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Morgan Stanley

Equity Research Spring Training

Industrials Teach-In

THURSDAY, MAY 6, 2021

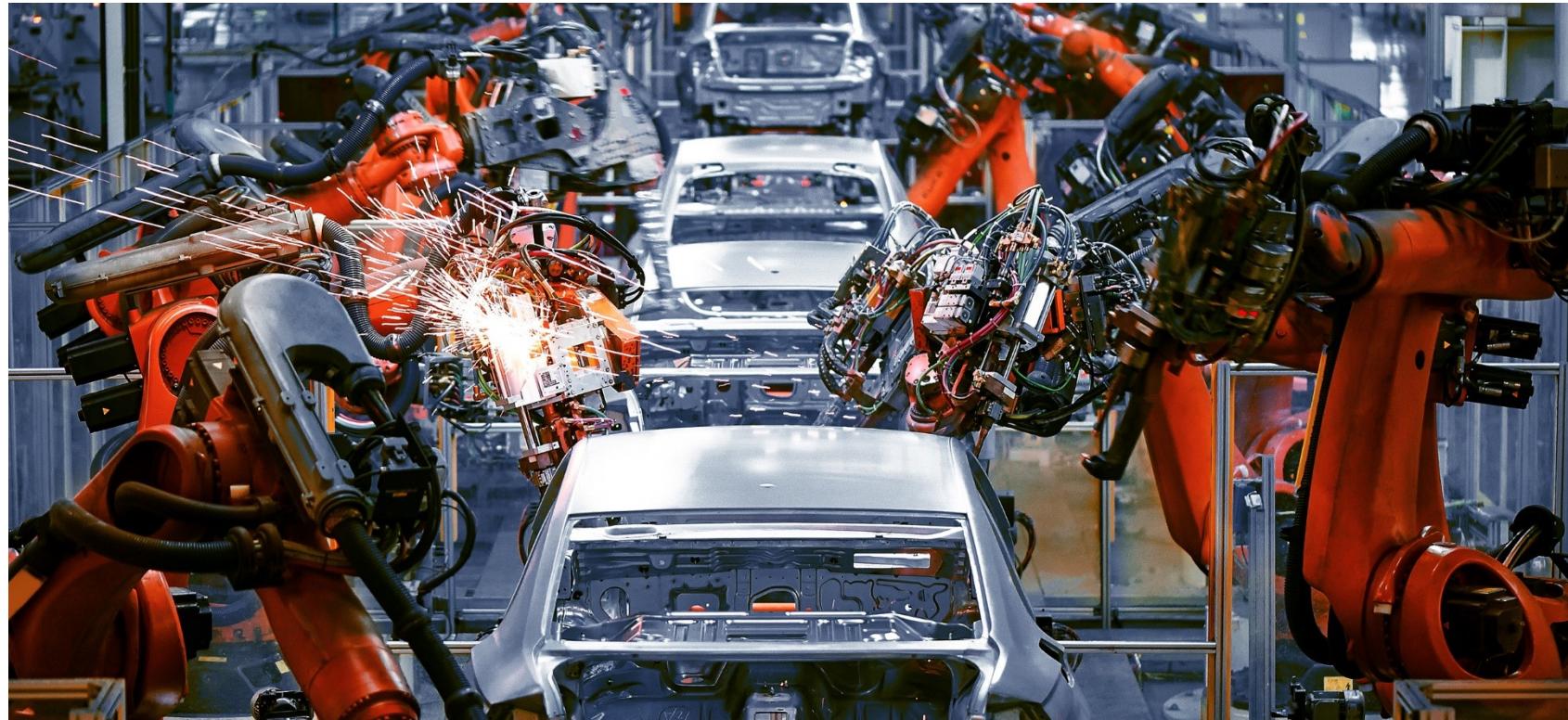


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Please see individual sections for pricing dates.

2021 Spring Training Live Event

Sector overviews, key investment debates,
top picks, and Q&A

Thursday, April 29 - Thursday, May 6

[Click here to see all the Spring Training Videos](#)

Agenda

Agenda

Thursday, May 6, 2021

8:00 a.m. – 8:05 a.m.	Welcome & Opening Remarks Michelle Teitsch, <i>Managing Director, Associate Director of North America Equity Research</i>	2:00 p.m. – 2:30 p.m.	Aerospace and Defense Kristine Liwag, <i>Executive Director</i>
8:10 a.m. – 8:50 a.m.	Autos & Shared Mobility Adam Jonas, <i>Managing Director</i>	2:40 p.m. – 3:10 p.m.	Government Services Matt Sharpe, <i>Vice President</i>
9:00 a.m. – 9:40 a.m.	Transportation & Airlines Ravi Shanker, <i>Executive Director</i>	3:20 p.m. – 3:50 p.m.	Machinery Dillon Cumming, <i>Associate</i>
9:50 a.m. – 10:20 a.m.	Multi-Industry & Conglomerates Josh Pokrywinski, <i>Executive Director</i>	4:00 p.m. – 4:40 p.m.	Stimulus / Infrastructure Panel Moderated by Michael Zezas <ul style="list-style-type: none"> • Carlos de Alba, <i>Managing Director</i> • Dillon Cumming, <i>Associate</i> • Josh Pokrywinski, <i>Executive Director</i>
10:30 a.m. – 11:00 a.m.	Metals & Mining Carlos de Alba, <i>Managing Director</i>	4:50 p.m. – 5:20 p.m.	Top Picks Panel with the Industries Team <ul style="list-style-type: none"> • Adam Jonas, <i>Managing Director</i> • Carlos de Alba, <i>Managing Director</i> • Connor Lynagh, <i>Executive Director</i> • Dillon Cumming, <i>Associate</i> • Josh Pokrywinski, <i>Executive Director</i> • Kristine Liwag, <i>Executive Director</i> • Matt Sharpe, <i>Vice President</i> • Neel Kumar, <i>Executive Director</i> • Ravi Shanker, <i>Executive Director</i> • Vincent Andrews, <i>Managing Director</i>
11:10 a.m. – 11:40 a.m.	Chemicals Vincent Andrews, <i>Managing Director</i>		
11:50 a.m. – 12:20 p.m.	Paper & Packaging Neel Kumar, <i>Executive Director</i>		
12:30 p.m. – 12:50 p.m.	Industrials Product Toolkit Joanie Kim, <i>Vice President, Institutional Equities Division</i> Mark van der Pluym, <i>Executive Director, Institutional Equities</i>		
1:00 p.m. – 1:50 p.m.	ESG Panel Moderated by Mark Carlucci, <i>Vice President</i> <ul style="list-style-type: none"> • Adam Jonas, <i>Managing Director</i> • Carlos de Alba, <i>Managing Director</i> • Dillon Cumming, <i>Associate</i> • Josh Pokrywinski, <i>Executive Director</i> • Kristine Liwag, <i>Executive Director</i> • Matt Sharpe, <i>Vice President</i> • Neel Kumar, <i>Executive Director</i> • Ravi Shanker, <i>Executive Director</i> • Vincent Andrews, <i>Managing Director</i> 		

Biographies



Adam Jonas, CFA
Autos & Shared Mobility

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Adam Jonas is a Managing Director and leader of Morgan Stanley's Global Auto & Shared Mobility research team. Adam joined the firm's investment banking division in Chicago in 1996, specializing in corporate finance and M&A in the automotive industry. In 1999, Adam moved to Equity Research and joined the Firm's European Autos team, based in London, serving as the lead European auto analyst from 2003 to 2010. In 2010, Adam returned to the US to lead the Global Autos & Shared Mobility teams, collaborating with his research colleagues to tell the story of the future of transportation and Auto 2.0. Adam earned his bachelor's degree in business administration (with distinction) from the University of Michigan.



Ravi Shanker
Freight Transportation

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Ravi Shanker is an Executive Director at Morgan Stanley and covers the North American transportation industry. Ravi joined the firm's global automotive industry research team in 2004 as a research associate before picking up lead coverage of North American Autos in 2009 through 2015. Ravi holds Bachelor of Commerce and Master of Management (Finance) degrees from the University of Mumbai, India. Ravi has been ranked by Institutional Investor magazine and recognized by The Financial Times as a top-10 stock picker across Wall Street and top Auto stock picker.

Biographies



Joshua Pokrzynski

Multi-Industry

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Josh Pokrzynski is an Executive Director and research analyst covering Electrical Equipment and Multi-Industry names for Morgan Stanley. He has covered the industry since 2007, starting with KeyBanc Capital Markets and most recently as a director at Wolfe Research. Prior to equity research, he was a corporate lender for ABN AMRO. He has appeared on CNBC, Bloomberg, and in The Wall Street Journal. Josh graduated with a BS degree in Business Economics from Indiana University.



Carlos de Alba

Metals & Mining

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Carlos de Alba is a ranked analyst and managing director who leads Morgan Stanley's Americas Basic Materials research team, covering mining, steel, and pulp & paper equities. Carlos joined Morgan Stanley's North America Metals & Mining team in 2005, after spending several years in the aluminum industry, mainly in financial positions at Alcoa Inc. He assumed lead coverage of Latin America metals & mining stocks in 2007 and of the North America stocks in 2019. He has been named a top analyst in Latin America by Institutional Investors magazine and Greenwich Associates since 2008, including ranking in the top 2 positions from 2009 to 2014. Carlos has a BA in Economics from the Tecnologico de Monterrey in Monterrey, Mexico, and an MBA from The Wharton School at the University of Pennsylvania.

Biographies



Vincent Andrews

Chemicals

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Vincent Andrews, a Managing Director, joined Morgan Stanley in 2004. He covers the Chemicals industry. Vincent holds a BA from Georgetown University and an MBA from Columbia Business School.



Neel Kumar

Paper & Packaging

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Neel Kumar is an Executive Director covering the Paper & Packaging industry. Neel joined Morgan Stanley in 2014 and previously covered the Chemicals sector. He holds a Bachelor of Science degree in Finance and Information Systems from the NYU Stern School of Business, an MBA from the Tuck School of Business at Dartmouth, and the Chartered Financial Analyst (CFA) designation. Prior to attending Tuck, Neel worked in investment banking at Guggenheim Securities and Credit Suisse for over four years.

Biographies



Kristine T. Liwag

Aerospace and Defense

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Kristine Liwag is an executive director at Morgan Stanley. She is the Senior Aerospace & Defense equity analyst. Prior to joining Morgan Stanley in 2020, Liwag was at Bank of America Merrill Lynch for 12 years in the Aerospace & Defense Team and covered Smid-Cap Aerospace & Defense companies and Aircraft Lessors. Liwag holds a bachelor's degree in business administration from Georgetown University.



Matthew Sharpe

US Government Services

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Matt Sharpe covers the US Government Services industry and is a member of the Aerospace & Defense equity research team. Prior to joining Morgan Stanley in 2017 he spent 12 years in the Defense industry at Raytheon and Northrop Grumman in Corporate Strategy, Business Development, and Finance. Matt holds a BS in Business Economics from the State University of New York College at Oneonta and an MBA from Fordham University.

Biographies



Dillon Cumming

Machinery

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Dillon Cumming is an equity analyst covering US Machinery with Courtney Yakavonis. Dillon joined Morgan Stanley and the US Capital Goods team in 2016, and has worked with both the Machinery team and the No. 3 II-ranked Multi-Industry franchise. Dillon holds a BSc in Finance and Accounting from New York University's Stern School of Business.



Mark Carlucci

Sustainability Research

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Mark Carlucci is a Vice President, covering ESG equity research in North America as part of the Global Sustainability Research team. Previously, Mark held various roles at Morgan Stanley, including Integrated Oil, E&P, and Midstream Energy equity research and Energy & Utilities equity sales within Wealth Management. Prior to joining Morgan Stanley in 2013, Mark worked in Corporate and Institutional Banking at the PNC Financial Services Group. Mark graduated summa cum laude from the University of Pittsburgh and holds the CFA designation.

May 2021

Industrials Spring Training Teach-In

Autos and Shared Mobility



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Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 23, 2021, unless otherwise noted.

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SECTION 1: COVERAGE SUMMARY

Coverage: OEMs

Rank	Company	Market Cap	Current Price	Bear Case	Price Target			Bull Case	%	2021e EV / EBITDA	P / E
OW	gm	\$84,596	\$56.66	\$32	x	\$80		\$120	41%	5.1x	10.3x
	POLARIS	\$8,889	\$145.09	\$85	x	\$158		\$220	9%	8.4x	15.2x
	Ferrari	\$41,451	\$213.08	\$160	x	\$273		\$350	28%	19.2x	41.2x
	TESLA	\$690,797	\$719.69	\$450	x	\$900		\$1,272	25%	61.0x	145.5x
	HARLEY-DAVIDSON	\$7,367	\$48.07	\$25		\$38	x	\$65	-21%	8.6x	16.4x
	Ford	\$46,809	\$11.94	\$6		\$9	x	\$18	-25%	3.8x	9.7x

Coverage: Suppliers

	Rank	Company	Market Cap	Current Price	Bear Case	Price Target	Bull Case	%	2021e EV / EBITDA	P / E		
OW	1	• A P T I V •	\$37,575	\$138.93	\$92	x	\$200	\$407	44%	13.8x	26.5x	
EW	2	 LEAR CORPORATION	\$10,894	\$181.18	\$75	x	\$185	\$270	2%	10.5x	11.3x	
UW	3	 MAGNA	\$28,560	\$95.40	\$55	x	\$96	\$135	1%	3.8x	10.8x	
UW	4	 AEM	\$1,033	\$9.07	\$2		\$8	x	\$19	-12%	3.9x	7.8x
UW	5	 ADIENT	\$4,309	\$45.76	\$22		\$38	x	\$65	-17%	5.1x	10.9x
UW	6	 Visteon	\$3,187	\$114.18	\$29		\$65	x	\$160	-43%	9.5x	22.4x
UW	7	 BorgWarner	\$11,841	\$49.54	\$15		\$29	x	\$60	-41%	9.6x	11.2x
UW	8	 TENNECO	\$864	\$10.54	\$1		\$5	x	\$15	-53%	1.8x	2.5x

Price Targets as of 4/21/121

Source: Morgan Stanley Research, Bloomberg, Company websites

Coverage: Dealers

	Rank	Company	Market Cap	Current Price	Bear Case	Price Target	Bull Case	%	2021e EV / EBITDA	P/E
OW	1	 CARVANA	\$45,673	\$265.01	\$130	x	\$420	\$800	58%	NM NM
	2	 CARMAX	\$21,058	\$129.05	\$63	x	\$165	\$250	28%	17.0x 22.0x
	3	 ASBURY AUTOMOTIVE GROUP	\$3,981	\$205.98	\$90		\$180	x	\$250	-13% 9.2x 13.8x
	4	 PENSKE Automotive	\$6,907	\$85.45	\$50		\$80	x	\$90	-6% 6.9x 10.3x
	5	 GROUP 1 AUTOMOTIVE	\$2,858	\$157.46	\$85	x	\$185		\$245	17% 6.7x 8.9x
	6	 SONIC Automotive	\$2,039	\$49.05	\$30		\$48	x	\$60	-2% 6.7x 9.9x
	7	 LITHIA	\$10,255	\$382.20	\$160		\$320	x	\$400	-16% 9.9x 15.3x
	8	 AutoNation	\$7,929	\$96.20	\$35		\$65		\$90	-32% 6.2x 10.6x

Price Targets as of 4/21/21

Source: Morgan Stanley Research, Bloomberg, Company websites

Coverage: SPAC

	Rank	Company	Market Cap	Current Price	Bear Case	Price Target		Bull Case	%	EV/Sales at PT	2025e EV/EBITDA at PT	
OW	1		\$3,750	\$15.15	\$10	x	\$40	\$90	164%	1.2x	16.2x	
UVW	2	[REDACTED]	\$11,590	\$33.50	\$11	x	\$70	\$157	109%	3.0x	14.2x	
UVW	3		\$941	\$7.87	\$2		\$7	x	\$16	-11%	0.8x	4.7x
UVW	4		\$1,620	\$9.76	\$2	x	\$12	\$35	23%	0.4x	7.7x	

Global Autos Team

Morgan Stanley Global Auto Team

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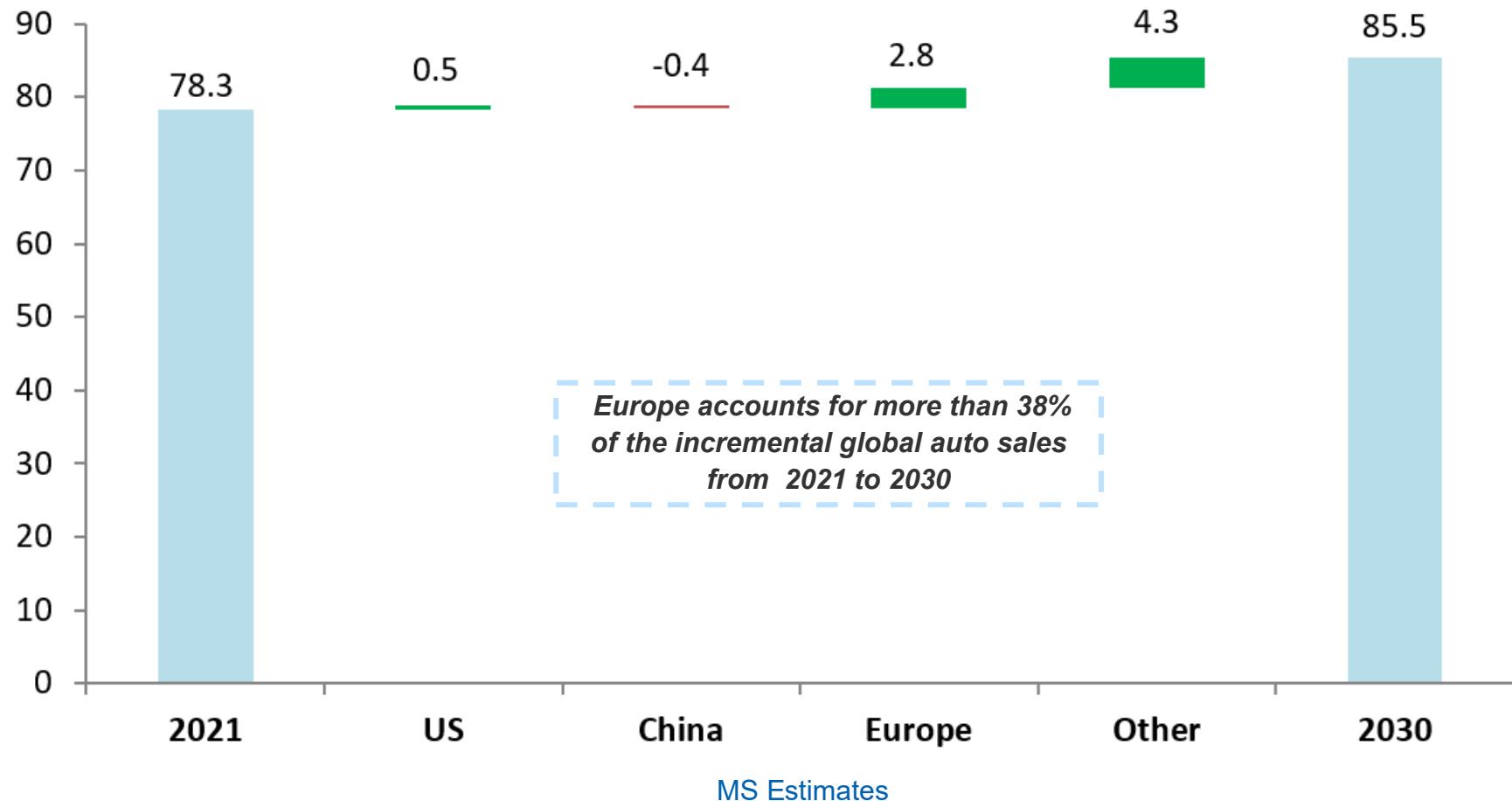
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SECTION 2: REVENUE

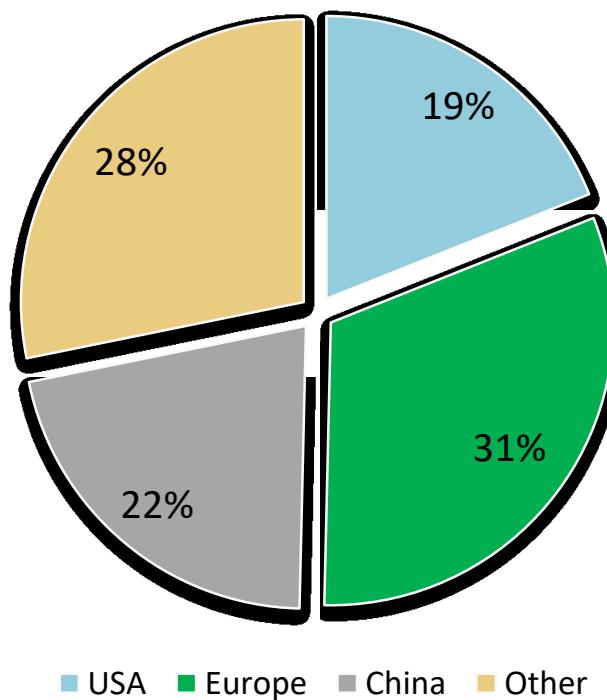
Global New Car Sales (mm units)

Country	Passenger Car Units ('mn)								Growth%							CAGR '18-'21E					
	2015	2016	2017	2018	2019	2020	2021e	2022e	2023e	2015	2016	2017	2018	2019	2020	2021e	2022e	2023e			
Asia																					
China	21.1	24.4	24.7	23.7	21.4	20.1	21.1	21.6	19.3	7%	15%	1%	-4%	-9%	-6%	5.0%	2.0%	-10%	-4%		
Japan	4.9	4.7	5.2	5.2	5.1	4.5	4.7	5.4	5.4	-10%	-4%	9%	1%	-2%	-13%	4.3%	16.3%	-4%			
South Korea	1.6	1.6	1.5	1.6	1.5	1.6	1.7	1.5	1.6	12%	-2%	-5%	5%	-2%	4%	7%	-10%	3%			
India	2.8	3.0	3.2	3.4	3.0	2.4	2.75	3.2	3.6	8%	7%	9%	5%	-13%	-18%	13%	15%	-7%			
Indonesia	1.0	1.0	1.0	1.1	0.9	0.5	0.5	0.6	0.6	-19%	4%	0%	5%	-10%	-47%	5%	15%	-20%			
Australia	1.1	1.2	1.2	1.1	1.0	0.9	0.9	1.0	1.0	4%	2%	1%	-3%	-8%	-14%	5%	4%	-6%			
Thailand	0.8	0.7	0.8	1.0	1.0	0.8	0.8	0.9	0.9	-9%	-6%	17%	20%	-3%	-23%	5%	8%	-8%			
Rest of Asia	1.2	1.5	2.2	2.5	2.7	2.0	2.1	2.3	2.4	61%	28%	43%	14%	8%	-27%	5%	11%	-6%			
Total Asia	34.5	38.1	39.8	39.6	36.8	32.8	34.6	36.4	34.8	4.6%	10.3%	4.6%	-0.7%	-7.1%	-10.8%	5.6%	5.3%	-4.4%	-4%		
North America																					
US	17.4	17.6	17.3	17.3	17.1	14.5	16.0	16.3	16.5	5%	1%	-2%	0%	-1%	-15%	10%	2%	-3%			
Canada	2.2	2.3	2.0	2.0	1.9	1.5	1.7	1.8	1.9	2%	6%	-12%	-2%	-3%	-20%	9%	9%	-6%			
Mexico	1.4	1.6	1.5	1.4	1.3	0.9	1.0	1.1	1.1	19%	18%	-4%	-7%	-7%	-28%	5%	6%	-11%			
Total NAFTA	20.9	21.5	20.9	20.7	20.3	17.0	18.7	19.1	19.5	5.8%	2.8%	-3.0%	-0.9%	-1.9%	-16.1%	9.6%	2.5%	1.8%	-3%		
South America																					
Brazil	2.5	2.0	2.2	2.5	2.7	2.0	2.1	2.2	2.4	-26%	-20%	9%	14%	8%	-27%	5%	5%	-6%			
Argentina	0.6	0.7	0.7	0.6	0.4	0.3	0.4	0.4	0.4	-6%	11%	8%	-17%	-27%	-28%	10%	10%	-17%			
Rest of South America	0.9	0.9	1.1	1.2	1.0	0.7	0.7	0.8	0.8	-7%	-9%	29%	10%	-18%	-31%	5%	5%	-16%			
Total South America	4.0	3.5	4.0	4.3	4.1	3.0	3.1	3.3	3.6	-19.2%	-12.6%	14.1%	7.0%	-4.7%	-27.9%	5.5%	5.6%	8.9%	-10%		
Eastern Europe																					
Russia	1.6	1.4	1.7	1.9	1.9	1.6	1.8	2.1	2.3	-36%	-11%	20%	12%	-4%	-13%	10%	20%	-3%			
Turkey	1.0	1.0	1.0	0.8	0.6	0.9	0.7	0.8	0.6	26%	0%	-1%	-20%	-24%	63%	-31%	23%	-5%			
Romania	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.4	-20%	7%	9%	6%	9%	-14%	7%	36%	0%			
Poland	0.4	0.5	0.6	0.6	0.7	0.5	0.5	0.7	0.8	9%	17%	16%	3%	11%	-23%	8%	28%	-3%			
Other E Europe	0.6	0.6	0.6	0.6	0.7	0.5	0.5	0.7	0.6	0%	11%	-10%	0%	19%	-25%	9%	21%	-1%			
Total E. Europe	3.8	3.7	4.0	4.1	4.0	3.8	3.8	4.6	4.7	-15.7%	-0.9%	8.2%	1.2%	-1.6%	-5.7%	-1.0%	22.7%	3.0%	-3%		
Western Europe																					
France	2.3	2.4	2.5	2.5	2.7	2.0	2.2	2.4	2.4	6%	6%	6%	1%	5%	-24%	10%	6%	-4%			
Germany	3.6	3.8	3.9	4.0	4.2	3.4	3.6	3.9	3.8	5%	5%	3%	1%	5%	-17%	6%	6%	-3%			
Italy	1.7	2.0	2.2	2.2	2.1	1.5	1.7	1.8	1.8	16%	19%	7%	0%	-2%	-28%	10%	6%	-8%			
Spain	1.2	1.3	1.4	1.5	1.5	1.0	1.1	1.2	1.2	23%	11%	9%	2%	0%	-32%	10%	6%	-9%			
UK	3.0	3.1	2.9	2.9	2.7	1.9	2.1	2.3	2.3	7%	2%	-5%	-7%	-29%	-29%	10%	6%	-10%			
Other	3.3	3.4	3.6	3.6	3.6	2.8	3.1	3.2	3.1	10%	5%	4%	1%	-1%	-21%	8%	3%	-5%			
Total W. Europe	15.1	16.1	16.6	16.7	16.7	12.8	13.8	14.6	14.6	9.2%	6.6%	3.1%	0.7%	0.2%	-23.6%	8.5%	5.3%	5.0%	-6%		
Total Europe	18.8	19.8	20.6	20.8	20.7	16.5	17.6	19.2	19.3												
Rest of World	5.2	5.0	4.8	4.8	4.5	4.1	4.1	4.3	4.3	-3.3%	-3.3%	-3.0%	-0.1%	-6.5%	-9.6%	1.7%	3.7%	0.0%	-5%		
Global LV Total	83.5	87.7	90.2	89.8	86.1	73.1	78.3	80.7	81.8	2.6%	5.0%	2.8%	-0.4%	-4.2%	-15.0%	7.1%	3.0%	1.4%	-4.5%		
Global PC Total	76.2	80.2	82.3	81.7	78.1	66.6	70.9	74.4	73.8	2.9%	5.3%	2.7%	-0.7%	-4.5%	-14.6%	6.3%	5.0%	0.0%	-4.6%		
Global LCV Total	7.3	7.5	7.8	8.1	8.0	6.5	7.5	8.0	8.1	-0.7%	-3.0%	4.6%	3.5%	-1.3%	-18.9%	15.1%	7.6%	0.0%	-2.7%		
ICE sales	83.1	87.1	89.5	88.6	84.8	70.9	75.2	76.3	75.8				2.7%	-0.9%	-4.4%	-16.3%	5.9%	1.5%	-0.6%	-5.3%	
BEV sales	0.4	0.5	0.7	1.2	1.3	2.2	3.2	4.4	6.0	32.4%	76.6%	7.9%	68.6%	45.4%	38.3%	35.9%	38.3%				

Car Sales Demand - Geography Bridge (2021 to 2030)



