# Inventory Impacts on the 2023 Transportation & Logistics Market

Presented for: STIFEL

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Transportation and Logistics Advisors, LLC

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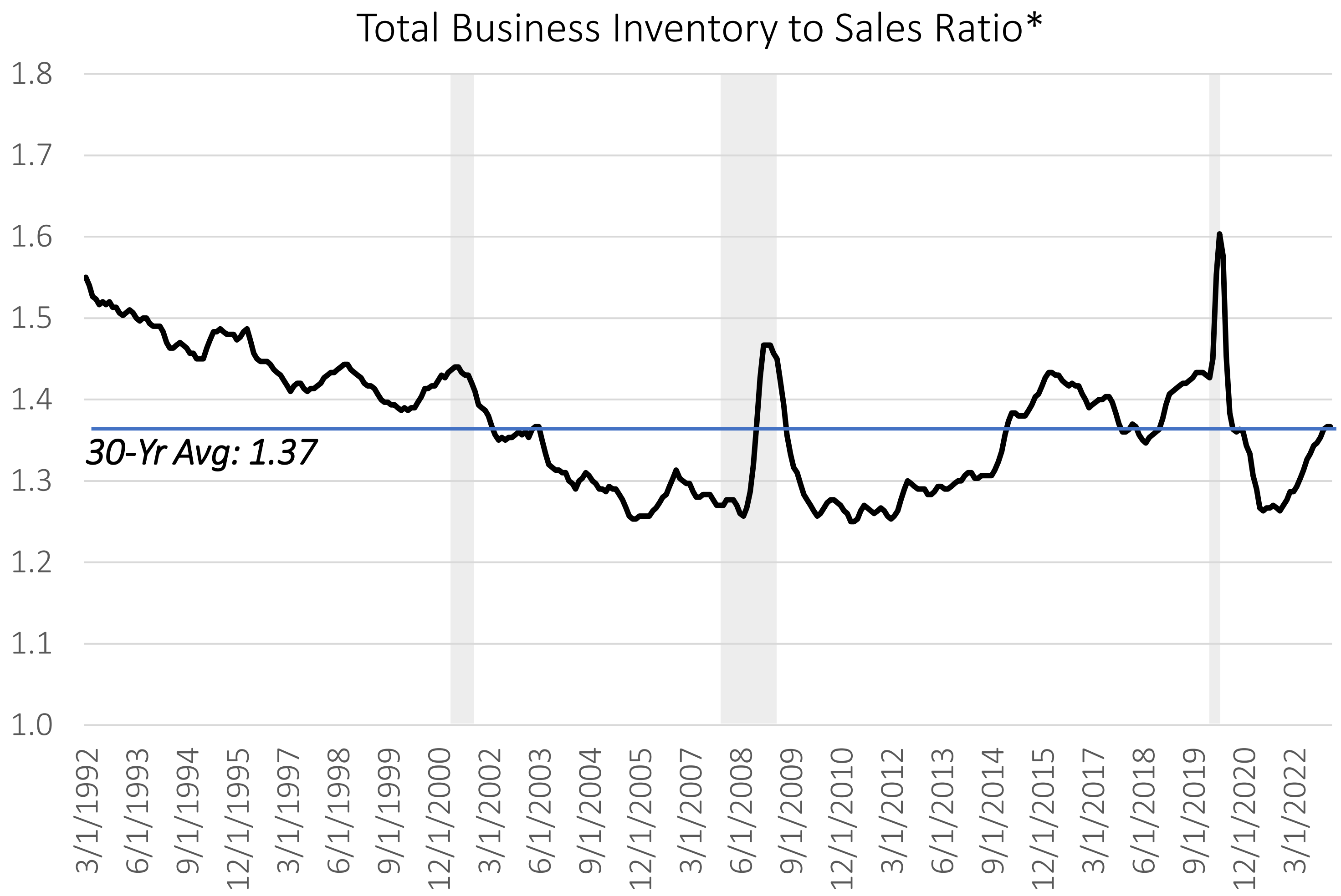
# Inventory levels play a significant role in transportation performance, and is likely to impact 2023 performance

- In the post-COVID world, overall inventory levels have been masking significant differences taking place by component of the supply chain and product category
  - Never before have we witnessed so many divergent inventories trends
  - Traditionally, most inventories went up and down with economic swings
  - But post COVID, inventories in many different sectors have been moving in different directions
- As a result, the modal/service shifts between rail, truckload, less-than-truckload, and parcel have differed greatly for different shippers/receivers/beneficial cargo owners
  - Depending on the markets and customers for a supply chain service provider, and what services they provide, 2023 may be an "interesting year"

