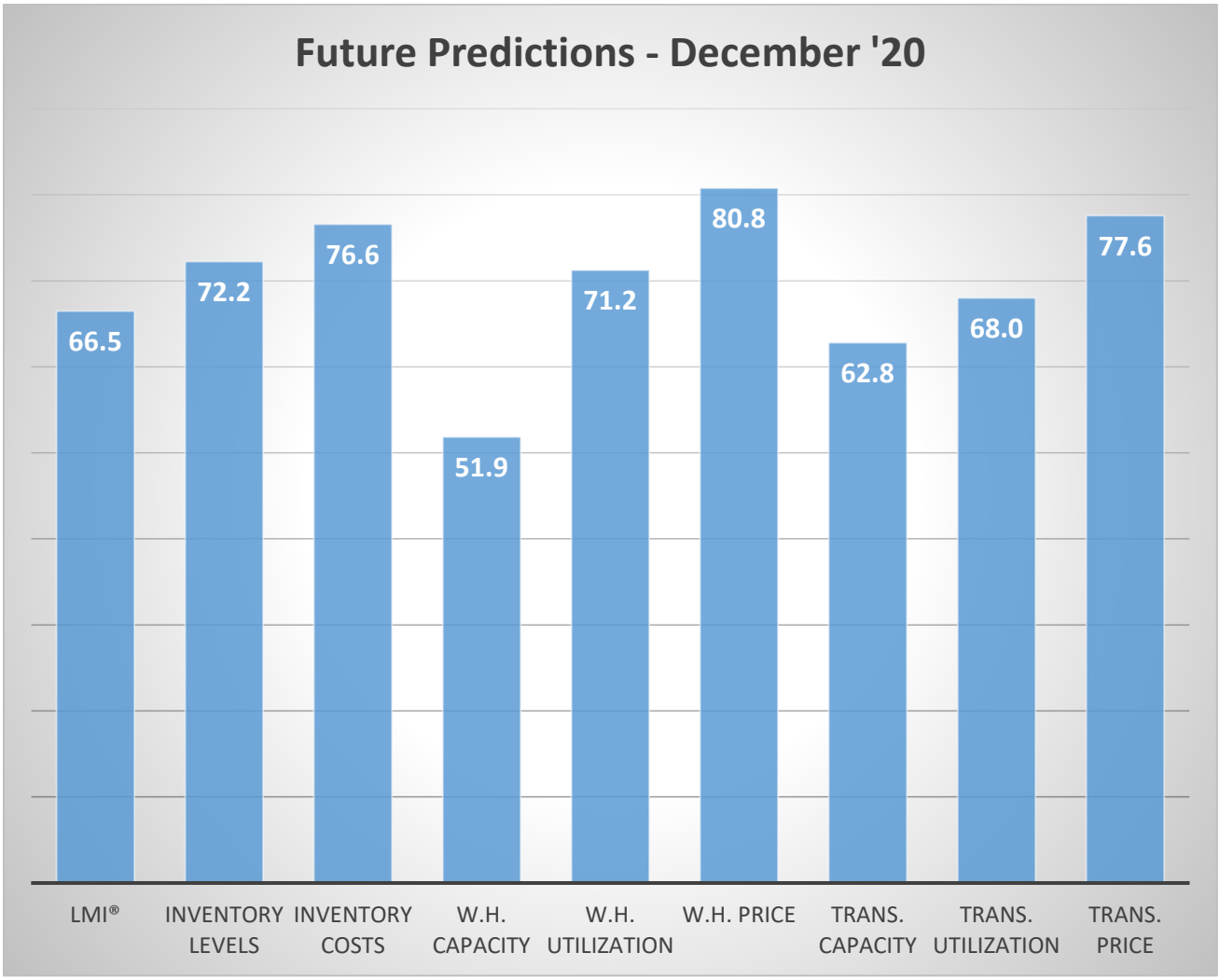
This month, both upstream and downstream firms reported significant continued growth in utilization of logistics services, albeit in somewhat different ways. Downstream firms such as retailers (represented by the orange bars) reported a slightly tighter warehousing market, while upstream firms reported a tighter transportation market. This is the reverse of last month, as we now see retailers struggling to store inventory, and upstream firms scrambling to find transportation to move goods – something likely corroborated with crunch on rail and container shipping mentioned above.



Interestingly, T-tests demonstrate no difference between the experiences of upstream and downstream respondents. Upstream firms are having more difficulty tracking down transportation, and downstream firms are struggling to find places to hold their inventory:

	Inv. Levels	Inv. Costs	WH Cap.	WH Util.	WH Price	Trans Cap	Trans Util.	Trans Price
Upstream	55.3%	75.0%	50.0%	61.8%	76.4%	33.8%	66.2%	88.5%
Downstream	58.1%	69.0%	44.2%	65.1%	77.3%	42.9%	64.3%	82.3%
Delta	2.9%	-6.0%	-5.8%	3.3%	0.9%	9.1%	-1.9%	-6.2%
Significant?	No	No	No	No	No	No	No	No

Respondents were asked to predict movement in the overall LMI and individual metrics 12 months from now. Their predictions for future ratings are presented below. Respondents predict that prices will continue to grow, but at decreased rates from what we presently observe. This does not necessarily suggest that relief is around the corner however, as they also predict a strong level of continued growth in both inventory levels and prices. While more capacity is predicted to come online, particularly transportation capacity, it seems unlikely that it is enough to significantly bring down prices over the next year.