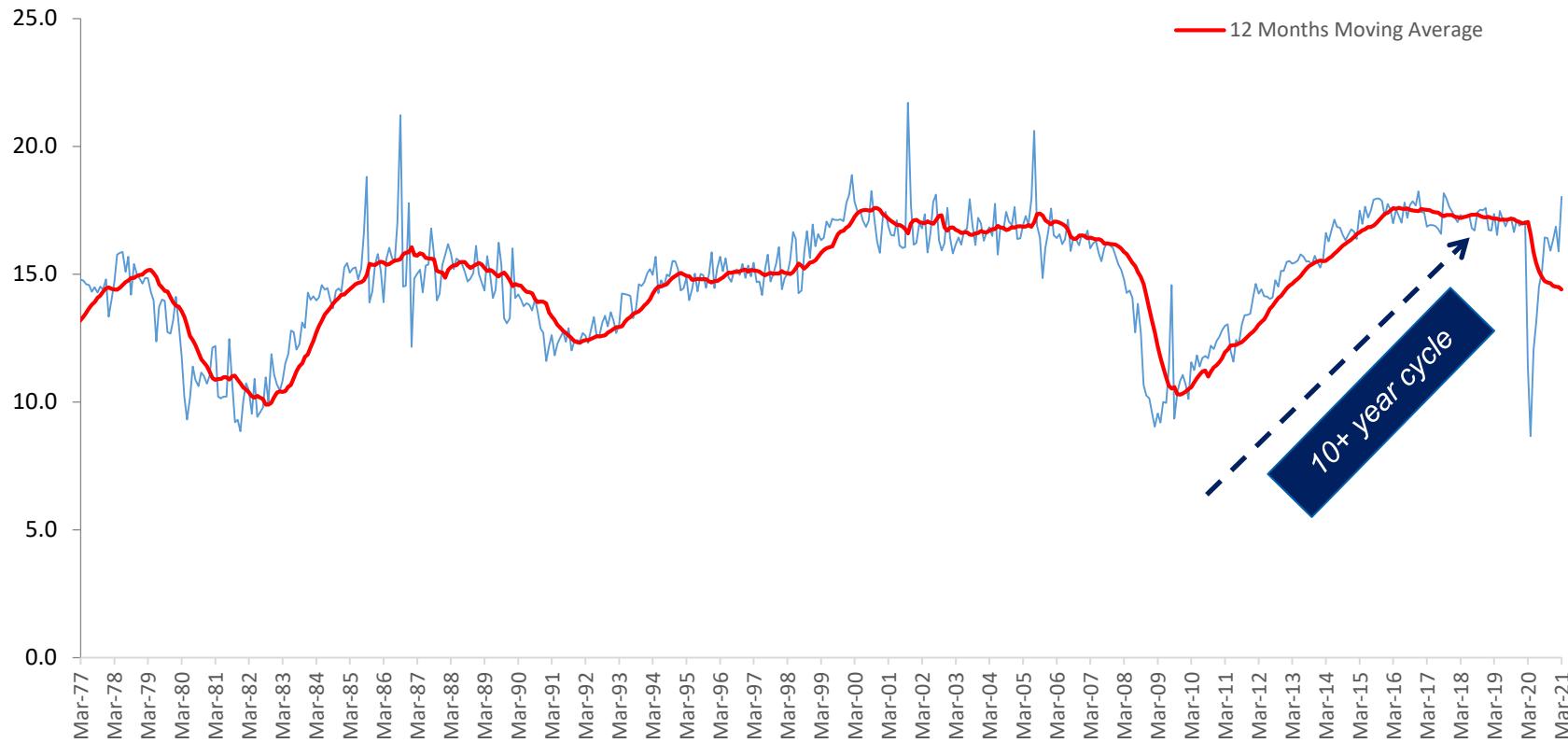
Demand (unit volume) - Passenger Car Units (2020)



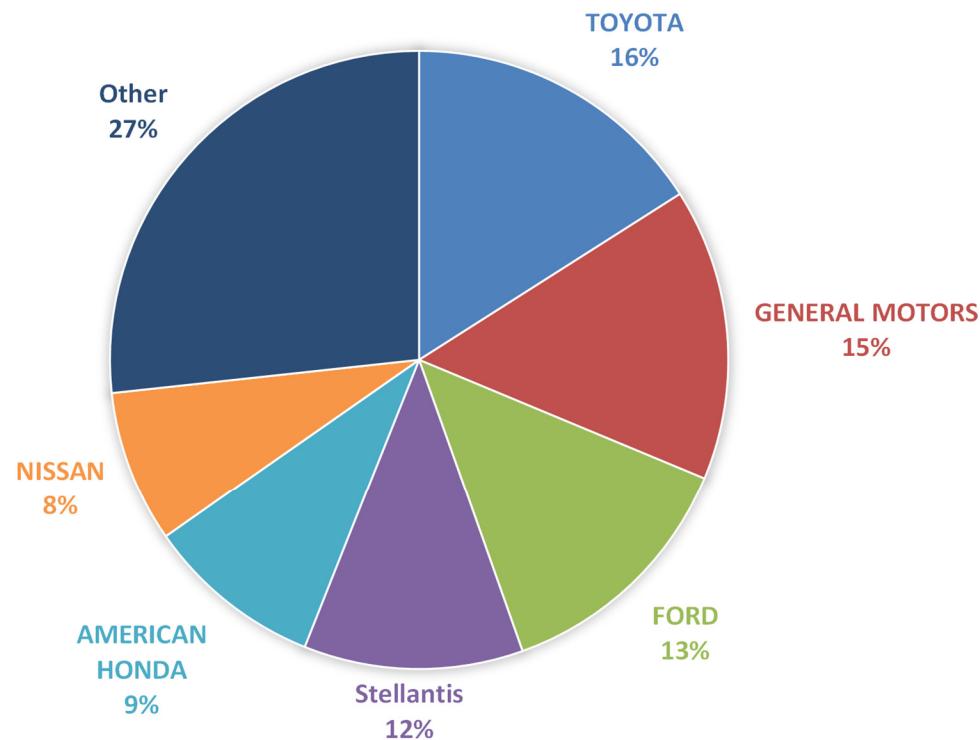
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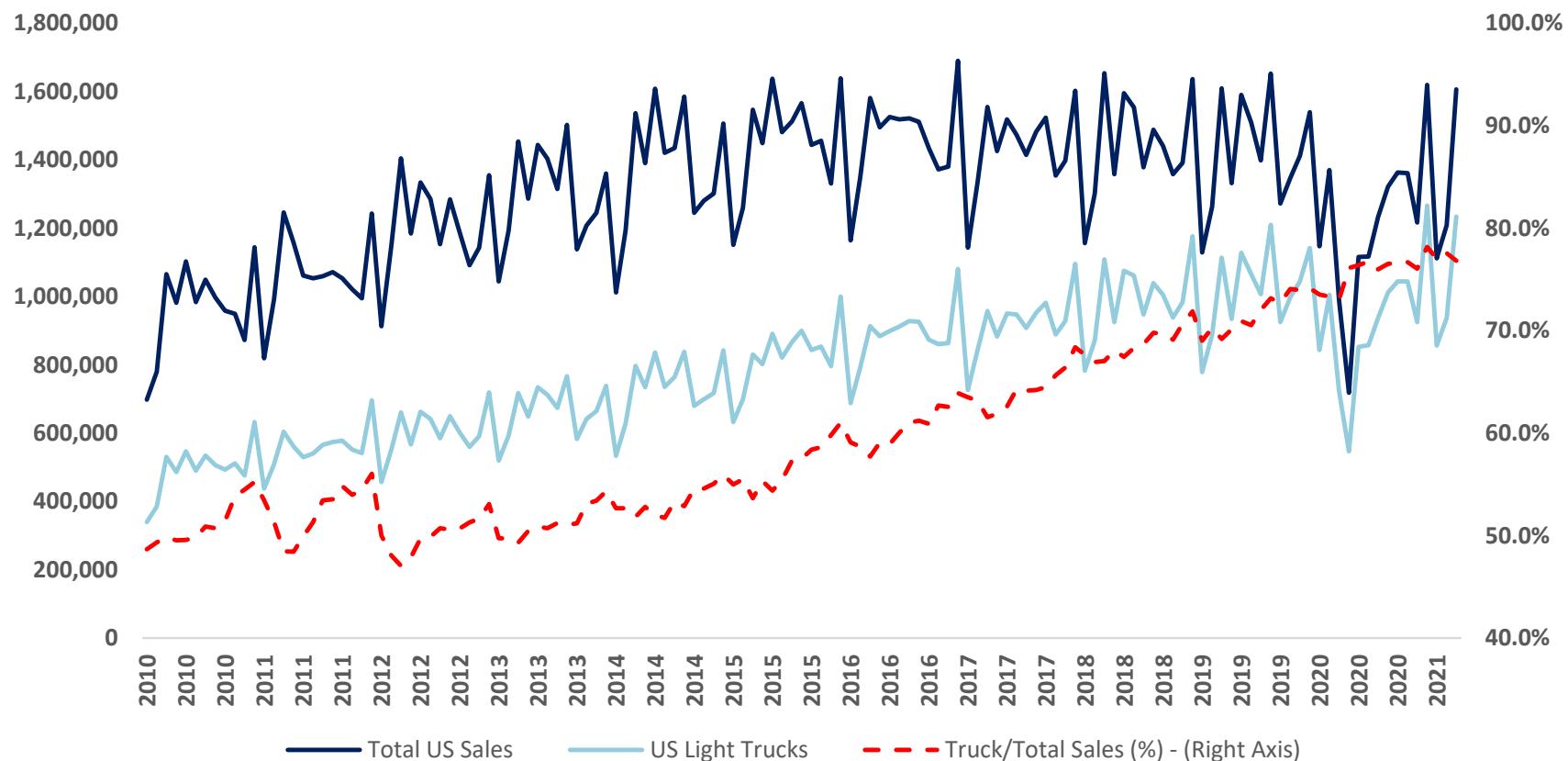
US New Vehicle Sales - Seasonal Adjusted Annual Rate (SAAR)



US OEM Market Share - March 2021

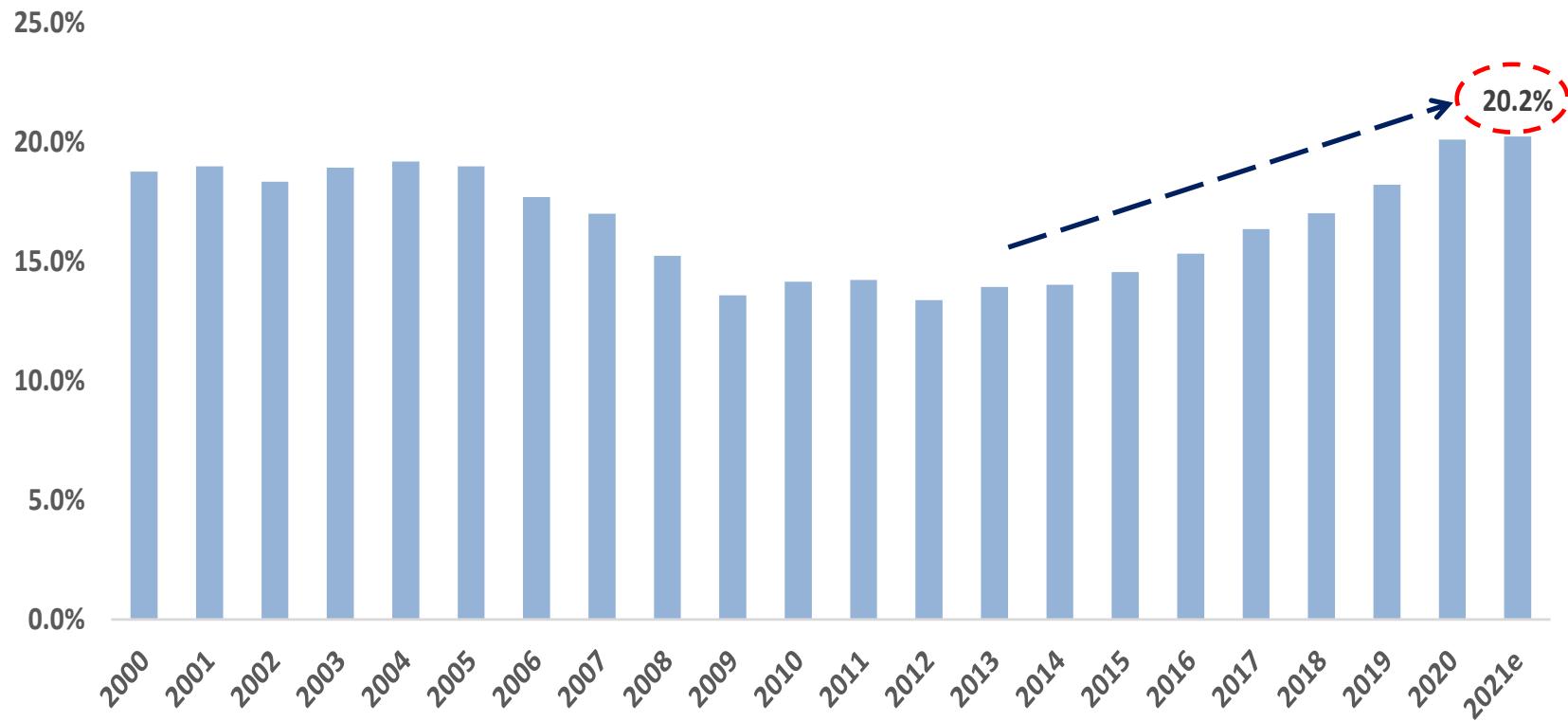


US Light Trucks as % of Sales

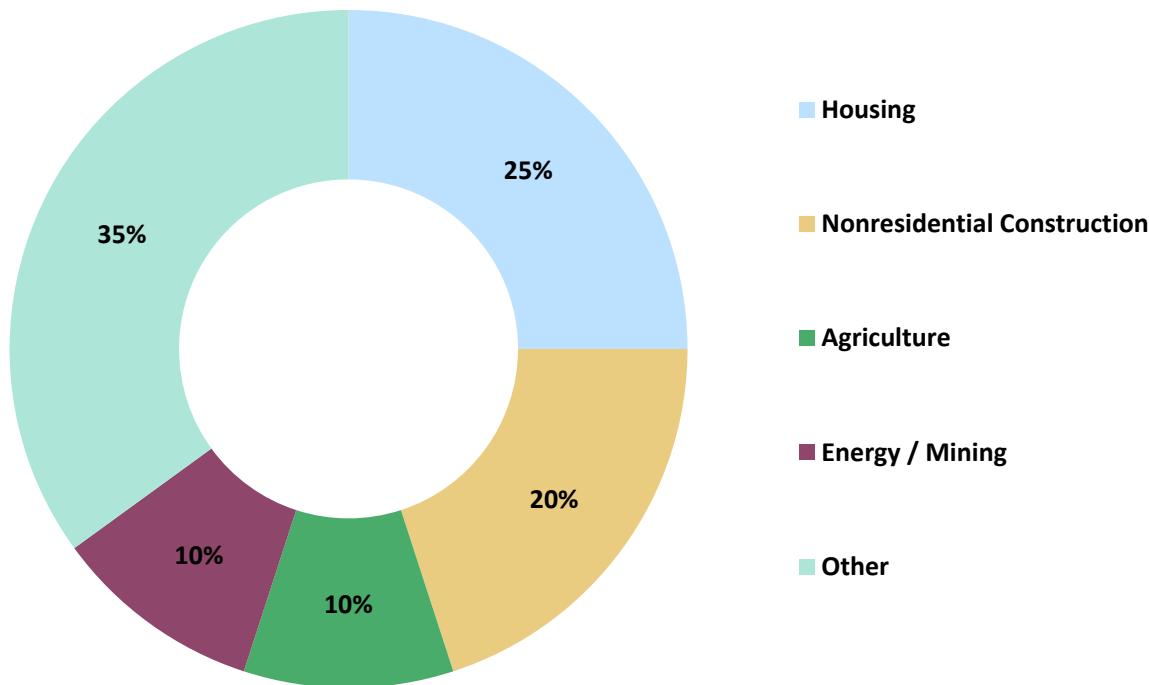


Appetite for trucks in the US is at an all time high (76% of US Sales) – bringing ATPs near record highs

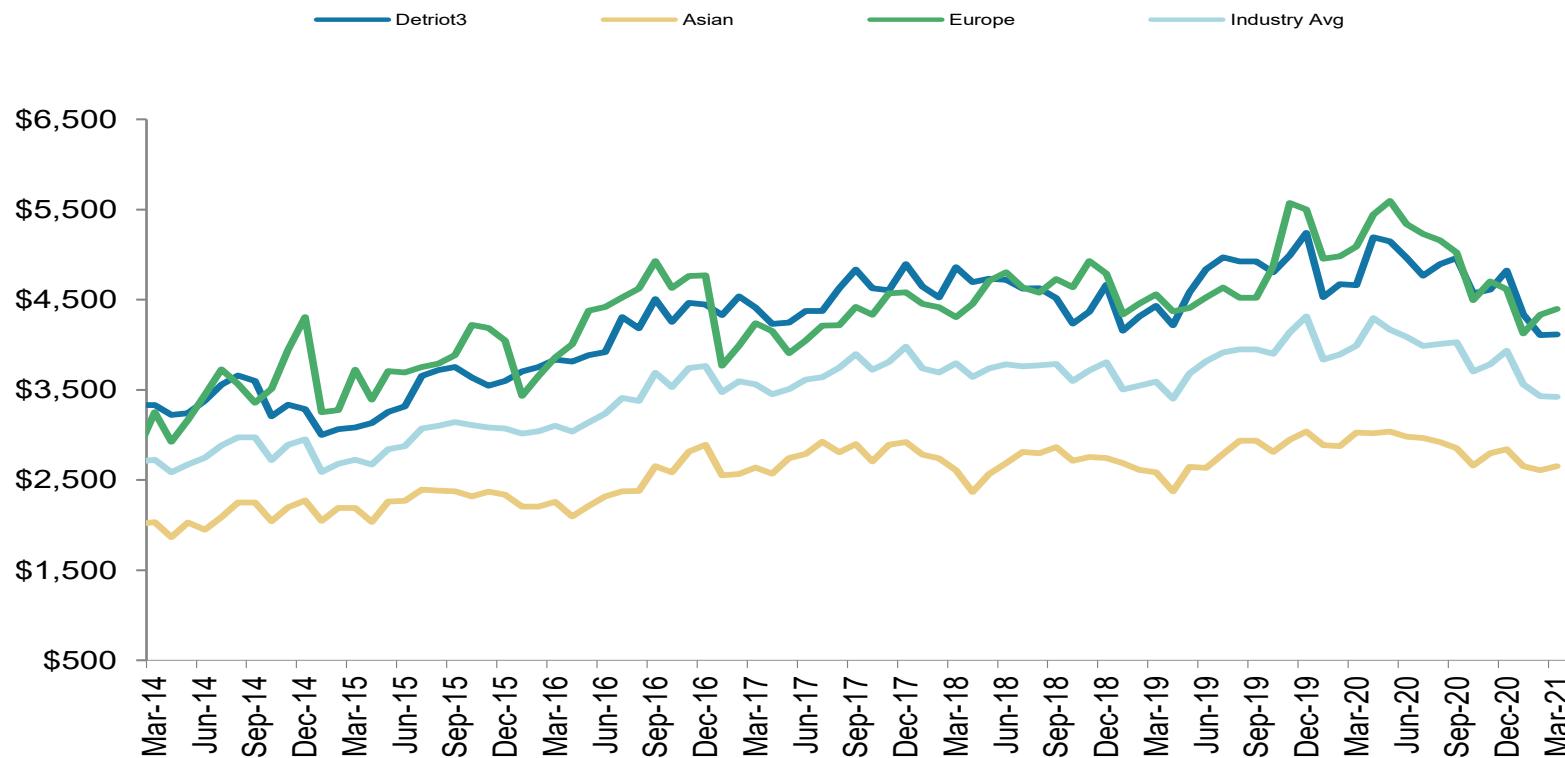
Pickup Trucks % of US Sales



Pickup Truck End Market Demand

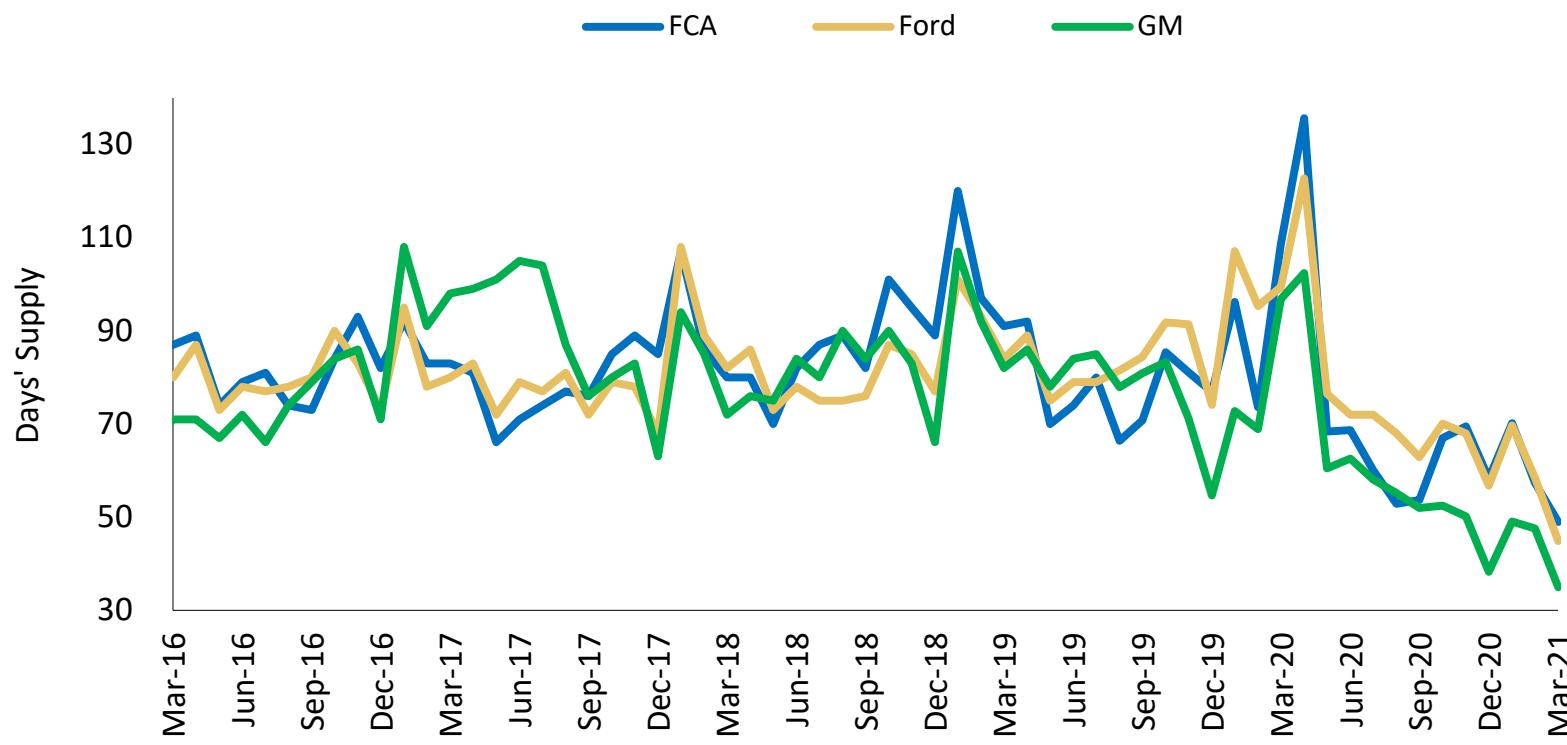


D3 Incentives



Incentives for the Auto OEMs have been steadily rising since 2009

D3 Inventory

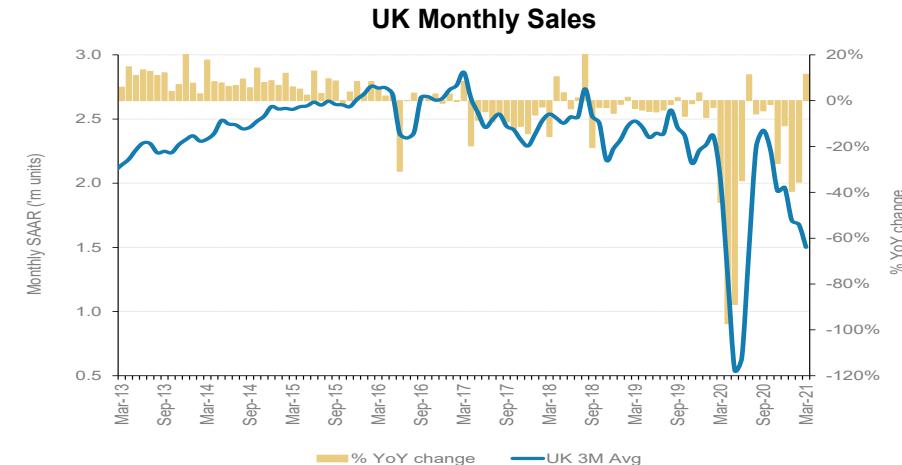
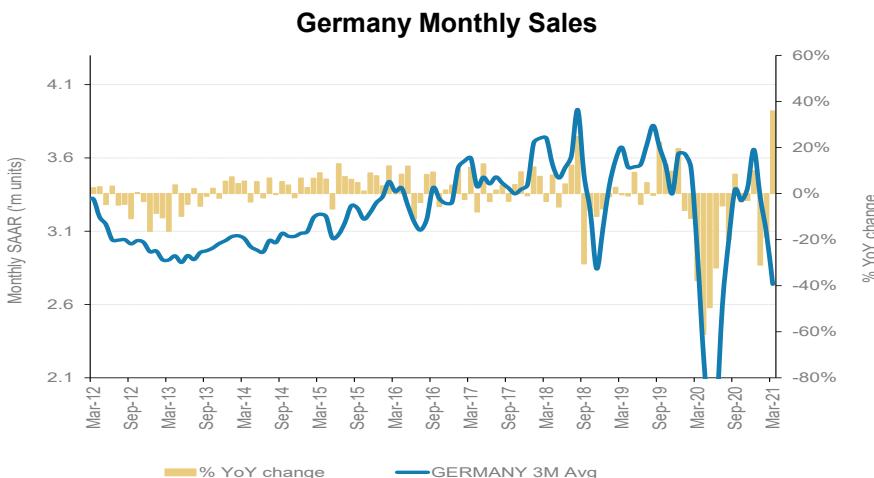
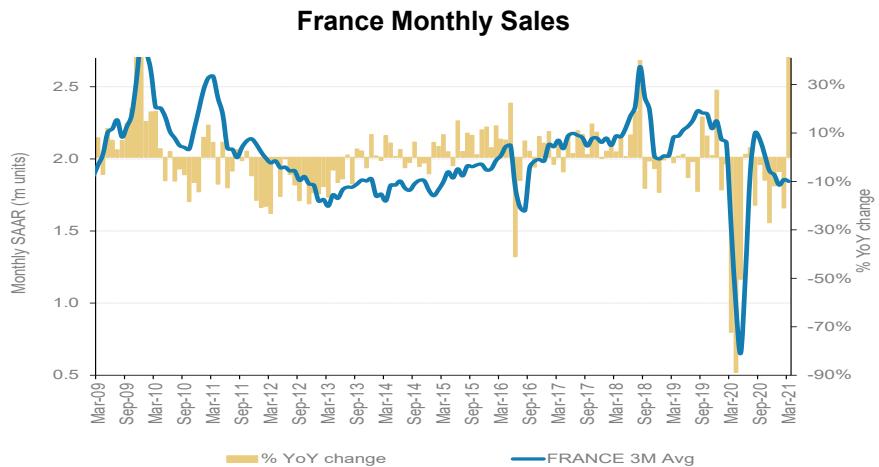
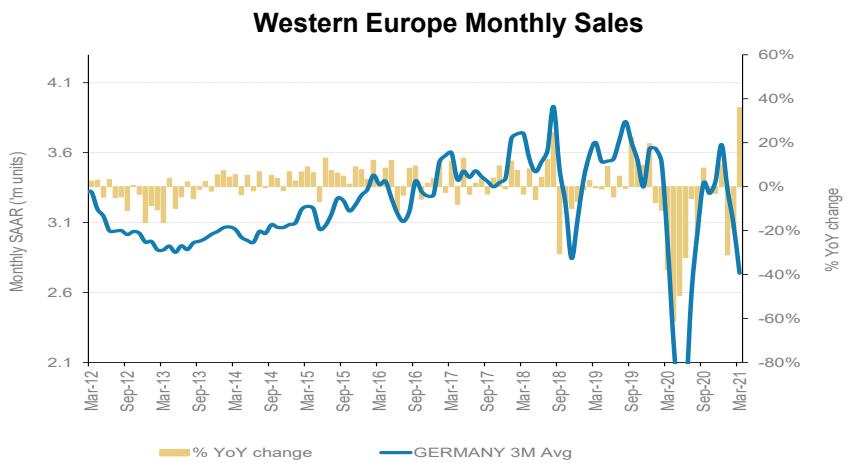


Days Supply is at the lowest. GM's unit inventory is the lowest with 35 days supply at ~3,30,000 units

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Europe Sales

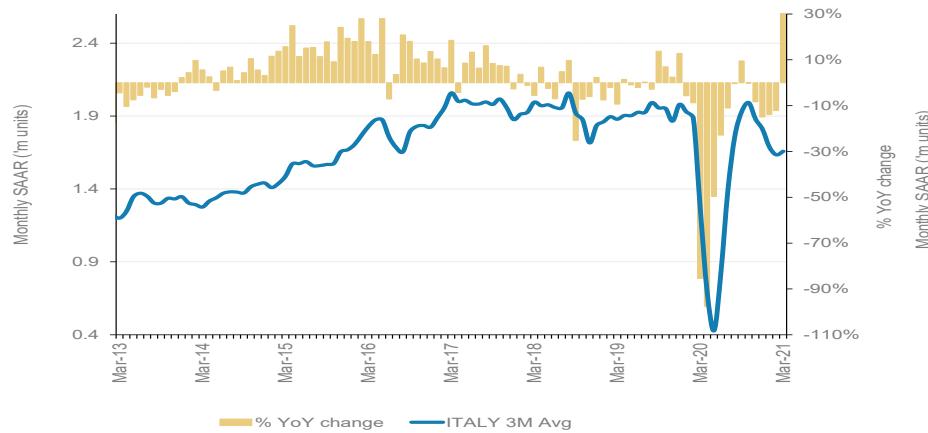


May 2021

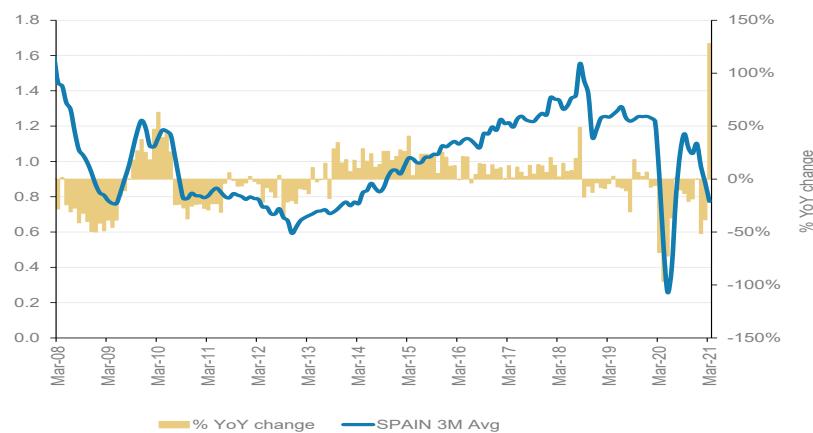
Industrials Spring Training Teach-In

Europe Sales (Cont.)