# The total inventory to sales ratio is now at the historical average, after a lot of recent volatility

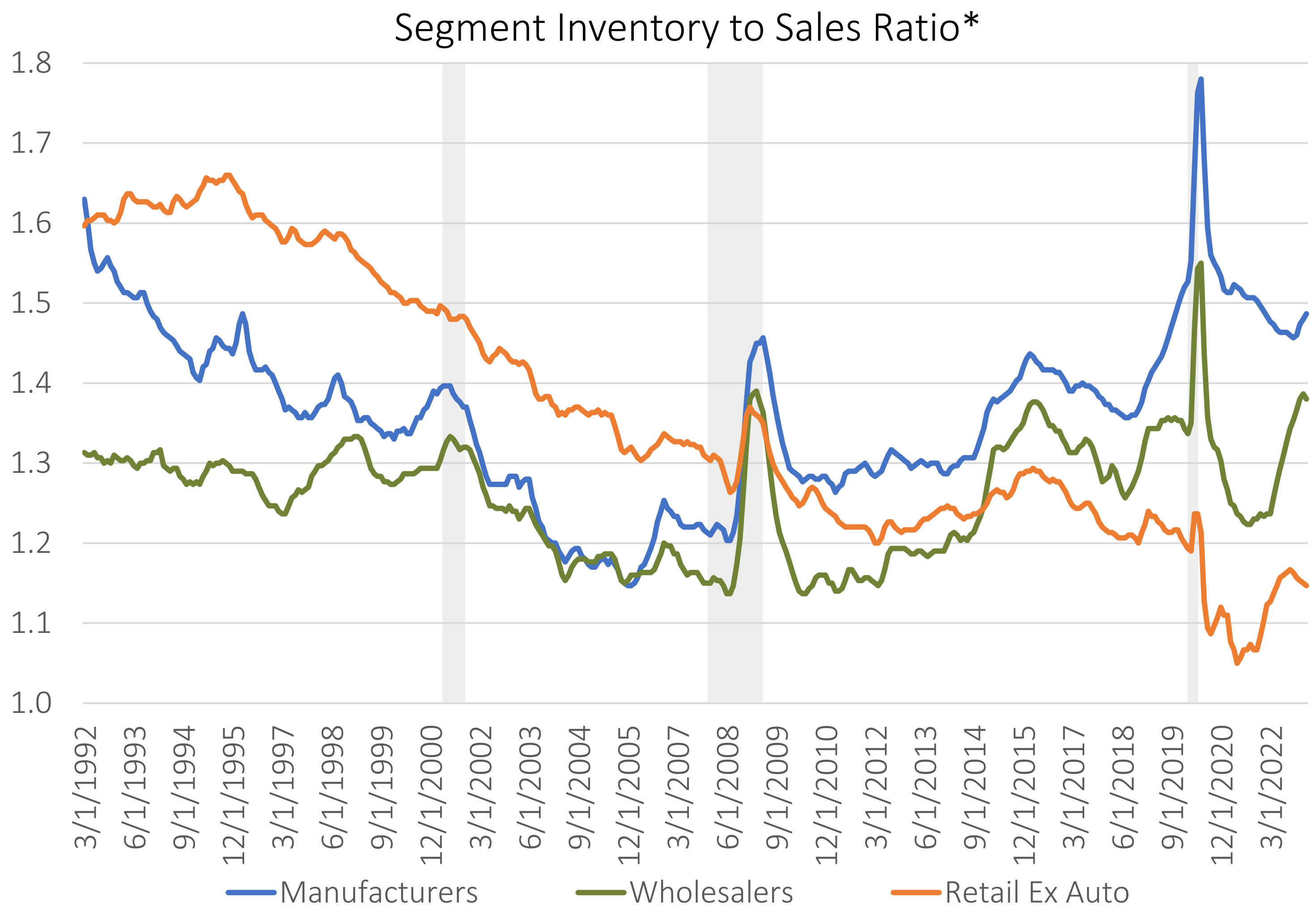
- Long period of declining inventory to sales from 1992 to 2005
- Relatively flat 2005 to the Great Recession at under 1.3
- Following the Great Recession, Ratio flattened out again below 1.3 (2004 – 2014)
- Late 2014  ratio increased and remained elevated until COVID
- COVID ratio bottomed second half of 2021 at 1.26x
- Now back to the “long-term” average




*Rolling 3 months, 1992 – 2/2023
Sources: St. Louis Federal Reserve Bank; US Census Bureau

# 1992 through 2006 inventory to sales ratios for Manufacturers, Wholesalers, and Retailers moved relatively together, but diverged following COVID