Historic Logistics Managers' Index Scores

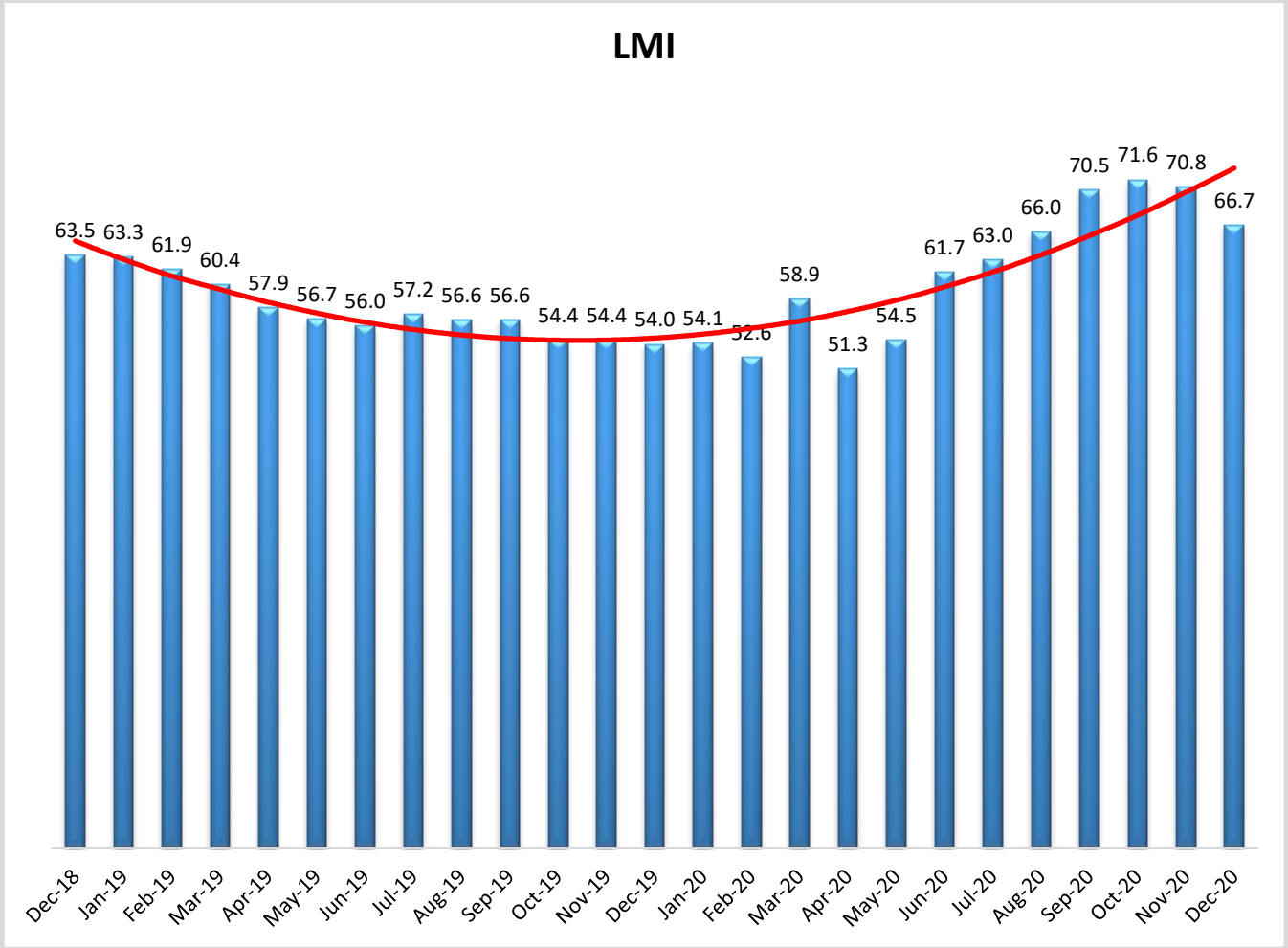
This period's along with prior readings from the last two years of the LMI are presented table below. The values have been updated to reflect the method for calculating the overall LMI:

Month	***LMI***	Average for previous readings – 62.3 High – 75.7 Low – 51.3 Std. Dev – 6.45
Dec '20	66.7	
Nov '20	70.8	
Oct '20	71.6	
Sep '20	70.5	
Aug '20	66.0	
July '20	63.0	
June '20	61.7	
May '20	54.5	
Apr '20	51.3	
Mar '20	58.9	
Feb '20	52.6	
Jan '20	54.1	
Dec '19	54.0	
Nov '19	54.4	
Oct '19	54.4	
Sep '19	56.6	
August '19	56.6	
July '19	57.2	
June '19	56.0	
May'19	56.7	
April '19	57.9	
March '19	60.41	
February '19	61.95	
January '19	63.33	
December '18	63.54	

LMI®

The overall LMI index is 66.7, down (-4.1) from November's reading of 70.8. This breaks a streak of three consecutive readings above 70.0. This is driven by a slight decline in every LMI metric (both capacity metrics increased, but that represents decreased demand) in December 2020. This may indicate that logistics networks are taking a slight "exhale" after the escalated crunch observed in Q4. However, it should still be noted that a reading of 66.7 is significantly higher than the index-average LMI score of 62.3. While the rate of growth has declined, we are still observing significant levels of growth, and tight capacity, across the broader logistics industry. With a record-breaking volume of returns inbound and the distribution of the COVDI-19 vaccines just beginning, it seems unlikely that this rate of growth will significantly slow down anytime soon.