Italy Monthly Sales

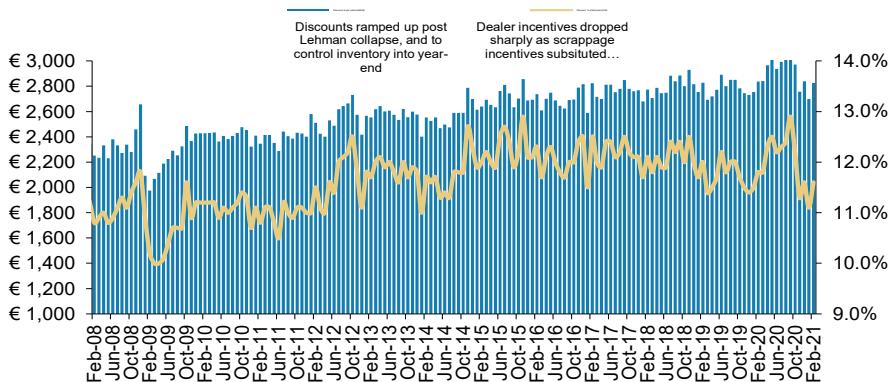


Spain Monthly Sales

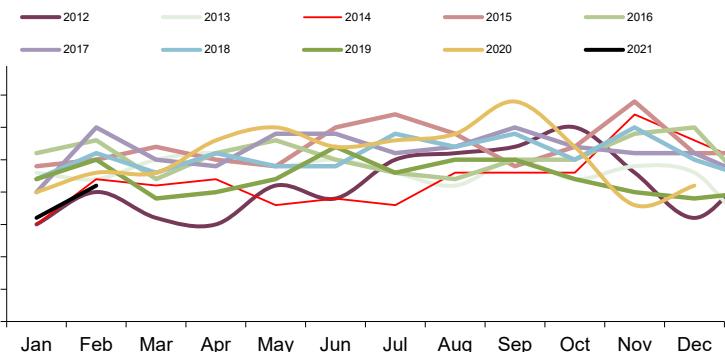


German Discounts and Sales Rates

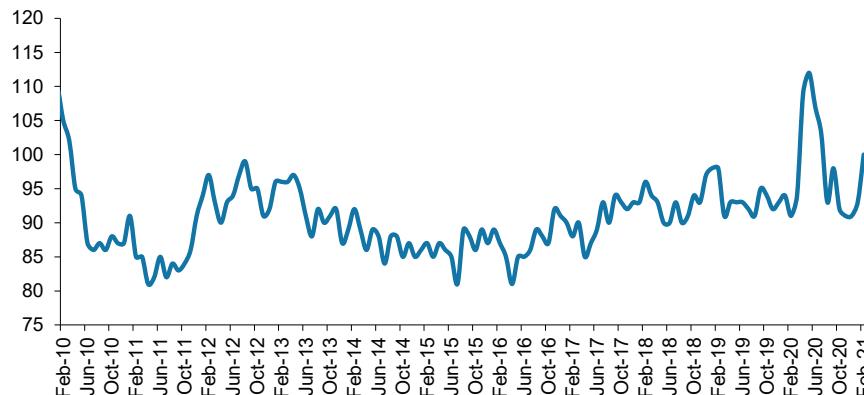
German Discounts Per Vehicle



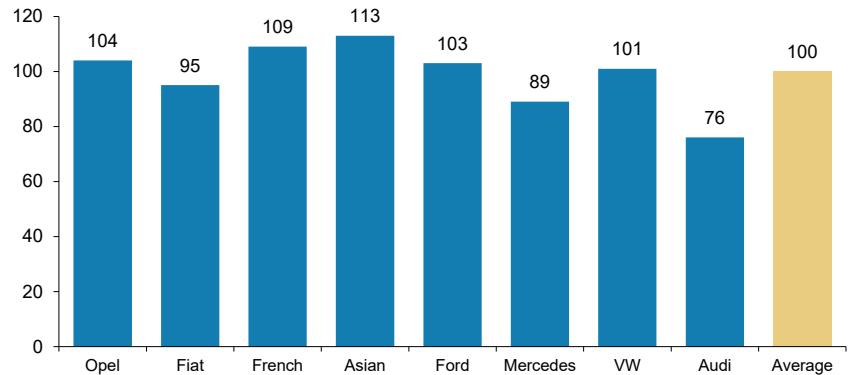
German Discounts as % of List Price



Germany Used Car Standing Time (Days on Lot)



German Used Car Jun Standing Time by OEM (Days on Lot)

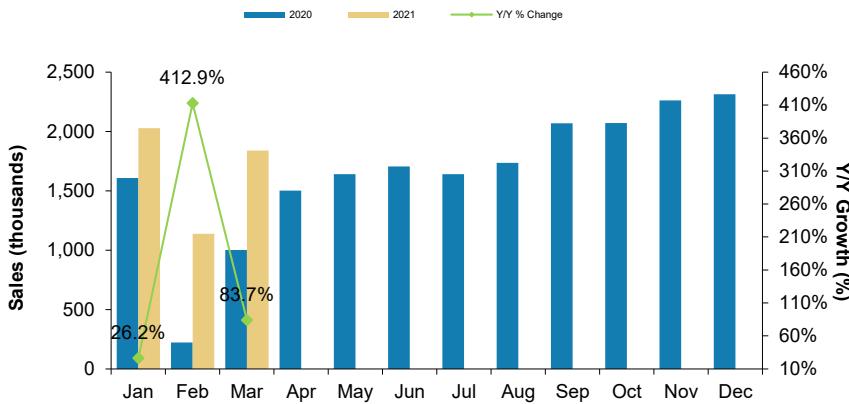


May 2021

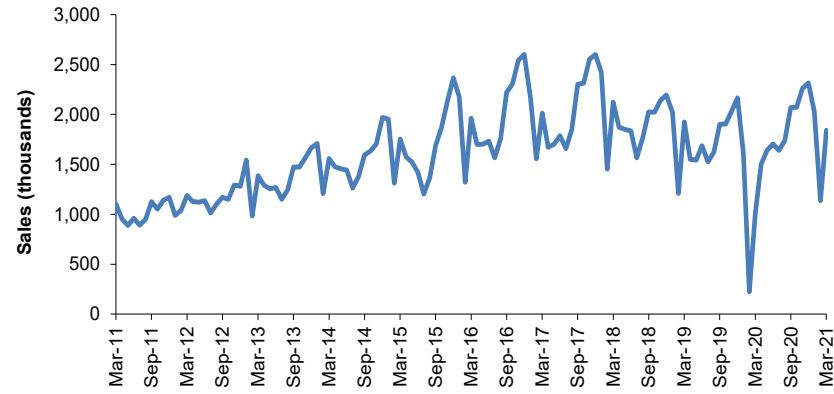
Industrials Spring Training Teach-In

China Passenger Vehicle Sales

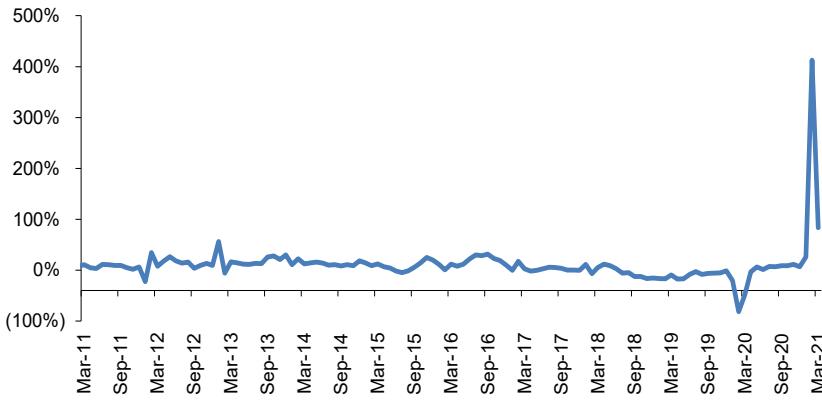
China Monthly Passenger Vehicle Sales Volume



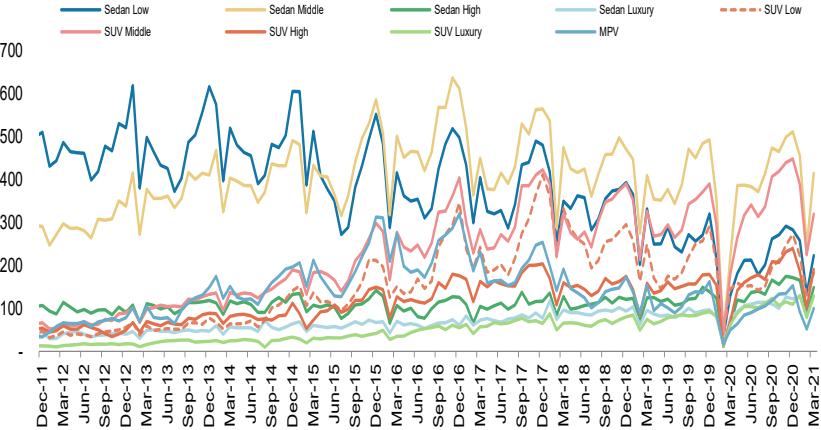
China Monthly Passenger Vehicle Sales Volume Trend



China Monthly Passenger Vehicle Sales YoY Change



China Monthly Passenger Vehicle Sales by Segment

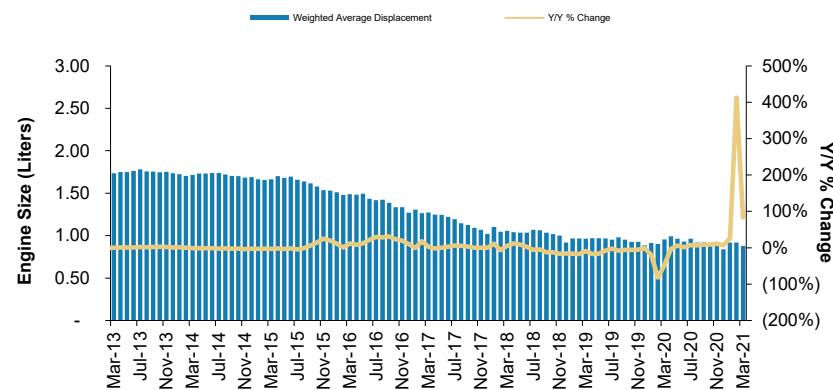


China Passenger Vehicle Segment Data

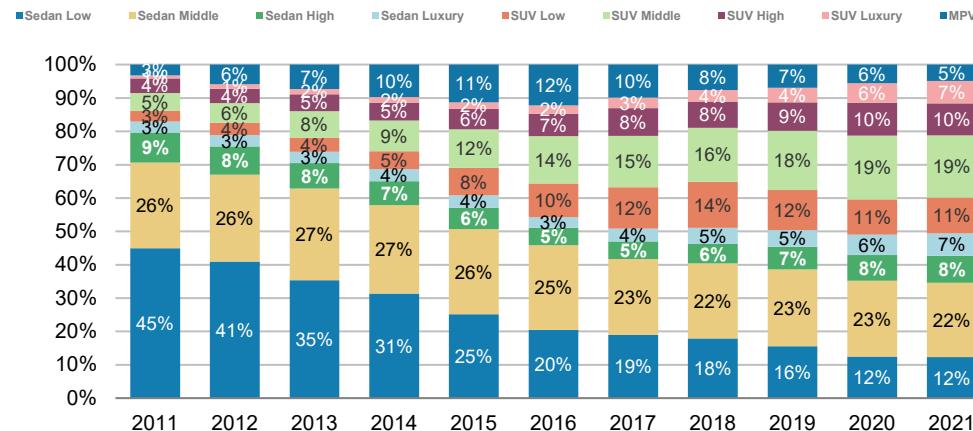
China PV Market MTD Sales by Segment (Mar 2020)

MTD Segments	Units (K)	YoY %	Mkt Share	Growth Contri.	Growth Share
Sedan Low	223,421	71.6%	12.1%	9.3%	11.1%
Sedan Middle	415,182	87.6%	22.6%	19.4%	23.1%
Sedan High	148,993	139.7%	8.1%	8.7%	10.4%
Sedan Luxury	129,889	63.9%	7.1%	5.1%	6.0%
SUV Low	182,697	25.9%	9.9%	3.8%	4.5%
SUV Middle	319,876	77.2%	17.4%	13.9%	16.6%
SUV High	191,193	170.6%	10.4%	12.0%	14.4%
SUV Luxury	129,001	107.2%	7.0%	6.7%	8.0%
MPV	99,936	99.7%	5.4%	5.0%	6.0%
Grand Total	1,840,188	83.7%	100.0%	83.7%	100.0%

China PV Weighted Average Monthly Engine Size



China Passenger Vehicle Market Share by Segment

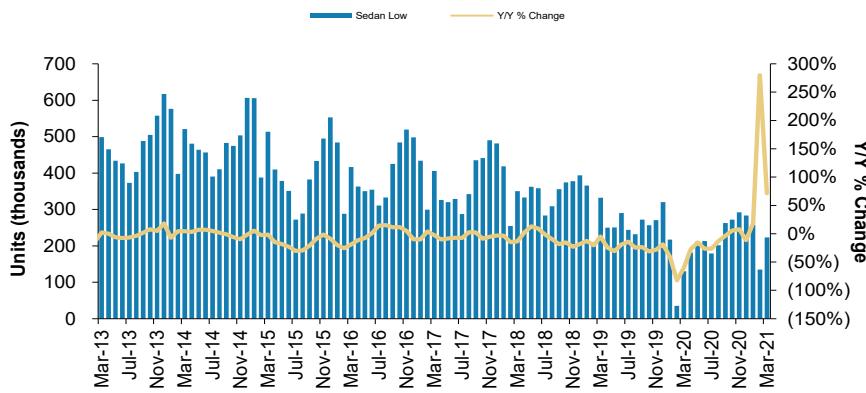


May 2021

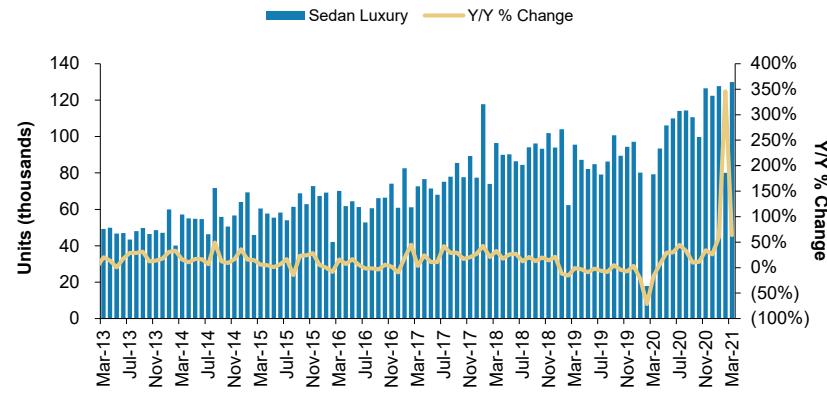
Industrials Spring Training Teach-In

China Passenger Vehicle Sales by Segment

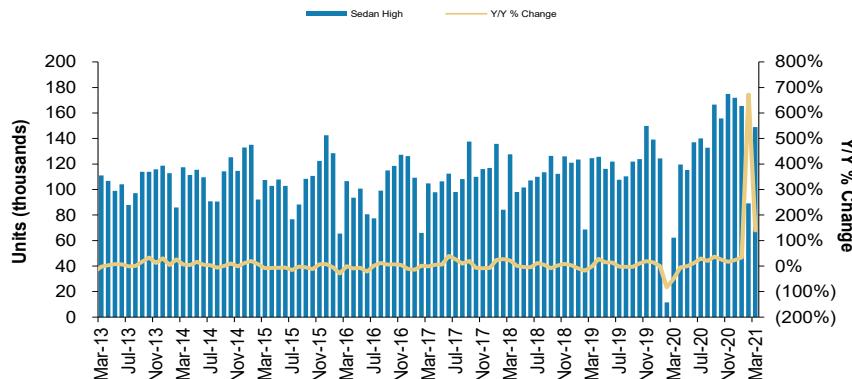
Monthly Passenger Vehicle Sales – Sedan Low



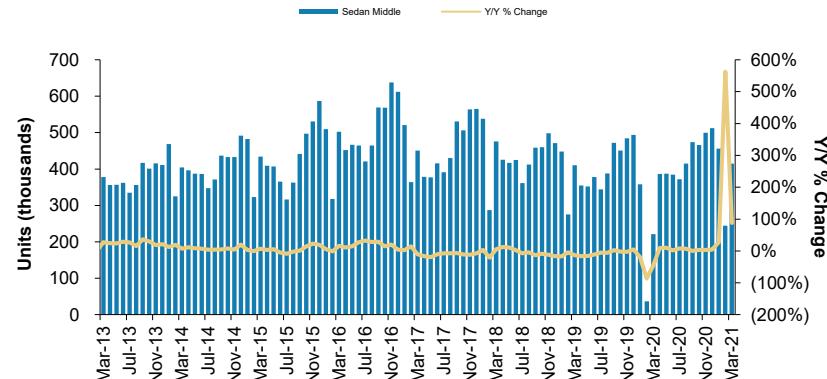
Monthly Passenger Vehicle Sales – Sedan Luxury



Monthly Passenger Vehicle Sales – Sedan High



Monthly Passenger Vehicle Sales – Sedan Middle

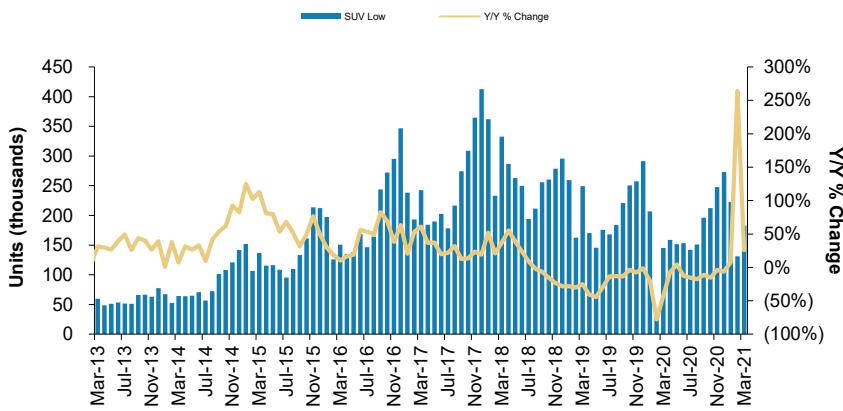


May 2021

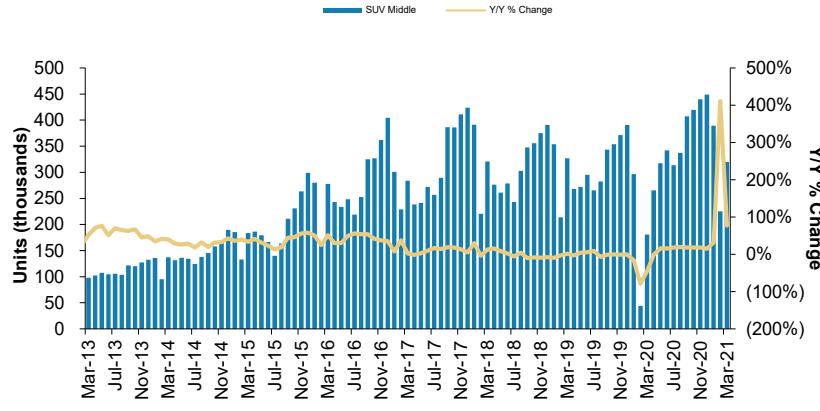
Industrials Spring Training Teach-In

China Passenger Vehicle Sales by Segment

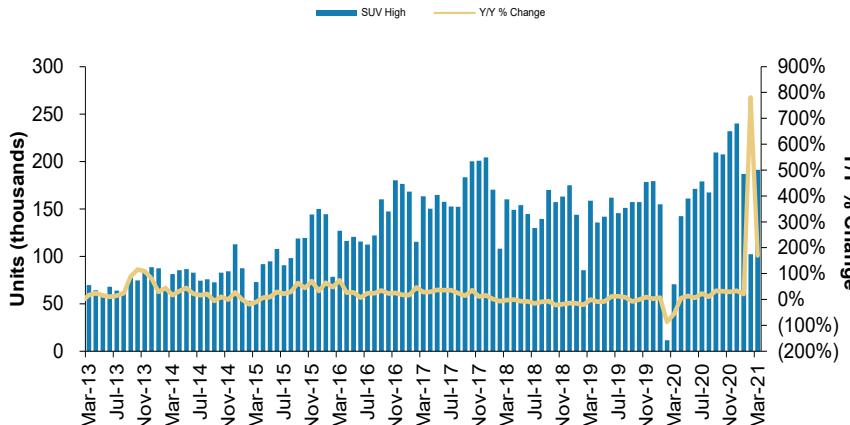
Monthly Passenger Vehicle Sales – SUV Low



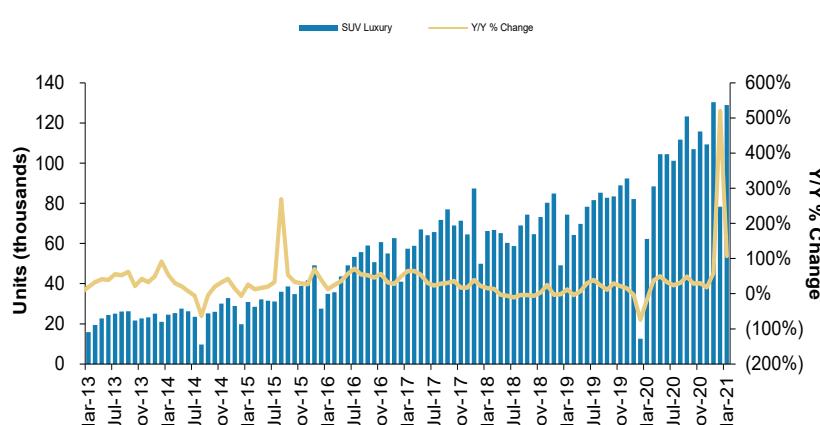
Monthly Passenger Vehicle Sales – SUV Middle



Monthly Passenger Vehicle Sales – SUV High



Monthly Passenger Vehicle Sales – SUV Luxury

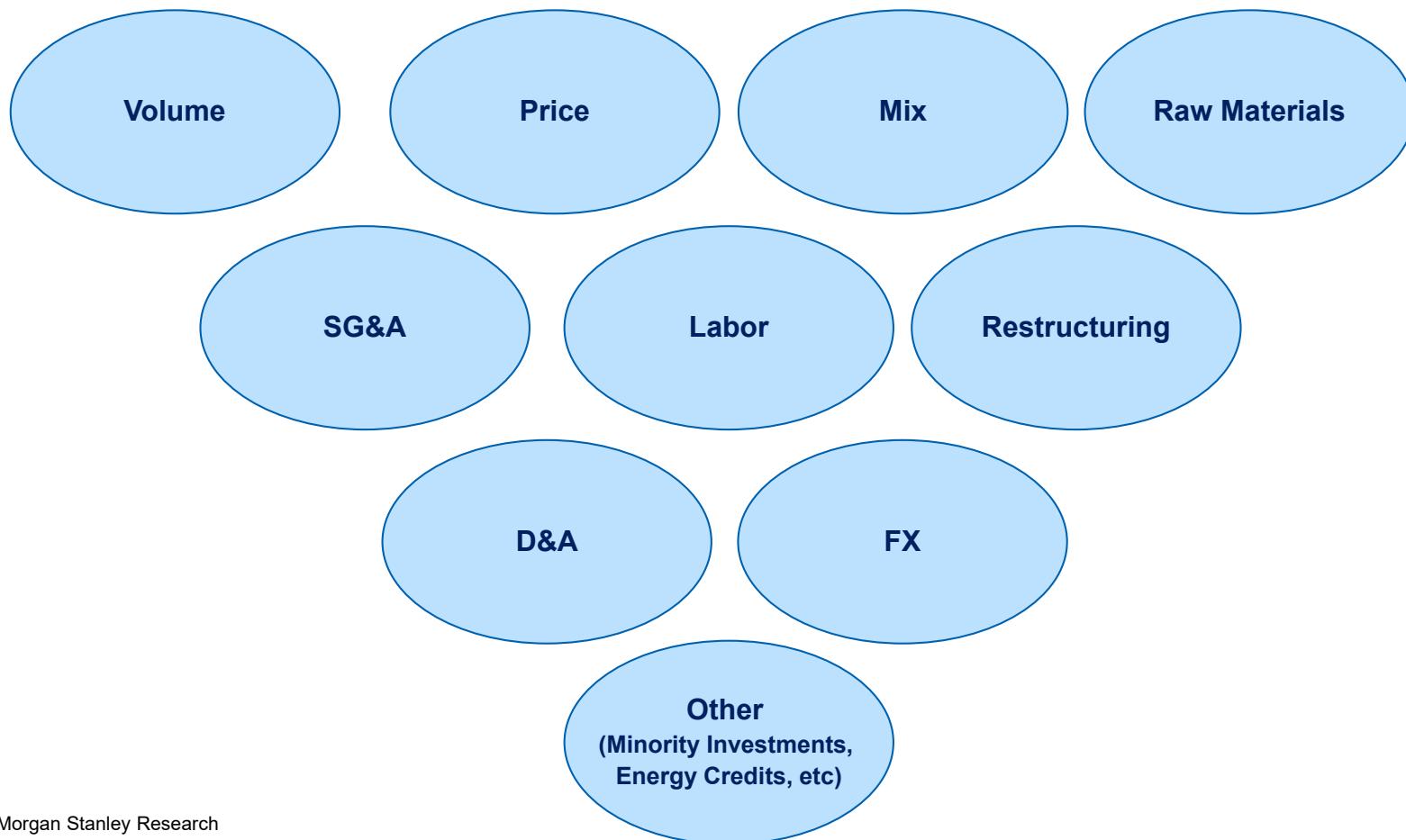


Source: Morgan Stanley Research, China Auto Market

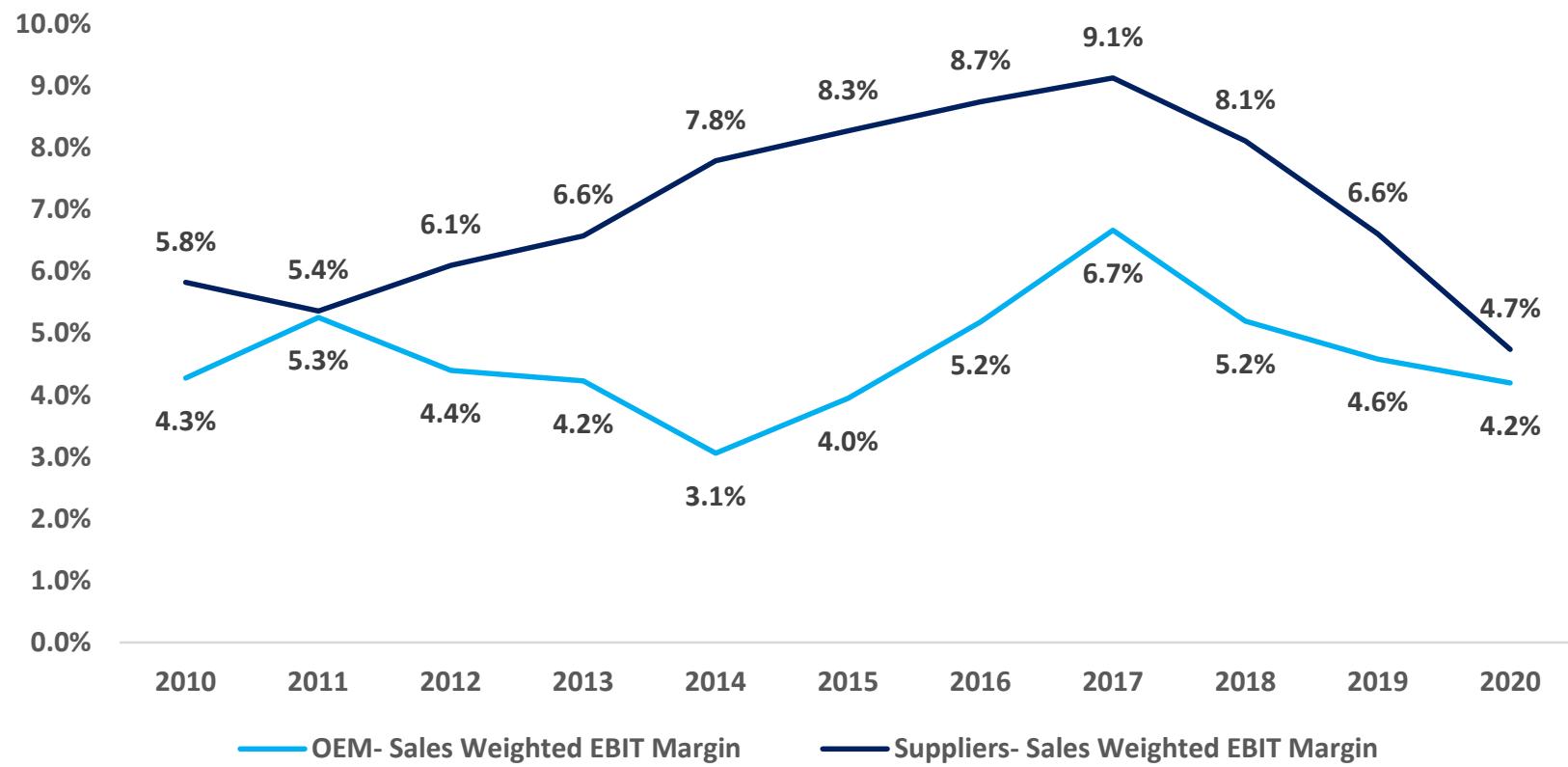
SECTION 3: PROFIT

Key Profitability Factors for OEMs

Factors affecting OEM margins include:



