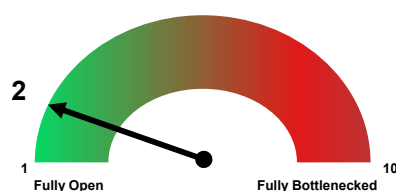


Tracking U.S. Supply Chain Congestion

GS Supply Chain Congestion Scale: May 1st: Scale Teeter-Totters Back to '2' from '1' Amid Weekly Volatility

GS Supply Chain Congestion Scale
Week of 5/1/2022

Scale is based solely off weekly metrics to give more granularity on high frequency data indications; see Appendix for scale that combines weekly and monthly metrics

Source: Goldman Sachs Global Investment Research

Our weekly bottleneck scale rose back to a '2' this week following last week's tick down to '1'; this week, the absolute level of our congestion index ticked up ~9% w/w ([Exhibit 1](#)).

The number of container ships waiting to dock and unload goods along the West Coast remained at zero for the 22nd consecutive week, but East Coast backlogs increased from 4 to 7 (note that we slightly overweight ship backlogs when calculating the index;

[Exhibit 6](#)). West Coast intermodal rail performance was mixed on the back of decelerating BNSF intermodal traffic (-20% YoY) and higher BNSF dwell (13.6 hours versus 7.3 hours last week), though UNP traffic was better (-3.6% YoY versus -8.0% last week) as dwell went slightly lower (12.2 hours versus 14.3 hours last week). Overall, chassis dwell time at the ports did tick up ~6% w/w, partly contributing to this week's scale ticking back up to '2'; ocean container rates also rose from ~\$1k per forty foot equivalent unit to ~\$1.7k, further contributing to the scale uptick.

While this week's tick back up to '2' is disappointing, it somewhat reflects weekly bottleneck volatility; we still think we can exit April with a combined bottleneck scale implying supply chains in line with levels seen prior to March 2020 (give or take a few percentage points).

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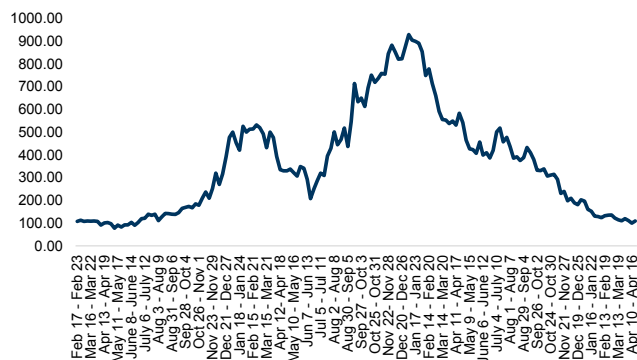
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Exhibit 1: Our weekly composite increased (+9.3% w/w) in the most recent week

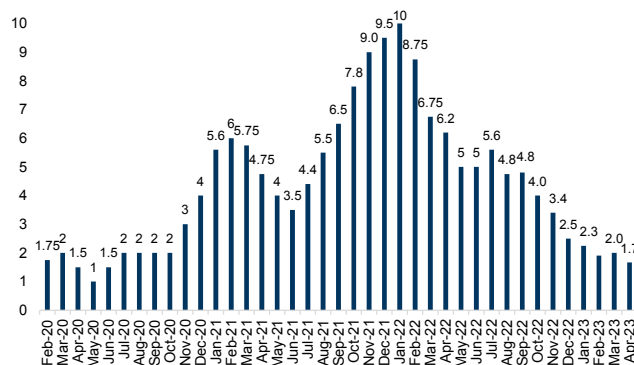
GS Weekly Bottleneck Index, Feb 2020 - Apr 2023



Source: Goldman Sachs Global Investment Research

Exhibit 2: Our average bottleneck score for April is 1.7 - down significantly from the Dec21/Jan22 peak, and nearly in line with pre-pandemic levels

GS Weekly Congestion Scale, Scored by Month*



*Numbers reflect the average weekly score seen in each respective month

Source: Goldman Sachs Global Investment Research

As a reminder (and to help reiterate why and how we construct the index), please refer to the Appendix following [Exhibit 17](#). Additionally, for further clarity on tracked congestion metrics, please refer to the glossary following [Exhibit 19](#).

Transport Subsectors to Watch as Congestion Eases

The key question remains focused on whether the last stumbling blocks around congestion ease in the US - notably the still-full warehouses, as well as the East Coast port backlogs. Should this continue to mitigate, then it is conceivable we could sustain the index being back to a '1' over 1H23. As suspected could happen when we first introduced the index, labor and equipment availability is improving alongside demand moderation, both helping the fall in the index.