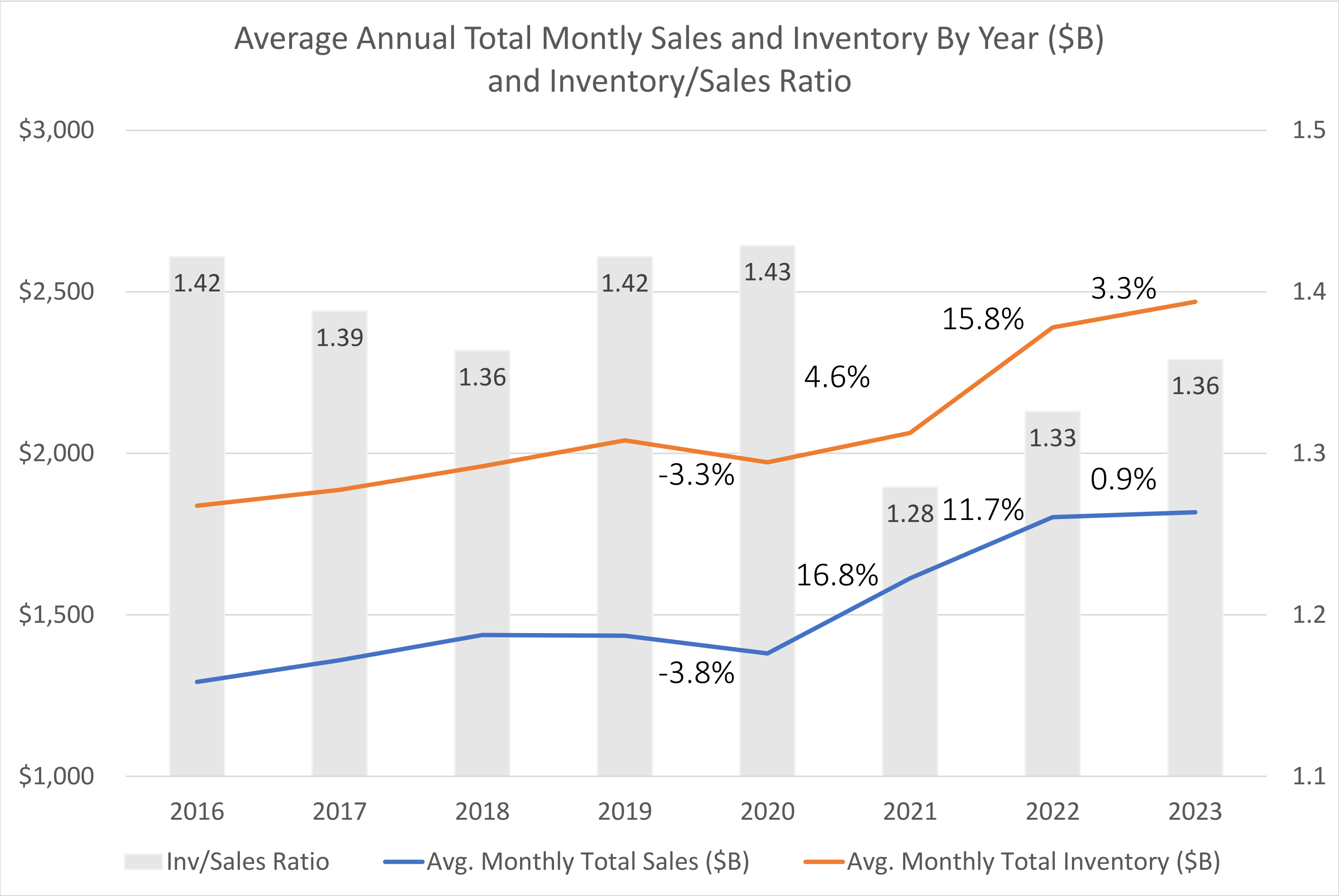
- All segments inventory to sales ratios declined from 1992 through 2006
  - Retailers held the most inventory
  - Manufacturer inventory declined the most
- Coming out of the Great Recession Manufacturer and Wholesaler inventory ratios increased, while Retailers to declined slowly
- Following COVID ratios have diverged




*Rolling 3 months, 1992 – 2/2023
Sources: St. Louis Federal Reserve Bank; US Census Bureau

# In dollar terms, total inventories declined in 2020 and increased at a moderate rate in 2021 despite much higher sales, then grew rapidly in 2022 amid strong sales growth