Supplier vs. OEM Sales Weighted EBIT Margins

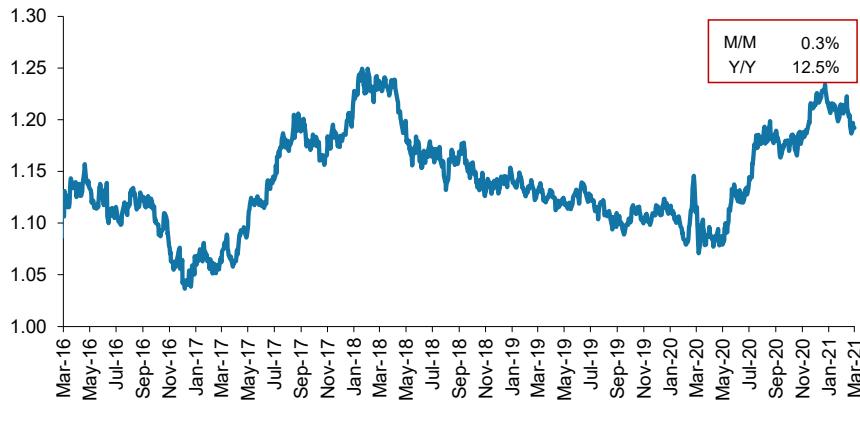


May 2021

Industrials Spring Training Teach-In

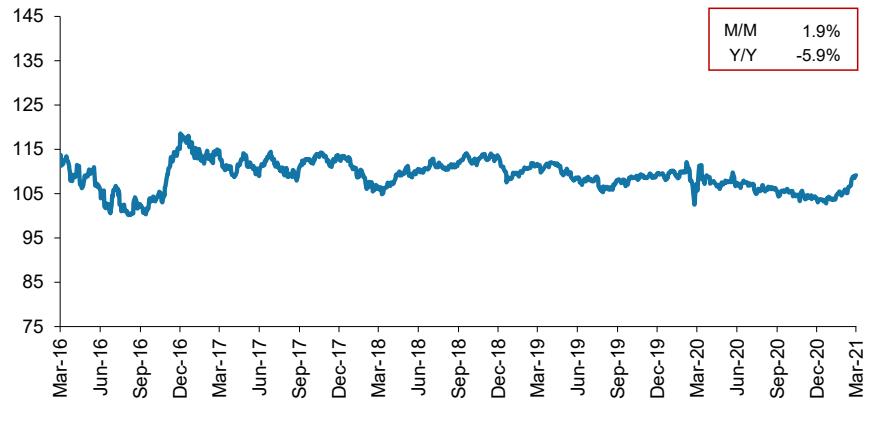
OE Suppliers – Currency

EUR / USD



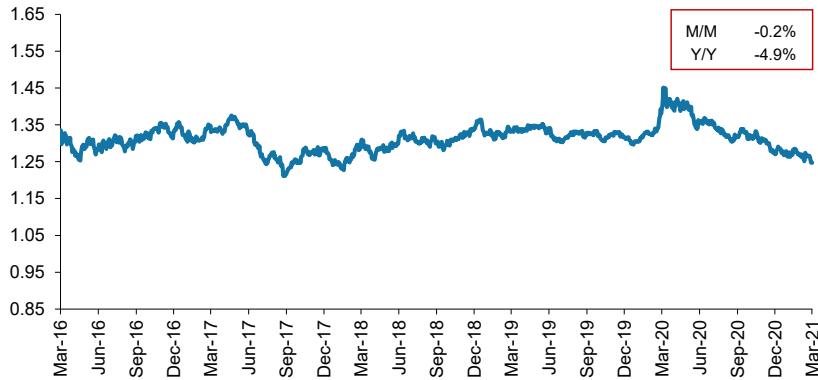
Source: Datastream, Morgan Stanley Research

USD / JPY



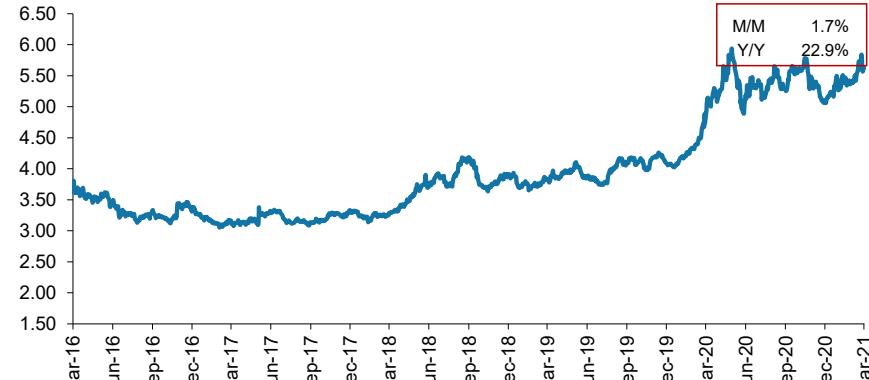
Source: Datastream, Morgan Stanley Research

USD / CAD



Source: Datastream, Morgan Stanley Research

BRL / USD

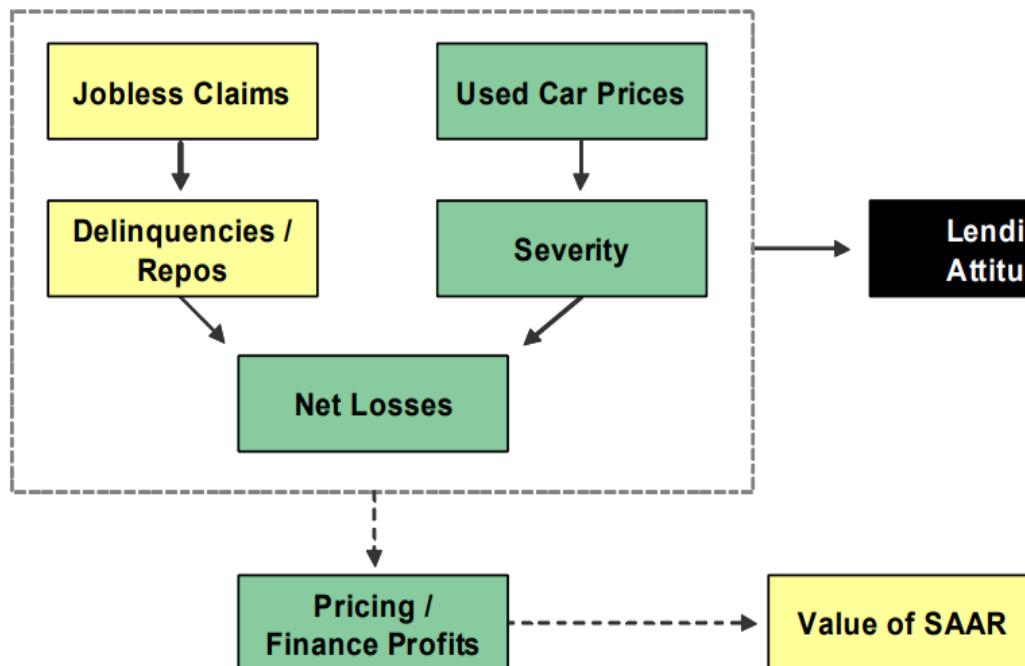


Source: Datastream, Morgan Stanley Research

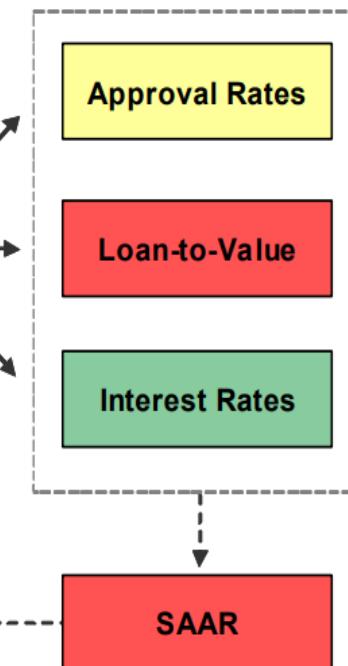
SECTION 4: FINCO

Auto Credit Inter-relationships

Auto Credit Quality: ACQ



Auto Credit Availability: ACA

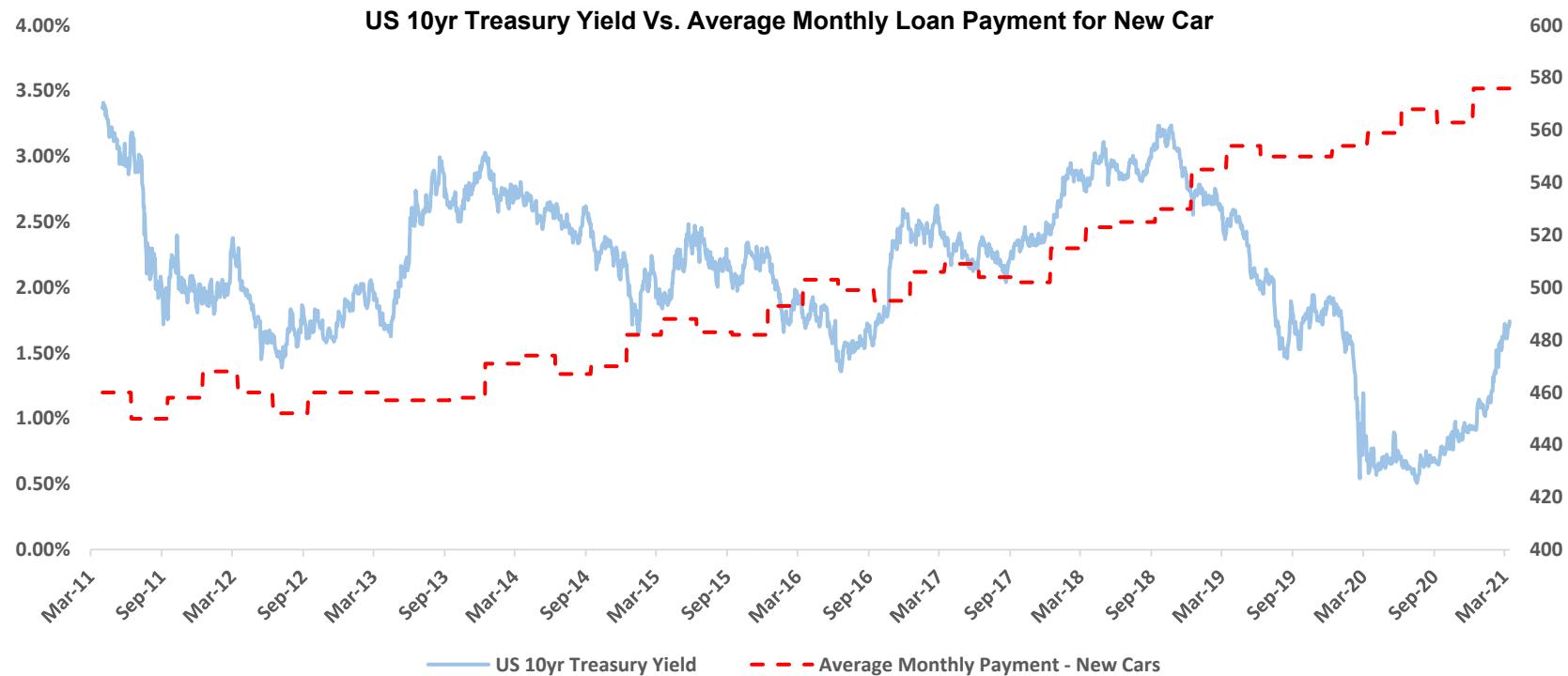


= Positive

= Mixed

= Negative

OEM - Credit: US Auto Credit / The Fed



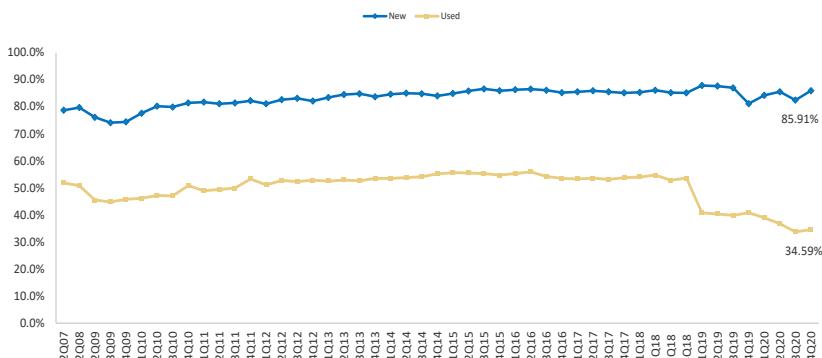
>90% of the value of new car sales is transacted via a financial instrument

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Industrials Spring Training Teach-In

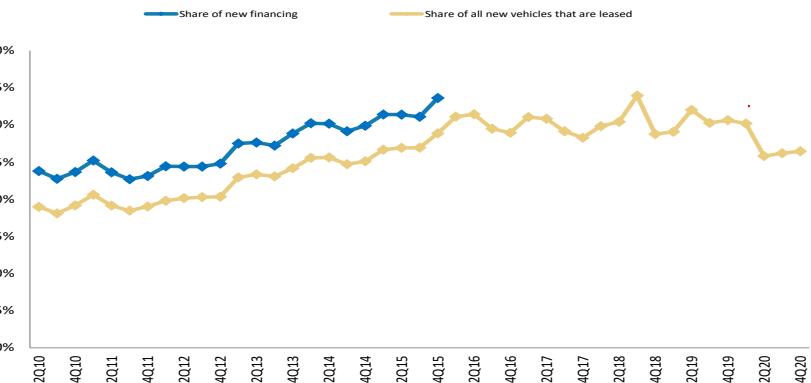
OEMs – Credit

Percentage of vehicles with financing



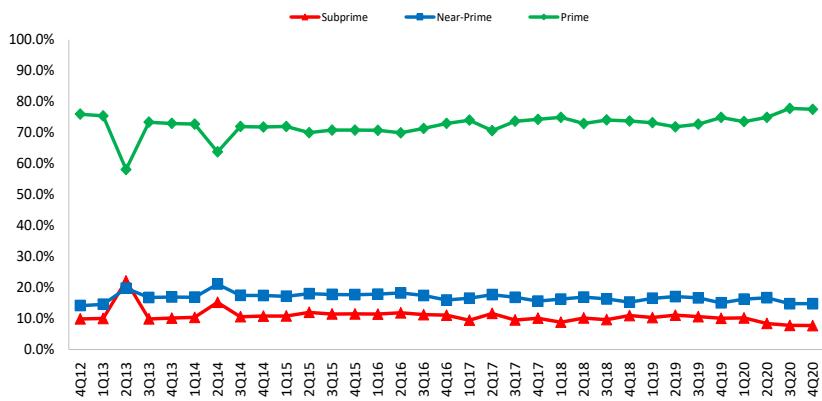
Source: Experian, Morgan Stanley Research

New Lease market share



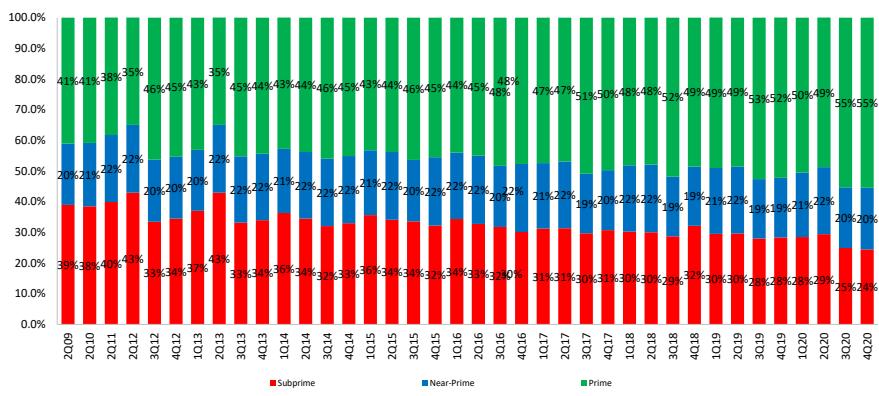
Source: Experian, Morgan Stanley Research

New Loan Originations by Risk Segment



Source: Experian, Morgan Stanley Research

Used Car Loans by Risk Segments



Source: Experian, Morgan Stanley Research. Latest available data 2Q20

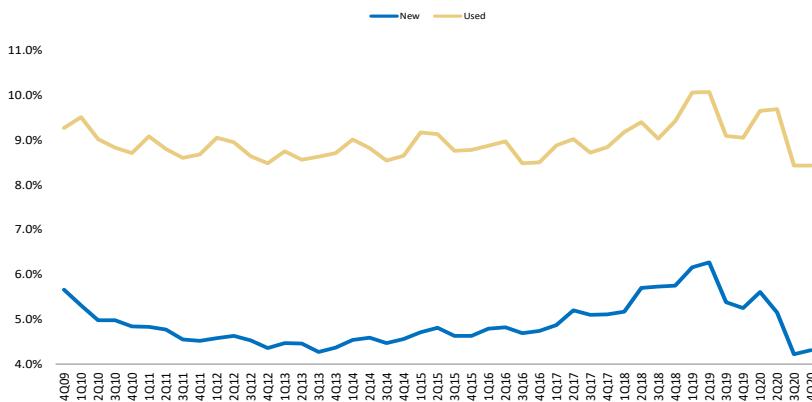
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Industrials Spring Training Teach-In

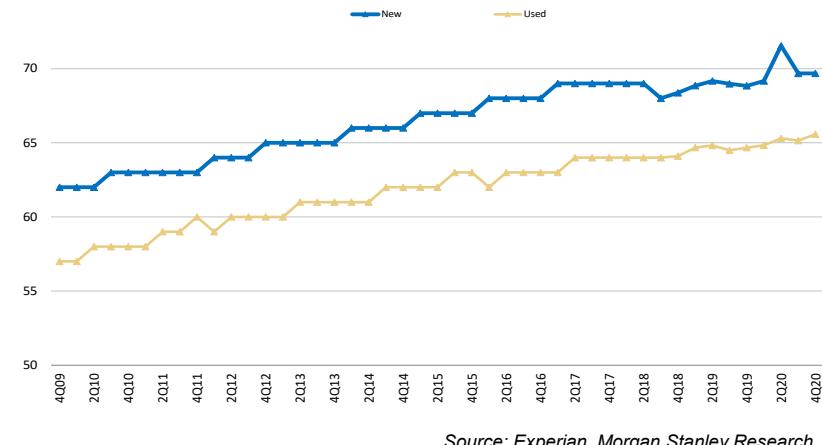
OEMs – Credit

Average Rate on New & Used vehicle loans

New and Used Financing – Average Term

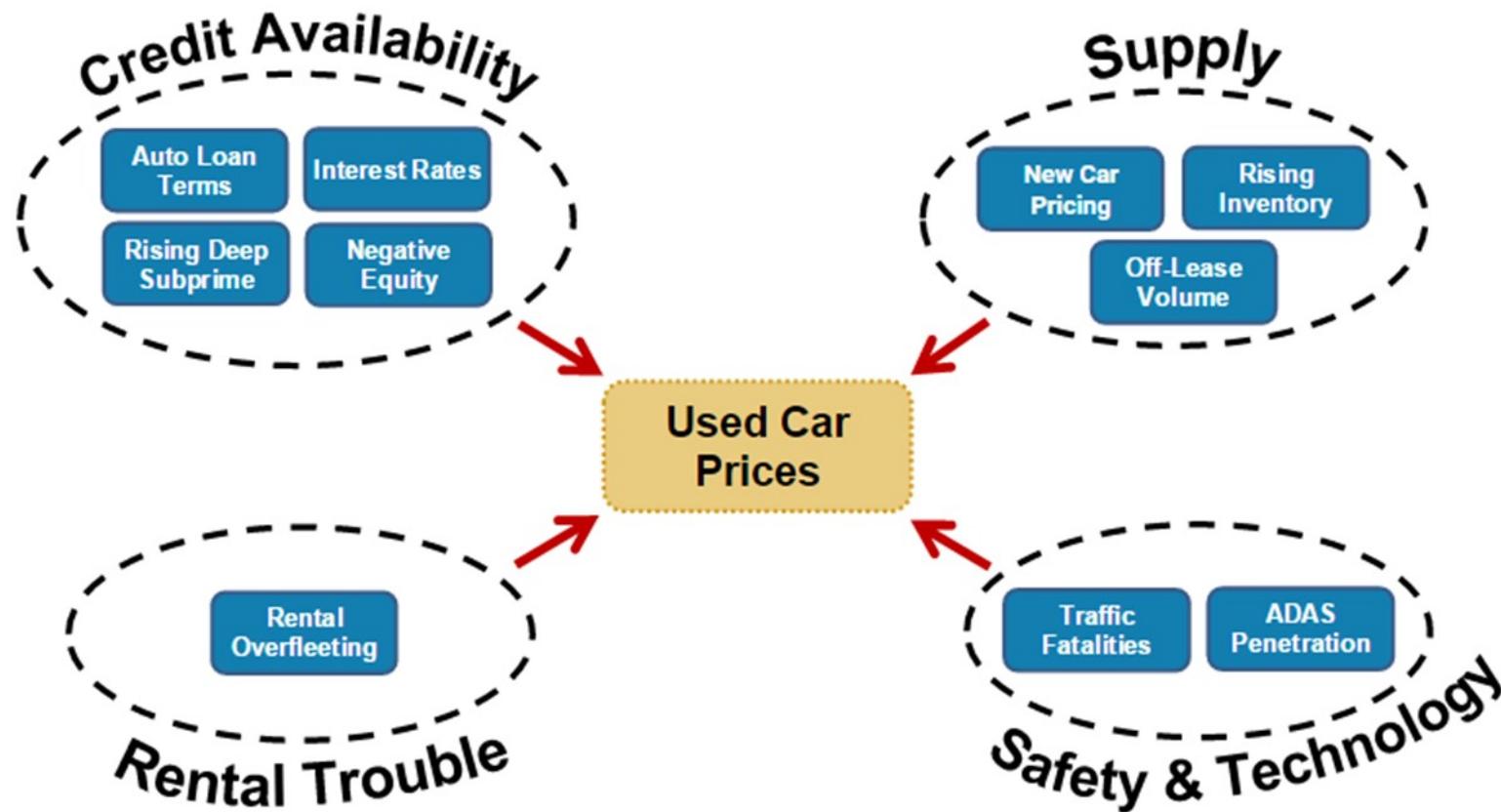


Source: Experian, Morgan Stanley Research



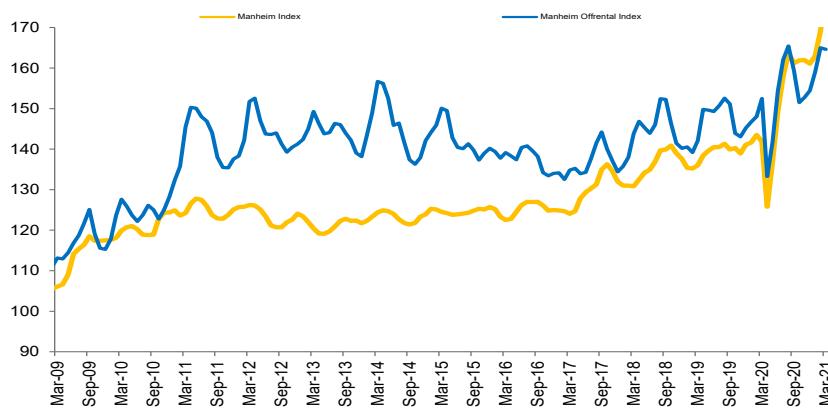
Source: Experian, Morgan Stanley Research

Used Vehicle Prices

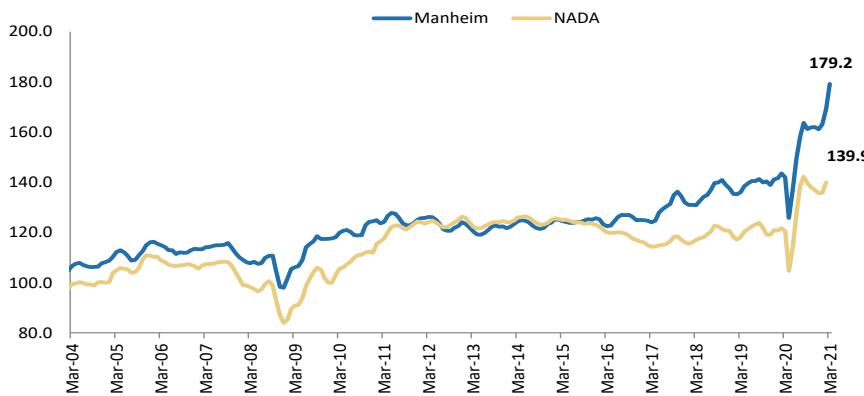


Auto Dealers - US Used Car Data

Manheim Index & Off-Rental Index

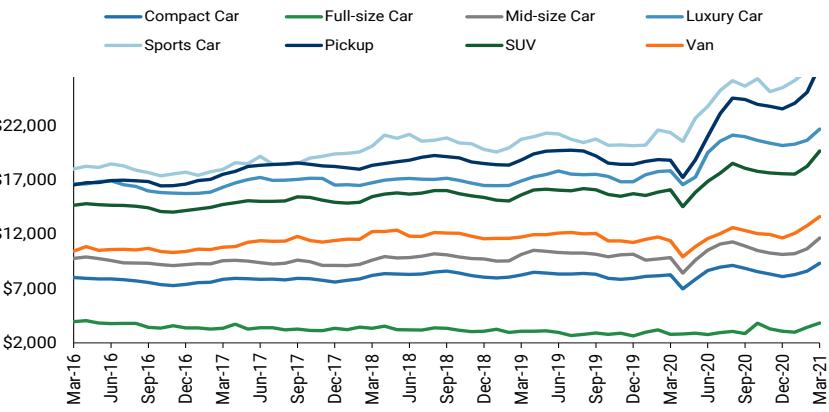


Manheim Vs NADA Used Vehicles Pricing Index

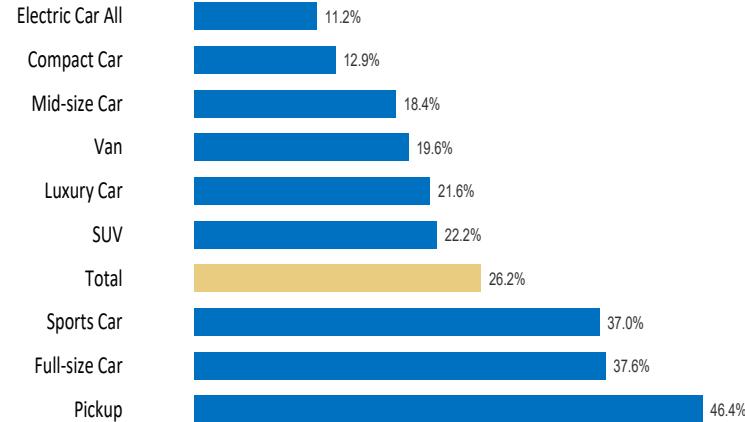


Source: Morgan Stanley Research, Manheim, NADA

NSA Prices

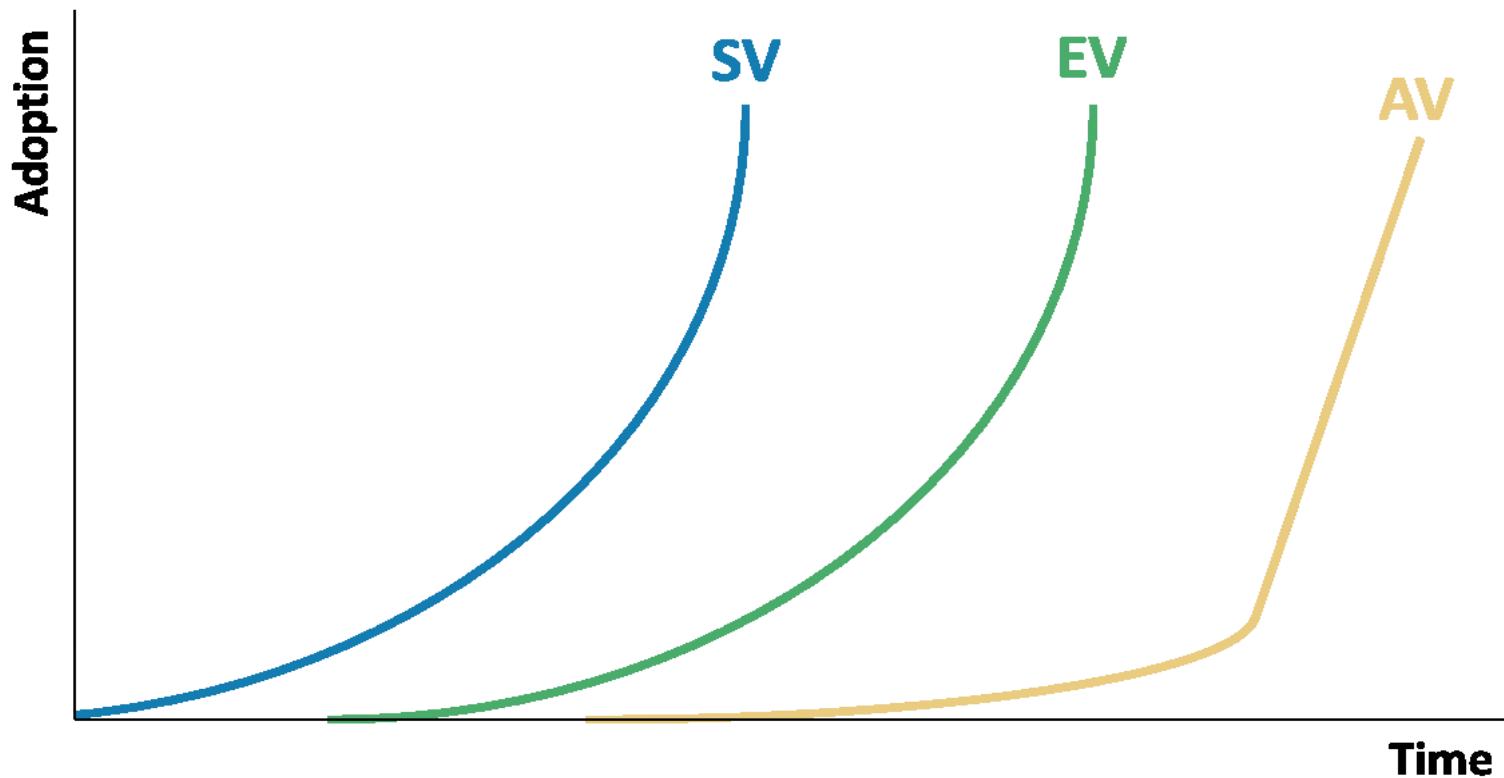


Used Vehicles Prices (Mar 2020 vs. LY)

