



ITR ECONOMICS
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Calculate to Win

Presented by ITR Economics
President
Alan Beaulieu, PhD

	Duration	Accuracy *
US GDP (September)	18	98.8%
US Ind. Production (November)	18	98.9%
Europe Ind. Production (October)	23	99.5%
Canada Ind. Production (September)	24	99.9%
China Ind. Production (November)	16	98.3%
Retail Sales (November)	13	97.6%
Housing - Single Family (November)	17	84.8%
Employment-Private Sector (November)	13	98.7%

* Projected for year end

ITR Economics provides the best economic intelligence to reduce risk and drive practical and profitable business decisions.



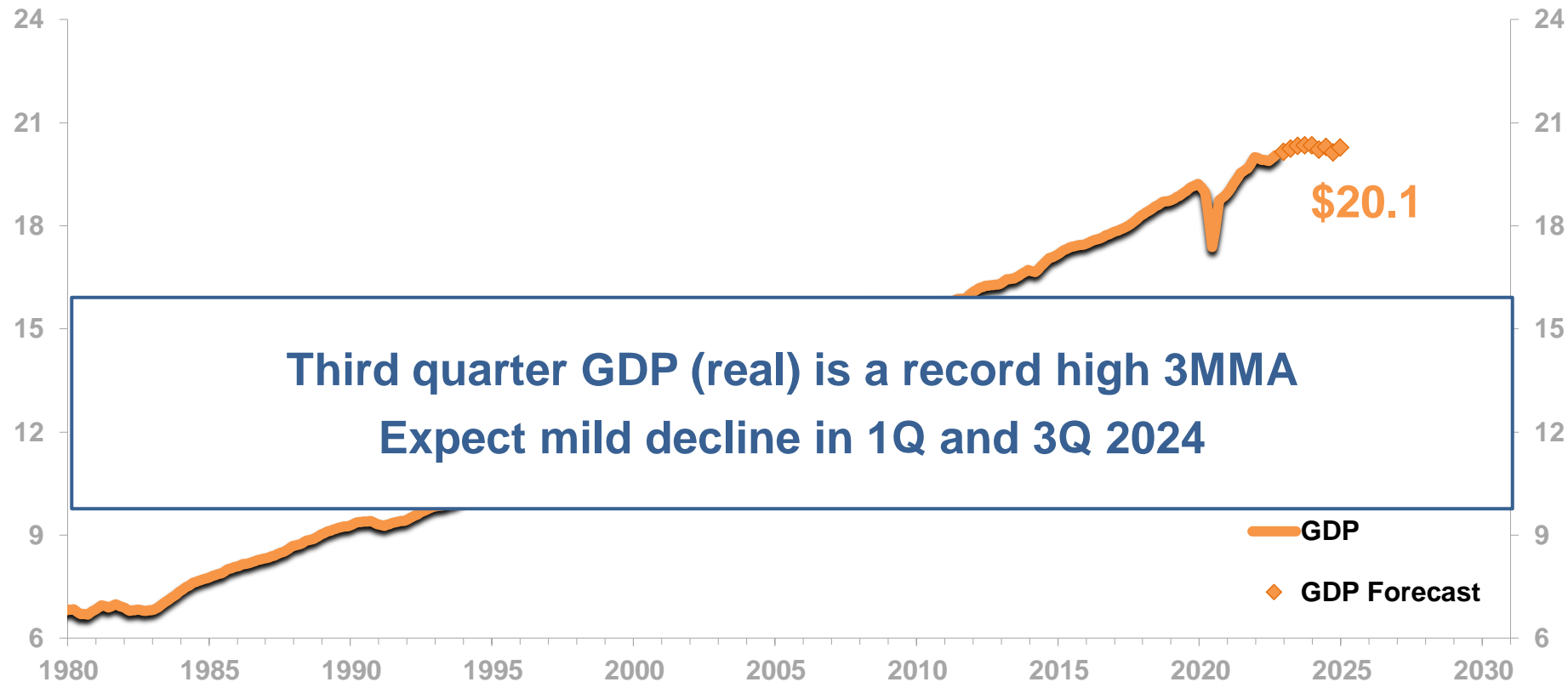
The US Economy

Expect An Essentially Flat/Mildly Positive 2024

Source: BEA

US Real Gross Domestic Product

Quarterly Data Trends: Trillions of Chained 2012 Dollars



A Powerful Management Tool • Rates-of-Change

	Raw	3MMT	3/12	12MMT	12/12
Dec-20	5.399				
Jan-21	4.942				
Feb-21	4.803	15.1			
Mar-21	6.035	15.8			
Apr-21	5.850	16.7			
May-21	5.756	17.6			
Jun-21	6.216	17.8			
Jul-21	5.982	18.0			
Aug-21	6.075	18.3			
Sep-21	6.208	18.3			
Oct-21	6.279	18.6			
Nov-21	6.366	18.9		69.9	
Dec-21	6.524	19.2		71.0	
Jan-22	6.063	19.0		72.2	
Feb-22	6.001	18.6	22.7%	73.4	
Mar-22	7.406	19.5	23.4%	74.7	
Apr-22	6.904	20.3	21.7%	75.8	
May-22	7.162	21.5	21.7%	77.2	23.0%
Jun-22	7.501	21.6	21.0%	78.5	22.4%
Jul-22	6.697	21.4	19.0%	79.2	21.5%
Aug-22	7.228	21.4	17.3%	80.3	21.0%
Sep-22	7.056	21.0	14.9%	81.2	20.2%
Oct-22	7.014	21.3	14.7%	81.9	19.5%
Nov-22	6.896	21.0	11.2%	82.5	17.9%

3/12

Based on data from a consecutive 3-month period compared to one year earlier.

Anticipates shifts in business cycle trends.

12/12

Based on data from a consecutive 12-month period compared to one year earlier.

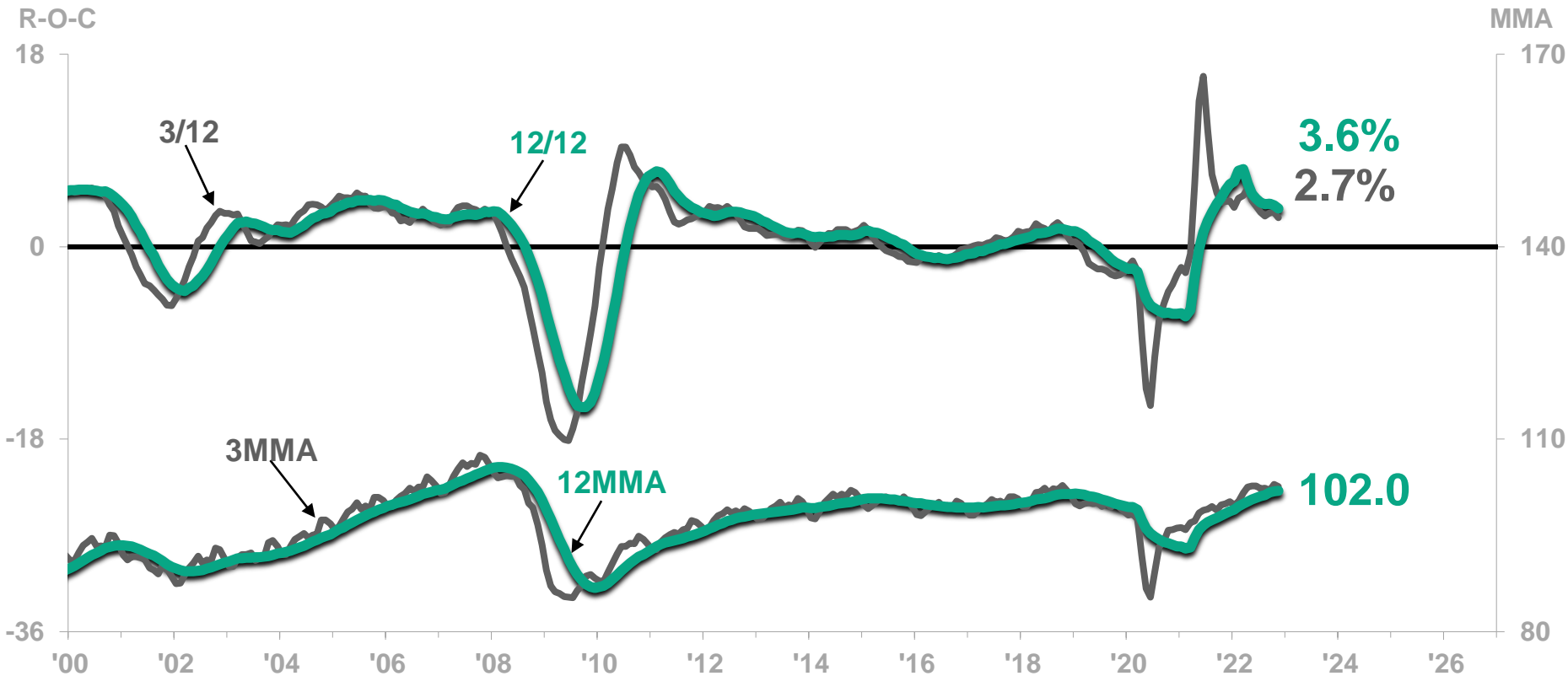
Defines the business cycle.