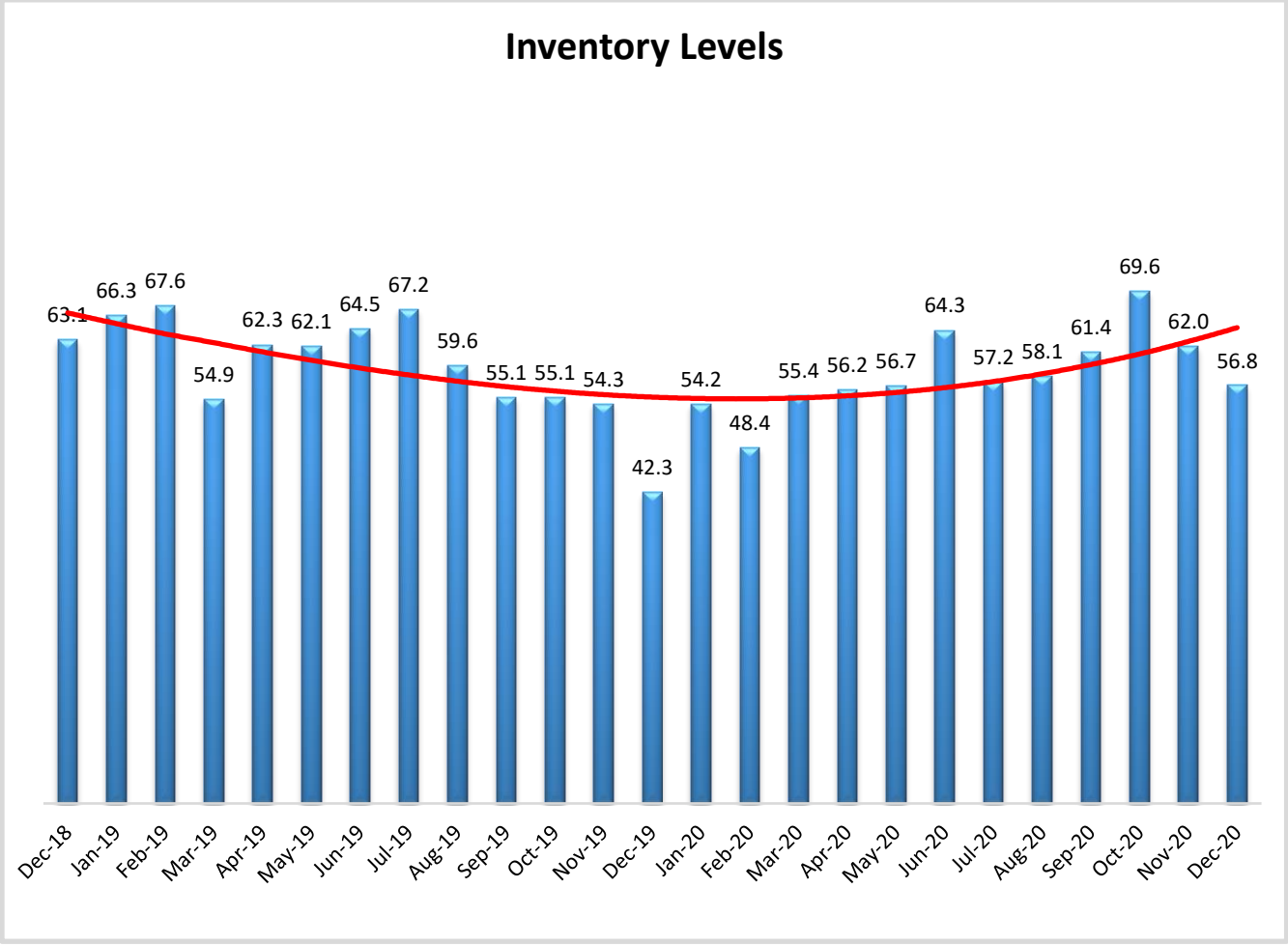
Respondents seem to agree with this, predicting that over the next year, the LMI will be at 66.5, down (-3.4) from November's future prediction of 69.8. While down slightly, respondents are anticipating increasing rates of growth in the logistics industry over the next 12 months.



Inventory Levels

The Inventory Level value is 56.8, down 5.3 points from November's reading of 62.0. That being said, December's value is significantly higher (14.5 points) than the same time last year. Seasonally speaking, inventories are increasing faster than a year ago, this potentially reflects the backlog that has existed across many major ports over the last month. However, it must be noted that the value from December of last year was significantly below the values of the periods before and after it, and may have reflected the then-raging trade-war between the U.S. and China. Upstream respondents returned a value of 55.3, compared to 58.1 for downstream respondents, suggesting that inventory levels are slightly elevated for consumer-facing respondents.

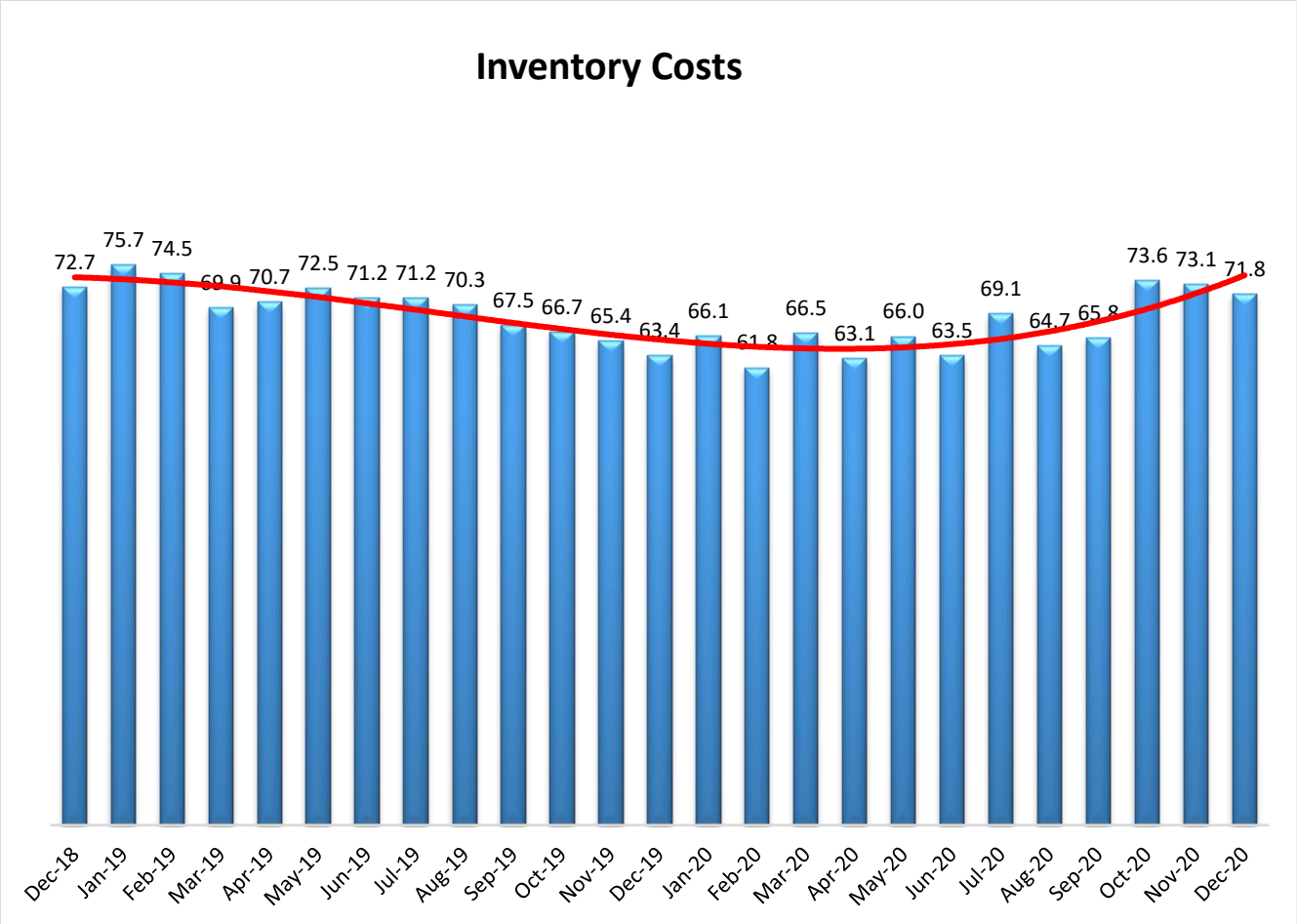
When asked to predict what conditions will be like 12 months from now, the average value is 72.2., down slightly (-1) from November's future prediction of 73.2. Respondents expect inventory values to continue increase significantly over the next year, potentially indicating a sentiment that the increase in inventory-intensive practices that were adopted due to the pandemic will continue, even after vaccines are distributed.