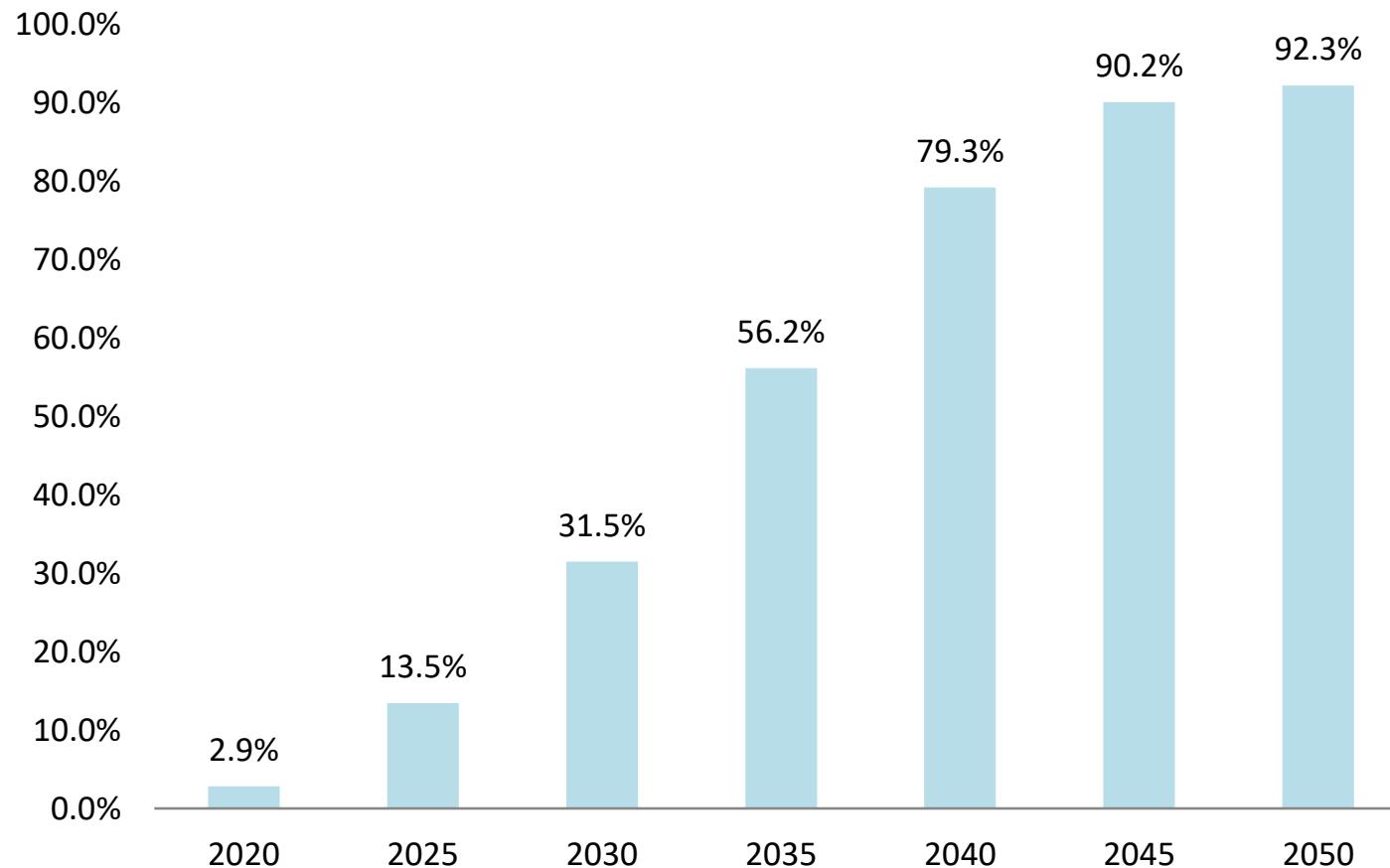


SECTION 5: DISRUPTION

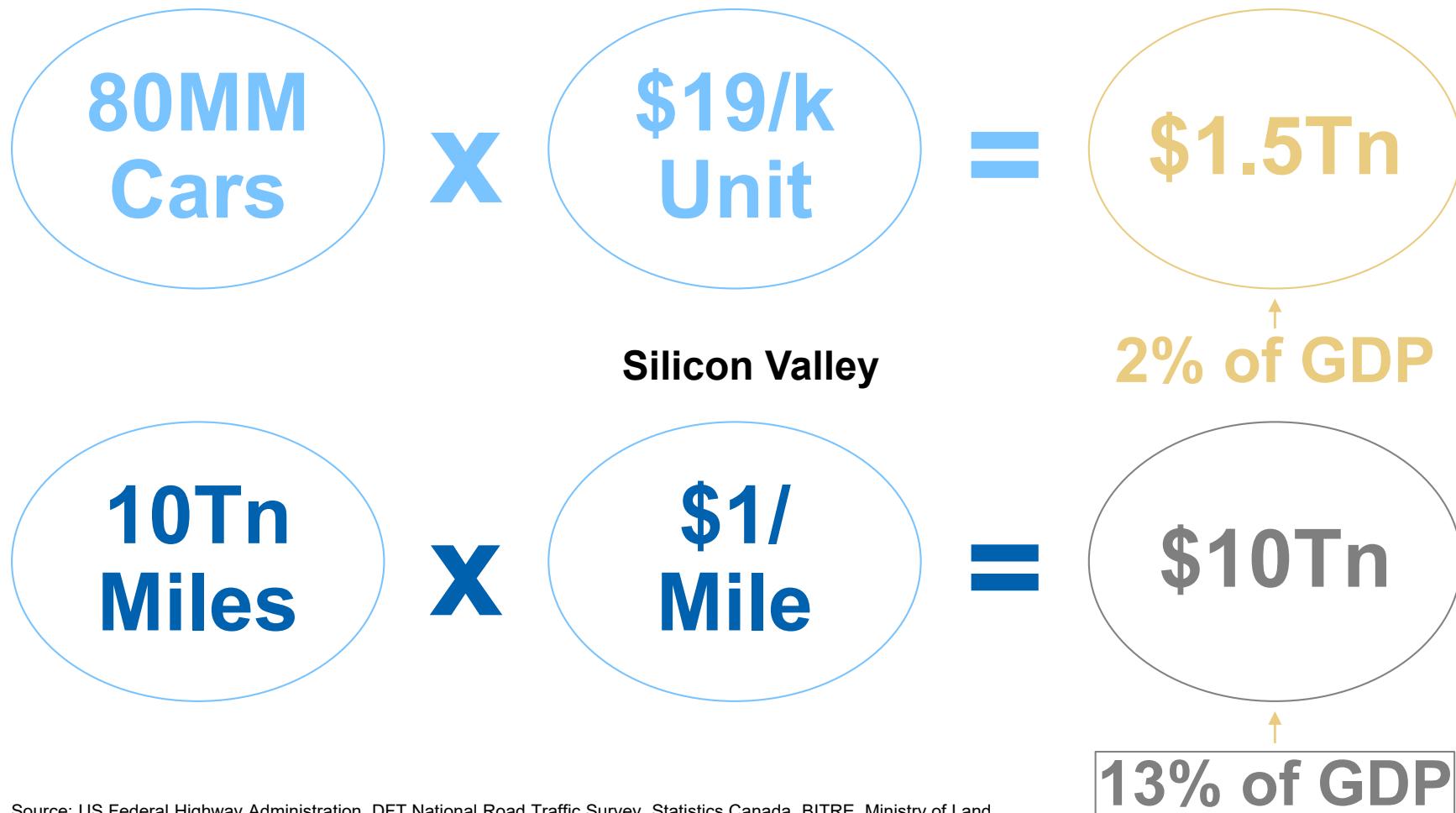
3 Key Drivers of Auto Disruption: Shared, Electric, Autonomous



Global EV Penetration (% of Sales)

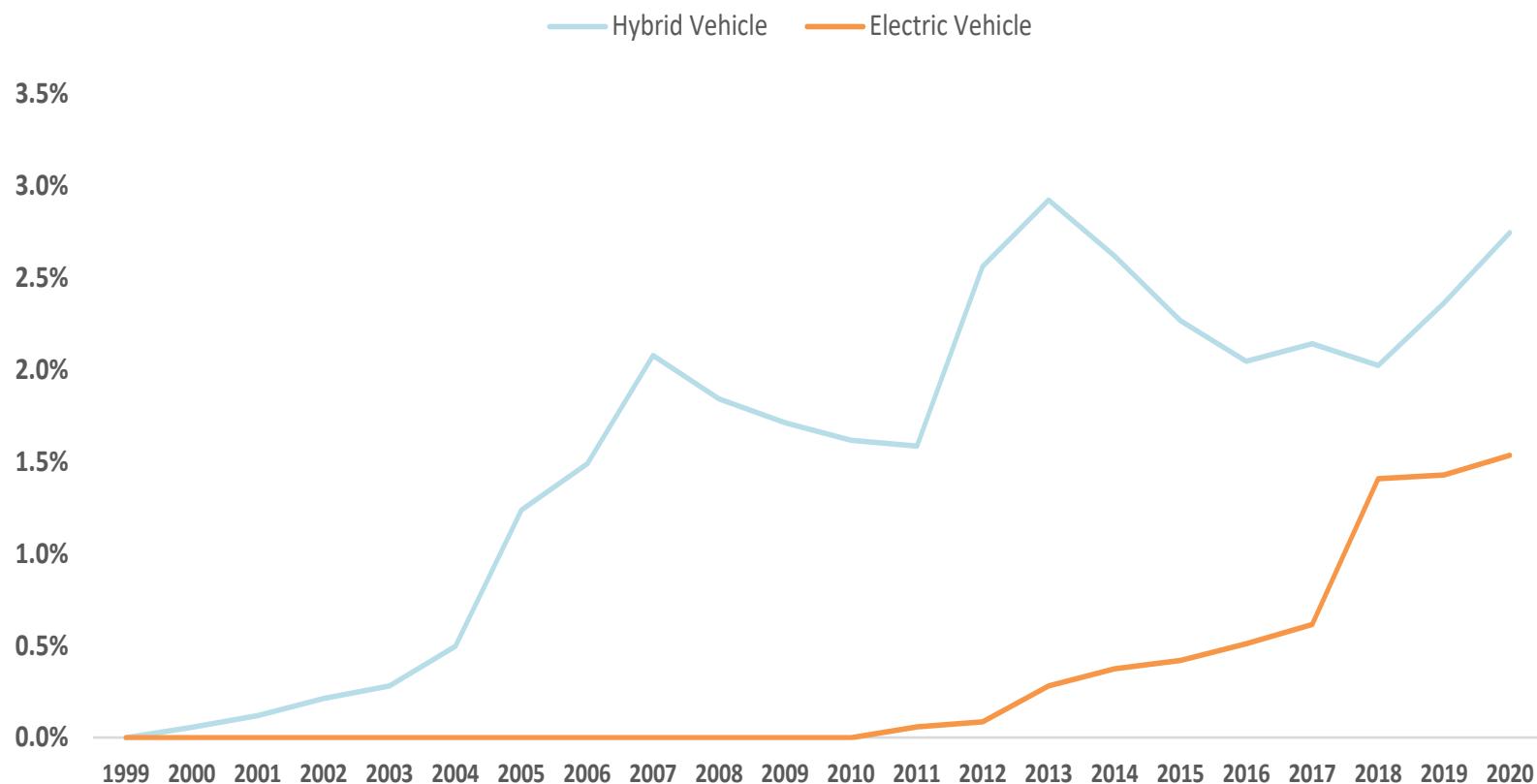


TAM Models



Hybrid & Electric as % of Overall LV Sales

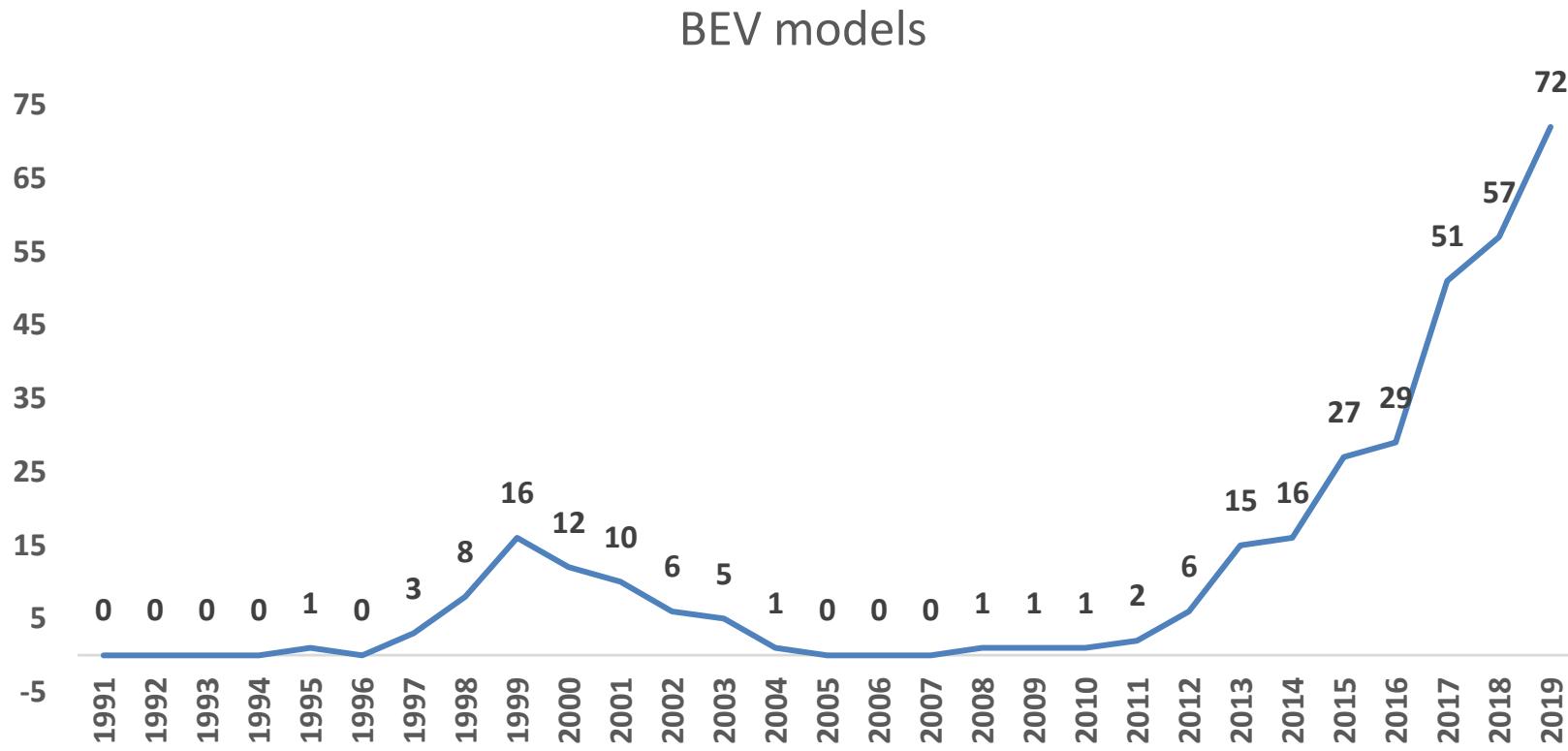
We are Bearish on Hybrids...



May 2021

Industrials Spring Training Teach-In

Number of Electric Vehicle Models Available



EV Payback

EV PAYBACK	PRIVATELY OWNED	TAXI
Hr/Day	1 hr/day	10 hr/day
Miles/Yr	10k miles/yr	100k miles/yr
Annual Savings	\$400/yr	\$4,000/yr
Payback	28.5 yrs	< 3 yrs



YTD Top 10 OEMs by Global BEV Sales - Jan 2021 to Feb 2021

Rank	Model	YTD Sales	YTD Market Share
1	Tesla	76,882	19%
2	GM	65,865	16%
3	VW	31,669	8%
4	Ren/Nis/Mit	21,018	5%
5	Stellantis	20,726	5%
6	Hyundai	19,553	5%
7	Great Wall	17,626	4%
8	SAIC	13,652	3%
9	Nio	13,115	3%
10	GAC	10,629	3%
Top 10 BEV Sales - YTD		290,735	71%
Other BEV Sales		115,932	29%
Total Monthly BEV Sales YTD		406,667	100%

Feb 2021 - Top BEV Model Sales - Global

Rank	Model	Feb 2021 BEV Sales	Feb Market Share
1	Tesla Model 3	27,595	15%
2	Wuling HongGuang Mini BEV	20,167	11%
3	Tesla Model Y	13,956	8%
4	Great Wall Ora R1 / Black C	4,561	3%
5	BYD Han BEV	4,100	2%
6	Ford Mustang Mach-E BEV	4,023	2%
7	Nissan Leaf BEV	3,810	2%
8	Renault Zoe BEV	3,808	2%
9	VW ID.3 BEV	3,799	2%
10	Audi e-tron Quattro BEV	3,570	2%
11	Hyundai Kona BEV	3,527	2%
12	Changan Benni E-Star BEV	3,274	2%
13	Kia e-Niro BEV	3,194	2%
14	Peugeot e-208 BEV	3,161	2%
15	GAC Aion S BEV	2,724	2%
16	Chevrolet Bolt BEV	2,689	1%
17	VW e-Up! BEV	2,570	1%
18	Nio ES6 BEV	2,252	1%
19	Fiat 500 BEV	2,183	1%
20	Smart Fortwo BEV	2,054	1%
Total Top 20 BEV Models - Feb 2021		117,017	65%
Total BEV Sales Feb 2021		181,352	100%

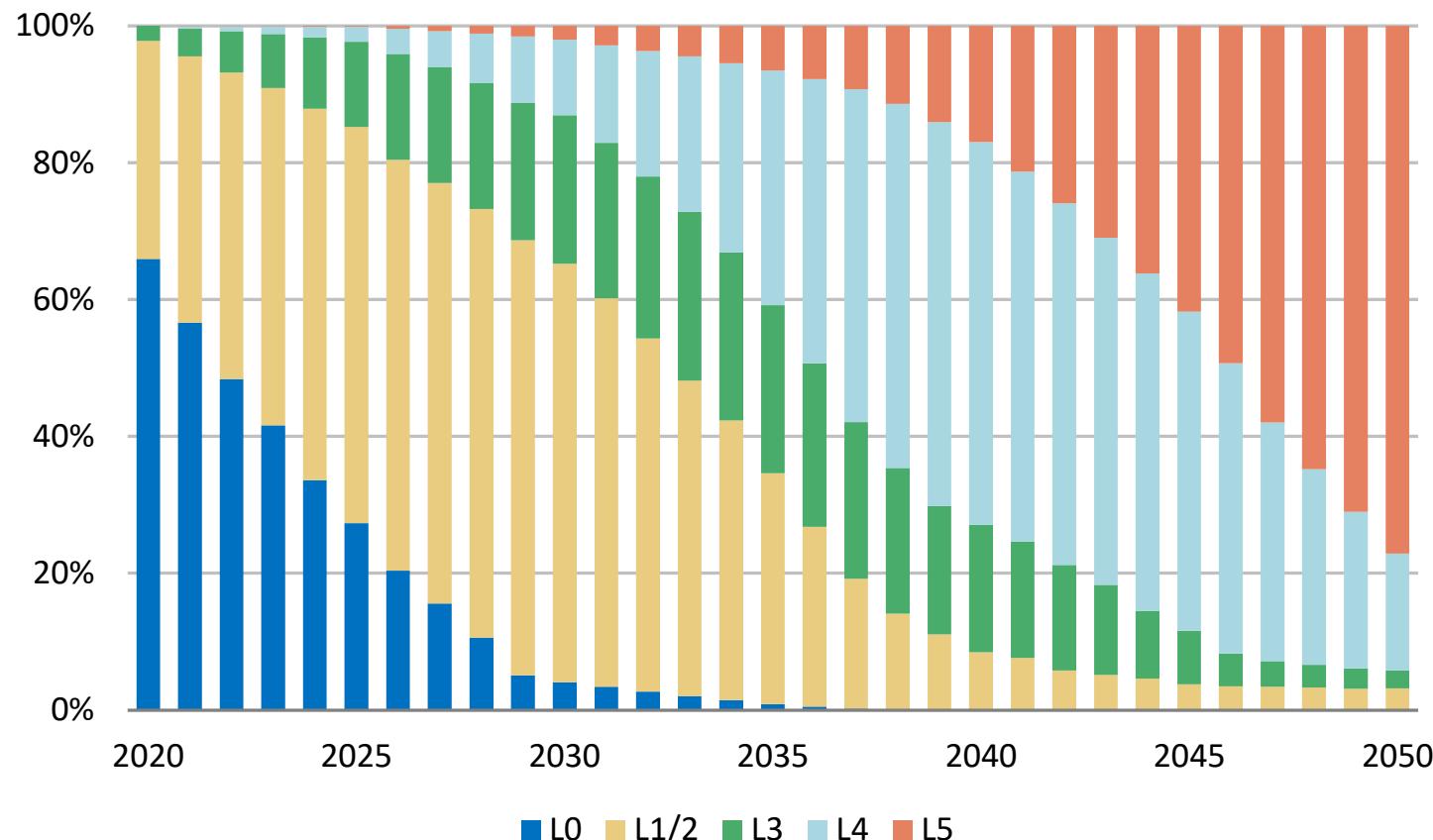
Why does big tech want to get into autos?



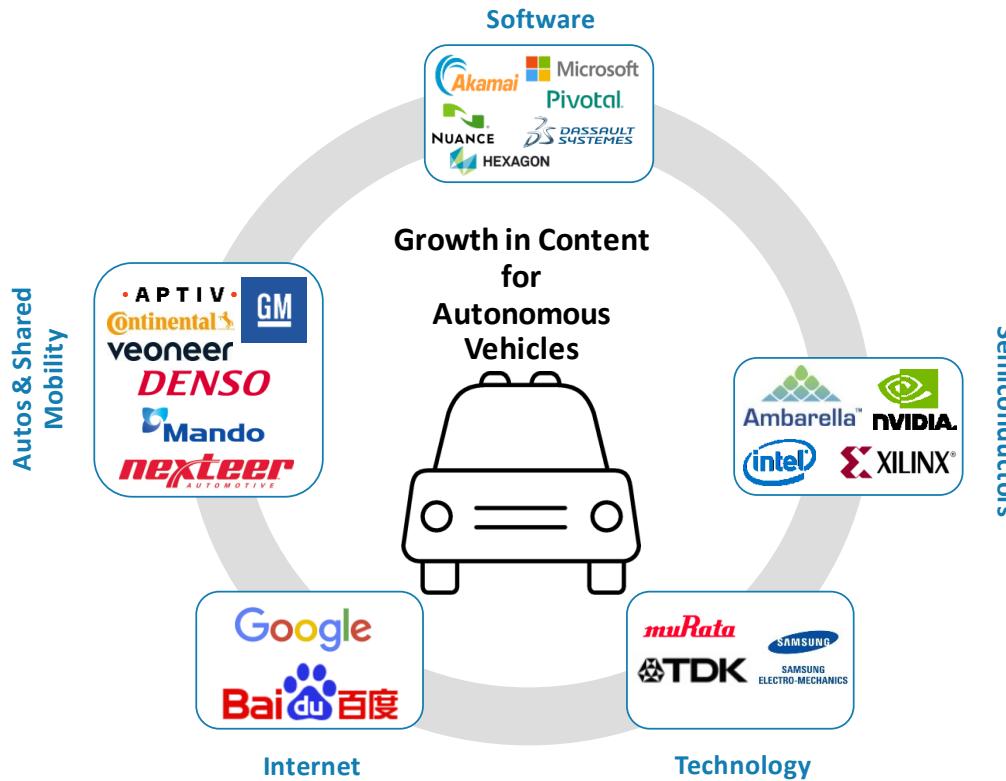
California Autonomous Car Licenses



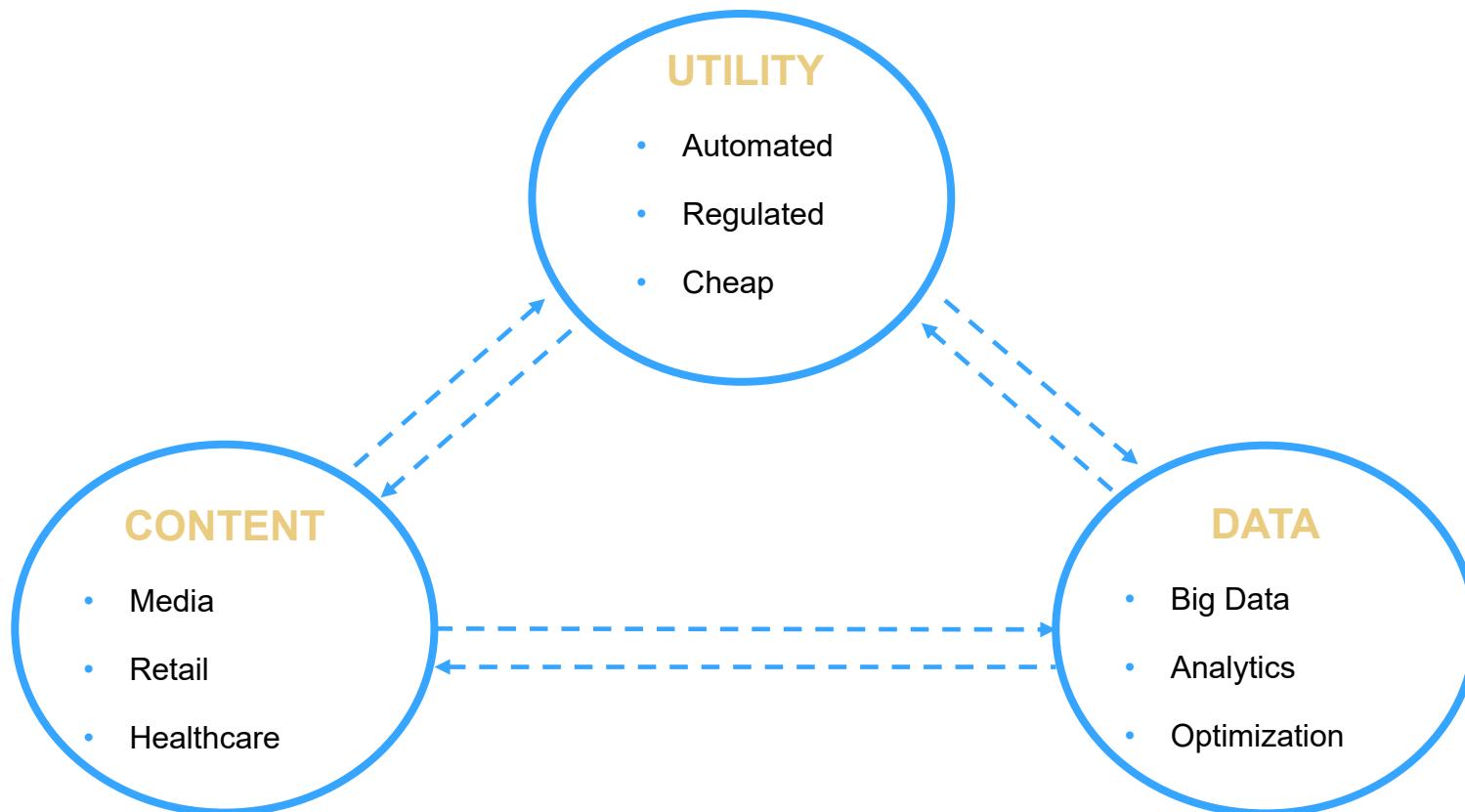
AV Penetration (% of Sales - MSe)