Expect Mild Decline Late in 2023

Source: FRB

US Total Manufacturing Production Index

2017 = 100



A Clear Signal of Downside Cyclical Pressure

Sources: FRB, ITR Economics

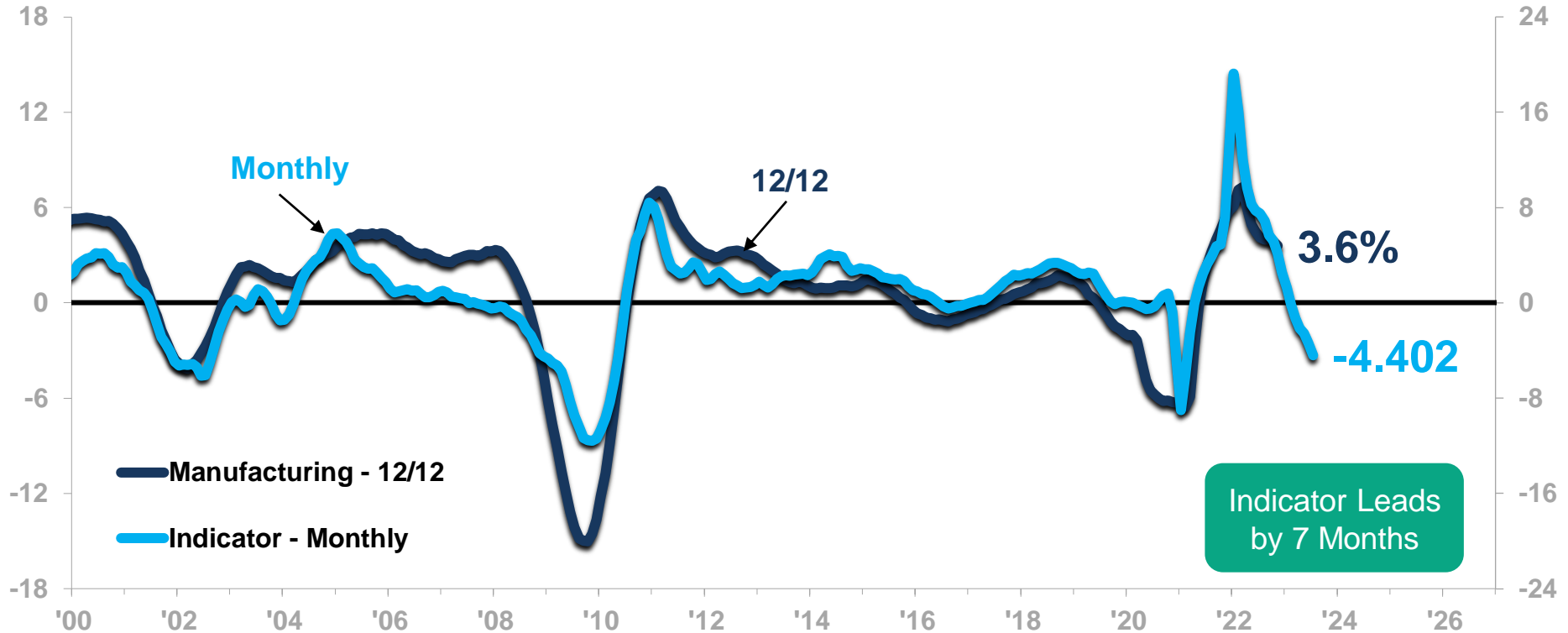


US Total Manufacturing Production Index to ITR Leading Indicator™

Rates-of-Change

Manufacturing

Indicator





Macroeconomic Implications of the Inverse Yield Curve

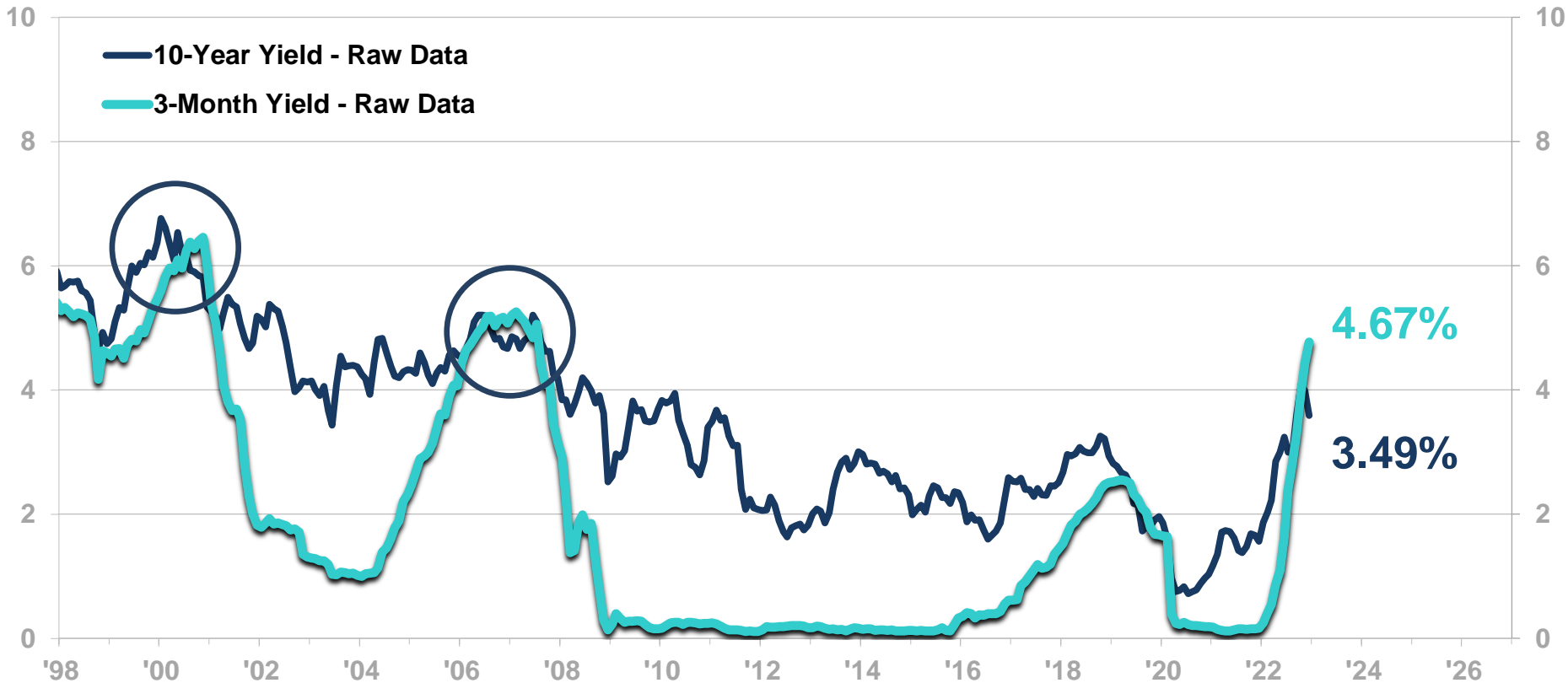
Inverse Yield Curve in Place: Business Cycle Decline Ahead Source: US Treasury Dept.

US Government Long-Term Bond Yields to US 3-Month Treasury Bond Yield



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Raw Data: Percent



Faster-Than-Normal Ascent in Mortgage Rates

Sources: WSJ, Freddie Mac

US Federal Funds Target Rate to US 30-Year Conventional Mortgage Rate

Raw Data Trends, Percent



Federal Funds

Mortgage Rate



Decelerating Rise Through Sep 2023

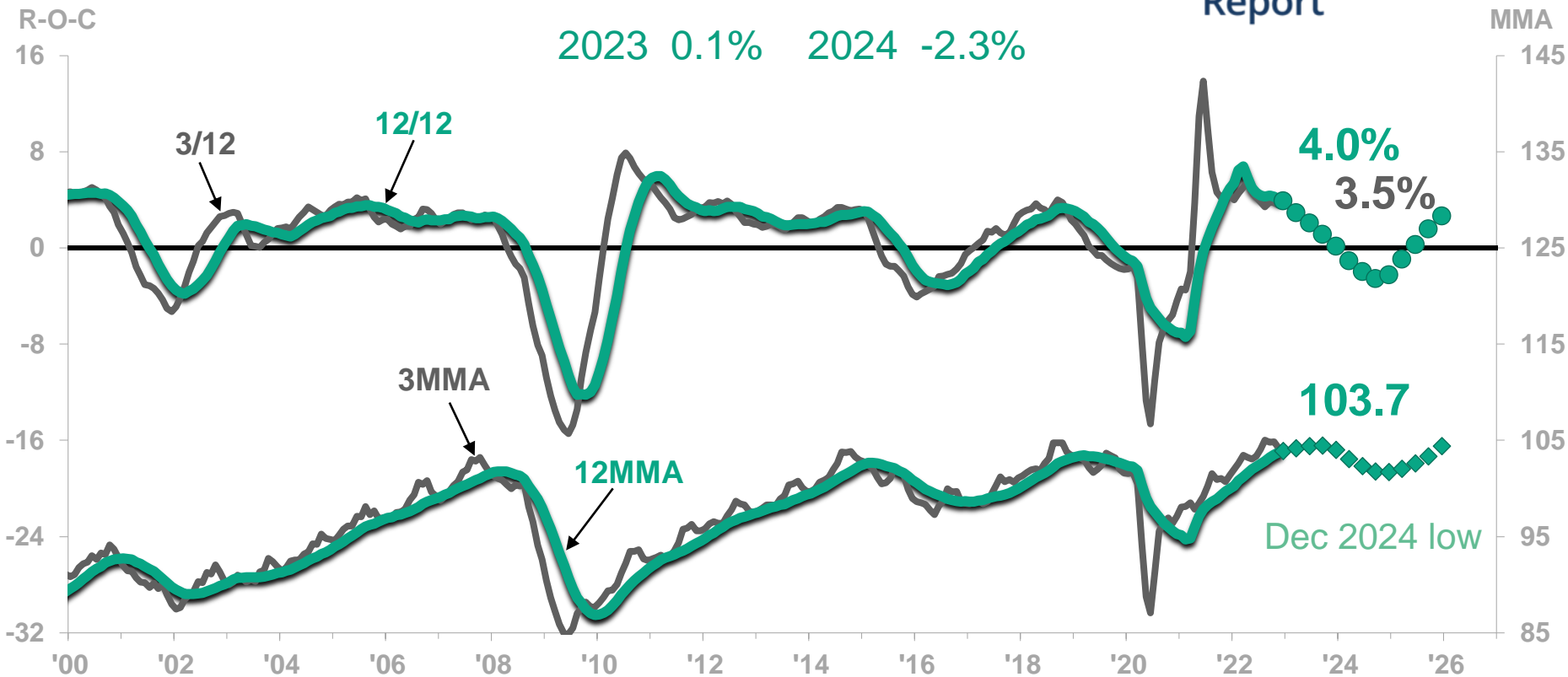
Source: FRB

US Industrial Production Index

2017 = 100

as seen in
ITR Economics'
**Trends
Report**


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Note The Relative Resilience of High-Tech

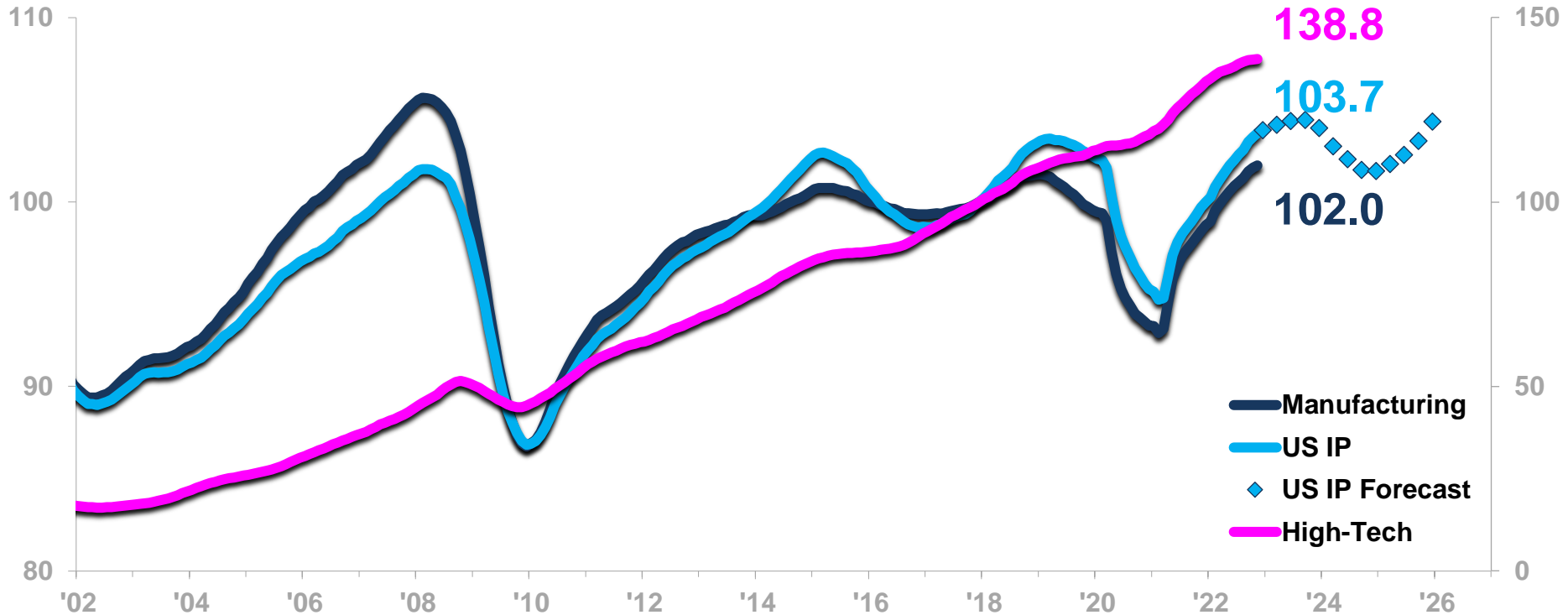
Source: FRB

US Industrial Production Index to US High-Technology Industries Production Index to US Total Manufacturing Production Index