With the dramatic easing that already took place in 2022, we think from a transport subsector perspective – we would look to the US Rails (NSC, UNP, CSX) and intermodal marketing companies (SNDR, JBHT) as being the prime beneficiaries should congestion stay easier, as these networks have generally been amongst the most adversely impacted by supply-chain problems – both from operational constraints and underperformance on volumes due to an inability to translate high consumer demand into actual throughput. The truckload sector, on the other hand, has benefited significantly from elevated spot rates due to constraints on truck capacity. Should the labor and equipment shortages see further relief due to moderating congestion, this could open the pressure relief valve as presumably additional effective truck capacity would be created through more normalized goods flow.

Indicator Updates

Of the metrics we track ([Exhibit 3](#)), we provide updates for the weekly and monthly variables below ([Exhibit 4](#) - [Exhibit 5](#)).

Exhibit 3: Tracked Congestion Metrics

Tracked Metrics	
Weekly Variables	Monthly Variables
Container Ships Waiting to Dock at LA/LB	Container Weighted Average Dwell (San Pedro's Bay)
Container Ships Waiting Along to U.S. Gulf/East Coast	Containers Dwelling > 5 days (San Pedro's Bay)
UNP Intermodal Traffic	PMI Manufacturing Supplier Delivery Time
UNP Intermodal Velocity	Big Three' West Coast Ports' Inbound Loaded Containers
UNP Intermodal Dwell	LMI Transportation Capacity
BNSF Intermodal Traffic	LMI Warehousing Capacity
BNSF Intermodal Velocity	LMI Warehousing Utilization
BNSF Intermodal Dwell	Door to Door Shipping Days, China to US
Ocean Shipping Rates, East Asia to U.S. West Coast	Class 8 Trucking Driver Count Growth
Chassis Street Dwell, 20ft Containers	Rail Container Dwell (San Pedro's Bay)
Chassis Street Dwell, 40/45ft Containers	
Chassis Terminal Dwell Time, 20ft Containers	
Chassis Terminal Dwell Time, 40/45ft Containers	

Source: Goldman Sachs Global Investment Research

Exhibit 4: Bottleneck metrics were more mixed this week; certain overweighted variables (Ship Backlog, dwell times) deteriorated, pushing the index back slightly above '1'

	Feb 13 - Feb 19	Feb 20 - Feb 26	Feb 27 - March 5	Mar 6 - Mar 12	Mar 13 - Mar 19	Mar 20 - Mar 26	Mar 27 - Apr 2	Apr 3 - Apr 9	Apr 10 - Apr 16	Apr 17 - Apr 23
Container Ships Waiting to Dock at LA/LB	0	0	0	0	0	0	0	0	0	0
Container Ship Backlog (East and Gulf Coast)*	14	10	11	4	5	6	6	2	4	7
UNP Intermodal Traffic (YoY Growth)	-2.0%	-3.9%	-6.3%	-6.6%	-6.0%	-8.1%	-4.7%	-10.7%	-8.0%	-3.6%
UNP Intermodal Velocity (YoY Growth)	0.7%	2.0%	-0.7%	-1.7%	3.0%	3.5%	-3.0%	3.5%	5.5%	8.4%
UNP Intermodal Dwell (Hours)	19.8	23.0	18.3	16.2	16.1	15.1	16.6	14.4	14.3	12.2
BNSF Intermodal Traffic (YoY Growth)	-13.1%	-21.6%	-18.3%	-22.3%	-22.2%	-21.8%	-23.1%	-24.7%	-18.9%	-20.2%
BNSF Intermodal Velocity (YoY Growth)	8.6%	8.4%	5.2%	4.4%	10.7%	6.3%	5.4%	7.1%	8.3%	12.7%
BNSF Intermodal Dwell (Hours)	13.2	12.3	4.9	16.5	13.9	6.8	17.6	9.8	7.3	13.6
Ocean Shipping Rates, East Asia to U.S. West Coast (YoY Growth)	-92.1%	-92.7%	-93.4%	-93.6%	-93.6%	-93.6%	-93.6%	-93.7%	-93.6%	-88.9%
Chassis Street Dwell, 20ft Containers (Days)	6.0	7.4	7.9	7.6	6.4	6.0	6.8	7.6	5.4	5.9
Chassis Street Dwell, 40/45ft Containers (Days)	7.1	10.7	10.4	9.0	7.2	7.0	7.2	7.9	6.2	6.0
Chassis Terminal Dwell Time, 20ft Containers (Days)	11.9	13.6	15.6	16.1	13.5	10.2	12.0	14.4	9.0	10.0
Chassis Terminal Dwell Time, 40/45ft Containers (Days)	5.7	8.3	9.5	9.5	8.2	8.1	8.1	9.6	7.1	6.6