Content Opportunity for Autonomous Vehicles



Future Industry Model



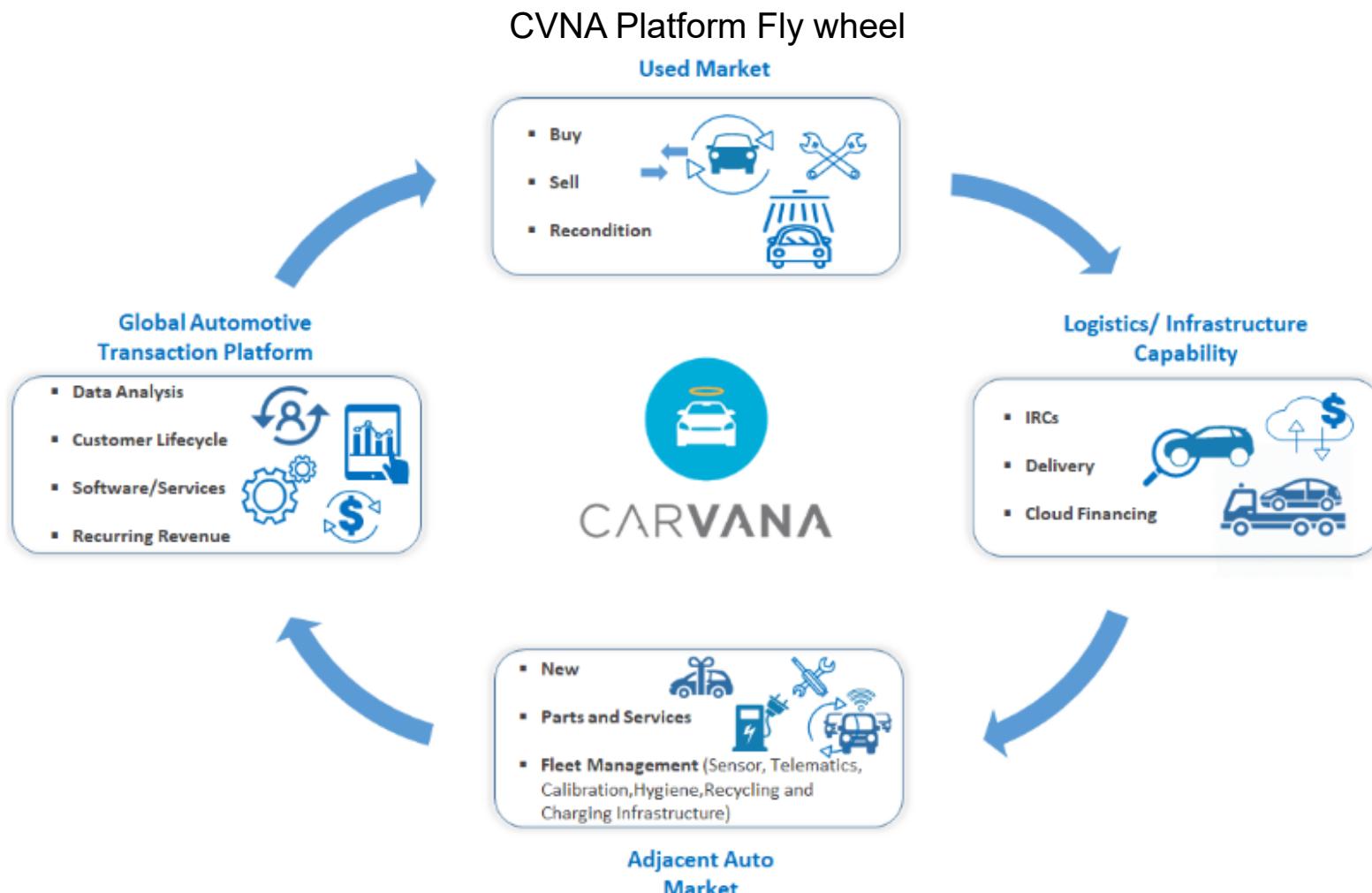
Software Monetization in Autos

E.g. Tesla Network Services

What's included in Network Services? (by 2030e)

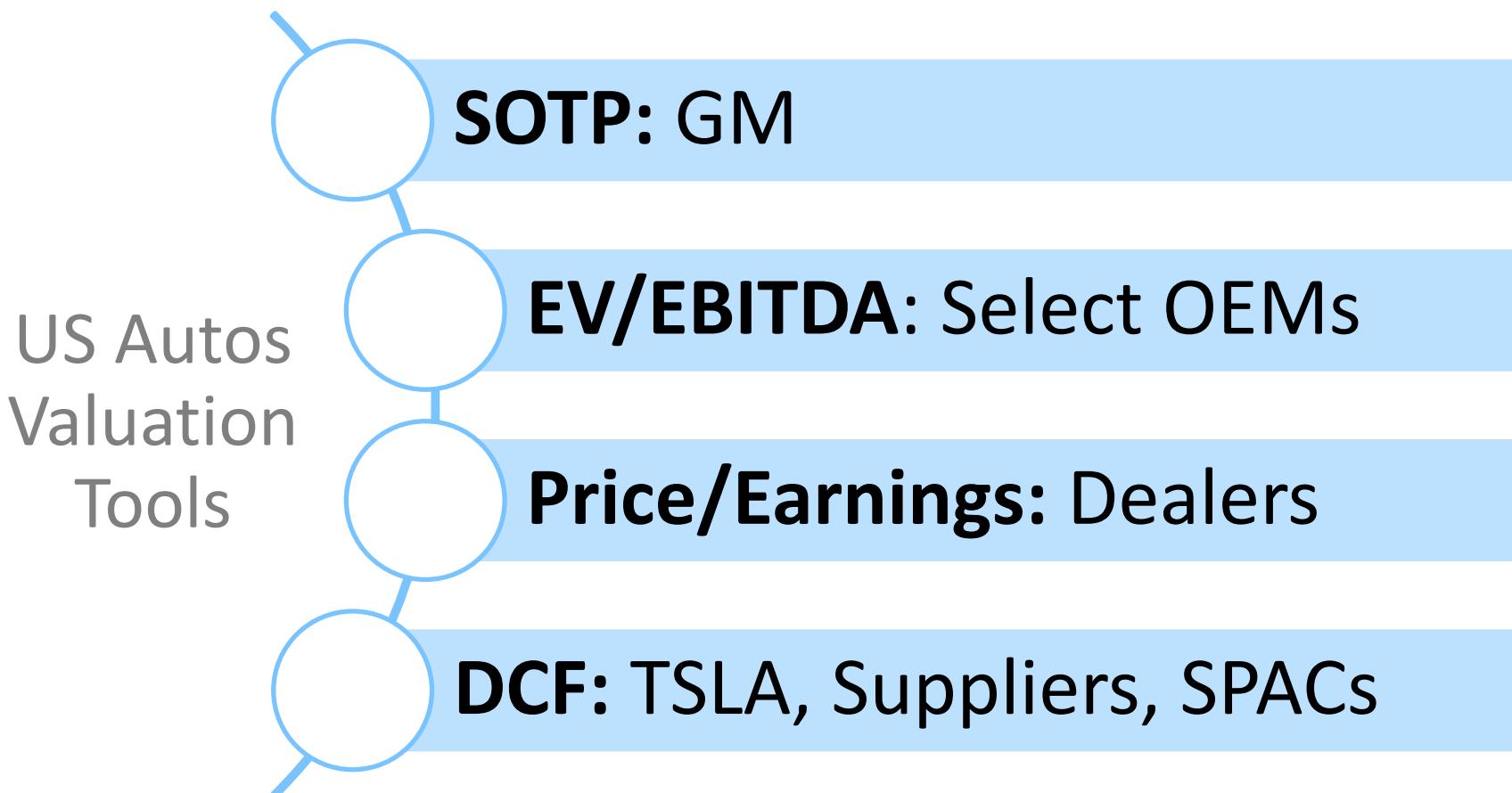
Network Services	Mix %	Rev (\$mm)	\$/Veh Mile	\$/Veh Hour	Month ARPU	Year ARPU	\$/Life of Car
Autonomy	44%	8,819	0.04	0.99	\$ 44	\$ 533	\$ 8,000
Charging	14%	2,772	0.01	0.31	\$ 14	\$ 168	\$ 2,514
Maintenance	16%	3,233	0.01	0.36	\$ 16	\$ 196	\$ 2,933
Upgrades	10%	1,984	0.01	0.22	\$ 10	\$ 120	\$ 1,800
Content	5%	992	0.00	0.11	\$ 5	\$ 60	\$ 900
Other	10%	2,043	0.01	0.23	\$ 10	\$ 124	\$ 1,853
Total	100%	19,843	0.09	2.24	\$ 100	\$ 1,200	\$ 18,000

Dawn of Changing Auto Service Platform – Used Car Market



SECTION 6: VALUATION

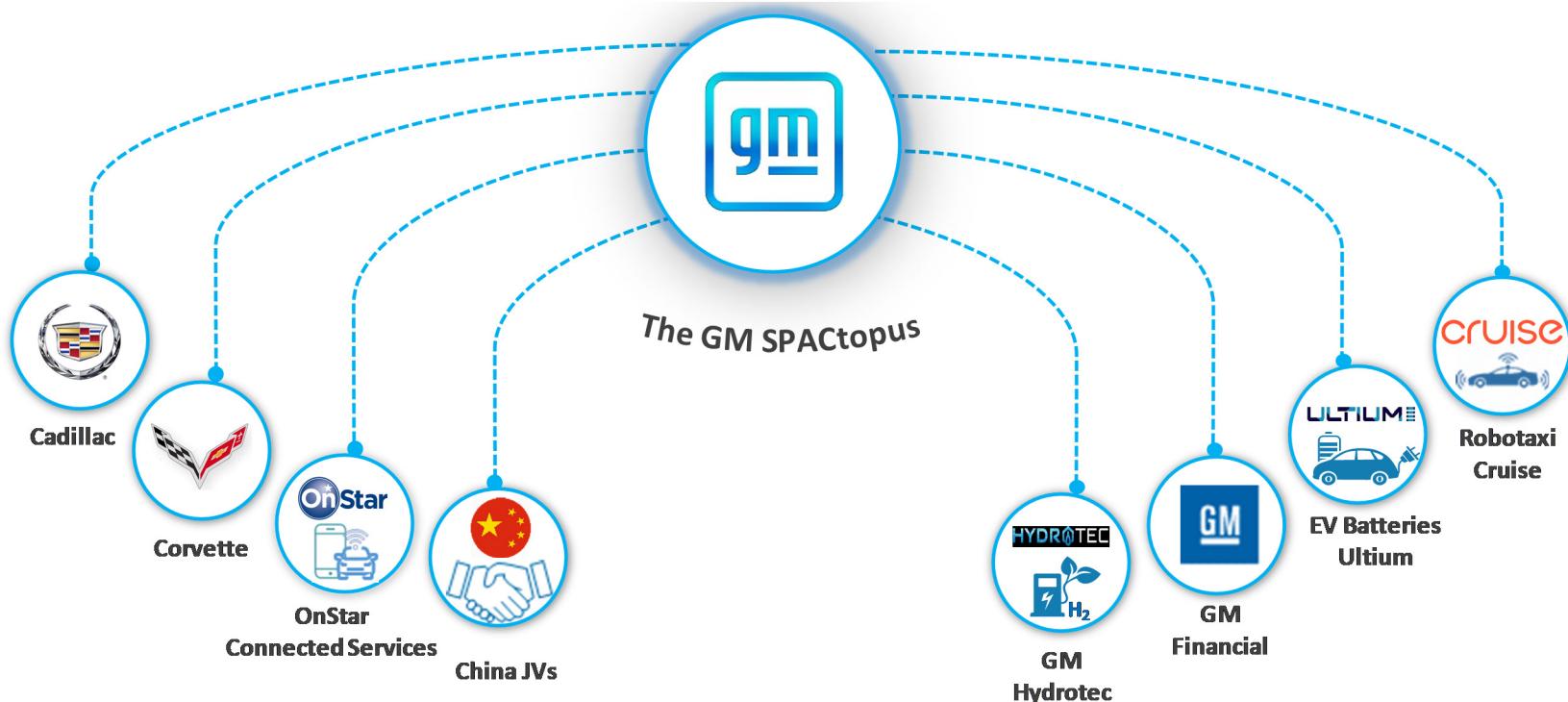
Valuation Methodologies & Why?



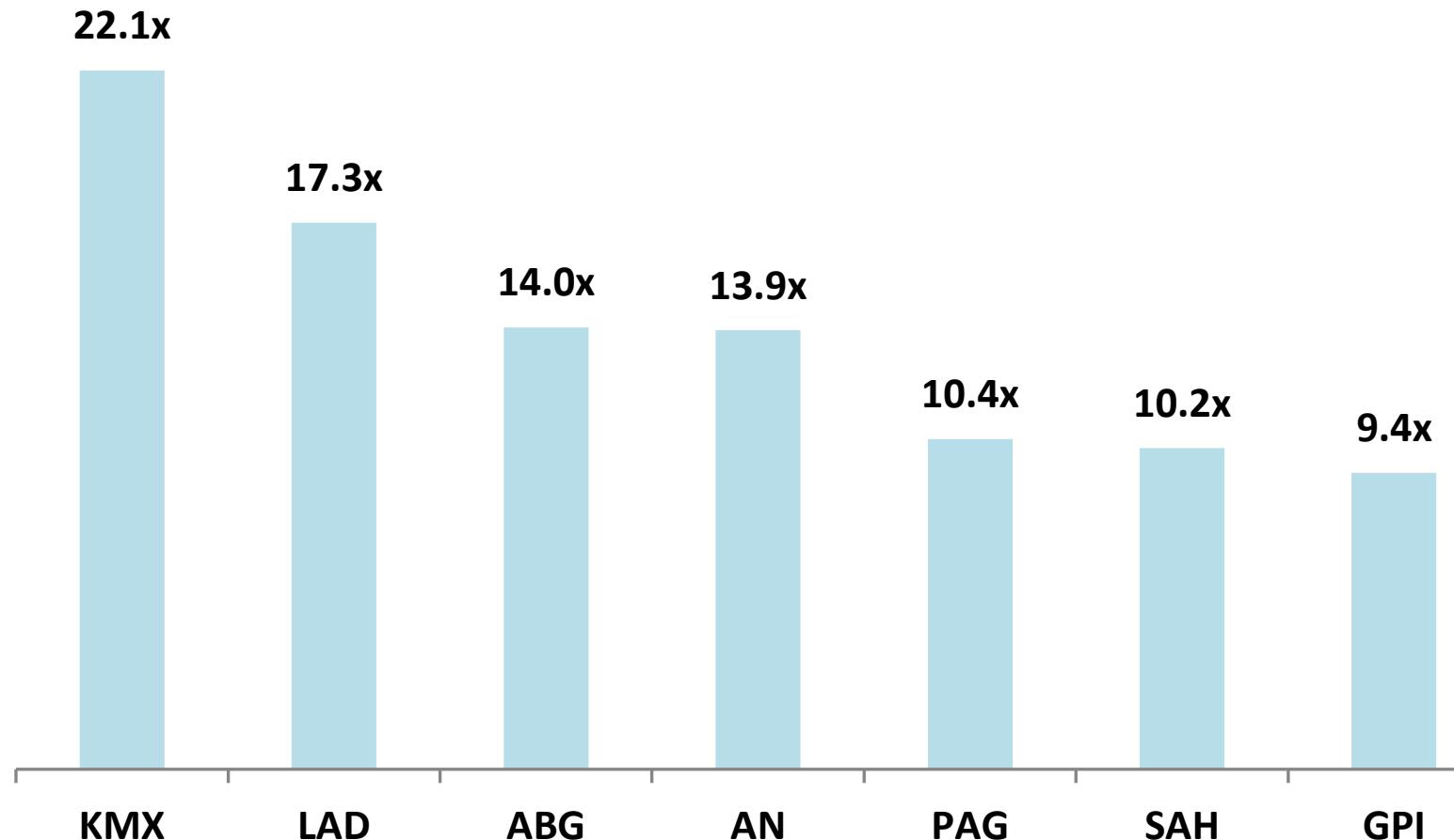
Example SOTP: General Motors (Top Pick)

			MS PT Value		
	GM SOTP	Full Valuation / Pre-discount (\$bn)	Discount	Enterprise Value \$bn	Value / Share \$ Cash free/debt free
1	Remaining GM ICE Business	0.0	0%	0.0	\$0
2	GM Captive EV Business	100.0	25%	75.0	\$52
3	Ultium 3rd Party Battery	17.6	20%	14.1	\$10
4	Cruise LLC	30.4	30%	14.7	\$10
5	GM China JVs	6.8	0%	6.8	\$5
6	Corvette	7.0	0%	7.0	\$5
7	GM Financial	10.3	0%	10.3	\$7
8	GM Connected Services	77.2	70%	23.2	\$16
	Total			151.1	\$105
					
Starting Enterprise Value from SOTP (\$bn)		151.1			
2020 YE Net Cash/(Debt) (\$bn)		6.5			
Assumed Pension Liabilities (\$bn)		(13.6)			
Equity Value (\$bn)		144.1			
SOTP Discount		20%			
MS PT Equity Value (\$bn)		115.3			
2020 s/o		1,441			
MS Equity Value/Share - Price Target		\$80			

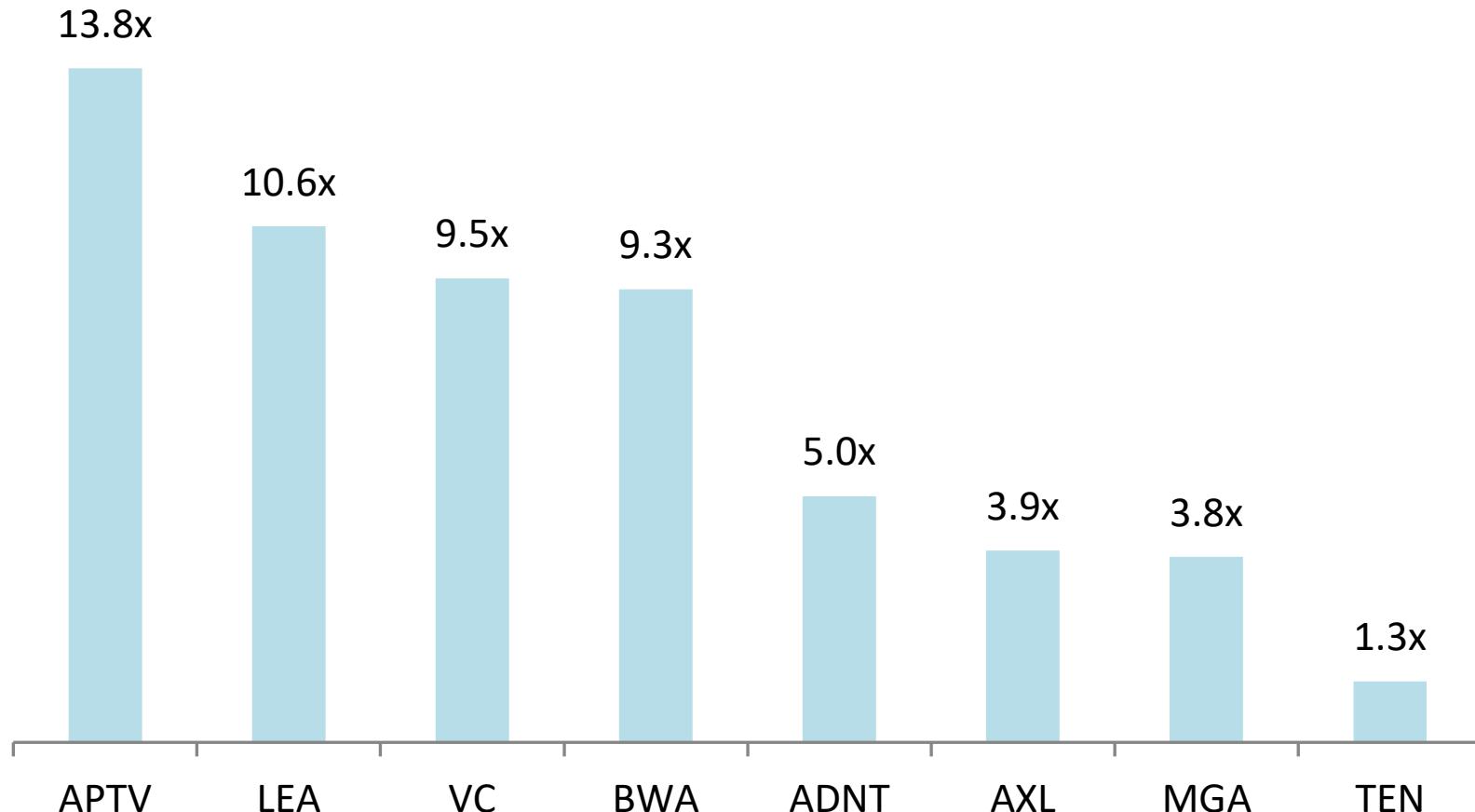
GM 'SPACtopus' – Eight hidden gems



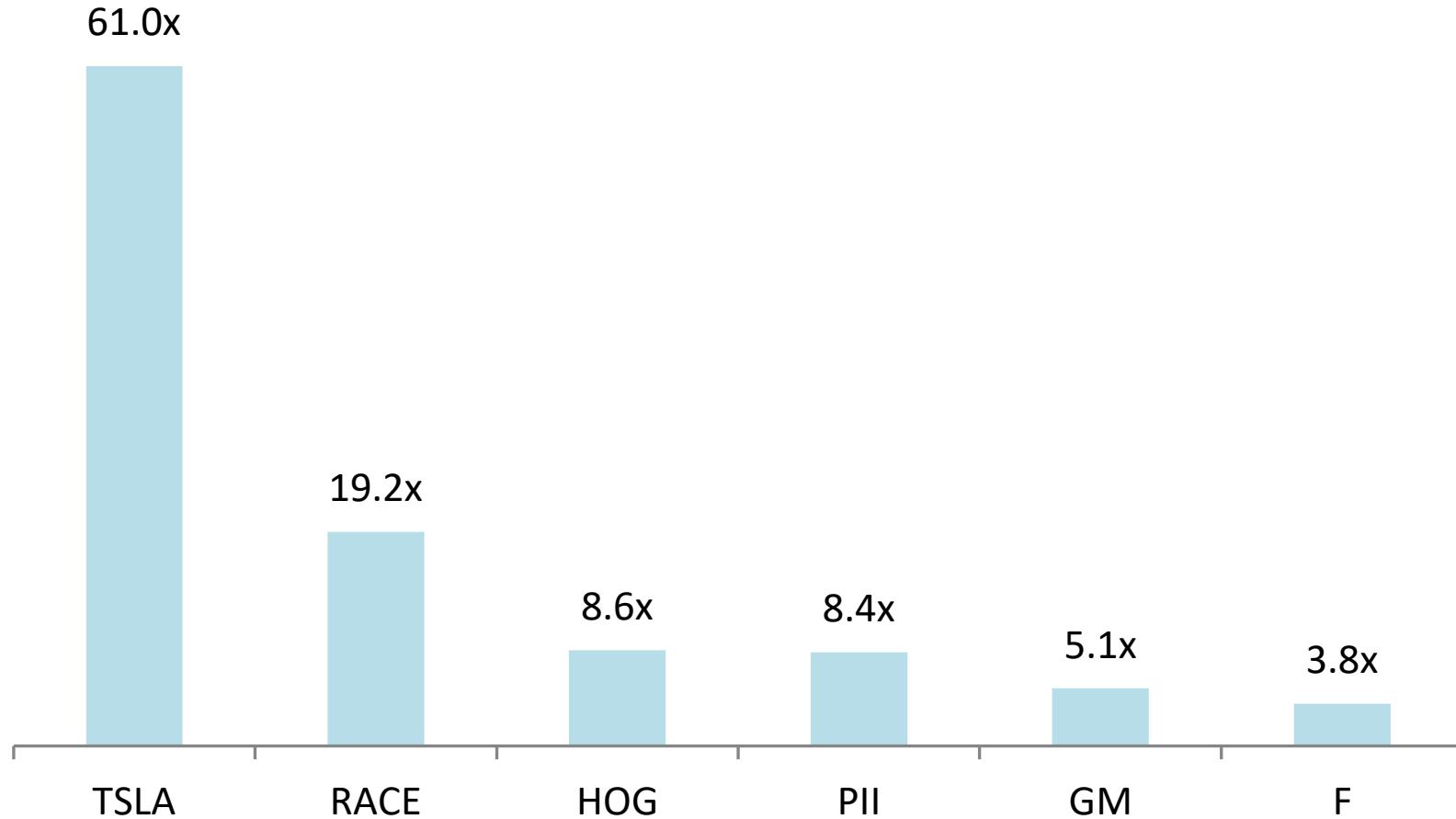
Dealers 2021E P/E Multiples



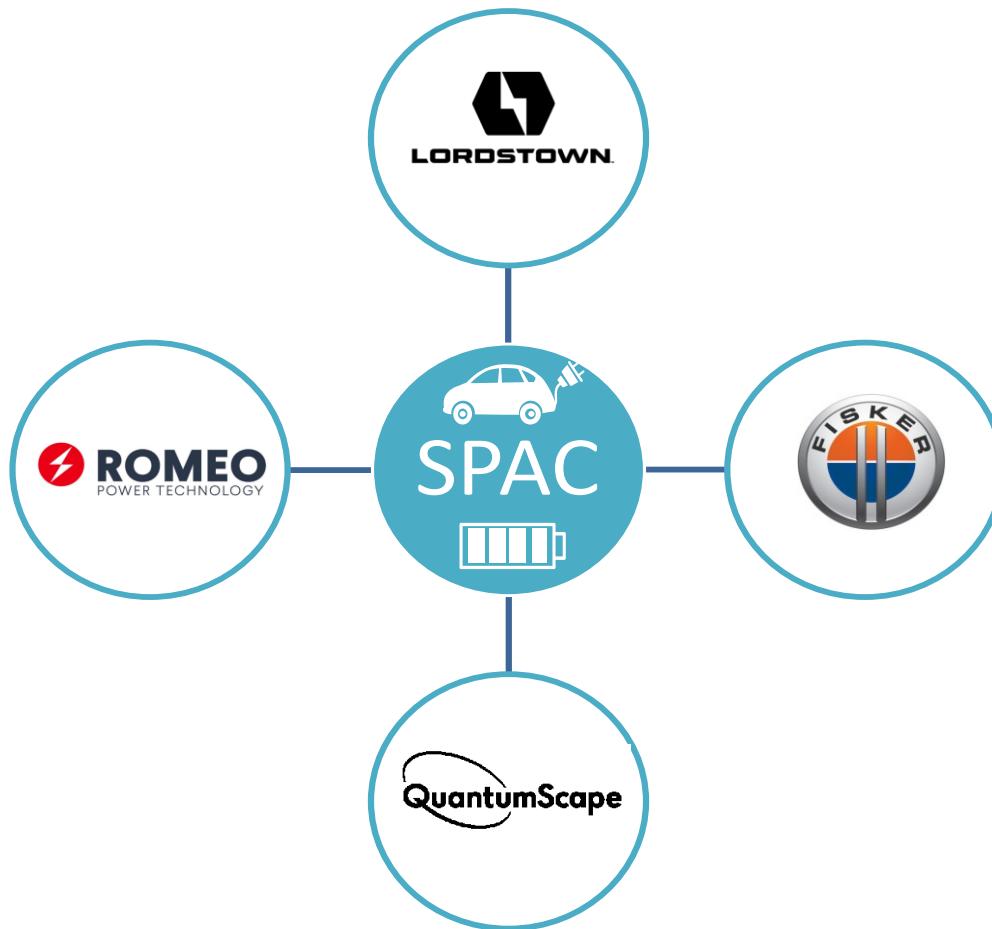
Suppliers 2021E EV/EBITDA Multiples



OEM 2021E EV/EBITDA Multiples



Morgan Stanley SPAC coverage

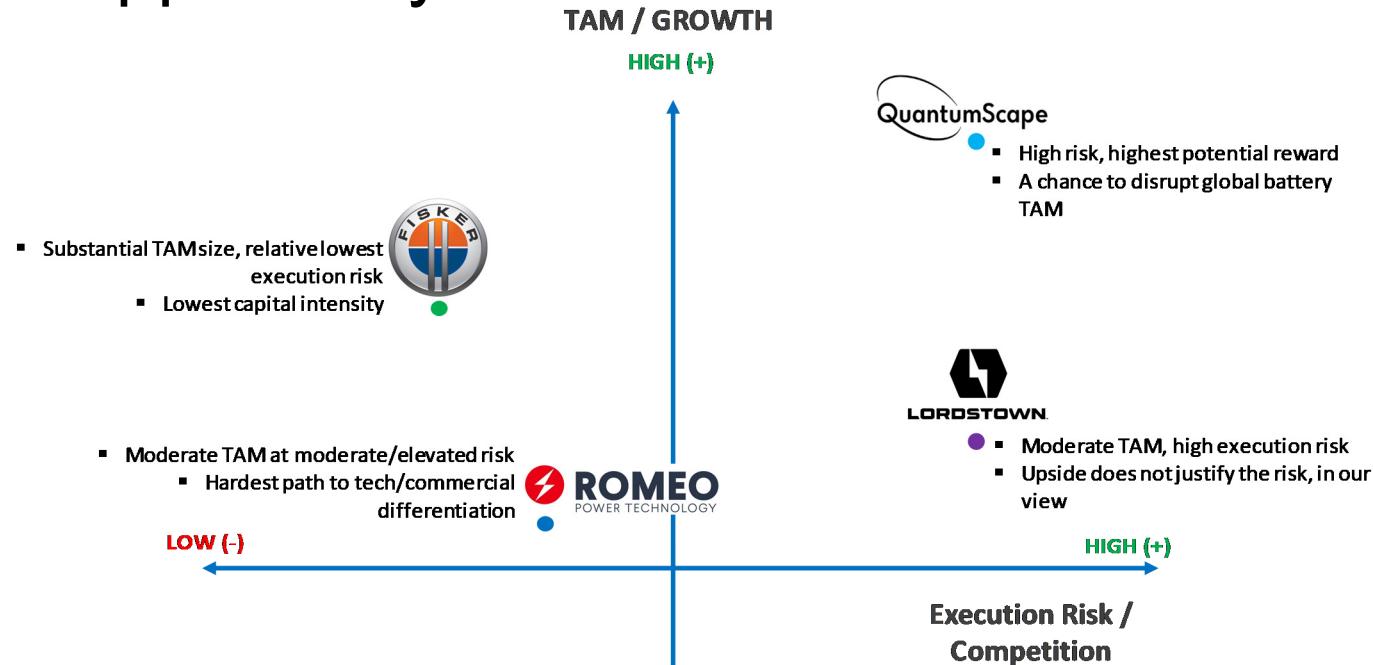


.... more to come

SPAC Comparable Analysis

Ticker	7-YR Revenue CAGR*	7-YR EBITDA CAGR	Terminal Growth Rate	Gross Margin (2030e)	EBITDA Margin (2030e)	EV/EBITDA at PT (2025e)	EV/Sales at PT (2025e)	Risk Reward Skew
FSR	22%	46%	4.0%	NA	11.0%	16.2x	1.2x	3.7
RIDE	19%	-239%	2.5%	15.0%	9.0%	7.7x	0.4x	1.1
RMO	23%	27%	3.0%	24.7%	15.1%	4.7x	0.8x	-1.0
QS	31%	32%	4.0%	26.0%	21.0%	14.2x	3.0x	2.8