Annual Data Trends: 2017 = 100

Manufacturing, US IP

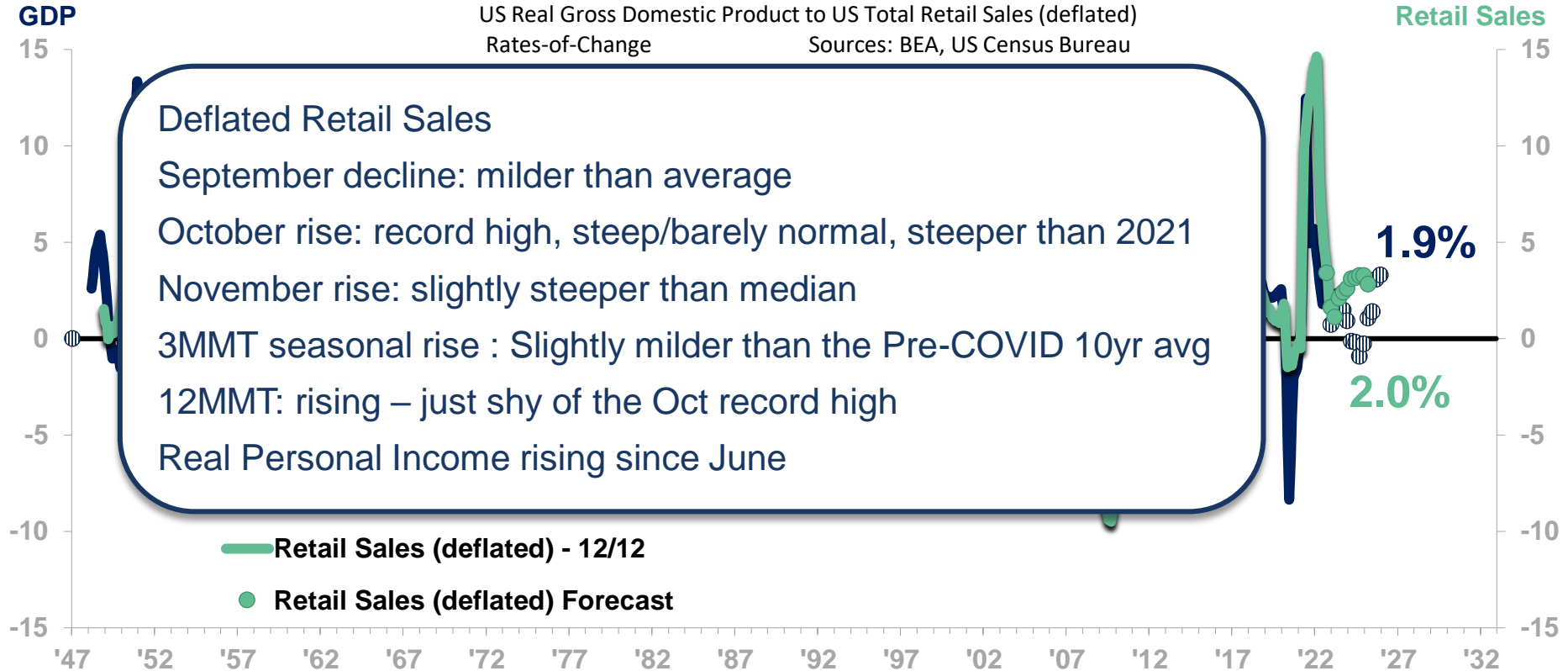


Retail Sales Deflated Bodes Well For The Economy

Source: US Census Bureau, BEA

US Total Retail Sales (deflated) to US Real Gross Domestic Product

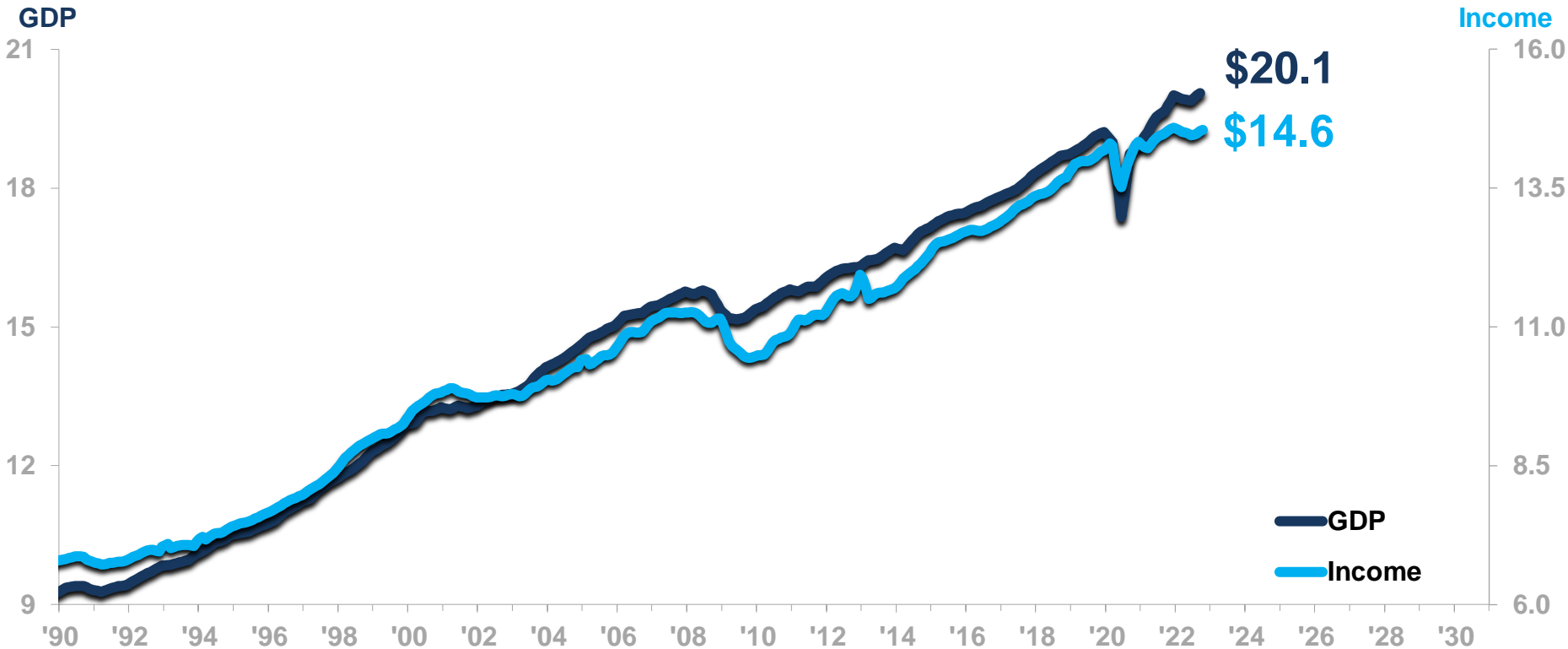
Rates-of-Change



Important That Wages Go Up Slightly Faster Than Inflation

Source: BEA

US Real Gross Domestic Product to
US Real Personal Income (excluding current transfer receipts)
Quarterly Data Trends



Able to Service the Debt Loads Going Into 2023

Source: FRBNY, FRB, BEA

US Profits and Delinquency Rates



Monthly

Notes

Auto Loan Delinquency

3.89%

Five year low

Credit Card Delinquency

2.07%

Pre-Covid 10yr avg 2.76%

Residential Delinquency (>90 days)

1.80%

Lowest in 15.5 years

Domestic Nonfinancial Profits

\$2.09T

Record high

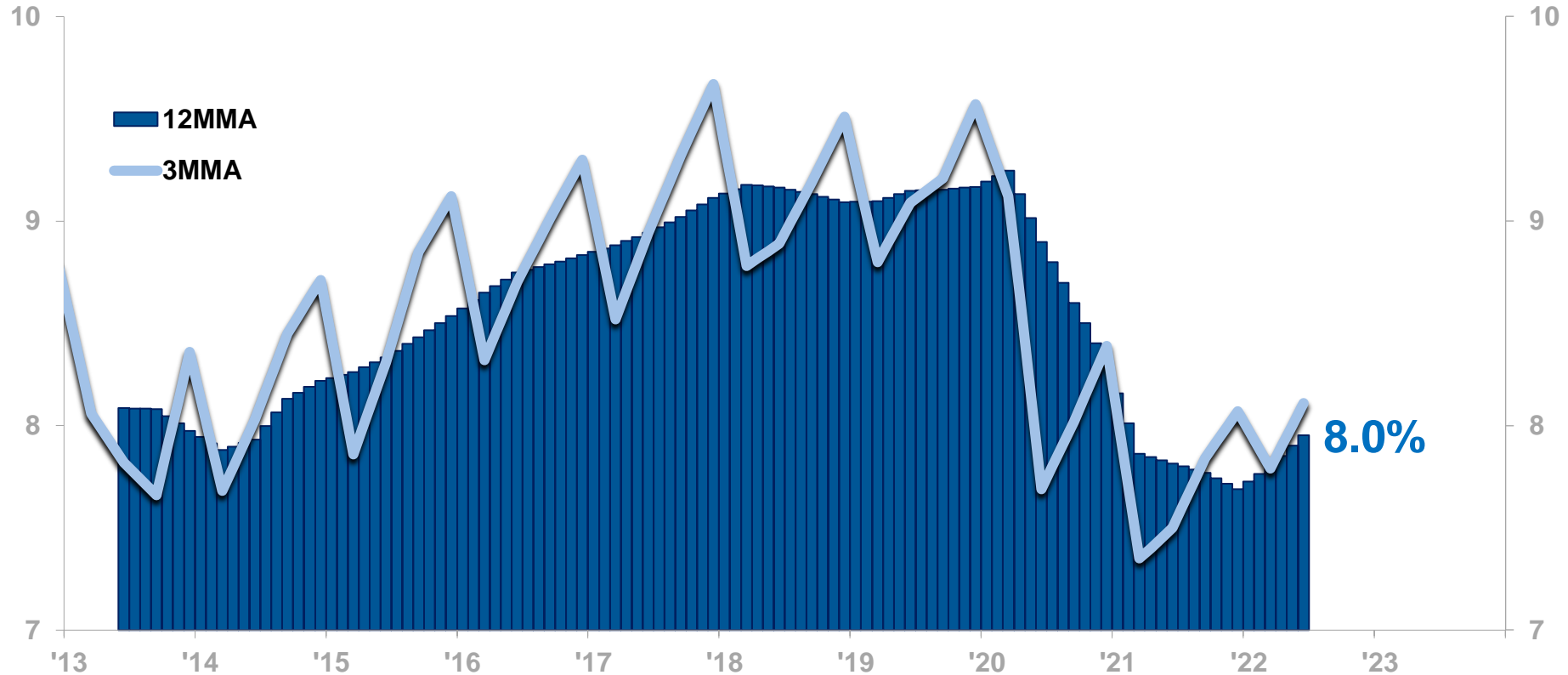
Handling the Monthly Payment


Source: FRB Philadelphia

US Share of Consumer Credit Card Accounts Making the Minimum Payment



Percent



-  **Consumer financial health is good with incomes rising**
-  **Businesses are profitable and liquidity is high**
-  **Inverse Yield Curve is signaling decline for 2024**

Next Steps

- **Listen to your numbers and relevant leading indicators.**



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Financial Markets

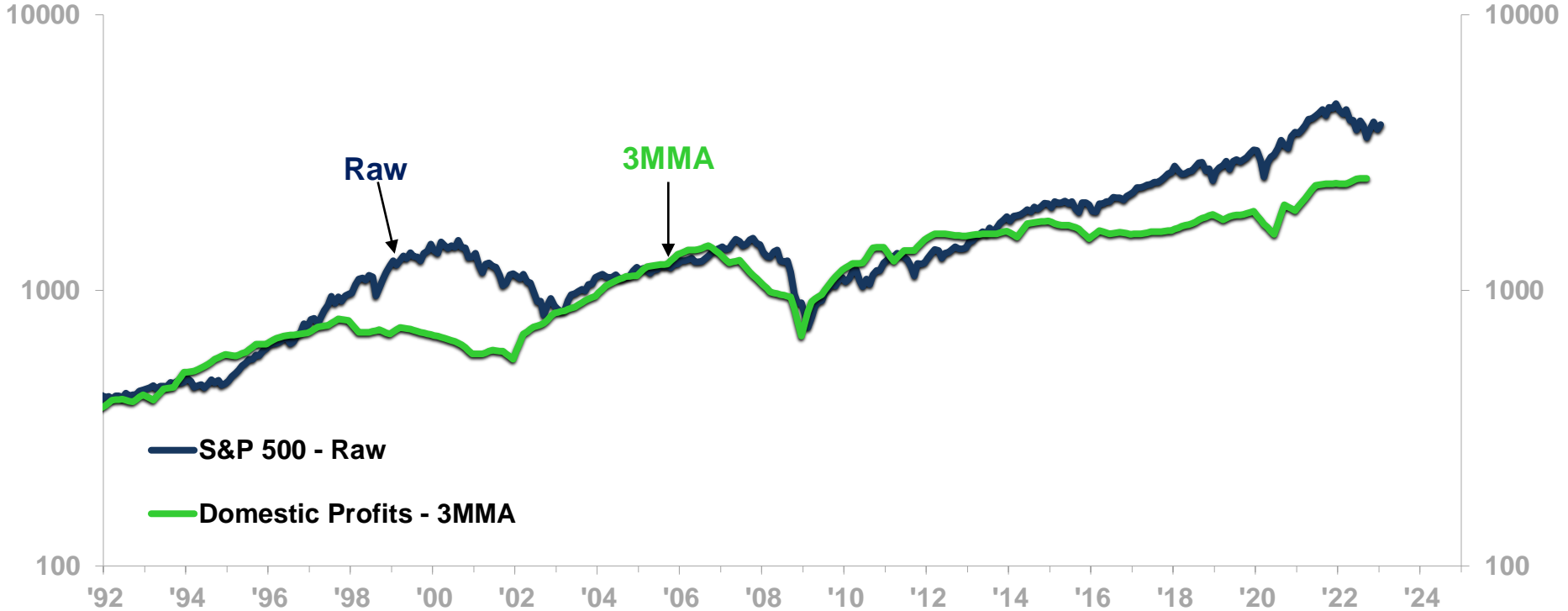


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US Stock Prices Index to US Domestic Corporate Profits with Capital Consumption Adjustments Data Trends

SP5



50/50 Blend Optimizer (50% A, 50% B) Oct 1, 2020 through December 30, 2022

50/50 Blend Optimizer is made up of 50% Optimizer A, and 50% Optimizer B





Inflation Trends

Oil Prices Decline Plays a Role in PPI Decline

Sources: BLS, EIA

US Producer Price Index to US Crude Oil Spot Prices

Rates-of-Change



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PPI

18

12

6

0

-6

-12

- PPI - 3/12
- ⊙ PPI Forecast
- Oil Prices - 12/12
- Oil Prices - Forecast

3/12

12/12

Oil Prices Lead
by 2 Months

Oil Prices

120

90

60

30

0

-30

-60

11.1%

39.4%

'90 '92 '94 '96 '98 '00 '02 '04 '06 '08 '10 '12 '14 '16 '18 '20 '22 '24 '26

Other Commodities Are Declining Also

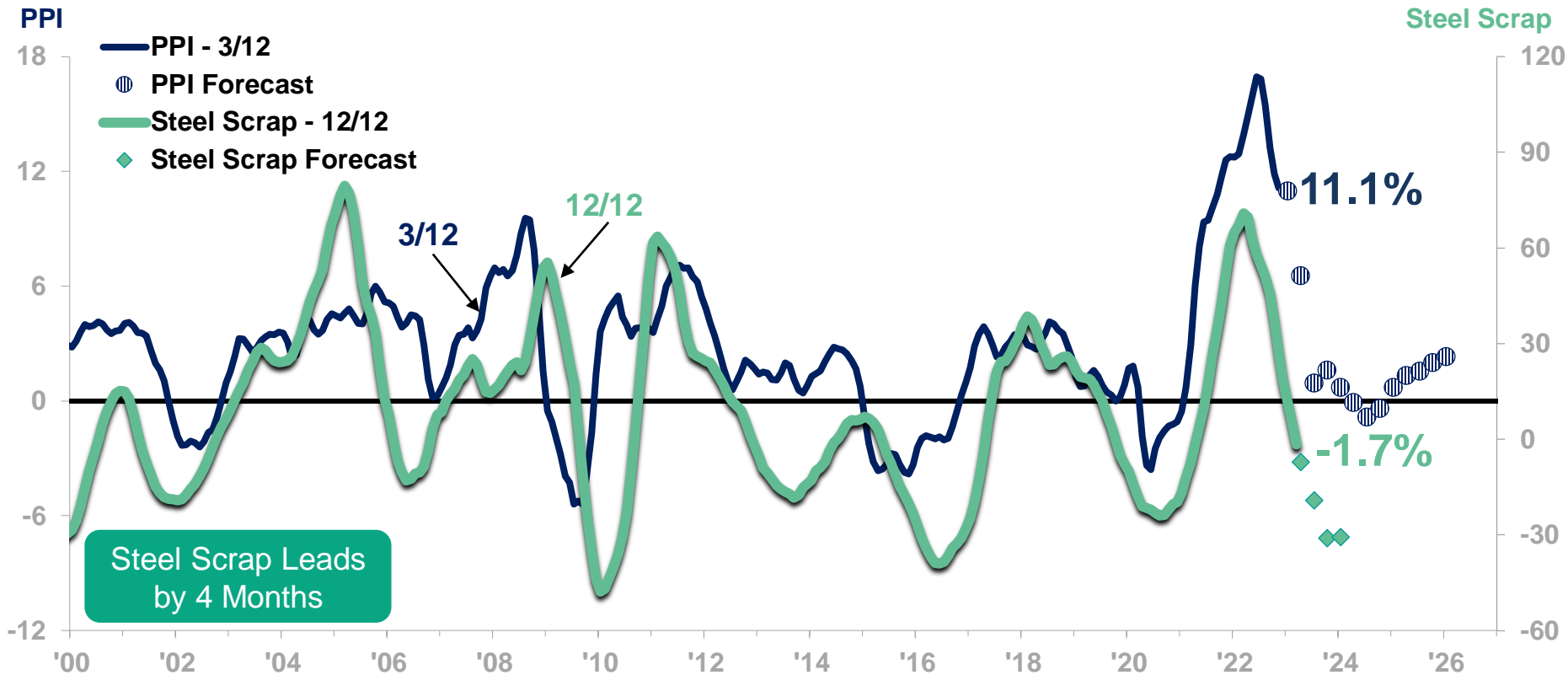
Source: BLS

US Producer Price Index to US Steel Scrap Producer Price Index

Rates-of-Change



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Added Help From Easing Supply Chain Pressures