As of 3/28/22, we added and backdated our estimates for the East and Gulf Coast container ship backlog

Source: Marine Exchange of Southern California, AAR, STB, Freightos, Pool of Pools, Pacific Merchant Shipping Association, Port of Long Beach, Port of Oakland, Port of Los Angeles, LMI, US Bureau of Labor Statistics, IHS Markit, Refinitiv Eikon, compiled by Goldman Sachs Global Investment Research

Exhibit 5: Most monthly bottleneck metrics improved sequentially in March

Monthly Variables	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Container Weighted Average Dwell (Days)	5.4	5.9	7.6	8.4	7.8	6.9	5.8	6.3	6.1	5.3	5.5	5.6	5.1	4.3	3.5	2.8	2.6	3.2	2.9	2.5
% of Containers Dwelling > 5 days	28%	33%	47%	50%	48%	38%	34%	39%	34%	27%	31%	31%	24%	16%	11%	7%	7%	10%	8%	6%
Rail Container Dwell (Days)	8.2	5.5	3.9	3.5	3.3	3.5	5.2	7.7	9.6	11.3	13.3	16.4	16.5	15.5	14.2	9.1	4.9	4.3	5.8	4.1
Big Three Inbound Loaded Containers (YoY)	1.4%	-5.3%	-6.9%	-8.3%	-14.0%	2.4%	3.8%	2.1%	-1.8%	-3.5%	3.9%	-1.7%	-11.6%	-17.0%	-23.4%	-25.2%	-19.9%	-22.2%	-37.5%	-35.1%
LMI Transportation Capacity	40.5	37.2	34.1	39.7	42.6	44.8	44.4	45.7	56.9	64.7	61.7	69.1	64.3	71.8	73.1	71.4	69.5	70.2	70.4	71.4
LMI Warehousing Capacity	39.1	47.9	47.6	44	46.5	47.1	42.4	36.1	40.8	45.9	41.0	47.0	42.3	44.3	44.7	46.8	44.7	46.4	56.6	58.2
LMI Warehousing Utilization	66.3	66.4	71.4	68.2	67.3	71.0	74.3	75.0	70.9	72.9	69.1	68.8	65.3	76.8	60.8	56.8	64.1	67.1	70.3	65.0
Door to Door Shipping Days, China to US	71	73	76	78	80	83	82	80	76	71	62	61	60	60	60	55	52	52	52	53
Class 8 Driver Count	1524.4	1526.8	1528.9	1537.6	1538.9	1557.4	1564.9	1561.8	1571.7	1583.8	1591.4	1597.0	1600.0	1598.3	1605.4	1605.5	1607.1	1611.4	1606.3	1612.0
PMI Manufacturing Supplier Delivery Time (YoY)	63.3	62.0	60.6	49.0	24.9	30.6	8.0	-9.8	-10.5	-21.9	-95.7	-104.7	-131.1	-159.4	-163.2	-167.6	-104.1	-116.6	-112.3	-93.2

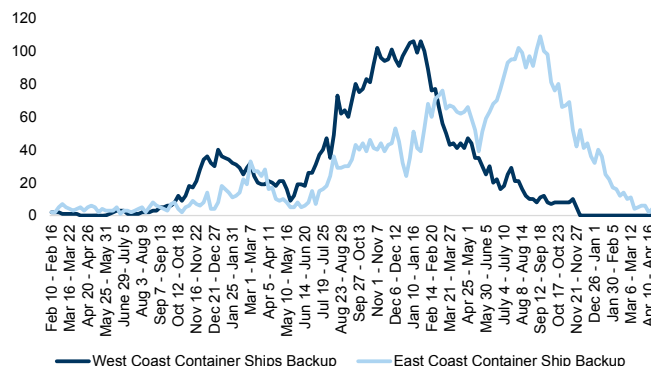
Source: Marine Exchange of Southern California, AAR, STB, Freightos, Pool of Pools, Pacific Merchant Shipping Association, Port of Long Beach, Port of Oakland, Port of Los Angeles, LMI, US Bureau of Labor Statistics, IHS Markit, compiled by Goldman Sachs Global Investment Research

Weekly Indicator Update**Anchored Container Ships**

- West Coast backlogs remained unchanged at 0 this week but East Coast backlogs increased from 4 to 7.