Inventory Costs

Given the continued increases in inventory levels, it is not surprising that inventory costs have continued to increase. The current value is 71.8, down (-1.3) from November's reading of 73.1. This is the third consecutive reading in the 70's after more than a year in the mid-60's, indicating that inventory has become more expensive, at an accelerated pace, during Q4. Continuing the trend we observe with Inventory Costs, the current value is 8.4 points above the value last year at this time. This month, upstream respondents gave a value of 75.0, an increase of 2.3 points, and downstream gave a value of 69.0, a decrease of 5.2 points. Last month, upstream was 1.5 points lower than downstream, and now it is 6.0 points higher than downstream, so the difference has swung by 7.5 points. This would indicate inventory costs for upstream have increased significantly more than for downstream.

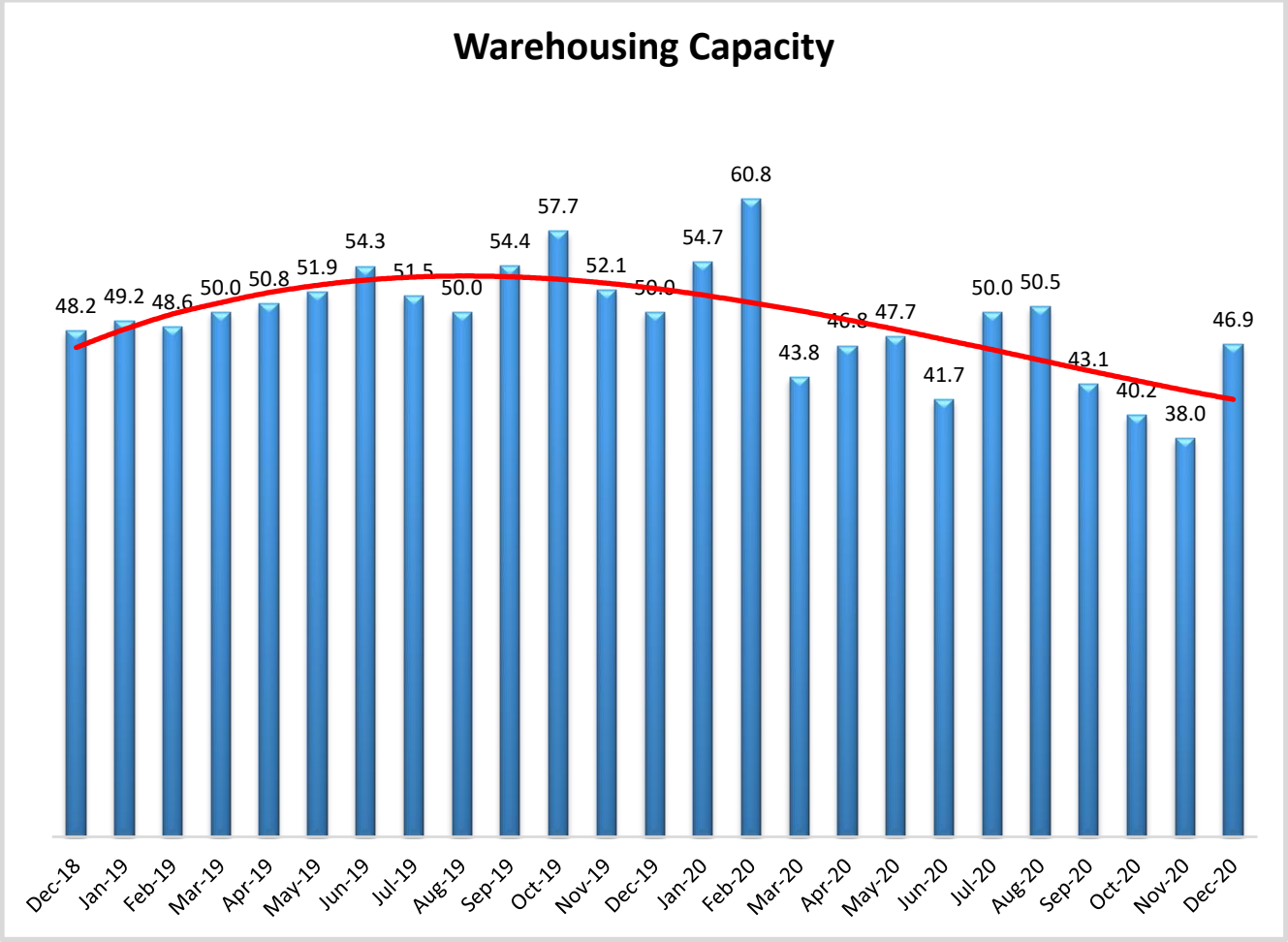
Responses from participants seem consistent with this hypothesis. When asked about what they expect inventory costs to be like 12 months from now, the index value is 76.6, a very slight decrease (-0.3) of from last month's value of 76.9. This value reflects expected continued inventory cost growth, which is quite similar to the current inventory cost index value of 71.8. Respondents clearly expect inventory costs to continue to be high for the next 12 months.