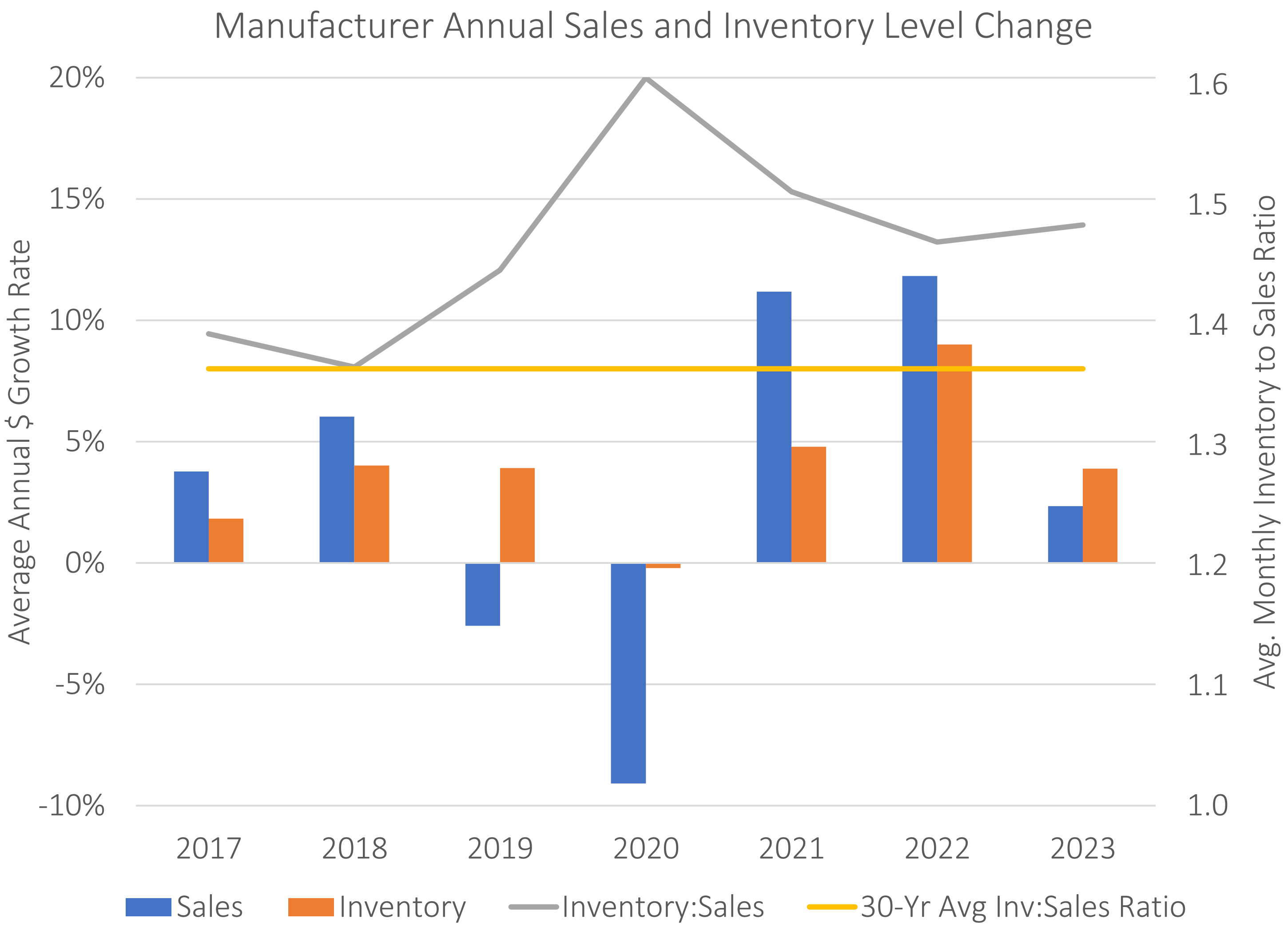
- From 2016 to 2019 average total monthly sales and inventories increased at 3.5%
- In 2020 both average total monthly sales and inventory levels declined by 3 to 4%
- Sales recovered strongly in 2021, up 16.8%, but inventories only increased 4.6%
  - Much lower inventory to sales ratio
  - Headlines about supply chain chaos
- In 2022 inventory growth outpaced even strong sales growth
- In early 2023 sales growth has been about 1%, while inventories are up 3.3%




Sources: St. Louis Federal Reserve Bank; US Census Bureau

# Manufacturer inventory to sales ratio exploded in 2020 before falling back somewhat in 2021 – 2023 at still-elevated levels