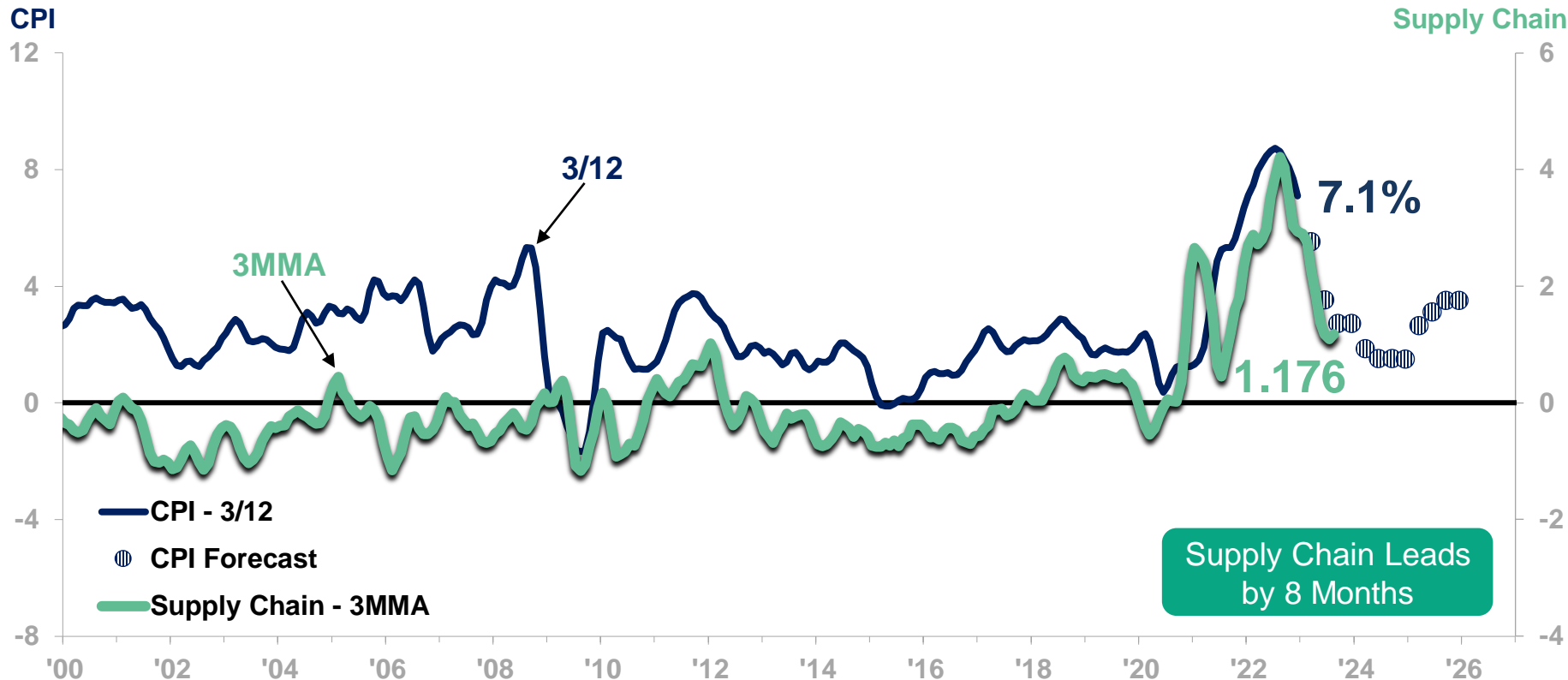
Sources: BLS, Federal Reserve Bank of New York Liberty Street Economics



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US Consumer Price Index to Global Supply Chain Pressure Index

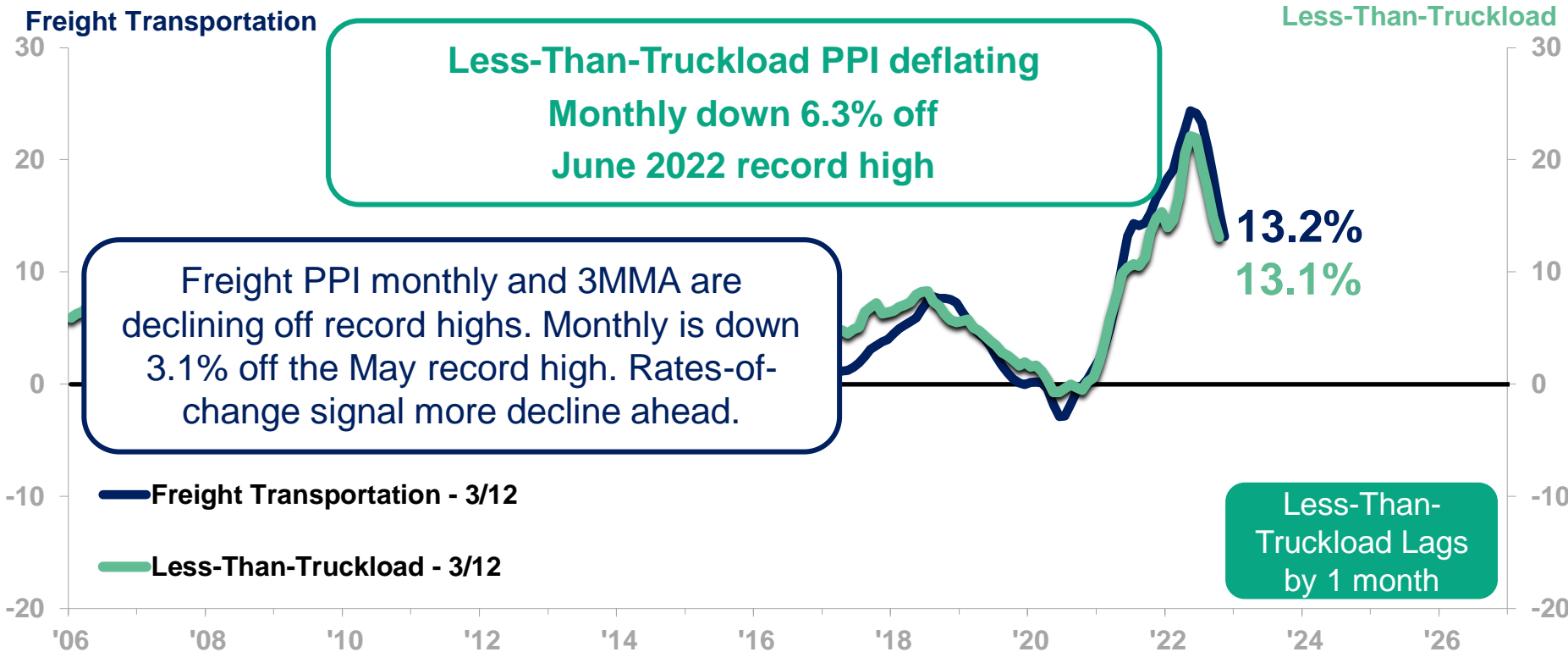
CPI: 3/12 Rate-of-Change, Supply Chain: Quarterly Data Trends



Downward Cyclical Pressure in LTL As Well

Source: BLS

US Truck Transportation of Freight Producer Price Index to
US Long Distance General Freight Trucking Less-Than-Truckload Producer Price Index
3/12 Rates-of-Change



Expect a Mild Decline in 2023

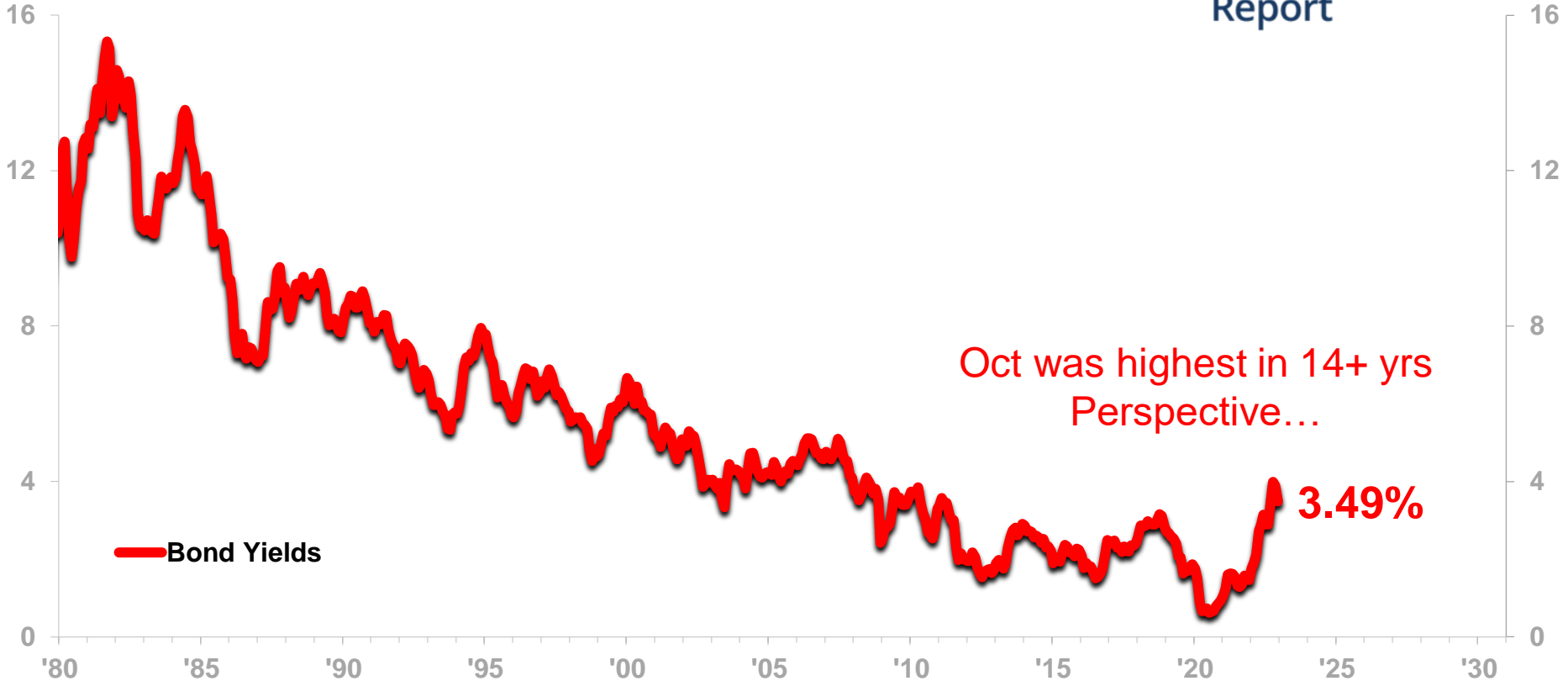
Source: FRB

US Government Long-Term Bond Yields

Raw Data, Percent

as seen in
ITR Economics'
**Trends
Report**


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Manufacturing Is Interest Rate Sensitive