Warehousing Capacity

The Warehousing Capacity Index registered 46.9 percent in December 2020, which indicates that warehouse capacity is still below the 50 percent mark, indicating contraction. This breaks the previous 3 month trend of increasing rates of decline, and boasts a rather sharp increase from last month by nearly 9 percentage points. In addition, this reading is down nearly over 3 percentage points from the reading one year ago (December 2019 registered in at 50). Previous predictions from the LMI reports indicated that "consumers' behavioral shift to more e-commerce, will likely manifest in increasingly tight warehouse capacity" and indeed, there is still contraction in this space. It appears, though, as the tensions of the holiday season ease more capacity is being brought back online. If this continues, warehousing capacity may rebound to more normal levels seen in the pre-pandemic landscape.

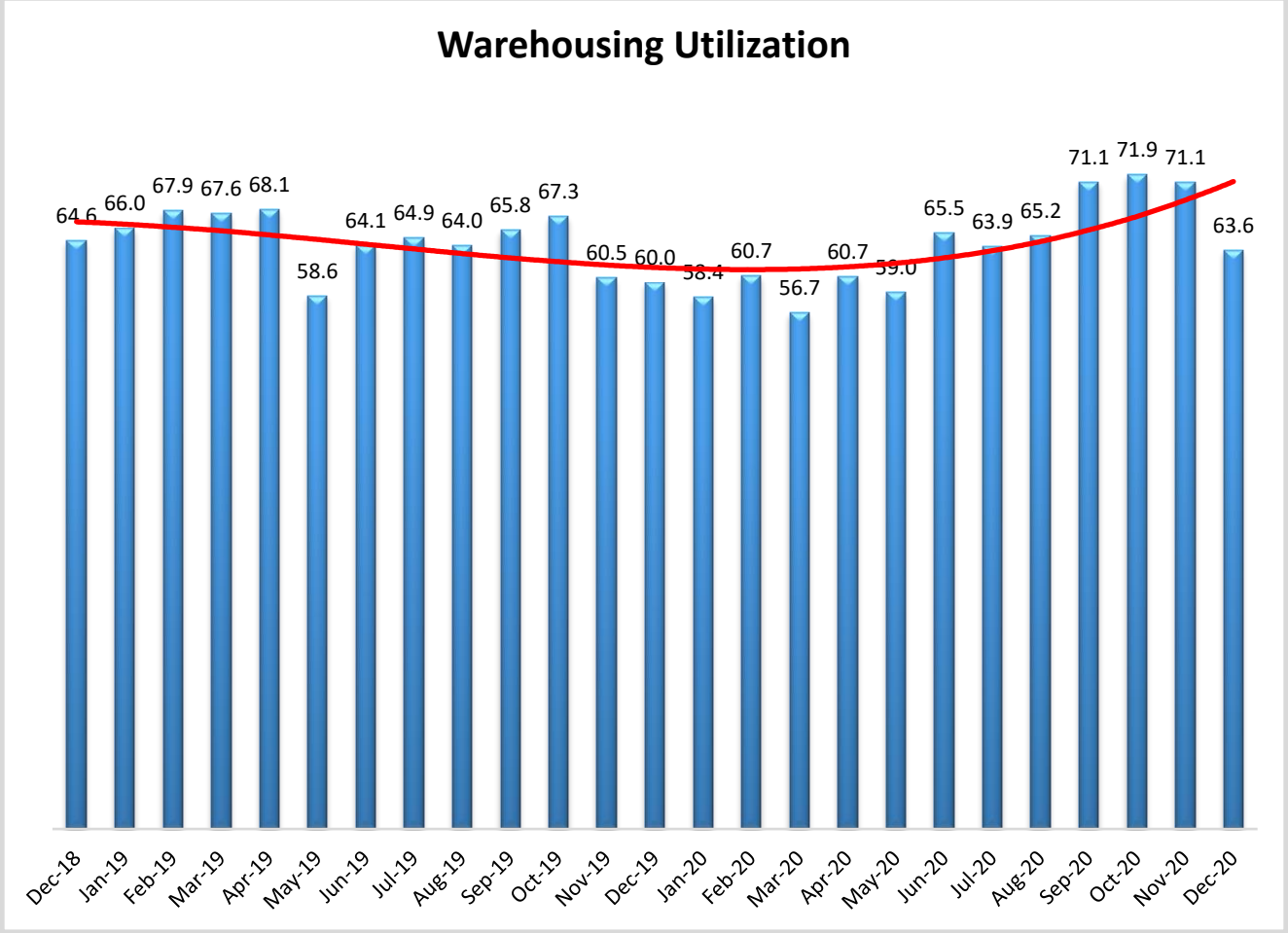
Looking forward at the next 12 months, the predicted Warehousing Capacity index is predicted to increase slightly with a score of 51.9, up slightly (+2.5) from November's future prediction of 49.4 which suggested a slight contraction over the next 12 months. November and December's future predictions are both close to 50, indicating that respondents expect available warehousing to roughly maintain status quo (i.e. not enough space) over the next year.



Warehousing Utilization

The Warehousing Utilization Index registered 63.6 percent in December 2020. This represents a rather sizable 7.5 percentage point decrease from last month, and is up by over 3.5 percentage points from the December 2019 reading of 60.0. This shift (i.e. a decrease in the rate at which utilization is growing) while still above the 50-point mark, represents a break from the increased growth rate of the previous months. This decrease from last month, coupled with the increased capacity signals a potential shift in the market. It appears that previous predictions related to the impact of the holiday season, coupled with the continued impacts from COVID-19 have been brought to bear. Previously, it was suggested that "the slight dip in the rate from last month … might represent or portend a shift for the post-holiday season" and indeed, this result may indicate as much. Further analysis is required, and the coming months will indicate whether this trend will continue, and whether warehousing is seeing a shift.