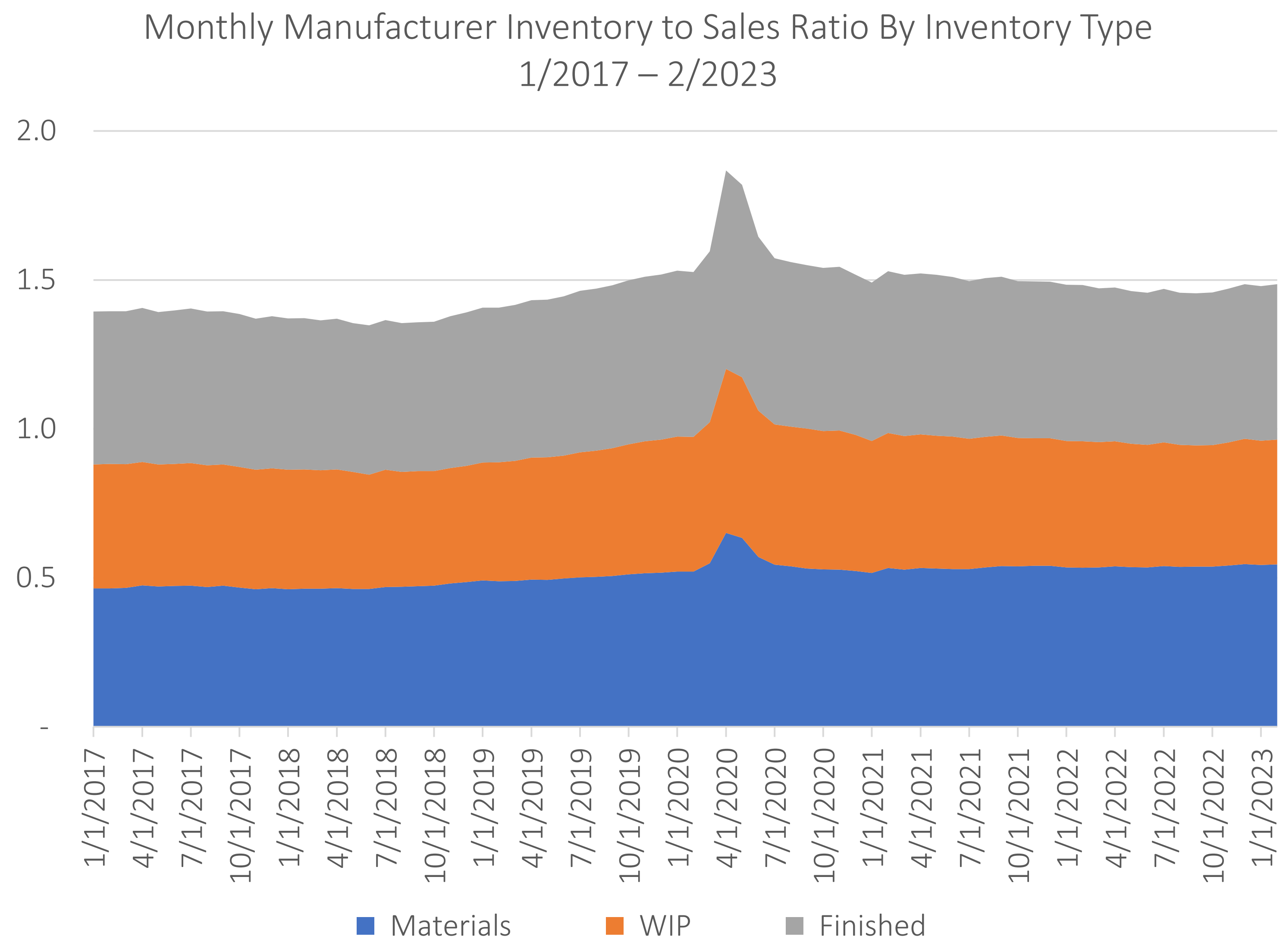
- Manufacturers 2019 inventory to sales ratio was 1.45, well above the 30-year average of 1.36
- Inventories were relatively flat in 2020 despite a 9% decline in sales
  - Inventory ratio rocketed to 1.61, higher than any year since at least 1992
- 2021 and 2022 inventories grew, but slower than sales
  - Inventory ratio declined, but to a still elevated 1.47
- Early 2023 inventories growing more quickly than sales




Sources: St. Louis Federal Reserve Bank; US Census Bureau

# Manufacturer Raw Materials is the driver of the increase in inventory to sales ratio from pre-COVID years

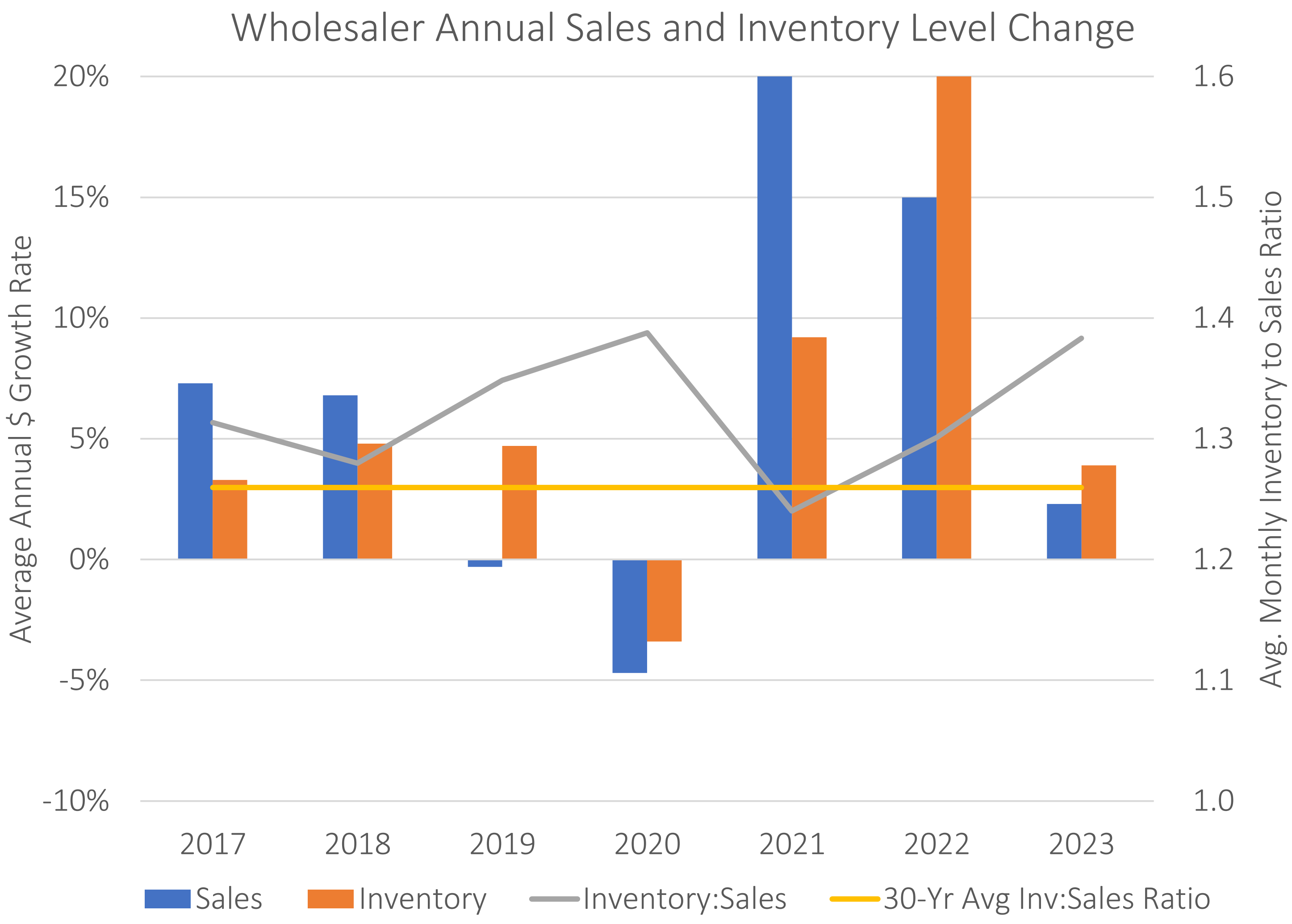
- Materials ratio 2017-2019 averaged 0.48, now at 0.54, a 13% increase
- Work In Process (WIP) ratio 2017-2019 averaged 0.41, and is now at 0.42, a 3% increase
- Finished Goods 2017-2019 averaged 0.52, the same level as in 2023