Source: FRB

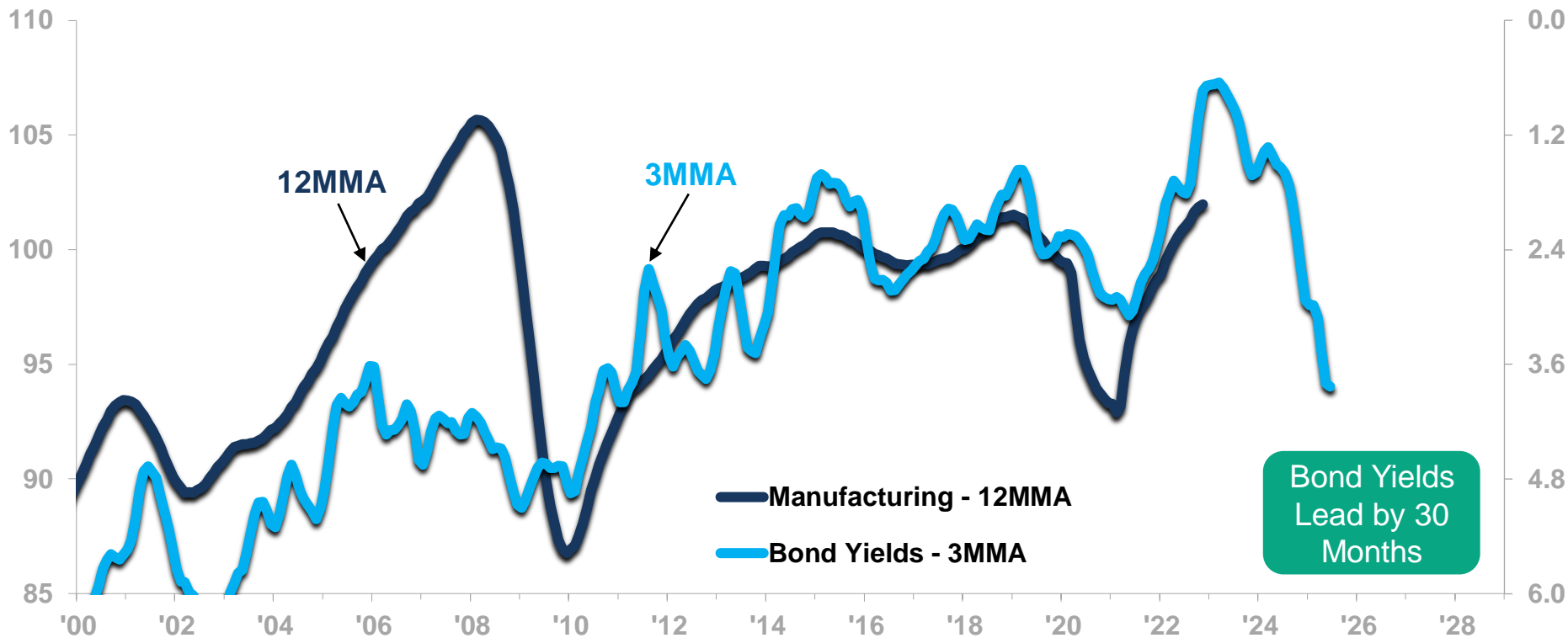
US Total Manufacturing Production Index to US Government Long-Term Bond Yields



Data Trends

Manufacturing (2017=100)

Bond Yields (Percent) , Inverted



New Orders Are Generally Interest Rate Sensitive

Sources: US Census Bureau, FRB

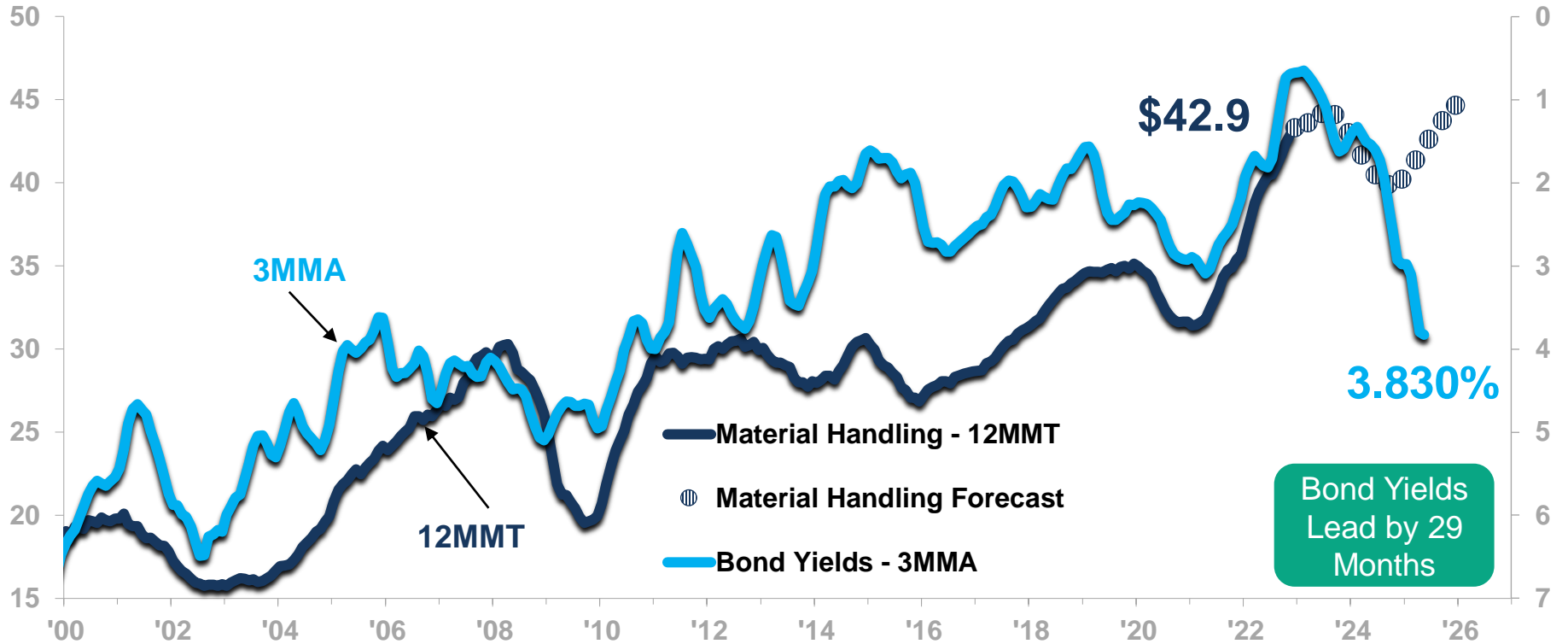
US Material Handling Equipment New Orders to US Government Long-Term Bond Yields



Data Trends

Material Handling (Bil. \$)

Bond Yields (Percent)



Robotics Shipments Show Interest Rate Sensitivity

Sources: A3, FRB

North America Value of Robotics Shipments to US Government Long-Term Bond Yields

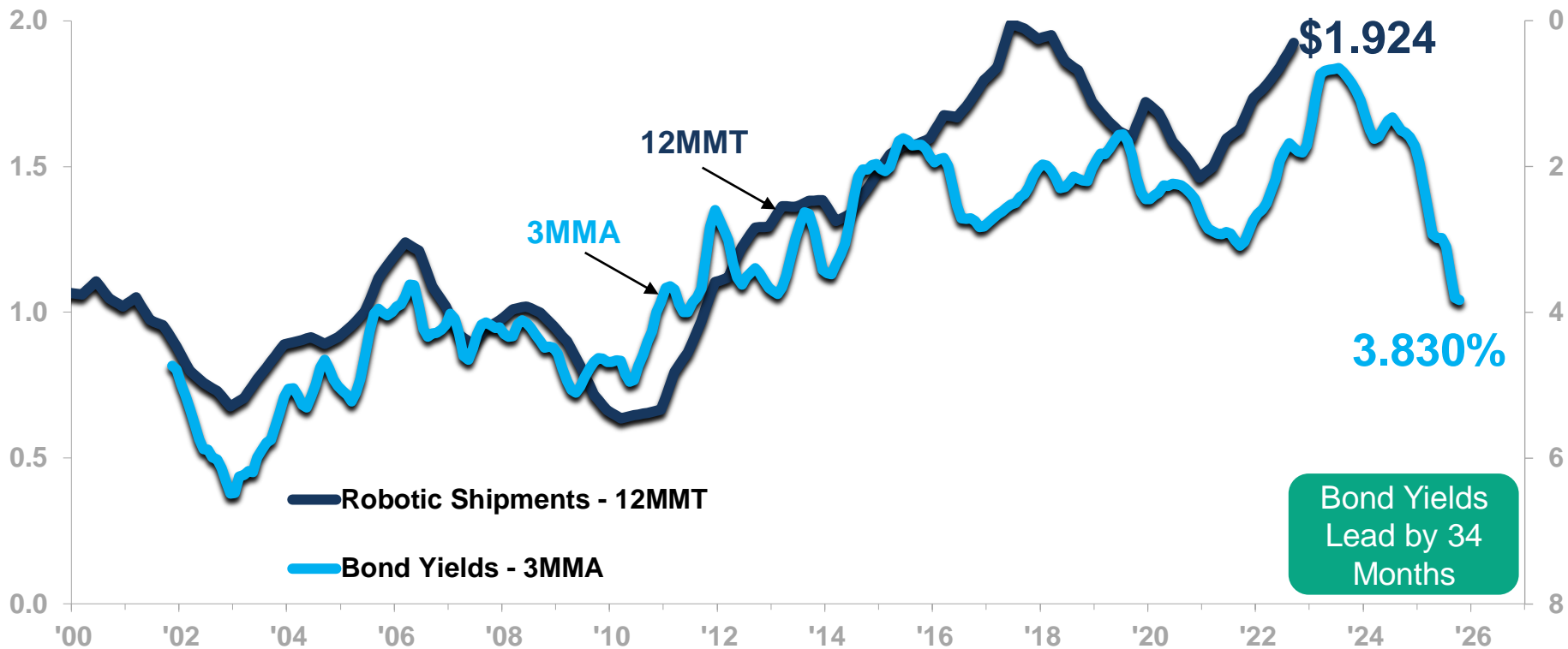


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Data Trends

Robotic Shipments (Bil. \$)

Bond Yields (Percent)



 Supply chain pressures easing as global growth slows

 Plan on disinflation and actual deflation in some areas

 Expect long-term interest rates to temporarily ease lower in 2023

Next Steps

- Inflationary pressures are abated – not gone



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Labor



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Decelerating Rise Anticipated for 2023