Looking forward at the next 12 months, the predicted Warehousing Utilization index is 71.2, down (-6.8) from November's future prediction of 78.0. This seems to support the notion that respondents do not expect significant amounts of warehousing to come online in the next year, and therefore anticipate the need to utilize more of the currently available space.



Warehousing Prices

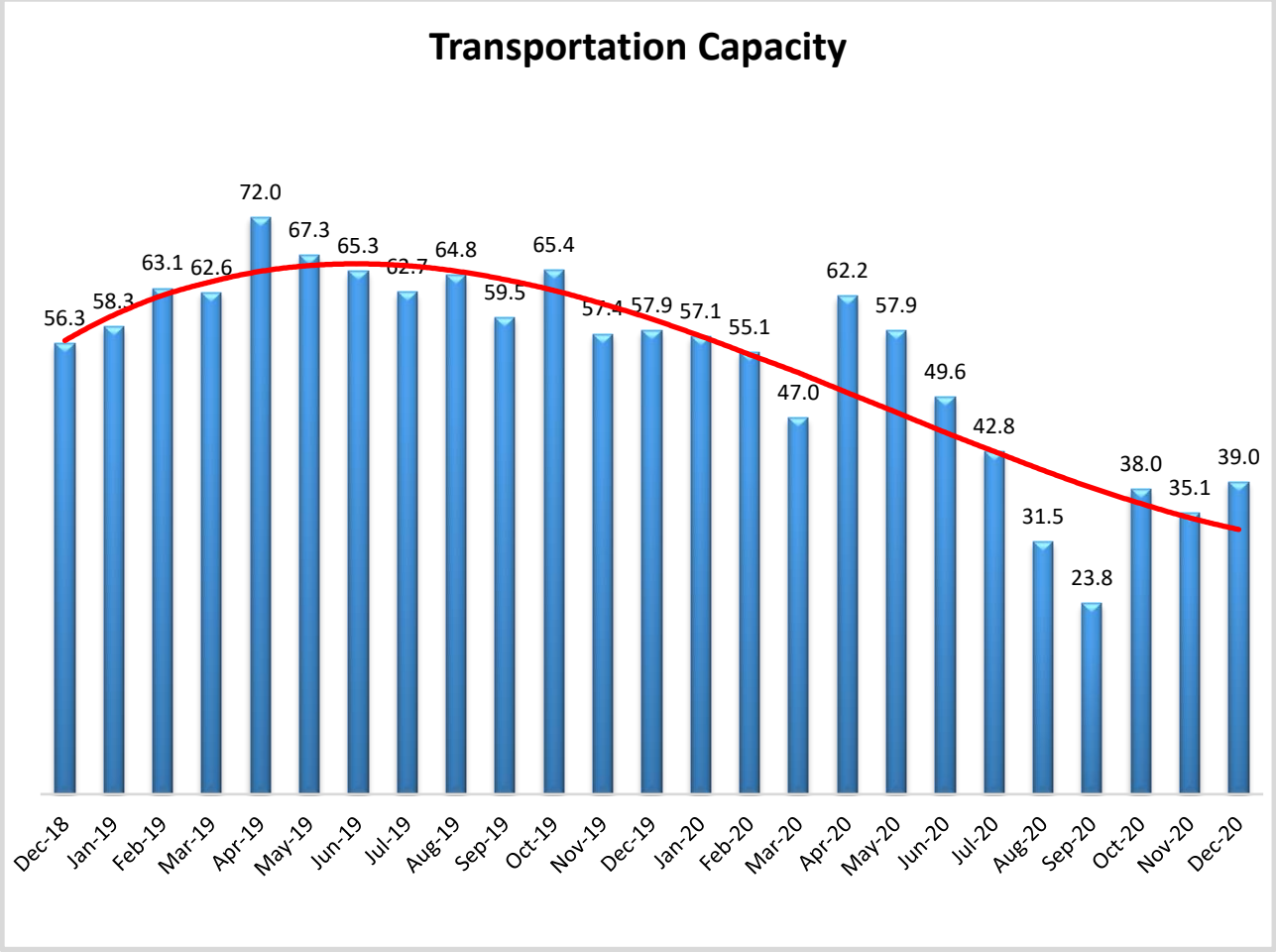
Warehousing Prices Index registered 76.9 percent in December 2020. This reading represents a rather negligible decrease of 1.5 percentage points from last month, which (though marginally) continues downward trend in the increased growth rate in warehousing prices amid the COVID-19 disruption(s), and previous holiday season preparations. This reading is also up by over 3 percentage points from the reading one year ago. Previously, it was suggested that "the data are indicating that pricing will not relent anytime soon, unless a rapid shift in the market occurs. Such a shift might come as a result of new warehouse capacity coming online, thereby potentially placing a downward pressure on pricing" which is supported by the modest increase in the capacity as noted previously. The forthcoming months will indicate whether or not this is a shift, or a mere course correction.

Future predictions suggest that respondents are expecting prices to continue to grow at a rate of 82.9, up slightly (+0.4) from October's future prediction of 80.8, down slightly (-1.7) from November's future prediction of 82.5. Clearly respondents are anticipating a significant increase in costs (and a continuation of current trends) over the next 12 months.

Transportation Capacity

The Transportation Capacity Index registered 39.0 percent in December 2020. This constitutes an increase of 3.9 percentage points from the November reading of 35.1. This latest reading is the highest number registered since August 2020, yet it is the fifth consecutive reading below 40.0, a mark this metric had not reached in the 2 years prior. e Transportation Capacity Index remained under 50 indicating contraction of capacity. This is consistent with recent news reports indicating that firms are struggling to find the trucks and boats necessary to meet consumer demand. Finding sufficient transportation continues to be an issue for many firms (particularly customer-facing firms), the five lowest scores for the last two years in the Transportation Capacity index have come in the last five months.