Sources: St. Louis Federal Reserve Bank; US Census Bureau

# Wholesaler inventory to sales ratio declined sharply in 2021 due to very high sales, but increased in 2022 and early 2023 to above pre COVID levels

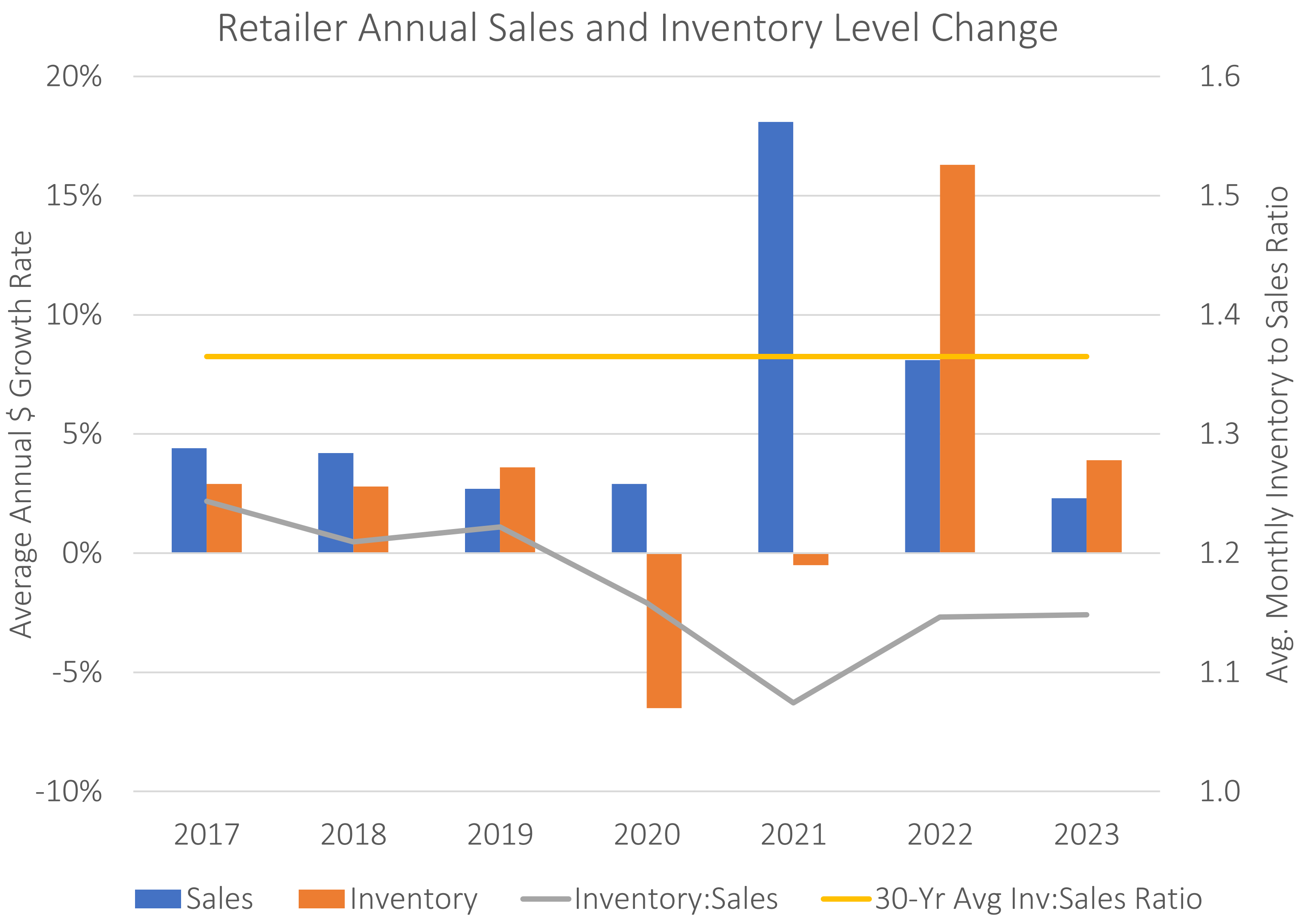
- Wholesalers 2019 ratio 1.35, well above the 30-year average of 1.26
- Inventories declined in 2020 but less than sales
  - Inventory ratio increased to 1.39, higher than any year since at least 1992
- Inventories grew more slowly than sales 2021, but faster in 2022
  - Inventory ratio declined, but to a still elevated 1.30 in 2022
- Early 2023 inventories growing more quickly than sales
  - High 1.38 ratio