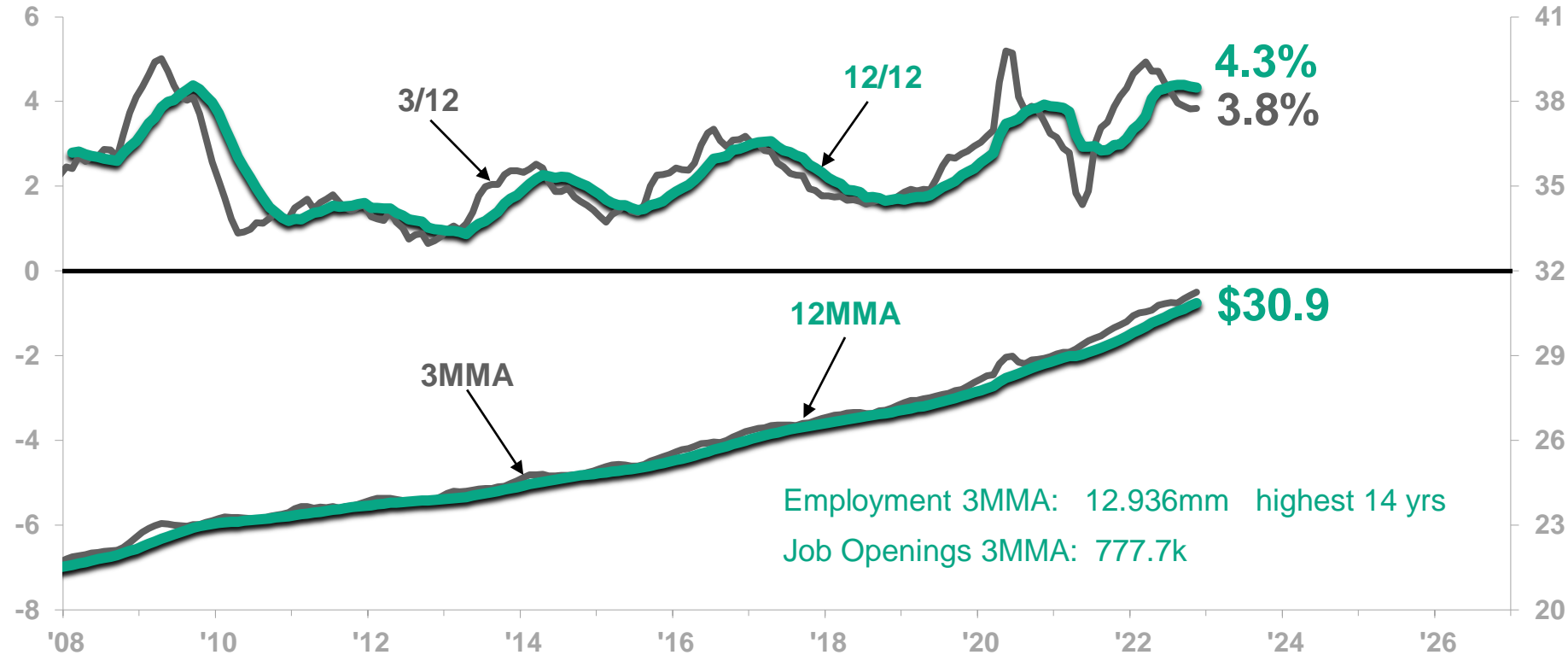
Source: BLS

US Manufacturing Employees Average Hourly Earnings

Dollars



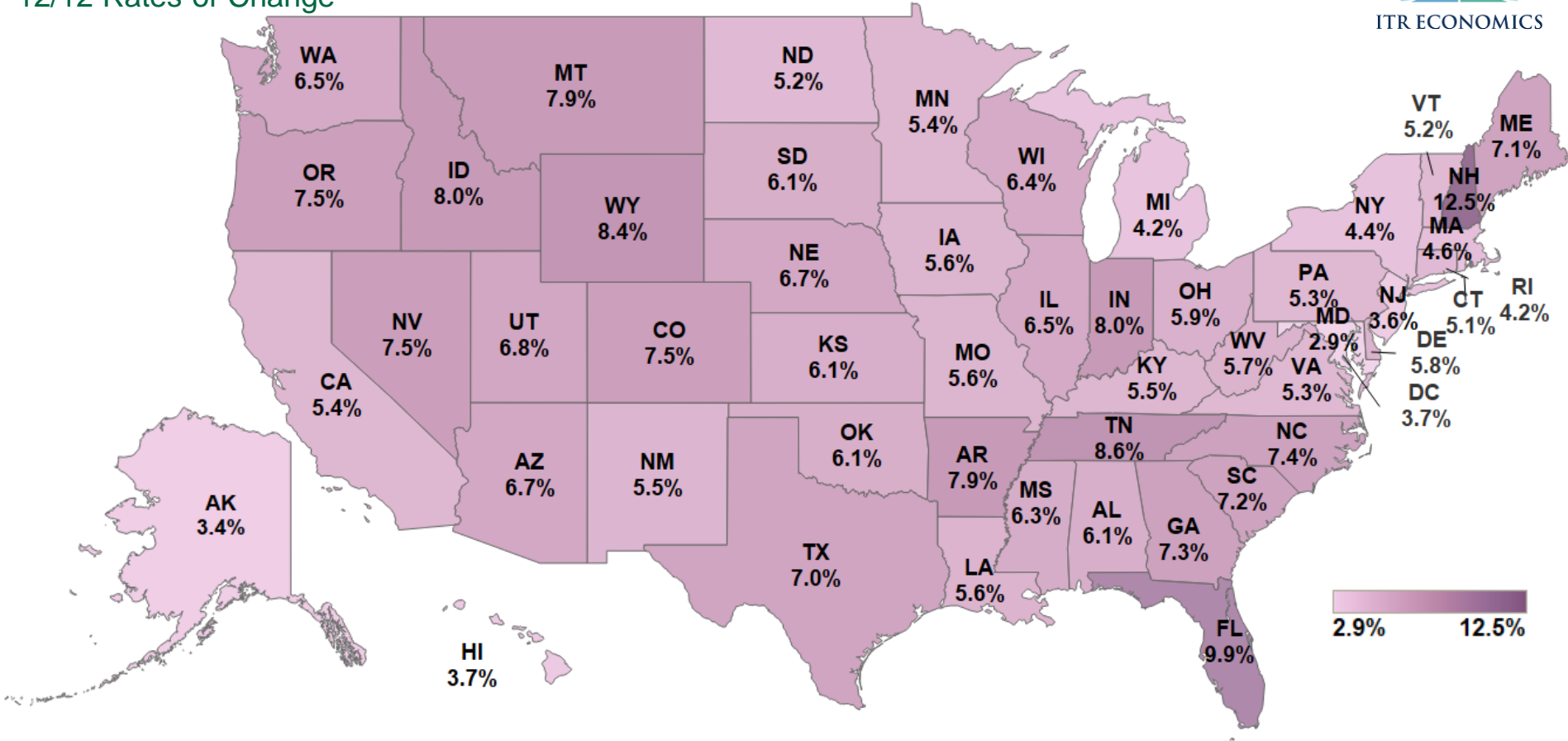
R-O-C



US Wage Inflation by State


Source: BLS

12/12 Rates-of-Change



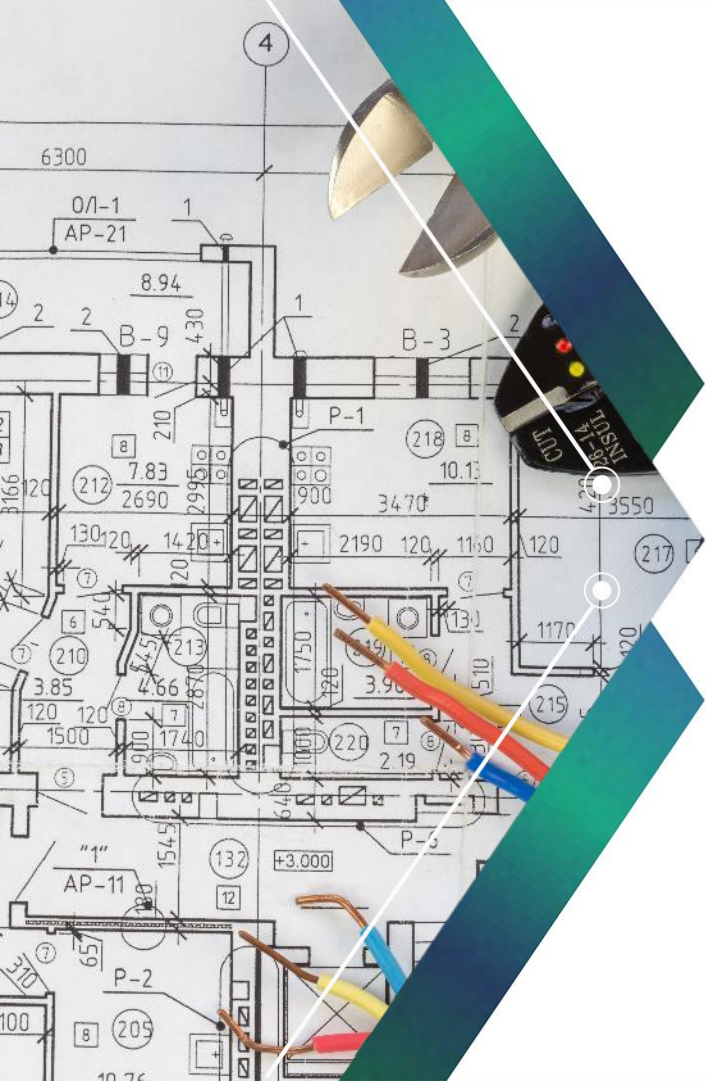
 **Disinflation on wages in 2023**

 **Tight labor market for years**

 **Weakening economic conditions means employees become more likely to stay.**

Next Steps

- **Years of opportunity for automation**



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Industry Segments



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Mild Decline Likely in 2024

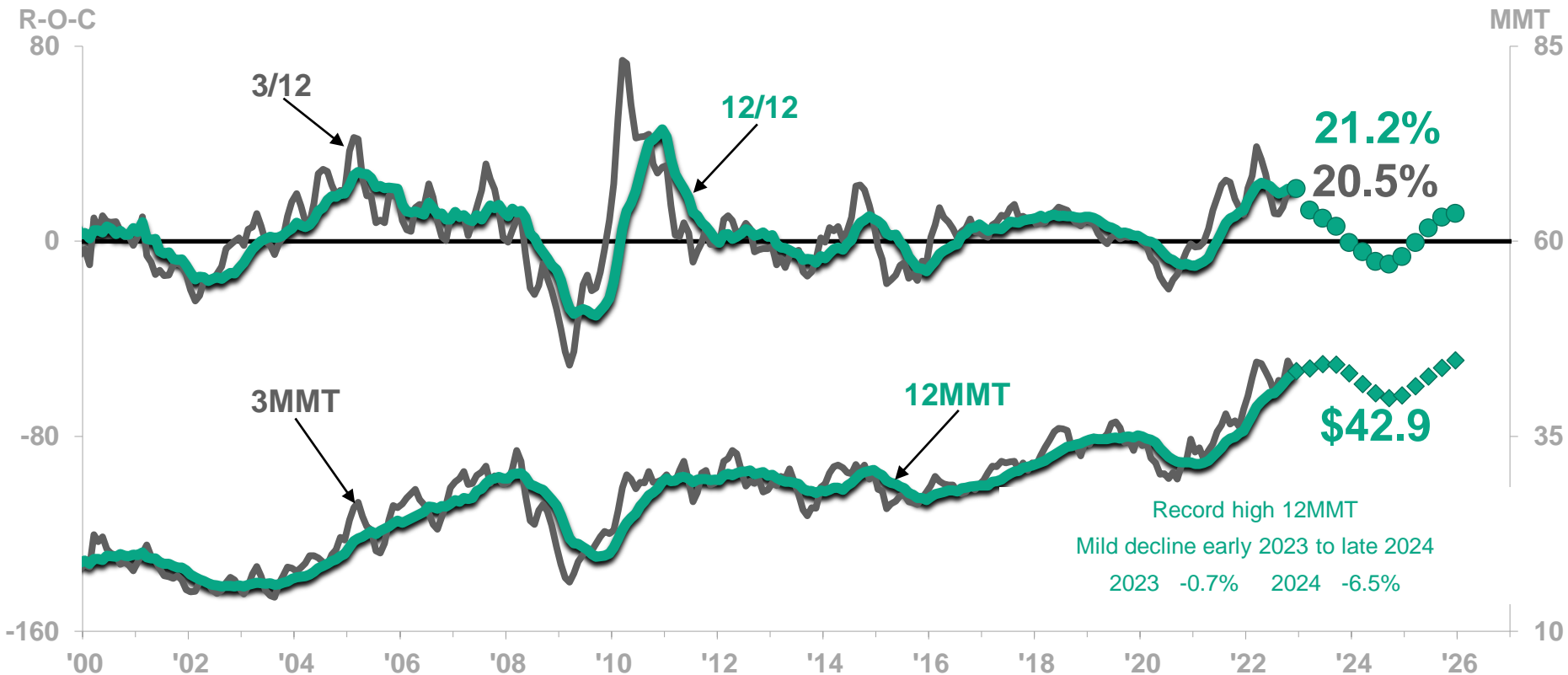
Source: US Census Bureau

US Material Handling Equipment New Orders

Billions of Dollars



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Auto Production Bodes Well For Robotics in 2023