SPAC Opportunity vs Risk matrix



DCF & Risk/Reward: Tesla



Bull Case	
Tesla Auto (Core)	\$462
Tesla Energy	\$110
Tesla Insurance	\$49
Tesla Mobility/ride-sharing	\$91
Tesla Network Services (net)	\$317
EV P-train 3rd party	\$243
Total	\$1,272

Base Case	
Tesla Auto (Core)	\$358
Tesla Energy	\$75
Tesla Insurance	\$37
Tesla Mobility/ride-sharing	\$77
Tesla Network Services (net)	\$253
EV P-train 3rd party	\$100
Total	\$900

Bear Case	
Tesla Auto (Core)	\$265
Tesla Energy	\$10
Tesla Insurance	\$0
Tesla Mobility/ride-sharing	\$38
Tesla Network Services	\$87
EV P-train 3rd party	\$50
Total	\$450

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Industrials Spring Training Teach-In

Select Comps: Autos OEMs

Company	Currency	Price at 23-Apr	MS Price Target	Upside to PT (%)	MS Rating	Market Cap		MS EPS		Consensus EPS		Dividend Yield	P / E		EV / EBITDA ⁽¹⁾		EV / Sales ⁽¹⁾		P / B	
						LC	US\$	2021e	2022e	2021e	2022e		2021e	2022e	2021e	2022e	2021e	2022e	2021e	2022e
Europe⁽¹⁾																				
Volkswagen	EUR	229.75	160.00	(30%)	EW	131.1	157.5	20.91	26.38	25.49	30.63	2.1%	11.0x	8.7x	2.7x	2.3x	0.3x	0.3x	0.9x	0.8x
Daimler	EUR	73.15	80.00	9%	OW	79.1	95.0	9.19	9.25	9.37	10.13	1.8%	8.0x	7.9x	3.5x	3.2x	0.5x	0.4x	1.3x	1.2x
Renault	EUR	34.08	40.00	17%	EW	10.1	12.1	3.49	6.77	2.79	7.00	0.0%	9.8x	5.0x	0.4x	0.3x	0.1x	0.0x	0.4x	0.4x
Stellantis	EUR	14.38	17.50	22%	OW	44.9	53.9	2.02	2.54	2.22	2.71	0.0%	7.1x	5.7x	0.5x	0.4x	0.1x	0.1x	0.4x	0.4x
BMW	EUR	85.56	80.00	(6%)	UW	52.0	62.4	10.68	10.36	10.09	11.48	2.2%	8.0x	8.3x	2.3x	2.2x	0.3x	0.3x	0.9x	0.8x
Europe Weighted Average												1.7%	9.2x	7.9x	2.4x	2.2x	0.3x	0.3x	0.9x	0.8x
North America																				
General Motors	USD	56.66	80.00	41%	OW	81.6	81.6	5.13	5.83	5.22	6.32	0.0%	11.1x	9.7x	4.3x	3.9x	0.5x	0.5x	1.4x	1.1x
Ford Motor	USD	11.94	9.00	(25%)	UW	46.8	46.8	1.00	1.23	1.19	1.61	0.0%	11.9x	9.7x	3.1x	2.4x	0.3x	0.2x	1.5x	1.3x
Quantumscape	USD	34.15	70.00	105%	OW	12.8	12.8	-0.26	-0.34	-0.28	-0.35	NA	NM	NM	NA	NA	NA	8.6x	9.4x	
North America Weighted Average												0.0%	11.4x	9.7x	3.8x	3.4x	0.4x	0.4x	2.1x	1.9x
China																				
SAIC Motor	CNY	19.94	25.00	25%	EW	233.0	35.9	2.66	3.09	2.28	2.57	4.4%	7.5x	6.4x	5.7x	4.9x	0.2x	0.2x	0.8x	0.8x
Geely	HKD	22.20	13.00	(41%)	UW	217.9	28.1	1.01	1.19	0.94	1.16	0.9%	21.9x	18.6x	9.8x	7.8x	1.5x	1.3x	2.5x	2.2x
BYD	HKD	180.50	126.00	(30%)	EW	189.1	24.4	2.68	2.97	1.91	2.49	0.1%	67.4x	60.8x	21.1x	18.8x	2.7x	2.5x	5.9x	5.3x
Great Wall	HKD	21.90	16.00	(27%)	UW	67.8	8.7	0.72	0.86	0.95	1.17	1.8%	30.5x	25.4x	21.7x	18.5x	2.4x	2.2x	2.7x	2.6x
FAW Car Company	CNY	11.08	5.00	(55%)	UW	51.5	7.9	-0.16	-0.17	0.50	0.56	0.0%	NM	NM	33.4x	42.0x	0.7x	0.7x	2.4x	2.5x
Dongfeng	HKD	7.11	10.00	41%	OW	61.2	7.9	1.25	1.25	1.42	1.54	1.6%	5.7x	5.7x	3.7x	3.8x	0.7x	0.8x	0.4x	0.4x
Zhengzhou Yutong Bus C	CNY	14.24	14.00	(2%)	EW	32.2	5.0	0.86	0.99	0.68	0.92	7.0%	16.6x	14.4x	7.9x	7.0x	0.9x	0.7x	1.9x	1.8x
Weichai Power	HKD	19.42	26.00	34%	OW	37.7	4.9	1.41	1.55	1.38	1.52	0.9%	13.8x	12.5x	4.4x	3.4x	0.5x	0.4x	2.1x	1.8x
Brilliance	HKD	7.30	5.00	(32%)	UW	36.8	4.7	1.17	0.37	1.74	1.40	1.5%	6.2x	19.6x	4.2x	11.7x	8.4x	7.5x	0.7x	0.6x
Guangzhou	HKD	6.88	9.00	31%	OW	21.3	2.7	1.42	1.56	0.79	0.96	2.9%	4.8x	4.4x	34.2x	19.2x	1.2x	1.0x	0.7x	0.6x
Anhui Jianghuai	CNY	8.55	8.00	(6%)	UW	16.2	2.5	0.72	0.81	0.15	0.08	0.2%	11.9x	10.6x	1.8x	0.6x	0.1x	0.0x	1.0x	0.9x
BAIC Motor	HKD	2.54	2.20	(13%)	UW	20.3	2.6	0.33	0.34	0.42	0.49	7.3%	7.8x	7.6x	0.6x	0.5x	0.1x	0.1x	0.3x	0.3x
Chongqing Changan	HKD	6.43	12.60	96%	OW	5.8	0.7	1.05	1.67	0.84	1.11	0.0%	6.1x	3.9x	4.5x	2.1x	0.3x	0.2x	0.6x	0.5x
China Weighted Average												2.1%	24.1x	21.8x	12.2x	11.3x	1.5x	1.3x	2.3x	2.1x
South Korea																				
Hyundai Motor	KRW	221,000.00	250,000.00	13%	EW	47,323.9	42.3	25,701.35	28,407.02	21,978.26	25,325.31	1.4%	8.6x	7.8x	10.5x	9.9x	1.0x	0.9x	0.6x	0.6x
Kia Motors	KRW	81,300.00	90,000.00	11%	EW	33,028.1	29.5	9,270.95	9,746.98	9,678.28	10,783.94	1.2%	8.8x	8.3x	4.5x	3.7x	0.5x	0.4x	1.0x	0.9x
South Korea Weighted Average												1.3%	8.7x	8.0x	8.0x	7.4x	0.8x	0.7x	0.8x	0.7x
India⁽²⁾																				
Maruti Suzuki	INR	6,674.9	8,400.0	26%	OW	2,007.9	26.7	235.8	315.3	249.0	314.3	0.9%	28.3x	21.2x	18.6x	12.2x	1.7x	1.3x	3.6x	3.2x
Bajaj Auto	INR	3,670.8	4,400.0	20%	OW	1,057.8	14.1	188.6	233.8	191.6	220.5	3.3%	19.5x	15.7x	15.5x	11.8x	2.6x	2.0x	4.4x	3.9x
Mahindra & Mahindra	INR	778.6	1,112.0	43%	OW	925.5	12.3	44.8	57.0	41.2	47.9	0.3%	17.4x	13.7x	18.0x	13.1x	2.1x	1.7x	2.4x	2.1x
Hero MotoCorp	INR	2,865.1	2,424.0	(15%)	UW	570.6	7.6	153.3	180.9	182.3	212.3	NA	18.7x	15.8x	11.6x	9.6x	1.4x	1.2x	3.5x	3.2x
Ashok Leyland	INR	111.3	145.0	30%	OW	325.8	4.3	2.4	5.6	2.9	6.0	1.8%	46.6x	19.7x	20.6x	10.4x	1.5x	1.0x	4.3x	3.5x
Tata Motors	INR	294.0	297.0	1%	EW	972.1	12.9	25.4	27.7	19.5	32.2	NA	15.1x	9.1x	3.4x	3.0x	0.5x	0.4x	1.5x	1.3x
TVS Motor	INR	533.6	393.0	(26%)	UW	252.5	3.4	15.9	20.3	18.4	23.3	0.7%	33.5x	26.3x	15.2x	12.5x	1.3x	1.1x	5.6x	4.9x
India Weighted Average												1.4%	23.3x	16.8x	14.9x	10.5x	1.7x	1.3x	3.3x	2.9x
Global Weighted Average												1.5%	13.4x	11.5x	6.3x	5.4x	0.7x	0.6x	1.6x	1.4x

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Industrials Spring Training Teach-In

US Auto Stock Ranking

	Rank	Company	Market Cap (\$bn)	Current Price	MS PT	Upside to PT (%)	EPS (2022e)			Valuation (2022e)		Consensuality		
							MS	Cons	% Diff	P/E	EV/EBITDA	OW	EW	UW
	1	GM	81.6	\$56.7	\$80.0	41%	\$5.83	\$6.32	(8%)	9.7x	5.1x	95%	5%	0%
	2	Ford	37.6	\$138.9	\$200.0	44%	\$5.25	\$5.00	5%	26.5x	12.5x	65%	23%	12%
	3	POLARIS	8.9	\$145.1	\$158.0	9%	\$9.54	\$9.42	1%	15.2x	8.4x	67%	33%	0%
	4	Ferrari	41.5	€ 213.1	€ 273.0	28%	€ 4.32	€ 4.74	(9%)	49.3x	20.0x	50%	25%	25%
	5	BMW	4.0	\$13.8	\$40.0	190%	(\$0.76)	(\$0.75)	NM	NM	NM	50%	50%	0%
OW	6	TESLA	690.8	\$719.7	\$900.0	25%	\$6.13	\$5.90	4%	117.4x	61.0x	42%	28%	31%
	7	Waymo	12.8	\$34.2	\$70.0	105%	(\$0.34)	(\$0.35)	NM	NM	NM	50%	50%	0%
	8	CARVANA	45.7	\$265.0	\$420.0	58%	(\$1.99)	(\$0.84)	NM	NM	182.1x	63%	33%	4%
	9	CARMAX	21.1	\$129.1	\$165.0	28%	\$5.88	\$5.72	3%	22.0x	17.0x	80%	13%	7%
	10	LEAR CORPORATION	10.9	\$181.2	\$185.0	2%	\$15.99	\$17.94	(11%)	11.3x	10.5x	58%	42%	0%
	11	ASBURY	4.0	\$206.0	\$180.0	(13%)	\$14.89	\$15.57	(4%)	13.8x	9.2x	75%	25%	0%
	12	PENSKE AUTOMOTIVE	6.9	\$85.5	\$80.0	(6%)	\$8.33	\$8.03	4%	10.3x	6.9x	78%	22%	0%
	13	GROUP 1 AUTOMOTIVE	2.9	\$157.5	\$185.0	17%	\$17.68	\$19.40	(9%)	8.9x	6.7x	86%	14%	0%
EW	14	MAGNA	28.6	\$95.4	\$96.0	1%	\$8.57	\$8.88	(4%)	11.1x	9.5x	78%	22%	0%
	15	avis budget group	5.5	\$79.3	\$67.0	(16%)	\$4.25	\$3.77	13%	18.6x	7.0x	29%	71%	0%
	16	SONIC	2.0	\$49.1	\$48.0	(2%)	\$4.97	\$5.22	(5%)	9.9x	6.7x	67%	33%	0%
	17	HARLEY-DAVIDSON	7.4	\$48.1	\$38.0	(21%)	\$3.10	\$3.20	(3%)	15.5x	8.6x	41%	59%	0%
	18	AMCI	1.0	\$9.1	\$8.0	(12%)	\$1.16	\$1.84	(37%)	7.8x	3.9x	36%	45%	18%
	19	LITHIA	10.3	\$382.2	\$320.0	(16%)	\$25.02	\$24.70	1%	15.3x	9.9x	70%	20%	10%
	20	ADIENT	4.3	\$45.8	\$38.0	(17%)	\$4.20	\$5.32	(21%)	10.9x	5.1x	64%	18%	18%
	21	Ford	46.8	\$11.9	\$9.0	(25%)	\$1.23	\$1.61	(23%)	9.7x	3.8x	37%	53%	11%
	22	AutoNation	7.9	\$96.2	\$65.0	(32%)	\$9.06	\$9.36	(3%)	10.6x	6.2x	8%	77%	15%
	23	ROMEO POWER TECHNOLOGY	1.1	\$8.3	\$7.0	(15%)	(\$0.66)	(\$0.48)	NM	NM	NM	50%	25%	25%
UW	24	DENSO	3.2	\$114.2	\$65.0	(43%)	\$5.09	\$5.74	(11%)	22.4x	20.0x	29%	53%	18%
	25	LORDSTOWN	1.7	\$9.7	\$12.0	24%	(\$1.64)	(\$1.01)	NM	NM	NM	60%	20%	20%
	26	BorgWarner	11.8	\$49.5	\$29.0	(41%)	\$4.44	\$4.84	(8%)	11.2x	9.6x	47%	47%	5%
	27	TENNECO	0.9	\$10.5	\$5.0	(53%)	\$4.15	\$4.47	(7%)	2.5x	1.8x	29%	57%	14%

SECTION 7: OTHER

Cyclical Issues and Constraints

Points to keep in mind on autos valuation:

- Auto stocks are extremely **cyclical**
- Buy when the stock seems “expensive”, **sell when “cheap”**
- Autos are in a **phase of disruption** with Electric Vehicles, Autonomous Vehicles, Shared Mobility etc.
- Auto stocks are **prone to restructuring** and negative EPS...leads to valuation on EV/EBITDA and if EBITDA is negative, Price/Sales

US Sector Risks

1. The US Cycle was nearly 10 years old pre-Covid
2. China is moving from a source of demand to supply
3. Used car values at all-time highs
4. Peak Truck?
5. Secular changes from EVs, SVs, and AVs

US Sector Opportunities

1. Cost reductions from restructuring
2. Cost reductions from collaboration and M&A
3. Cost reduction from re-design/de-complexification
4. Spin-off/carve-outs of key brands to tech
5. Monetization of software

Cash Flow Considerations

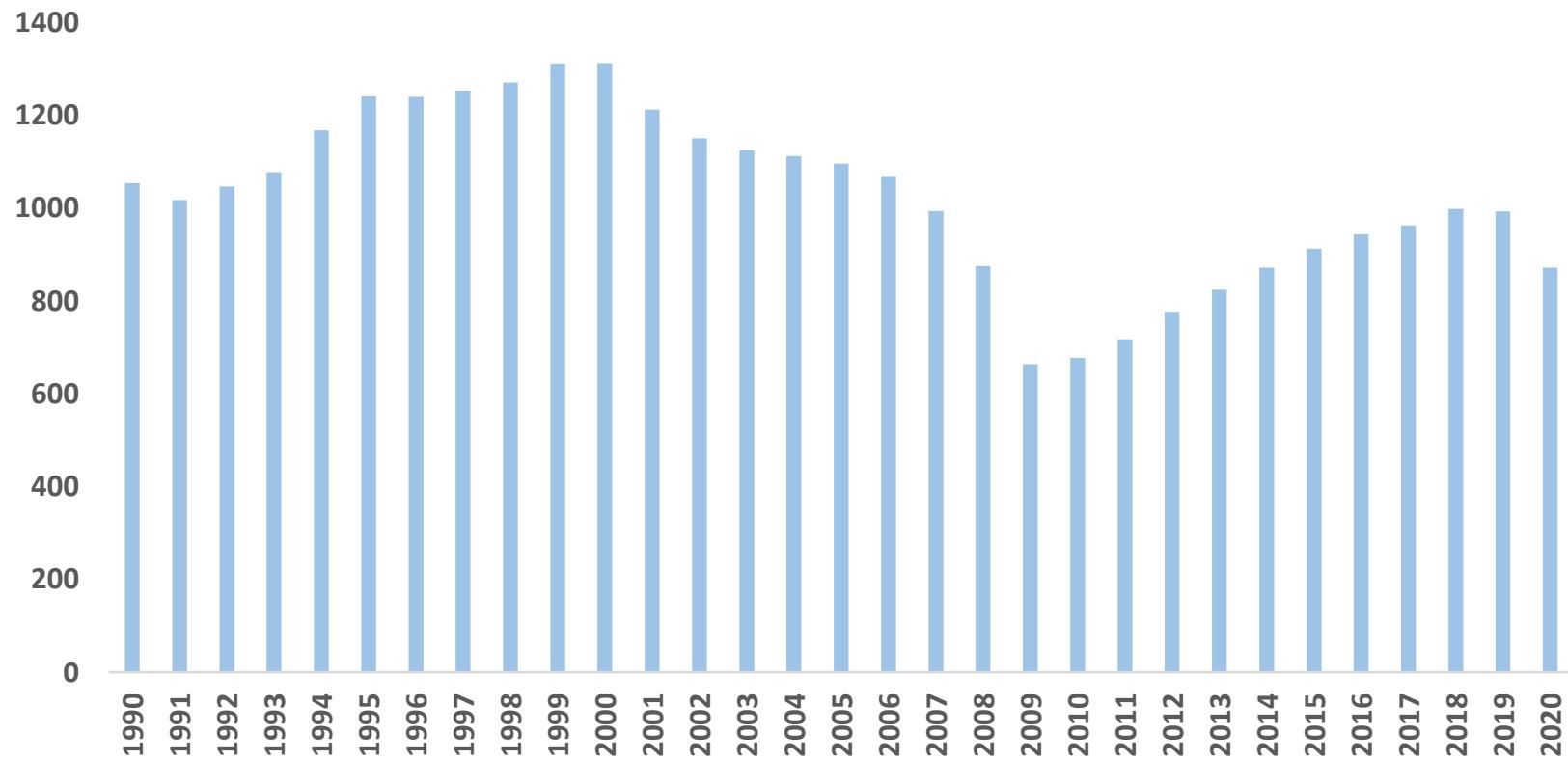
Many factors impact earnings quality in autos:

- **Capex/D&A ratio** (typically well over 110%)
- **Working capital** swings (negative trade cycle)
- **Pension accounting** (return on plan assets vs actual, interest vs service cost)
- **Equity affiliate earnings** (China JV income Vs dividends)
- **Restructuring** items vs. cash out
- **Deferred tax assets/NOLs**

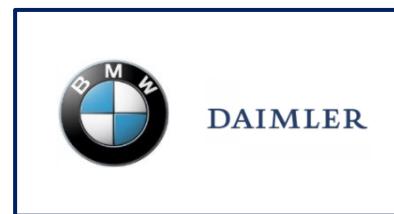
Other Considerations: M&A, Partnerships



Total Employees Motor Vehicles and Parts (000s)



Global OEM Partnerships



Other Considerations: Politics & Labor

- *Autos employs > 10 million people globally*
- *USA, Canada, EU, Brazil, Japan, Korea have unionized labor*
- *Cost to cut job = \$100/k/worker in mature markets*
- *EVs require 30%+ less labor Vs ICE*

Other Considerations: The Family

Many large auto companies are family controlled entities.

- *Ford* (Family has 2% of capital, 40% of votes)
- *FCA* (Agnelli family/Exor controls the company)
- *Tesla* (Elon)
- *BMW, PSA, VW* are family controlled
- *Renault* (French State)
- *Toyota* (Akio Toyoda)

May 2021

Industrials Spring Training Teach-In

Freight Transportation

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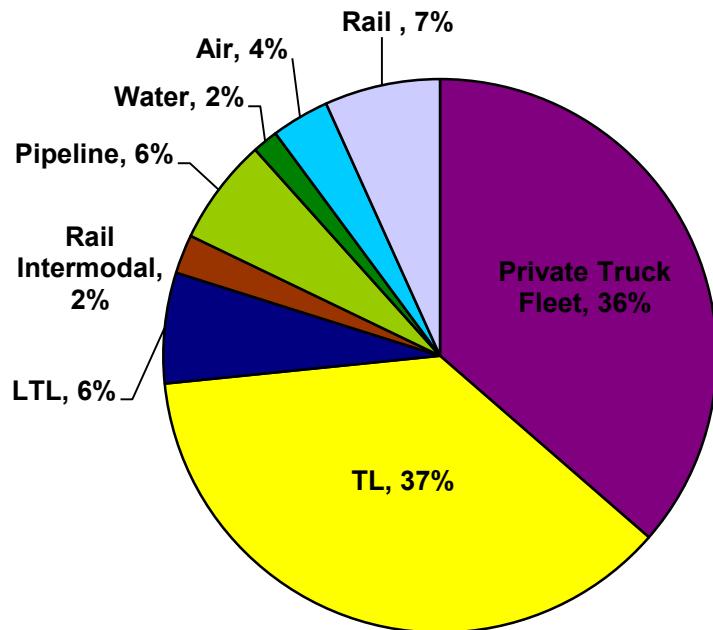
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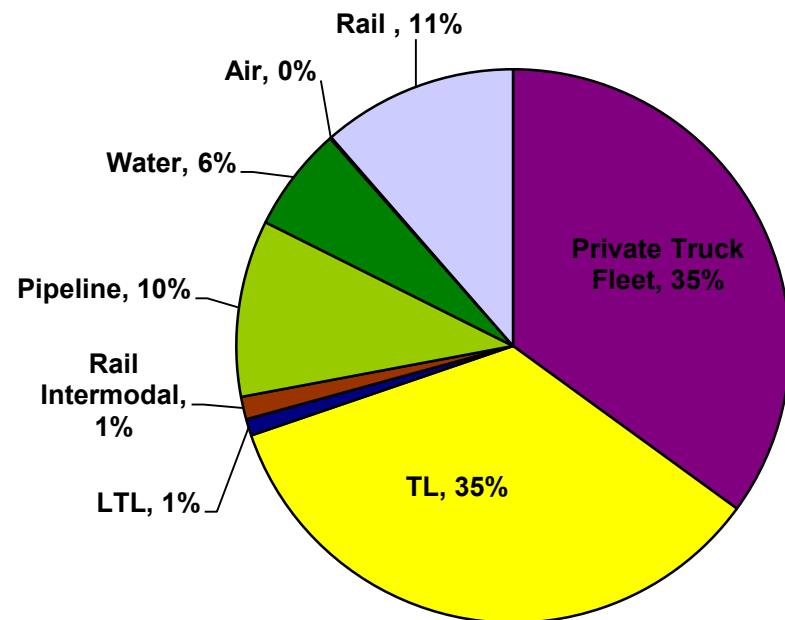
For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.
Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 23, 2021, unless otherwise noted.