Exhibit 6: 7/0* container ships backed up this week on the East/West Coast

West vs. East Coast Container Ship Backlog, Weekly Average, Feb 2020 - Apr 2023



*East Coast is estimated via satellite data - includes container ships sitting for more than 3 days within 140 miles of US ports to the right of longitude 100 (i.e., Gulf and East Coast)

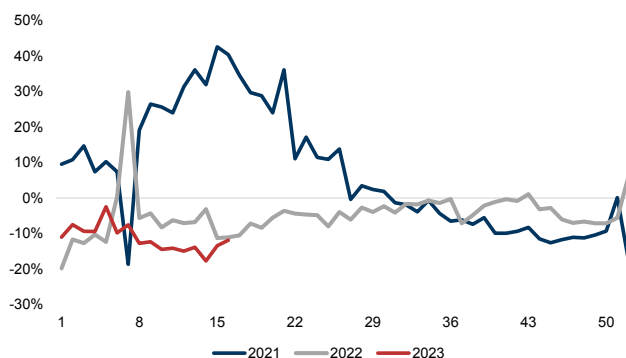
Source: Marine Exchange of Southern California, Refinitiv Eikon, Goldman Sachs Global Investment Research

Rail Intermodal Trends

- **West Coast Class 1 Rails' (Union Pacific and Burlington Northern Santa Fe) combined intermodal traffic was largely unchanged in terms of YoY growth in reporting week 16 of 2023, as better traffic at UNP was offset by worse traffic at BNSF.**
 - BNSF intermodal traffic at -20.2% YoY this week vs. -18.9% YoY last week; UNP intermodal traffic at -3.6% YoY vs. -8.0% YoY last week.
 - Note that intermodal volume declines have continued into April ([Exhibit 8](#)).

Exhibit 7: West Coast Class 1 Rails' Intermodal Volume Growth, Week 1 - Week 52

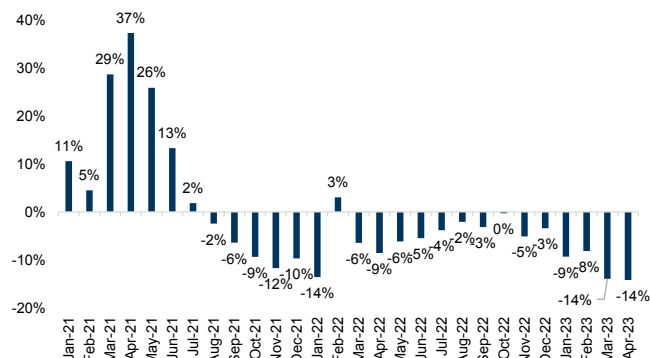
YoY % growth



Source: AAR, Data compiled by Goldman Sachs Global Investment Research

Exhibit 8: Intermodal volume declines (UNP and BNSF) have continued into April

West Coast Class 1 Rail Intermodal Traffic YoY % Growth



Source: AAR, Data compiled by Goldman Sachs Global Investment Research

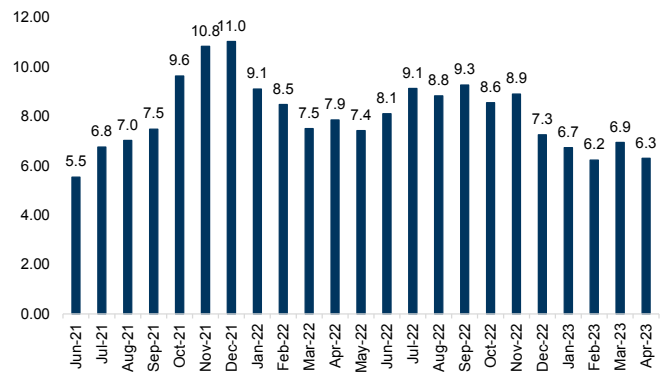
- **West Coast Class 1 Rail intermodal speed improved, but dwell was mixed, in the most recent week.**
 - BNSF intermodal dwell up to 13.6 hours from 7.3 last week; UNP dwell down to 12.2 hours from 14.3.

- On intermodal velocity, BNSF +12.7% YoY vs. +8.3% YoY last week; UNP at +8.4% YoY vs. +5.5% YoY last week.