Sources: St. Louis Federal Reserve Bank; US Census Bureau

# Retailer inventory to sales ratio fell dramatically in 2020 and 2021, and despite higher inventory levels in 2022 and early 2023, remains near record lows

- Retailers 2019 inventory to sales ratio was 1.22, well below the 30-year average of 1.37
- Inventories declined 6.5% in 2020 despite a 3.5% growth in sales
  - Inventory ratio decreased to 1.16, the lowest on record
- Inventories were flat in 2021 despite sales growth of 18%
  - Inventory ratio declined, to an extremely low 1.07
- 2022 and early 2023 inventories growing more quickly than sales, but the inventory to sales ratio remains low at 1.15




Sources: St. Louis Federal Reserve Bank; US Census Bureau





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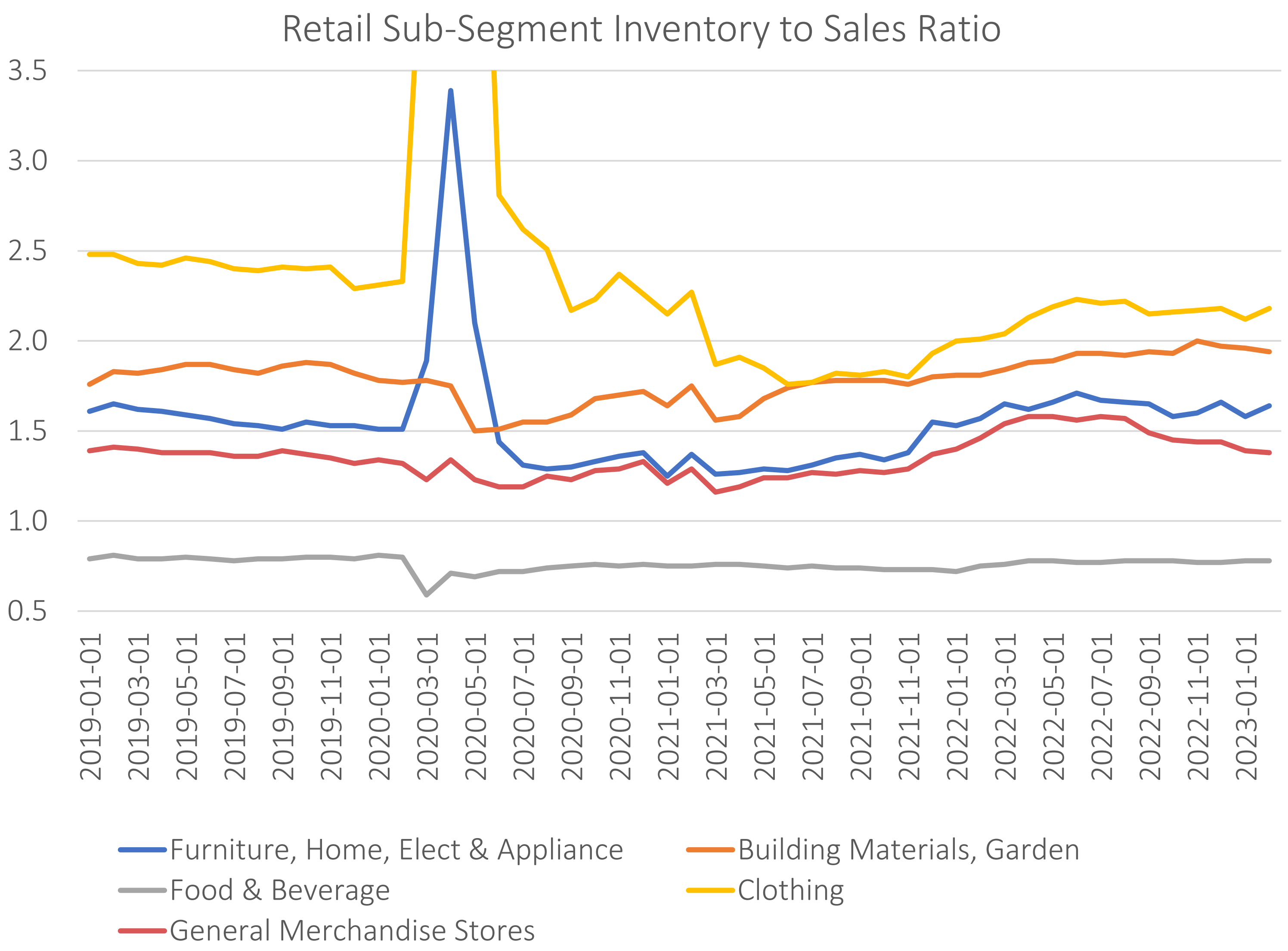
# Retailer sub-segments reached low inventory ratios with COVID, followed by an increase from mid-2021 to mid-2022