Sources: A3, FRB

North America Value of Robotics Shipments to US Automobile Production Index

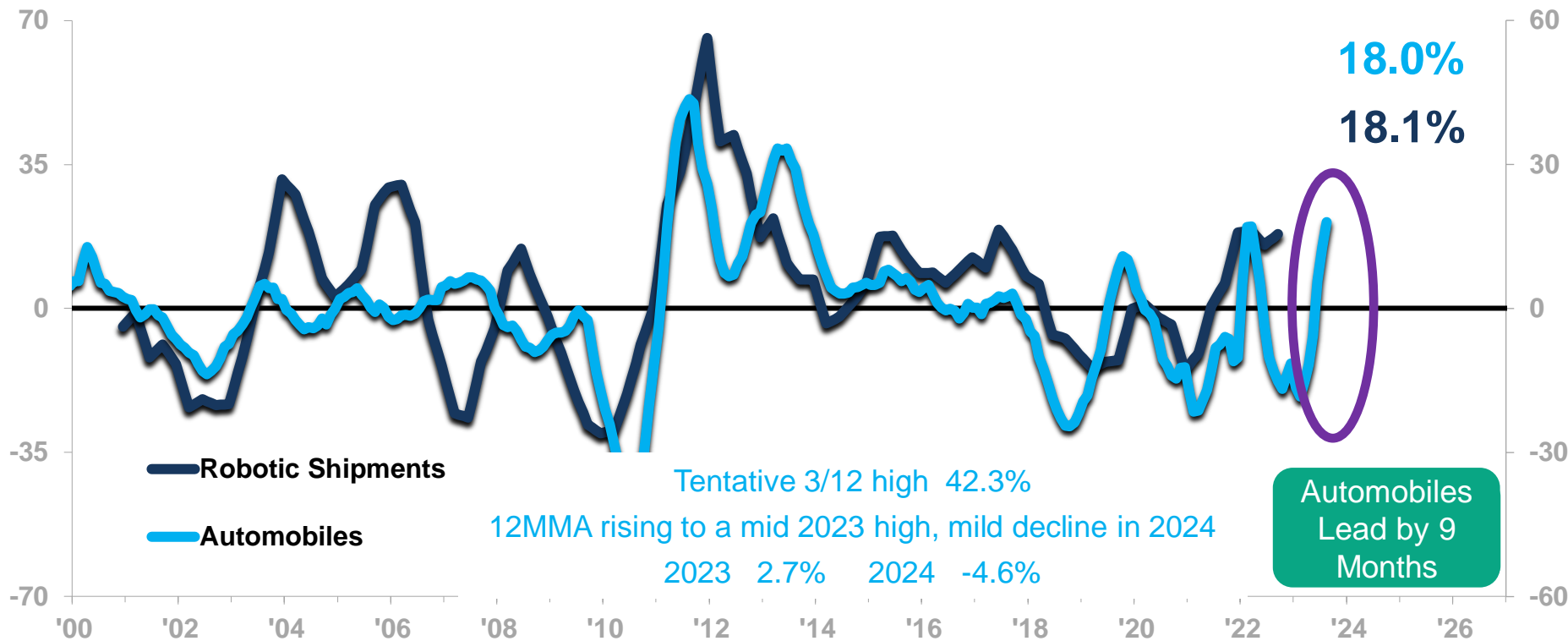
12/12 Rates of Change



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Robotic Shipments

Automobiles



Aerospace Offers Market Opportunities

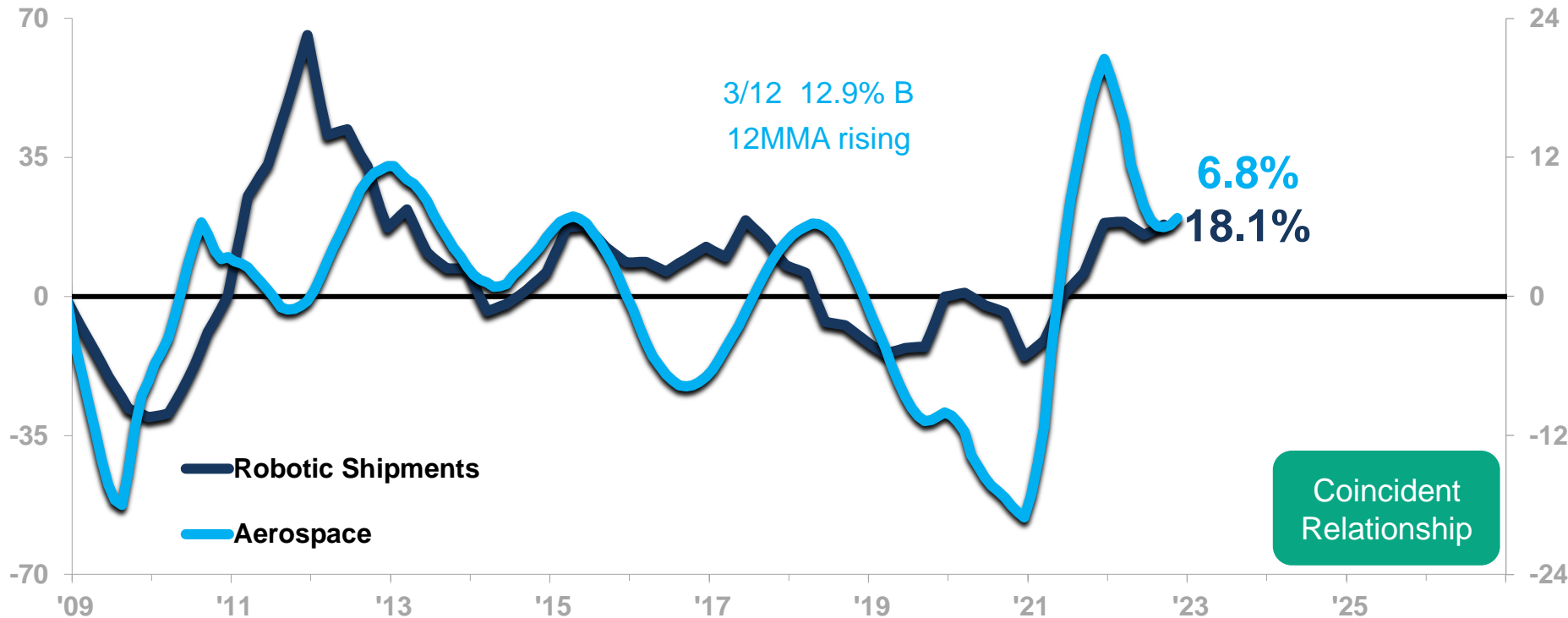
Sources: A3, FRB



North America Value of Robotics Shipments to US Aerospace Products and Parts Production Index 12/12 Rates-of-Change

Robotic Shipments

Aerospace

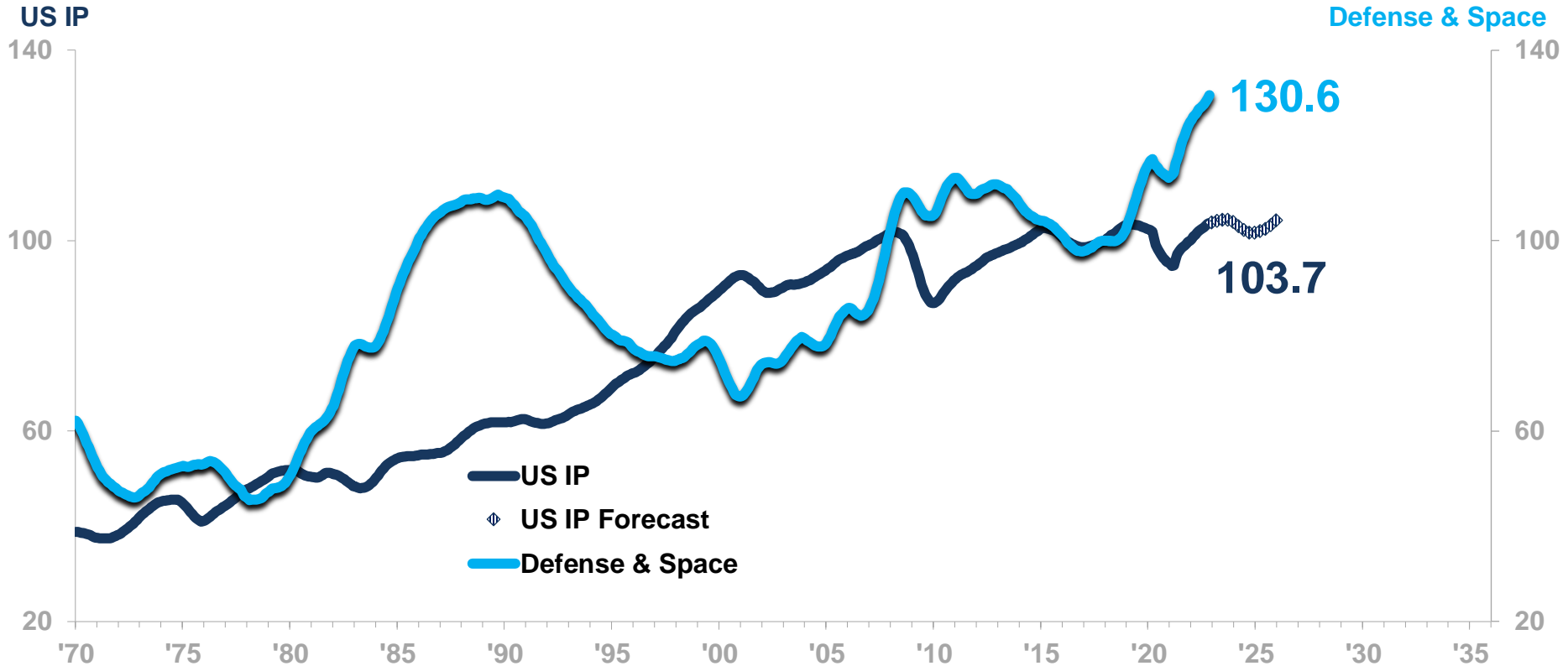


Able to Rise Despite Recessions

Source: FRB

US Industrial Production Index to US Defense and Space Equipment Production Index

Annual Data Trends: 2017 = 100



US Industry

Rates-of-Change



	12/12	Phase	3/12	Phase	12MM Notes
Aerospace Products and Parts	6.8%	B	12.9%	B	Ongoing Rise
Automobile	18.0%	B	42.3%	C	Projected mid 2023 high
Beverages	4.6%	C	3.6%	B	Record high – ongoing rise
Chemical Products	3.1%	C	0.2%	C	Decelerating rise
Civilian Aircraft	8.6%	C	9.7%	B	Decelerating rise
Computer & Electronics New Orders	5.0%	B	4.3%	C	Highest in 13yrs, decelerating
Construction Machinery	18.6%	C	13.1%	C	Decelerating rise



US Production Indexes

Source: FRB

US Industry

Rates-of-Change



	12/12	Phase	3/12	Phase	12MM Notes
Durable Hardgoods	4.6%	C	3.7%	C	Decelerating rise
Electric Power	2.1%	C	1.3%	C	Record high - decelerating
Engines & Turbines	9.7%	C	7.0%	C	Decelerating rise
Farm Machinery & Equip.	15.2%	B	30.3%	B	Rising
Food Production Index	1.5%	B	2.2%	B	Record high
High-Tech Industries	5.6%	C	2.4%	C	Record high - decelerating
Iron & Steel	-5.2%	D	-10.3%	D	Declining – 3Q24
Industrial Machinery	6.9%	C	5.3%	C	Highest in 14.5yrs – decelerating

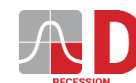


US Industry

Rates-of-Change



	12/12	Phase	3/12	Phase	Notes
Manufacturing (excl. vehicles)	3.2%	C	1.9%	C	Decelerating rise
Material Handling N.O.	21.2%	C	20.6%	C	Decelerating rise
Mining Machinery	6.2%	B	8.4%	C	Decelerating rise
Pharmaceuticals	4.4%	C	3.8%	B	Rise
Plastics	4.0%	C	2.0%	C	Tentative Oct high
Pulp, Paper, Board Mills	-0.5%	D	-5.3%	D	Decline
Tires	-2.5%	A	0.8%	B	Tentative Oct low



US Industry

Rates-of-Change



	12/12	Phase	3/12	Phase	Notes
Robotic Shipments (Units)	13.3%	C	8.3%	C	Decelerating rise
Robotic Shipments (Value)	18.1%	B	20.9%	B	Rise