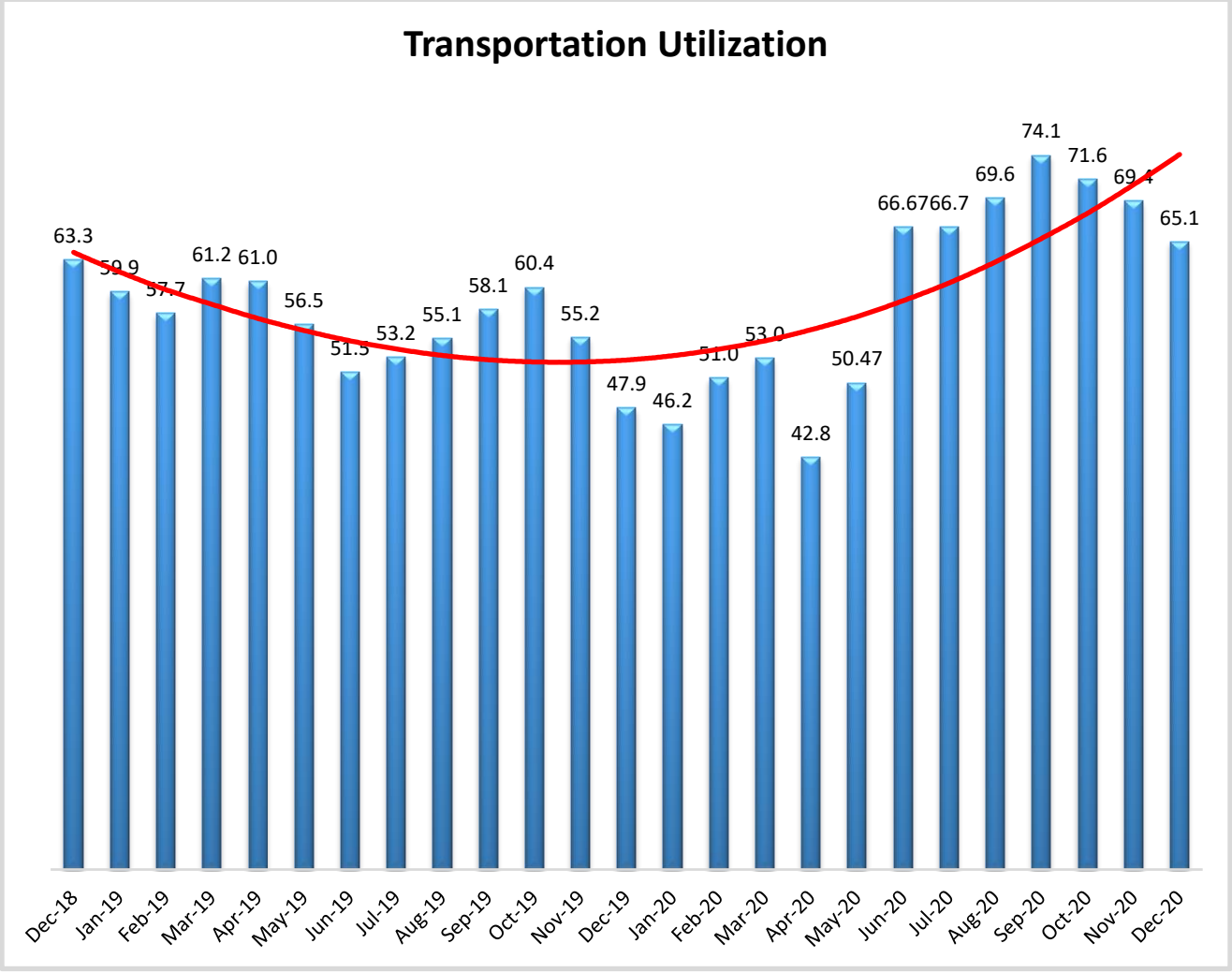
Future predictions suggest that respondents are expecting capacity to increase fairly significantly over the next year at a rate of 62.8, up (+2.9) from November's future prediction of 59.7. Whether or not sufficient capacity will come online over the next year, to make this prediction a reality, remains to be seen.



Transportation Utilization

The Transportation Utilization Index registered 65.1 percent in December 2020. This number denotes a 4.3 points decrease from the November reading of 69.4 and a 9 point from the recent high registered in September 2020. This drop continues the slight downward trend in Transportation Utilization Index, while it remains above 50, indicating expansion in transportation utilization, yet the rate of expansion continues to decrease.