Chassis Dwell Time

- Chassis dwell is showing sequential improvement when comparing the April data to the March average – as per [Exhibit 9](#). Dwell metrics improved in the most recent week.
- Average street dwell time for 20ft shipping container chassis was 5.9 days in reporting week 16, up from 5.4 hours in week 15.
- Street dwell for 40/45ft container chassis was 6.0 days in week 16, down from 6.2 days week 15.
- Chassis terminal dwell time for 20/40ft containers was at 10.0/6.6 days in week 16 versus 9.0/7.1 days in week 15.

Exhibit 9: Dwell for the more typical 20ft container chassis is showing sequential improvement in April
Chassis Street Dwell Time (20ft Containers)



Dwell time shown in days

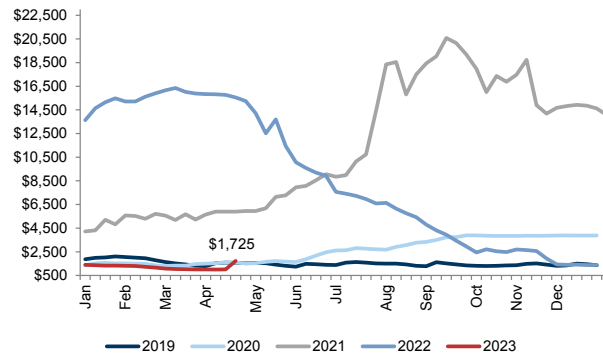
Source: Pool of Pools

Ocean Shipping Rates

- Ocean rates' YoY growth was better than -90% YoY for the first time in 14 weeks. The third week of April saw ocean rates tick back up to ~\$1.7k (-89% YoY) from ~\$1k, implying levels slightly above to more inline with Pre-Covid (versus below Pre-Covid levels for the last two months).

- China to North America West Coast: ocean shipping rates -89% YoY in reporting week 16 versus -94% in week 15.

Exhibit 10: Ocean Container Shipping Rates, China/East Asia to North America West Coast



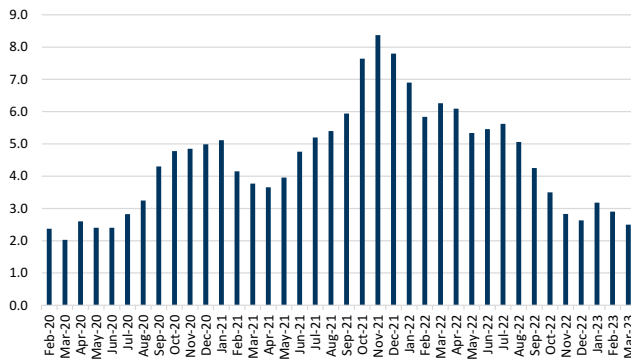
Rate is \$ per FEU (Forty-Foot Equivalent Unit)

Source: FBX

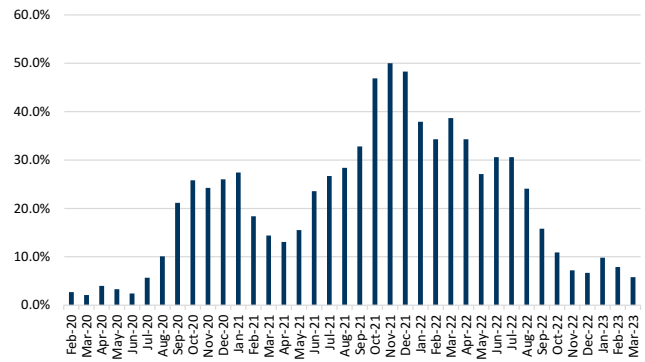
Monthly Indicators (March Data)

San Pedro's Bay Container Dwell

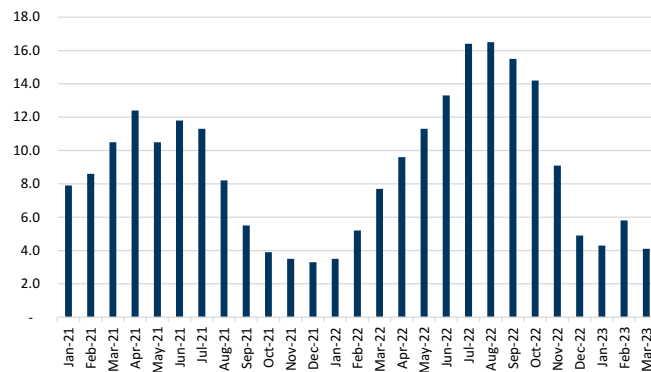
- Container weighted average dwell time declined slightly to 2.5 days in March from 2.9 days in February at San Pedro's Bay, implying dwell down 60% YoY.
- 6% of the San Pedro's Bay containers were dwelling for more than 5 days in March — this is down from ~50% at peak congestion levels and down slightly from February.
- Rail container dwell moved down to 4.1 days in March from 5.8 days in February.