- Each sub-segment experienced a decline to historically low levels shortly after COVID hit or within the next 15 months
  - Food/Beverage, Building Materials/Garden, and General Merchandise retailers experienced almost immediate inventory ratio declines
  - Furniture/Home Furnishings/Electronic/ Appliance retailers and Clothing retailers first experienced a spike in inventory rations before their subsequent dip
- Each sub-segment experienced an increase in inventory ratio from mid-2021 through mid-2022 before generally flattening out or in some cases declining




Sources: St. Louis Federal Reserve Bank; US Census Bureau

# Clothing and General Merchandise retailers inventory ratios are lower than their pre-COVID levels, while Furniture/Home and Building/Garden retailers are higher

- Food and Beverage retailers have had low and relatively constant inventory levels over time
  - COVID dip has increased back to long-term average
- General Merchandise retailers are off their inventory peaks of mid-2022 and now below their pre-COVID average
  - Higher than their 2021 levels
- Furniture/Home Furnishings/Electronic/ Appliance retailers are above their pre-COVID average, and up significantly from 9/20-9/21 levels
- Building Materials/Garden retailer inventories are at highs, and have steadily increased from low levels in Summer, 2020
- Clothing retailers have the highest inventory levels among sub-segments, but despite increases over the last 2 years are well below pre-COVID levels

Retailer Sub-Segment Inventory to Sales Ratios

| | 2014-2019 Avg | February, 2023 |
|---|---|---|
| Food/Beverage | 0.79 | 0.78 |
| General Merch | 1.43 | 1.38 |
| Furniture/Home | 1.59 | 1.64 |
| Building/Garden | 1.81 | 1.94 |
| Clothing | 2.44 | 2.18 |

Sources: St. Louis Federal Reserve Bank; US Census Bureau

# There are a number of considerations impacting business' approach to holding inventory

| Considerations | Implications |
|---|---|
| Most supply chain constraints have been worked through | • Reduced need to hold excess stock<br>• Reduced need for premium transportation<br>• Shift back from spot market to contract market |
| Higher interest rates | • Increased cost of holding inventory<br>• Increased finance cost for capital equipment |
| COVID showed how JIT resulted in stock-outs | • Shift from "just in time" to "just in case"<br>• Interest rates may shift back<br>• Shift to balance supply chain risk with cost |
| Recessions typically results in a jump in the inventory to sales ratio as sales contract | • But this time we are not starting at "normal"<br>• Moving back to "normal" from "low" for Retailers, from "high" for Manufacturers and Wholesalers this time |
| Shift to eCommerce results in the need for additional facilities, and higher inventory levels | • eCommerce will continue to fragment inventories |

# Impacts on Transportation

- Manufacturer raw materials elevated inventories may impact “Upstream” transportation volumes as inventory levels normalizes
  – Biggest impact on bulk and rail?
  – Offset being increased bulk exports due to lower dollar as economy weakens?
- Shipment volumes to retailers could stabilize due to stable but relatively low inventory levels (unless a recession), but depends on sub-segment
  – Transport demand likely to move with the economy
- Higher inventory results in less expedited transportation
  – Decreased air freight, express parcel
- Higher inventory results in fewer, larger, slower shipments with a lower cost/lb.
  – Favors barge vs. rail, intermodal vs. truckload, truckload vs. LTL, and LTL vs. parcel
  – Offset being high interest rates that favor small more frequent shipments?

# Impacts on Warehousing

- Overall warehousing demand unlikely to have "bottom fall out"
  - Dampened due to multi-year commitments and need for "buffer space"
  - Sales growth may dampen swings
  - Lower sales can result in more storage space required
- Slow down in need for storage space to support Manufacturers and Wholesalers
  - May be mitigated by any re-shoring
- Retailer warehousing could be relatively stable/strong
  - It is unlikely that Retailer inventory to sales ratio will decline much from current levels
  - Any increase in the ratios has to be stored someplace
  - eCommerce will continue to provide demand for Retailer warehousing

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