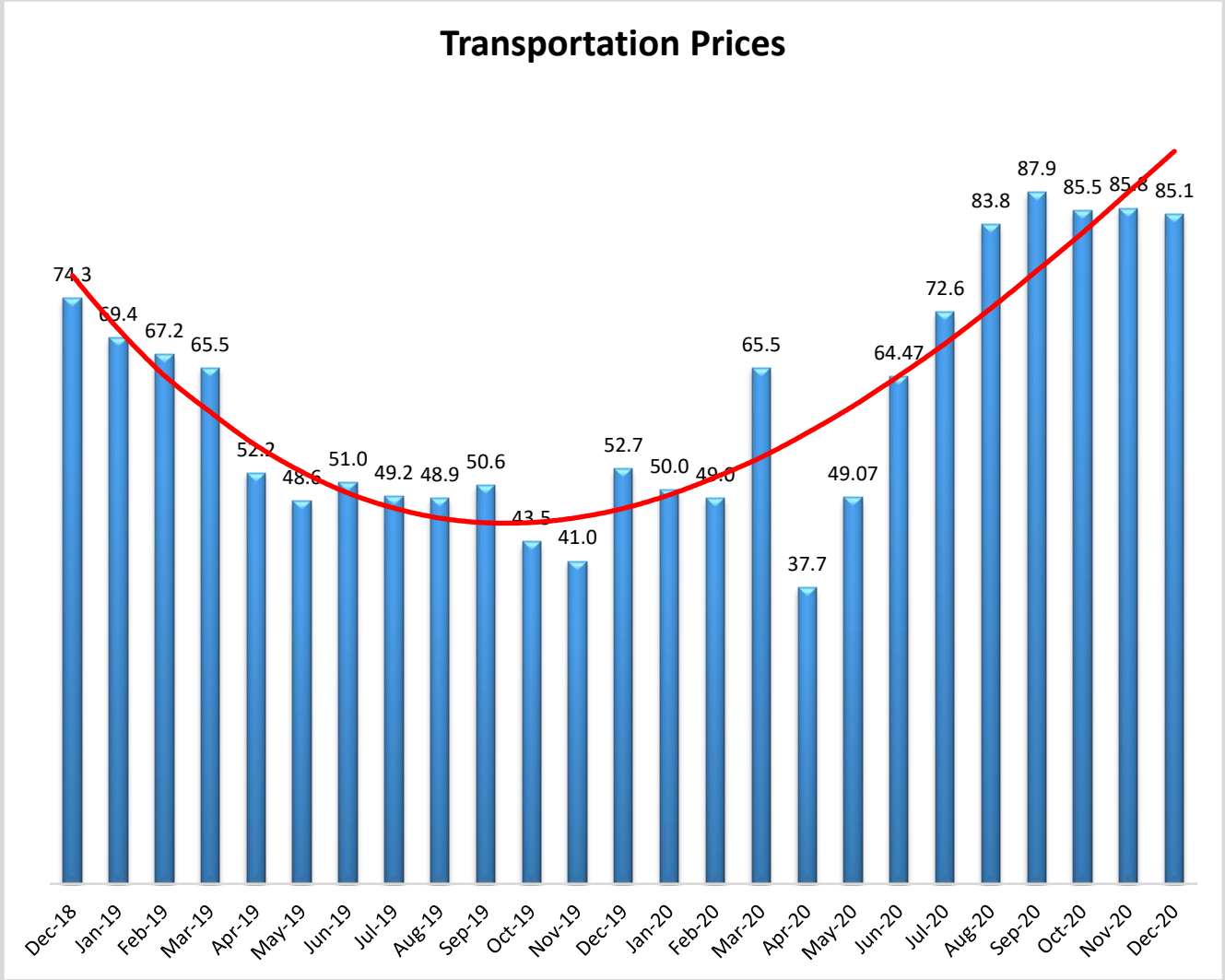
It should be noted that the future Transportation Utilization Index shows a value of 68.0, a significant drop (-10.8) from November's future prediction of 78.8. This reduced rate of utilization growth is consistent with the notion expressed above that more capacity might come online over the next year.



Transportation Prices

The Transportation Prices Index registered 85.1 percent in December 2020. This constitutes a small decrease of .7 percent from the November transportation prices reading of 85.8, continuing to indicate increasing transportation prices. This indicates that he strong upward pressure on transportation prices that gained momentum in the fall months of 2020 is still very strong, with the last five months having the highest Transportation Prices Index levels recorded over the last two years. Observing the last two years of Transportation Prices shows a “u-shaped” trend, with December’s rate of growth representing a return to the heady days of mid-to-late 2018.

Transportation Prices will likely remain elevated at least through the beginning of 2021. When asked to predict Transportation Prices one year from now respondents reported a growth rate of 77.6, negligibly down (-0.3) from November’s future prediction of 77.9. It is interesting that despite expecting more capacity to come online over the next year, respondents continue to predict strong price growth over the next 12 months.



About This Report

The data presented herein are obtained from a survey of logistics supply executives based on information they have collected within their respective organizations. LMI® makes no representation, other than that stated within this release, regarding the individual company data collection procedures. The data should be compared to all other economic data sources when used in decision-making.

Data and Method of Presentation

Data for the Logistics Manager's Index is collected in a monthly survey of leading logistics professionals. The respondents are CSCMP members working at the director-level or above. Upper-level managers are preferable as they are more likely to have macro-level information on trends in Inventory, Warehousing *and* Transportation trends within their firm. Data is also collected from subscribers to both DC Velocity and Supply Chain Quarterly as well. Respondents hail from firms working on all six continents, with the majority of them working at firms with annual revenues over a billion dollars. The industries represented in this respondent pool include, but are not limited to: Apparel, Automotive, Consumer Goods, Electronics, Food & Drug, Home Furnishings, Logistics, Shipping & Transportation, and Warehousing.

Respondents are asked to identify the monthly change across each of the eight metrics collected in this survey (Inventory Levels, Inventory Costs, Warehousing Capacity, Warehousing Utilization, Warehousing Prices, Transportation Capacity, Transportation Utilization, and Transportation Prices). In addition, they also forecast future trends for each metric ranging over the next 12 months. The raw data is then analyzed using a diffusion index. Diffusion Indexes measure how widely something is diffused, or spread across a group. The Bureau of Labor Statistics has been using a diffusion index for the Current Employment Statics program since 1974, and the Institute for Supply Management (ISM) has been using a diffusion index to compute the Purchasing Managers Index since 1948. The ISM Index of New Orders is considered a Leading Economic Indicator.

We compute the Diffusion Index as follows:

PD = Percentage of respondents saying the category is Declining,
PU = Percentage of respondents saying the category is Unchanged,
PI = Percentage of respondents saying the category is Increasing,
Diffusion Index = 0.5 * PD + 0.5 * PU + 1.0 * PI

For example, if 25% say the category is declining, 38% say it is unchanged, and 37% say it is increasing, we would calculate an index value of 0*0.25 + 0.5*0.38 + 1.0*0.37 = 0 + 0.19 + 0.37 = 0.56, and the index is increasing overall. For an index value above 0.5 indicates the category is increasing, a value below 0.5 indicates it is decreasing, and a value of 0.5 means the category is unchanged. When a full year's worth of data has been collected, adjustments will be made for seasonal factors as well.

Logistics Managers Index

About The Logistics Manager's Index®

The Logistics Manager's Index (LMI) is a joint project between researchers from Arizona State University, Colorado State University, University of Nevada, Reno, Rochester Institute of Technology and Rutgers University, supported by CSCMP. It is authored by Zac Rogers Ph.D., Steven Carnovale Ph.D., Shen Yeniyurt Ph.D., Ron Lembke Ph.D., and Dale Rogers Ph.D.