Expect Rise Until Approximately Mid 2024

Source: US Census Bureau

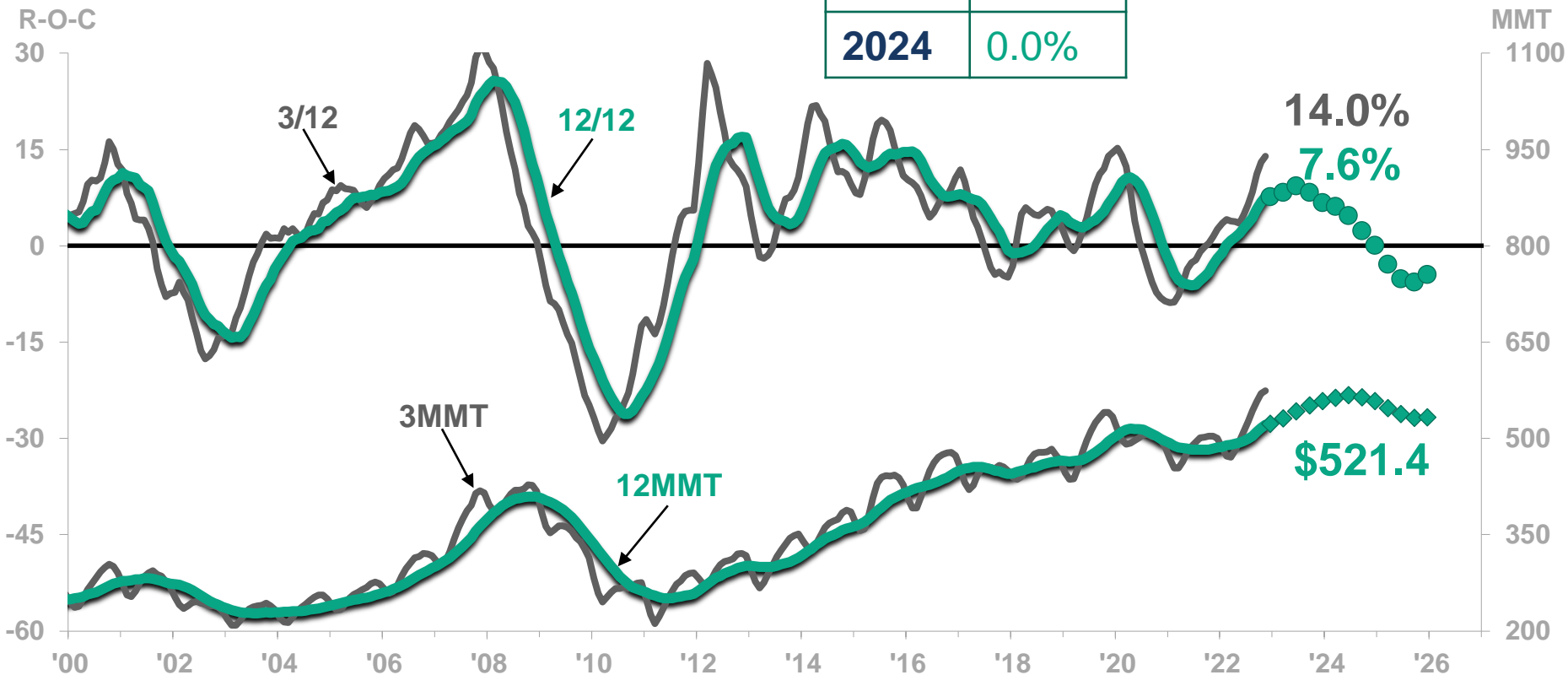
US Private Nonresidential Construction

Billions of Dollars



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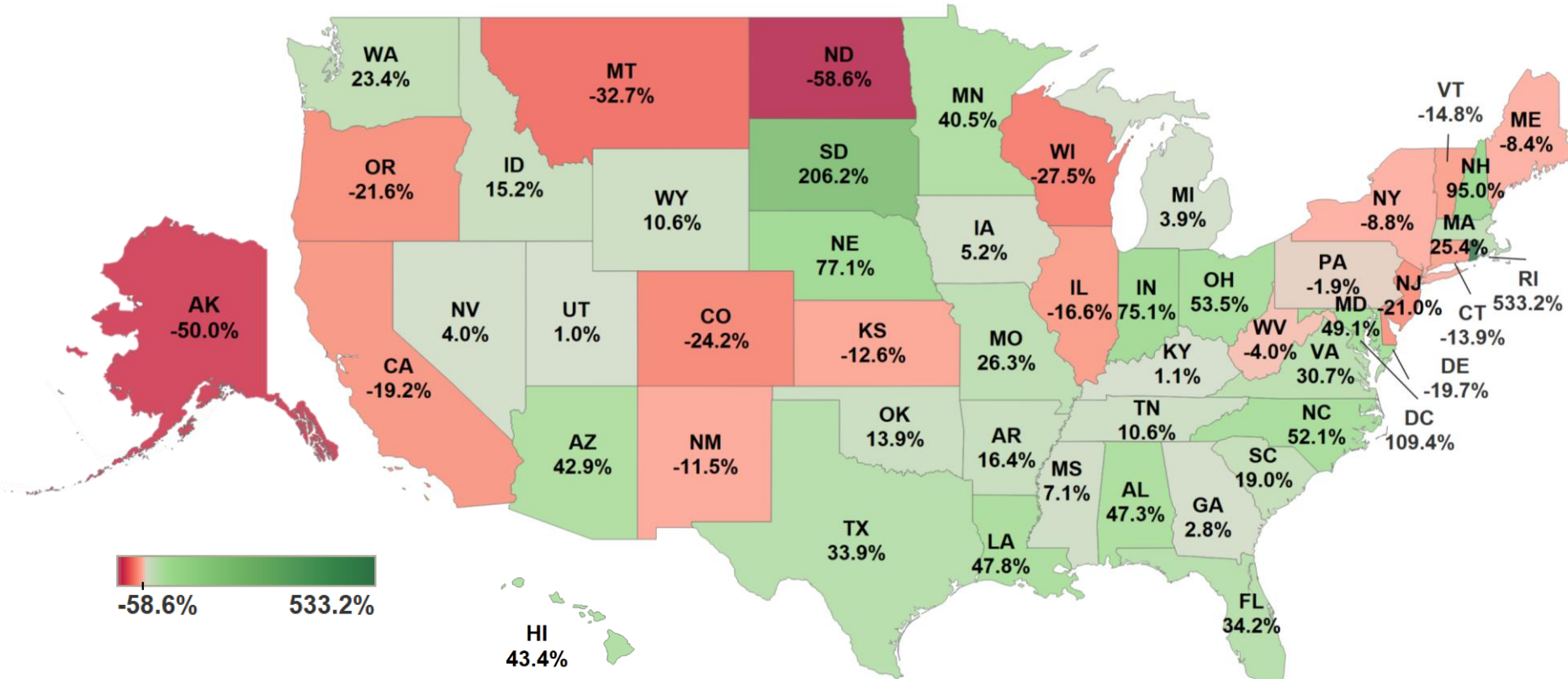
2023	6.7%
2024	0.0%



US Commercial Construction by State

Source: ConstructConnect

12/12 Rates-of-Change





Global Partners

Non-U.S. Economic Leading Indicators



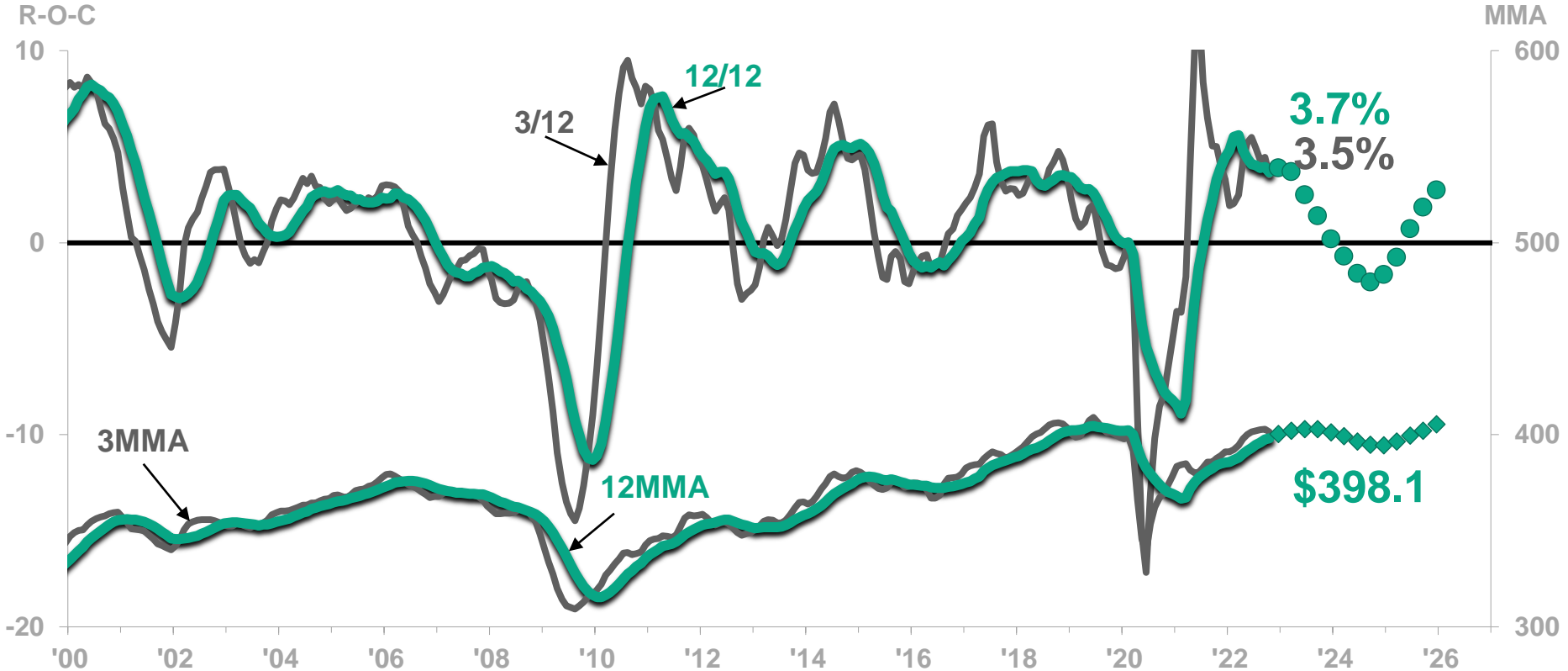
Indicator	Trend	Comments
Australia Leading Indicator	Rise	Potential improvement in 2023
Brazil Leading Indicator	Rise	Potential improvement in 2023
Canada Leading Indicator	Decline	Ongoing negative pressure
Eurozone Leading Indicator	Decline	Ongoing negative pressure
Japan Leading Indicator	Decline	Ongoing negative pressure
Mexico Leading Indicator	Decline	Ongoing negative pressure
Major Five Asia Leading Indicator	Rise	Potential improvement in 2023

Decelerating Rise Until Late 2023

Source: Statistics Canada

Canada Industrial Production

Billions of Chained 2012 Canadian Dollars

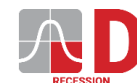


Canada Industry

Rates-of-Change



	12/12	Phase	3/12	12MM Notes
Aerospace	2.7%	C	-1.7%	Decline
Beverage & Tobacco	-0.4%	D	1.2%	Tentative rise
Food Manufacturing	3.2%	C	0.5%	Stalled rise
Manufacturing	3.6%	B	3.8%	Decelerating rise
Motor Vehicles	3.0%	B	20.5%	Rise
Pharmaceuticals	5.1%	B	12.1%	Rise – record high
Plastics	7.4%	C	2.1%	Decelerating Rise
Rubber	-0.3%	D	-5.3%	Decline



Mexico Industry

Rates-of-Change

	12/12	Phase	3/12	12MM Notes
Mexico Aerospace	16.0%	B	1.7%	Decelerating rise
Mexico Beverage & Tobacco	6.5%	B	4.1%	Decelerating Rise – record high
Mexico Food	2.2%	C	1.4%	Decelerating Rise – record high
Mexico Manufacturing	5.3%	B	6.1%	Decelerating Rise – record high
Mexico Light Vehicle	6.9%	B	17.1%	Decelerating rise
Mexico Plastic & Rubber	4.3%	C	2.2%	Stalled – record high



Mostly Rising in Brazil

Source: Brazilian Institute of Geography & Statistics

Brazil Industry

Rates-of-Change



	12/12	Phase	3/12	12MM Notes
Brazil Beverages	2.7%	B	0.4%	Stalled rise
Brazil Food	2.3%	B	6.6%	Rise
Brazil Vehicles	2.0%	A	15.3%	Rise
Brazil Manufacturing	-0.8%	A	1.3%	Rise
Brazil Rubber & Plastics	-7.1%	A	-2.7%	Decline



Increased Foreign Demand For Robots

Source: US Census Bureau

US Exports for the Robotics Trade

Millions of Dollars



	12/12	Phase	3/12	Phase	Annual Trend
Industrial Robots Export	12.8%	B	43.0%	B	\$342.7 record high
Industrial Robots to China	2.1%	B	88.3%	B	\$10.5 - rising
Motor Vehicle Parts and Accessories to China	-12.8%	D	-13.0%	A	\$1,558.5 - decline



More Trade With Europe Than With China

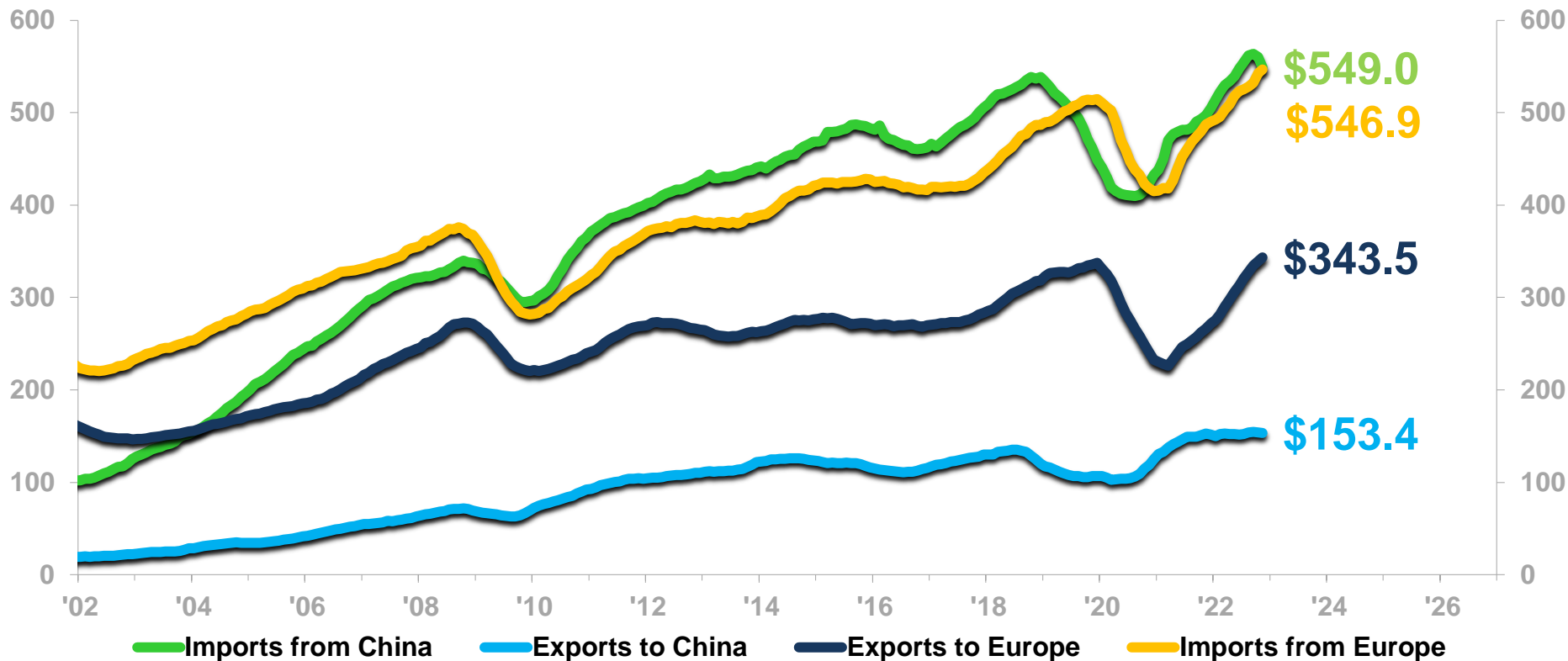
Source: US Census Bureau

Exports from the US to China and Europe and Imports to the US from China and Europe



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Annual Data Trends: Billions of Dollars



- Disinflation and deflation will characterize 2023 with an attendant easing of wage inflation.
- The Fed's actions gave rise to an inverse yield curve.

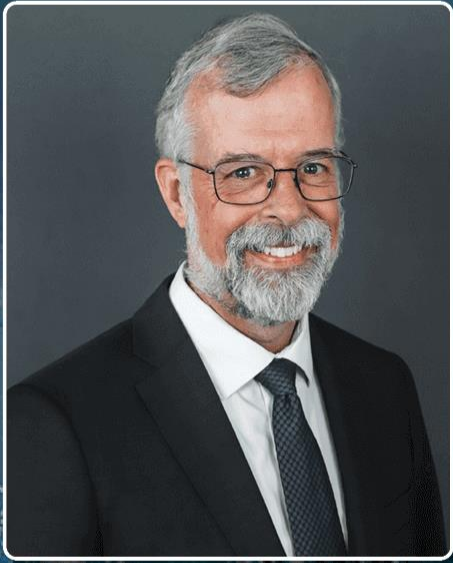
- Expect a recession to begin in 2023 and encompass most of 2024. US Industrial Production and GDP (deflated for inflation) will reflect the stress.
- We expect the recession to be mild.

- Invest in your business
- Maximize competitive advantages
- Think about expanding the asset classes you are invested in and using the ITR Optimizer™ Process



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Any questions?

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