Exhibit 11: Container Weighted Average Dwell Time at San Pedro's Bay, Days

Source: Pacific Merchant Shipping Association

Exhibit 12: % of Containers Dwelling More than 5 Days

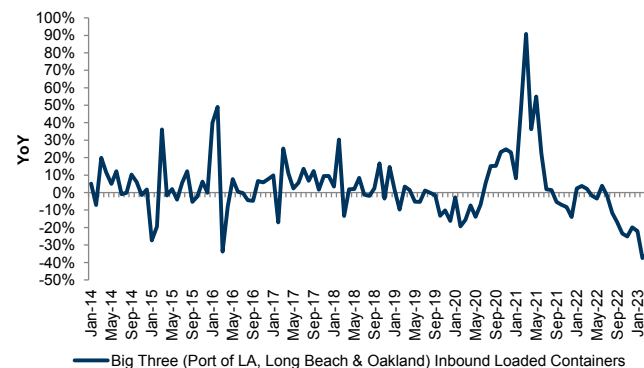
Source: Pacific Merchant Shipping Association

Exhibit 13: Rail Container Dwell Time, Days

Source: Pacific Merchant Shipping Association

"Big Three" West Coast Ports' Inbound Loaded Containers

- Total inbound containers for the Ports of LA, Long Beach, and Oakland -35% YoY in March.

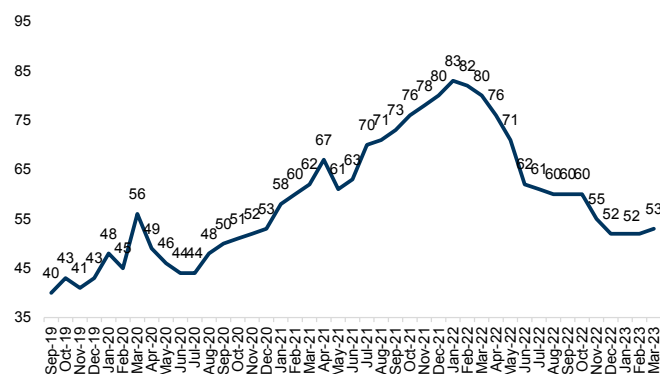
Exhibit 14: West Coast Ports' Inbound Loaded Containers -35% YoY in March

Source: Port of Long Beach, Port of Los Angeles, Port of Oakland

Door to Door Shipping, China to US

- It was taking an average of 53 days to ship (door-to-door) from China to the US in March, largely unchanged from the prior 3 months.

Exhibit 15: Door to Door Shipping Days, China to US

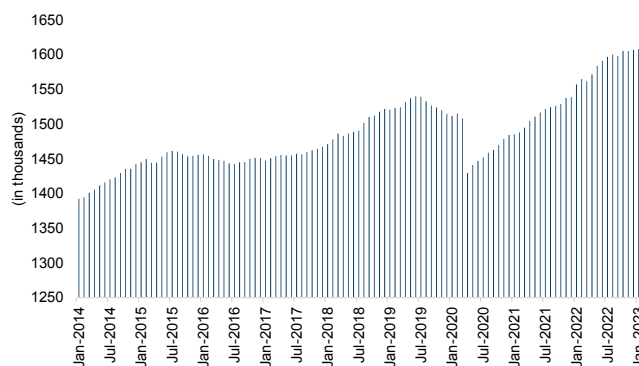


Source: Freightos

Trucking Employee Count

- Truck transportation employee count remains above pre-pandemic highs (+4.7% above), with YoY growth averaging about 4% over the past six months. March's employee count increased 0.4% sequentially after declining 0.3% in February.

Exhibit 16: Total Truck Transportation Employee Count, Seasonally Adjusted



Source: US Bureau of Labor Statistics

LMI Capacity and Utilization

■ LMI Transportation Capacity Index

- Transportation capacity remained in expansionary territory in March, and the rate of expansion accelerated relative to February. March's reading was 71.4 versus 70.4 in February.

■ LMI Warehouse Capacity Index

- Warehouse capacity remained expansionary in March after February rose

above contraction territory for the first time in nearly 2.5 years. March's reading of 58.2 expanded from 56.6 in February.

■ LMI Warehouse Utilization Index

- Warehouse utilization continued to increase in March with an above-50 reading. March's 65 reading fell from February's 70.3 reading, indicating a slower rate of utilization growth.

PMI Supplier Delivery Times

- Delivery times contracted on an absolute basis (i.e., above 50 indicates contracting delivery times) given the 55.1 reading in March; this implies delivery times are growing nearly 2x slower than at this same time last year.

Exhibit 17: PMI: Manufacturing Suppliers' Delivery Times, YoY, Seasonally Adjusted



Source: IHS Markit

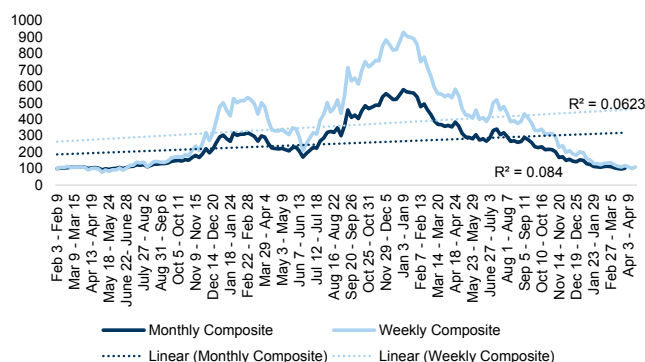
Appendix

Given the importance supply chain fluidity has on retailers, consumer goods companies, inflationary pricing, etc., we think this scale's importance is tied most directly to the pace at which supply chain congestion is on the mend. To this end, we look at a variety of variables that we think tie directly, or in some cases indirectly, to overall congestion; including ships at anchor, days to deliver, various dwell times, intermodal volume and velocity statistics amongst others. Aggregating this data, we create the Supply Chain Congestion Scale – an attempt to quantify the balance between supply chains being “Fully Bottlenecked” and “Fully Open,” relative to the pre-pandemic benchmark we chose as Feb 3rd, 2020. Basically, how fluid is the overall transport logistics network.

To determine the position of the Legacy Congestion Scale (1-10), we calculate growth or decline in each category (monthly and weekly variables) relative to pre-congestion levels, overweighting certain categories we deem most directly tied to supply chain bottlenecks (i.e., ships anchored off the ports of LA and Long Beach, shipping container and chassis street dwell times, door-to-door shipping days from China to US), and scale it based on our Composite Scale ([Exhibit 19](#)).

We publish the weekly scale on Monday PM/Tuesday AM to relay leading edge data that will inform the roughly one month lagged composite (i.e., we will update the weekly scale every week and the legacy scale will be updated monthly). Looking at the two charts, it is generally clear that the weekly composite should have good predictive ability as to the eventual direction of the monthly composite (which includes more encompassing variables than pure weekly ones to provide strong confirmation on congestion direction), and this is confirmed by the similarly high R^2 values seen in Exhibit 18.

Exhibit 18: The weekly composite index (light blue) leads the monthly (dark blue); expect future monthly updates to confirm recent weekly trends



Source: Goldman Sachs Global Investment Research

Exhibit 20: GS Legacy Supply Chain Congestion Scale (incorporates monthly and weekly data)

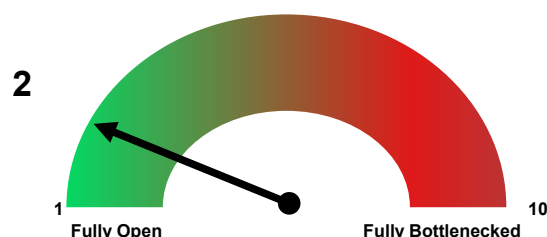
Composite Scale	Fluidity Scale
<101	1
101-153	2
154-206	3
207-259	4
260-313	5
314-366	6
367-419	7
420-472	8
473-526	9
>526	10

Source: Goldman Sachs Global Investment Research

Exhibit 19: Our March monthly reading averaged 104, indicating a bottleneck score just above '1' when looking at all metrics (weekly and monthly combined)

Weekly + Monthly Combined Congestion Scale*

GS Legacy Supply Chain Congestion Scale Monthly Data Updated Through March



*We rescaled our index on 3/28/2022 to account for higher-than-anticipated peak bottleneck levels

Source: Goldman Sachs Global Investment Research

Exhibit 21: GS Weekly Supply Chain Congestion Scale (High-Frequency Data)

Composite Scale	Fluidity Scale
<101	1
101-192	2
193-284	3
285-376	4
377-468	5
469-560	6
561-652	7
653-745	8
746-837	9
>838	10

Source: Goldman Sachs Global Investment Research

Glossary:

- West Coast container ship backlog:** tracks the number of container ships waiting to dock at the ports of LA and Long Beach; we add the number of ships anchored within 40 miles of the coast to the number of ships slow-steaming to port (AKA: ships loitering farther offshore) to get a better depiction of the true container ship

backlog.

2. **East Coast container ship backlog:** estimates the number of container ships waiting to dock at the East and Gulf Coast ports in the US; based on satellite image data technology (Eikon), we add the number of container ships sitting for at least three days within 140 miles of a US port (accounts for ships to the right of 100 degrees of longitude to account for East Coast).
3. **Intermodal traffic:** tracks Y/Y intermodal carload volume growth for West Coast Class 1 Rails (BNSF and UNP). Accelerating volumes would indicate a more fluid supply chain for our purposes as more goods get moved through the system.
4. **Intermodal velocity:** tracks the average speed of the intermodal railcars (BNSF and UNP).
5. **Intermodal dwell:** tracks the average number of hours an intermodal railcar is idle (i.e., how long the car spends waiting at a terminal).
6. **Chassis dwell:** refers to the average time for chassis waiting on-terminal and on-street.
7. **Rail container dwell:** refers to the number of days a container waits to depart from a rail facility after being unloaded from an ocean carrier.
8. **Container weighted average dwell:** refers to the number of days a container stays at a marine terminal after being unloaded from an ocean carrier and taken off the premises by a truck.
9. **Ocean shipping rates:** refers to the average cost of shipping a container by ocean; we specifically track the cost of shipping from East Asia to the US West Coast via the FBX01 index from Freightos.
10. **Big Three West Coast Ports' inbound loaded containers:** refers to the Y/Y growth that the Big Three West Coast ports (LA, Long Beach, and Oakland) see in inbound loaded containers (i.e., how many more goods are moving through the port versus the same period last year).
11. **PMI manufacturing supplier delivery time index:** readings of 50 indicate no change in delivery times versus the prior month; readings above 50 indicate delivery times improved (faster supply chain) and readings below 50 indicated delivery times deteriorated sequentially (more delayed supply chain). The index is a result of IHS Markit's PMI business survey which asks purchasing managers, "Are your suppliers' delivery times slower, faster or unchanged on average than one month ago?"
12. **China-to-US door-to-door shipping transit time:** sourced from Freightos, this metric tracks the number of days it takes for a good to reach final destination (on average) once an order is placed and accepted (i.e., door-to-door shipping is not necessarily port-to-port as it also captures delivery times from port to final destination).
13. GS Data Works leverages alternative data sources and advanced analysis techniques to create unique data-driven insights across Global Investment Research. GS Data Works analysis (East Coast container ship backlog estimates) provided by Dan Duggan, Ph.D., Aditi Singh, and Parag Agrawal.

Disclosure Appendix

Reg AC

We, Jordan Alliger, Andrzej Tomczyk, CFA and Paul Stoddard, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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GS Factor Profile

The Goldman Sachs Factor Profile provides investment context for a stock by comparing key attributes to the market (i.e. our coverage universe) and its sector peers. The four key attributes depicted are: Growth, Financial Returns, Multiple (e.g. valuation) and Integrated (a composite of Growth, Financial Returns and Multiple). Growth, Financial Returns and Multiple are calculated by using normalized ranks for specific metrics for each stock. The normalized ranks for the metrics are then averaged and converted into percentiles for the relevant attribute. The precise calculation of each metric may vary depending on the fiscal year, industry and region, but the standard approach is as follows:

Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

For a more detailed description of how we calculate the GS Factor Profile, please contact your GS representative.

M&A Rank

Across our global coverage, we examine stocks using an M&A framework, considering both qualitative factors and quantitative factors (which may vary across sectors and regions) to incorporate the potential that certain companies could be acquired. We then assign a M&A rank as a means of scoring companies under our rated coverage from 1 to 3, with 1 representing high (30%-50%) probability of the company becoming an acquisition target, 2 representing medium (15%-30%) probability and 3 representing low (0%-15%) probability. For companies ranked 1 or 2, in line with our standard departmental guidelines we incorporate an M&A component into our target price. M&A rank of 3 is considered immaterial and therefore does not factor into our price target, and may or may not be discussed in research.

Quantum

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Distribution of ratings/investment banking relationships

Goldman Sachs Investment Research global Equity coverage universe

	Rating Distribution				Investment Banking Relationships		
	Buy	Hold	Sell		Buy	Hold	Sell
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