Domestic Freight Transportation Market Size

Domestic Freight Transportation Market by Revenue (~\$900B in Total)



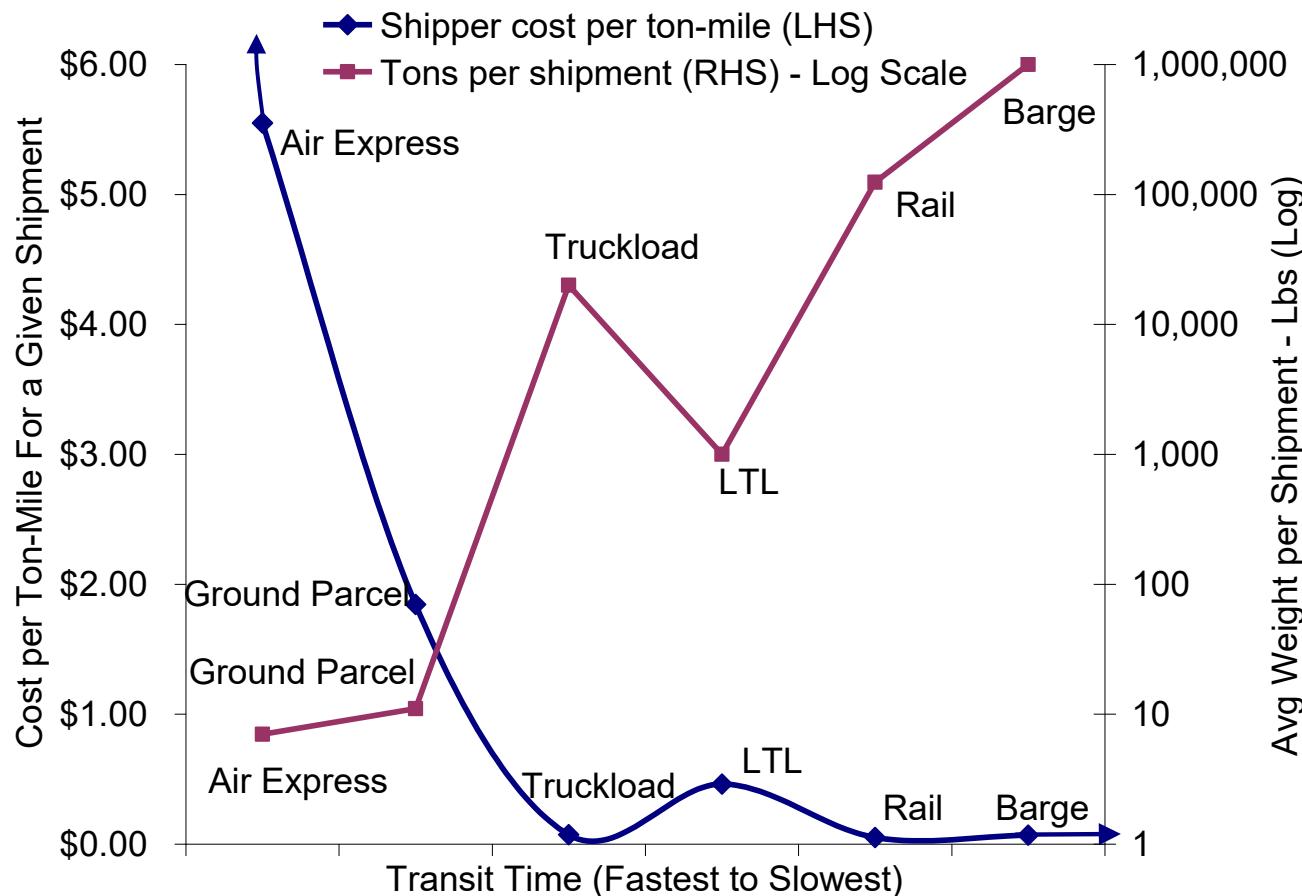
Domestic Freight Transportation Market by Volume (~15B tons in Total)



The US freight transportation market is ~\$800-1,000B in total revenue, with truck accounting for ~80% of the market share

Distance, Cost and Time to Deliver

Cost of Shipping and Weight per Shipment vs. Transit Time By Mode



Rail Industry Key Characteristics

Competition / Industry Structure

- 8 Large Rails in North America in 4 major regions; BNSF (owned by Berkshire Hathaway) and UNP in the west, CNR and CP in Canada, CSX and NSC in the east, KSU and Ferromex in Mexico
- Significant barriers to entry (irreplaceable networks built 100+ years ago)

Revenue

- Over 50% of Class I rail traffic is comprised of economically sensitive traffic (merchandise/IM)
- Industry is concentrated and has a relatively inelastic customer base
- When fuel prices fall / rise, surcharges pass them through with a 2-month lag

Cost / Margin

- Low cost mode relative to closest surface modal competitor (trucks); more fuel efficient than truck or parcel
- Some ability to take out cost in real time but still a high fixed cost business

Capital Needs

- Asset heavy with capex averaging ~17% of revenue for the last 20 years
- Maintenance capex remains high, growth capex now diverging amongst the Rails

Cycle Dynamics

- Majority of Class I traffic is economically sensitive freight, thus overall demand is highly correlated to US / global business cycles
- Pricing power has given rails a secular edge over the last 10 years – but we see this as an area of debate going forward

Truckload (TL) Industry Key Characteristics

Competition / Industry Structure

- Highly fragmented market (100,000+ carriers) with low barriers to entry and exit
- 96% of carriers have 20 or fewer trucks. Publicly-traded carriers operate only ~10% of industry fleet when measured in tractors

Revenue

- Due to significant competition within this fragmented market, carriers have little-to-no control over pricing (i.e., they are price takers)
- Higher exposure to consumer goods over industrials

Cost / Margin

- Most costs for TLs are incurred on a per mile basis. Regulation and industry changes driving both pricing power and cost inflation for the industry
- Mid-teens EBIT margin quite good for a relatively defensive high variable cost structure

Capital Needs

- TL carriers have relatively low capital needs (mainly tractors / trailers) as compared to other transport verticals; TLs ride mainly on public infrastructure (highways)
- Terminals and other operating facilities are a small percentage of plant, property & equipment on a TL carrier's balance sheet

Cycle Dynamics

- Tonnage tends to mirror the US business cycles
- The highly variable cost structure and higher consumer exposure makes them more defensive in a downcycle

Less-Than-Truckload (LTL) Industry Key Characteristics

Competition / Industry Structure

- More concentrated competition than TL; market consists of 5-7 large carriers and smaller carriers continue to consolidate
- High capital investment for terminal networks creates high barriers to entry

Revenue

- More concentrated industry structure and generally poor industry ROIC helps support price discipline among LTLs, but price wars have occurred
- After a price war in 2009/2010, LTL General Rate Increases (GRIs) have averaged at 3-6% over the past few years

Cost / Margin

- Fixed cost networks provide mature incumbents with significant operating leverage
- Unionized carriers with pensions exist, creating significant cost differences among carriers which can lead to irrational pricing as competitors seek to push high cost carriers out of markets

Capital Needs

- CapEx higher than TL due to network/terminal investments
- Real Estate a significant portion of asset base

Cycle Dynamics

- Tonnage tends to mirror the US business cycles
- LTLs exhibit more cyclical exposure than TL given higher fixed cost structure

Logistics Industry Key Characteristics

Competition / Industry Structure

- Domestic 3PL / freight brokerage market is highly fragmented
- Low barriers to entry, and thus very high intra-vertical competition. Most shippers use multiple 3PLs

Revenue

- Brokers thrive in an unstable, choppy business environment. Stability is bad for business
- Competition is growing with new entrants in multiple areas. Secular trends may also be a headwind

Cost / Margin

- Gross margins for brokers are under pressure given increasing competition, structural supply trends and new technologies creating greater pricing transparency
- Operating margin pressured by IT investments and will need headcount reduction for stability

Capital Needs

- Brokers have a highly variable cost structure with minimal capex requirements (though working capital needs are high); ROIC is higher vs. other transport verticals
- Capex is mainly spent on IT platform improvements

Cycle Dynamics

- The highly variable cost structure leads to the resiliency of brokers' business models, and thus are considered most defensive in a downturn, though secular/structural headwinds intensifying

Parcel Industry Key Characteristics

Competition / Industry Structure

- Oligopolistic Competition: a few major players dominate in each global region, especially developed markets
- Indirect competition from last-mile start ups and insourcing at large customers

Revenue

- B2C is a mixed blessing – volume growth offset by negative flywheel of no pricing power yet needing high network investment

Cost / Margin

- Trade down from premium products, mix, FX and fuel can all distort reported yield trends
- Growth in B2C volume poses a mix challenge due to lower density and contribution per package than higher-price ground service offerings

Capital Needs

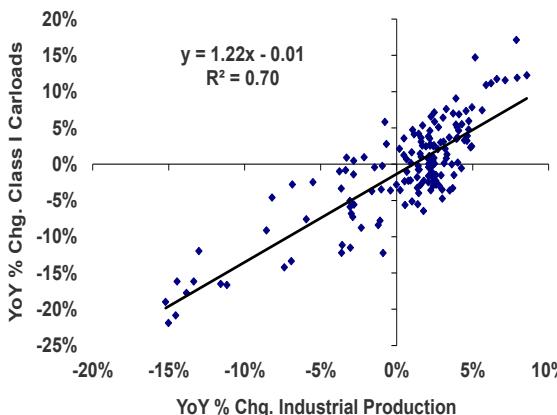
- Asset heavy, long-lived assets, mature domestic networks limit growth capex needs
- Air is much more capital intensive than ground, international investment are still a heavy burden
- Capital investment is increasing due to E-commerce growth in recent years

Cycle Dynamics

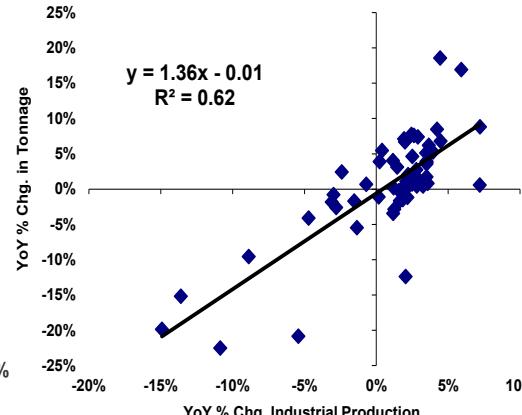
- Cycles tend to mirror US / global business cycles although parcel exhibits early cycle traits
- Density is a key driver of profitability and returns given low marginal cost per unit

Demand Trends: Correlations with Industrial Production

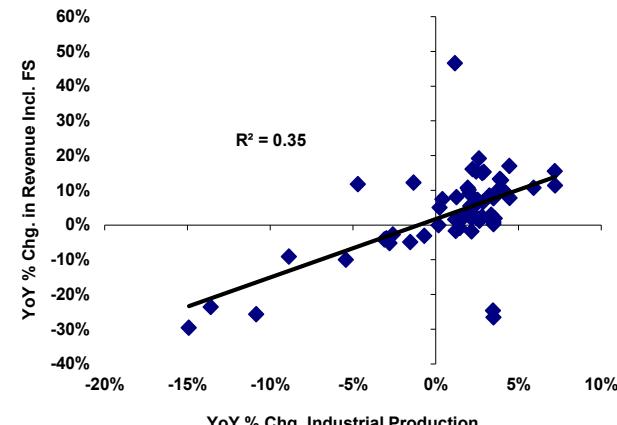
**Rail Traffic –
Industrial Production**



**Total LTL Tonnage
– Industrial Production**



**TL Revenue Incl. FS –
Industrial Production**



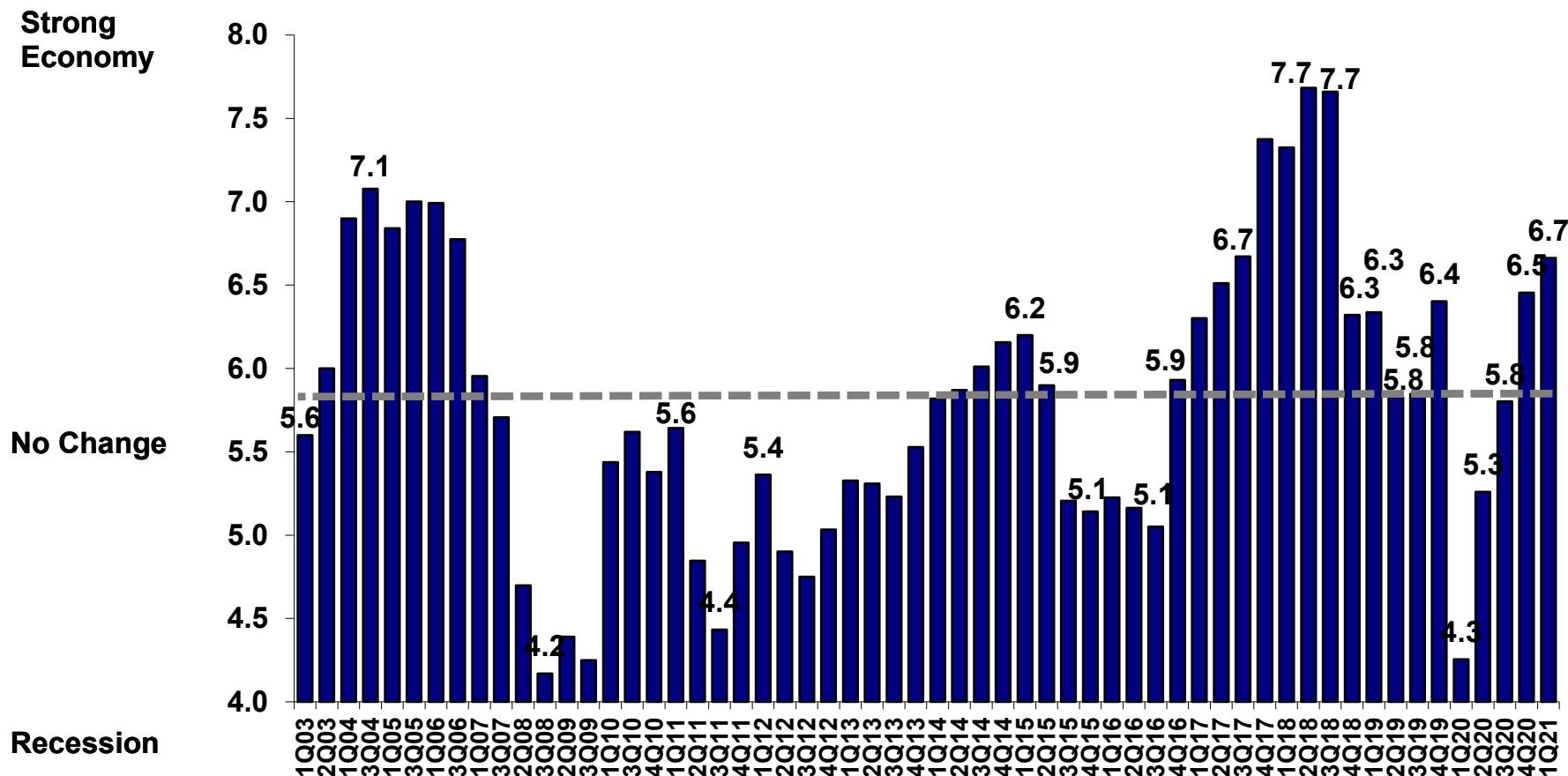
Railroad traffic, LTL shipments, and TL revenue have strong correlations with industrial production

Source: Morgan Stanley Research, AAR, Federal Reserve; Rail Correlation Note: We correlate monthly YoY growth rates in rail traffic with monthly YoY growth rates in various economic data points; in instances where economic data points are reported on a quarterly basis, we assume monthly data points are equal to the full quarter; LTL Correlation Note: Correlations based on relationship between YoY % chg. in variables (2Q05-4Q19); Total shipments include ABF Freight, CNW Freight, ODFL, FDX Freight, UPS Freight, SAIA, VTNC and YRCW (Regional & Freight); TL Correlation Note: Correlations based on relationship between YoY % chg. in variables (1Q05-4Q19) Truck revenue = JBHT+HTLD +KNX+SWFT+WERN+CGI+MRTN+USAK+CVTI+PTSI; SWFT does not provide revenue breakdown prior to 2010

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Shippers' Economic Outlook

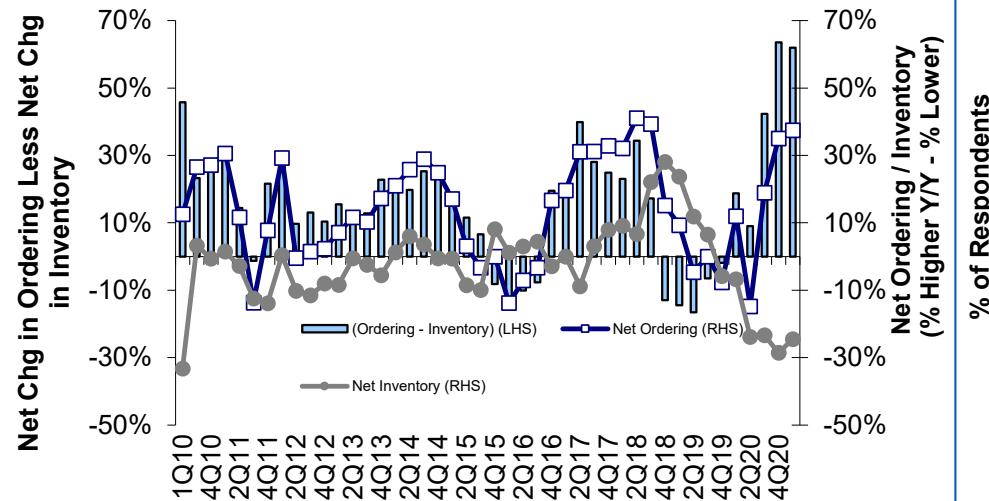


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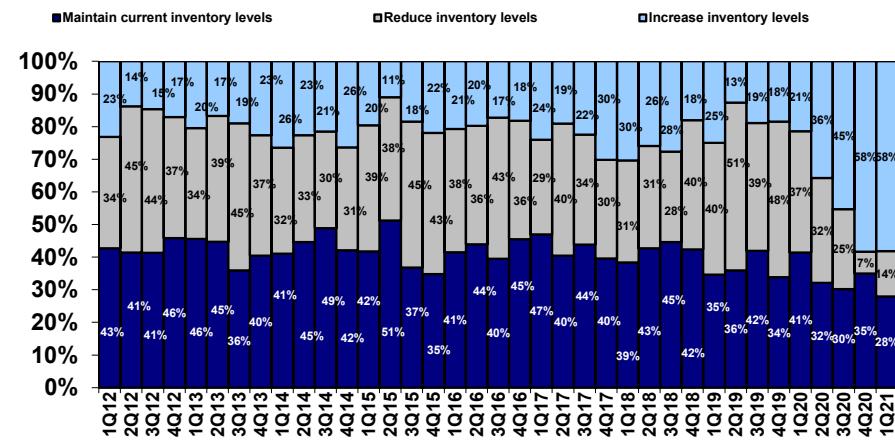
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Shippers' Orders and Inventory Plans

Shippers' Net Y/Y Orders vs. Net Y/Y Inventory



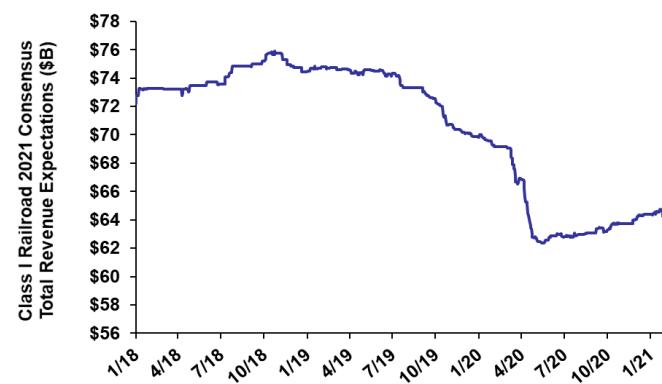
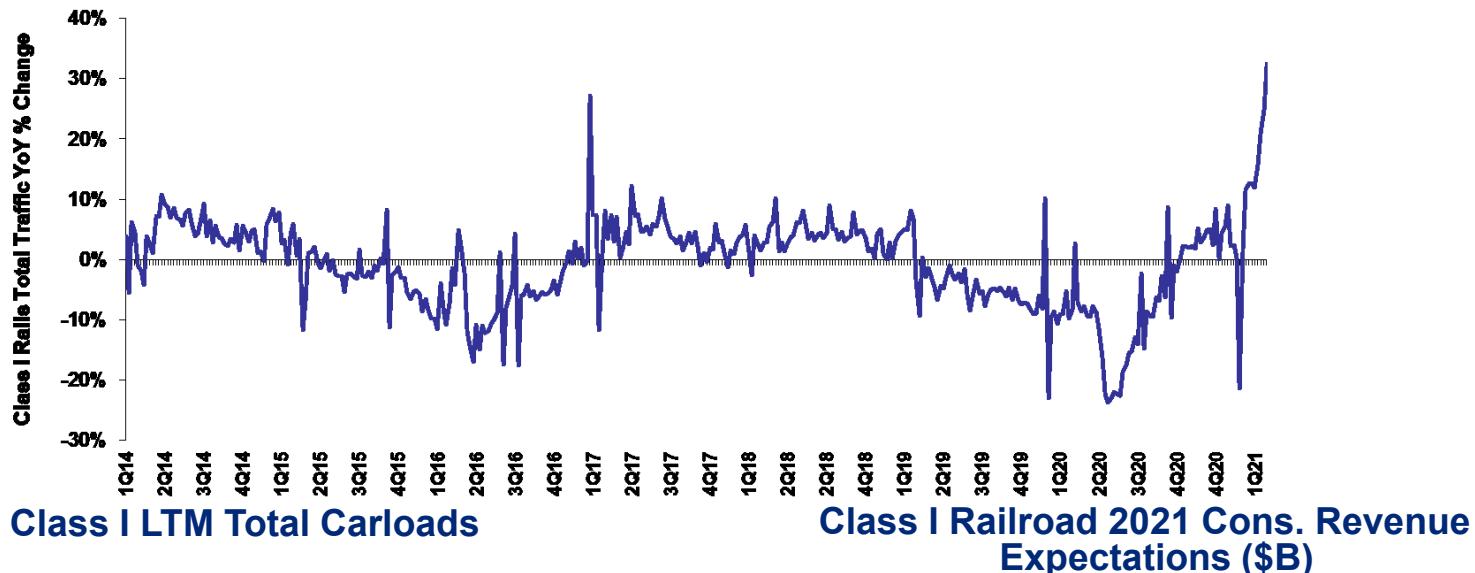
Shippers' Inventory Plans



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Rails: Carload Data Remains Weak for Cyclical and Secular Reasons

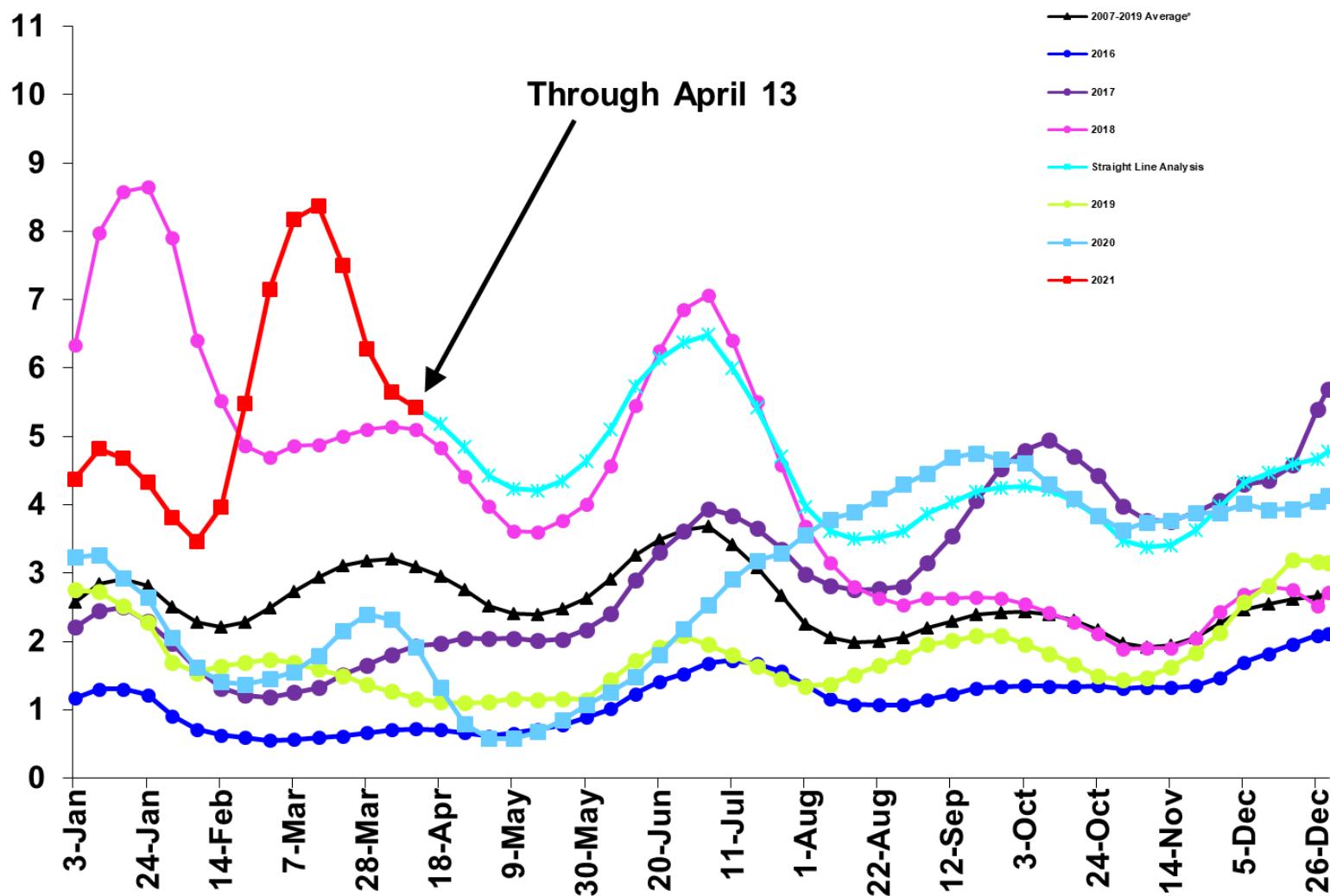


Source: Top graph: AAR; Bottom left graph: Company Data, Morgan Stanley Research Estimates; Note: We use the sum of CNR, CP, CSX, KSU, NSC, and UNP carloads to represent N.A. Class I railroads; Bottom right graph: Thomson Reuters, Morgan Stanley Research; Note: Data show the sum of consensus 2020 revenue expectations for CP, CNR, UNP, KSU, NSC, and CSX, with CNR and CP consensus revenue estimates in USD.

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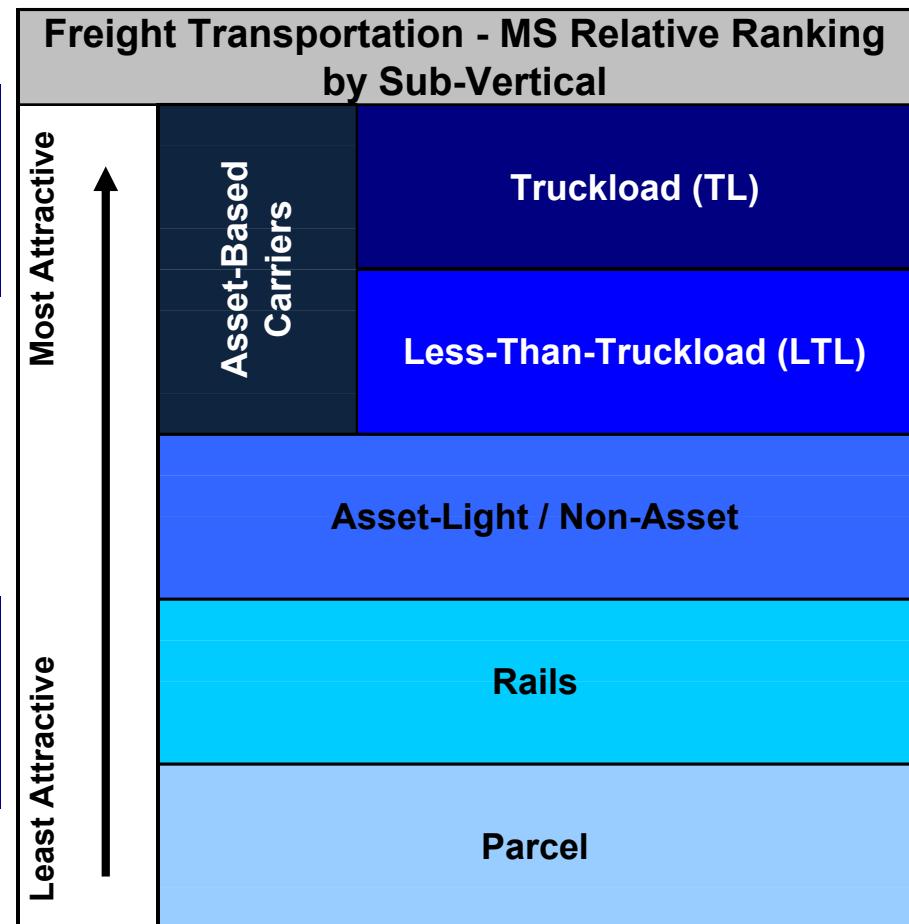
Morgan Stanley Truckload Freight Index (TLFI)



Freight Transportation: Our Positioning

Truckload is our favorite vertical within Freight, followed by LTL

3PL, Rail and Parcels are our least preferred verticals within Freight



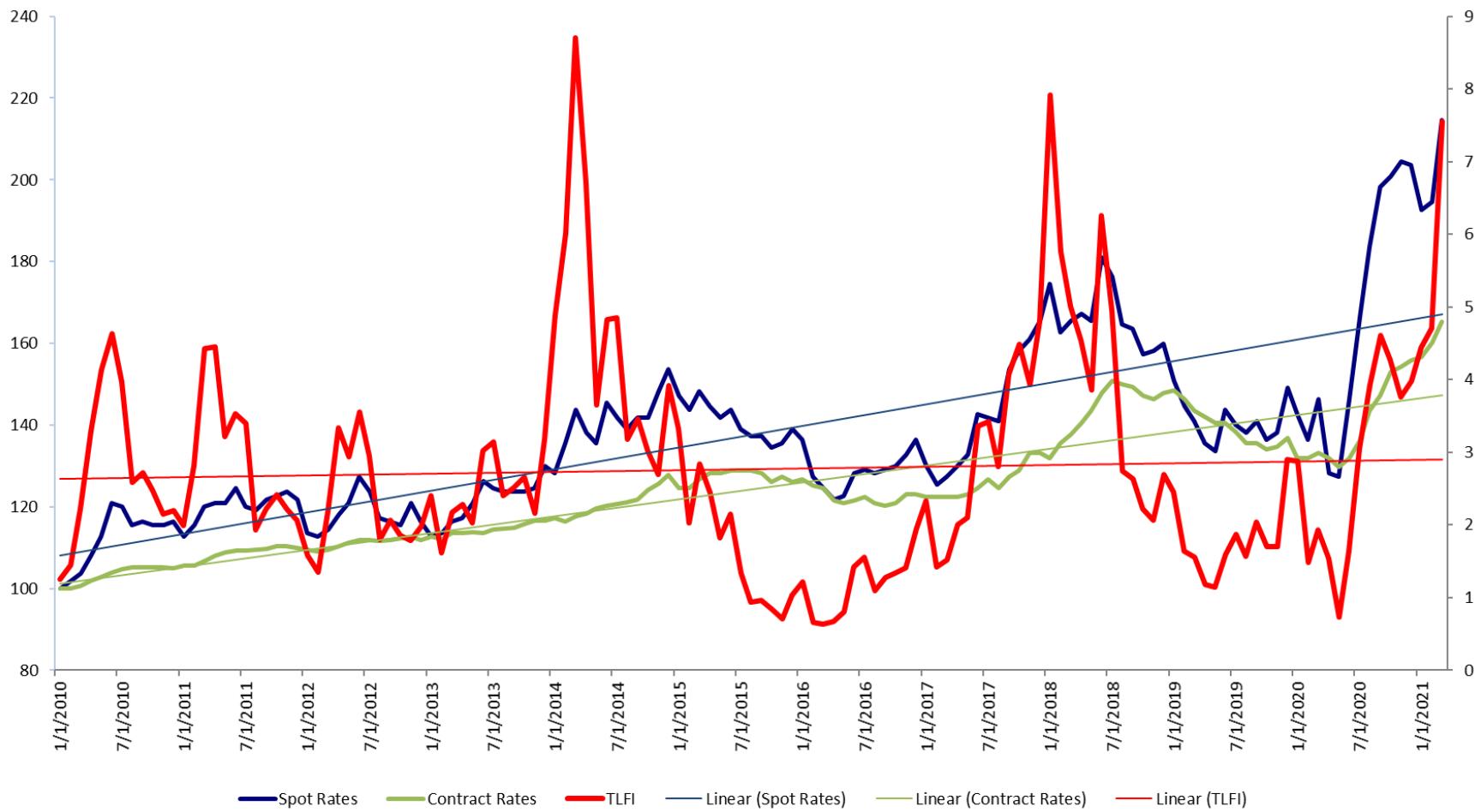
Disruption in Freight Transportation

The freight transportation space is on the cusp of a generational shift driven by disruptive technologies like intelligent trucks and drones and emerging players from Silicon Valley. Change appears imminent and powerful. We explore the disruptive impact of these forces on the incumbent players and business models.

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Morgan Stanley Truckload Freight Index, Spot and Contract Rates Indexed to January 2010



Trucking: An Intelligent Revolution is Coming

More importantly, we see new technologies collectively driving as much as a 30-50% reduction in trucking operating costs in the next 10 years

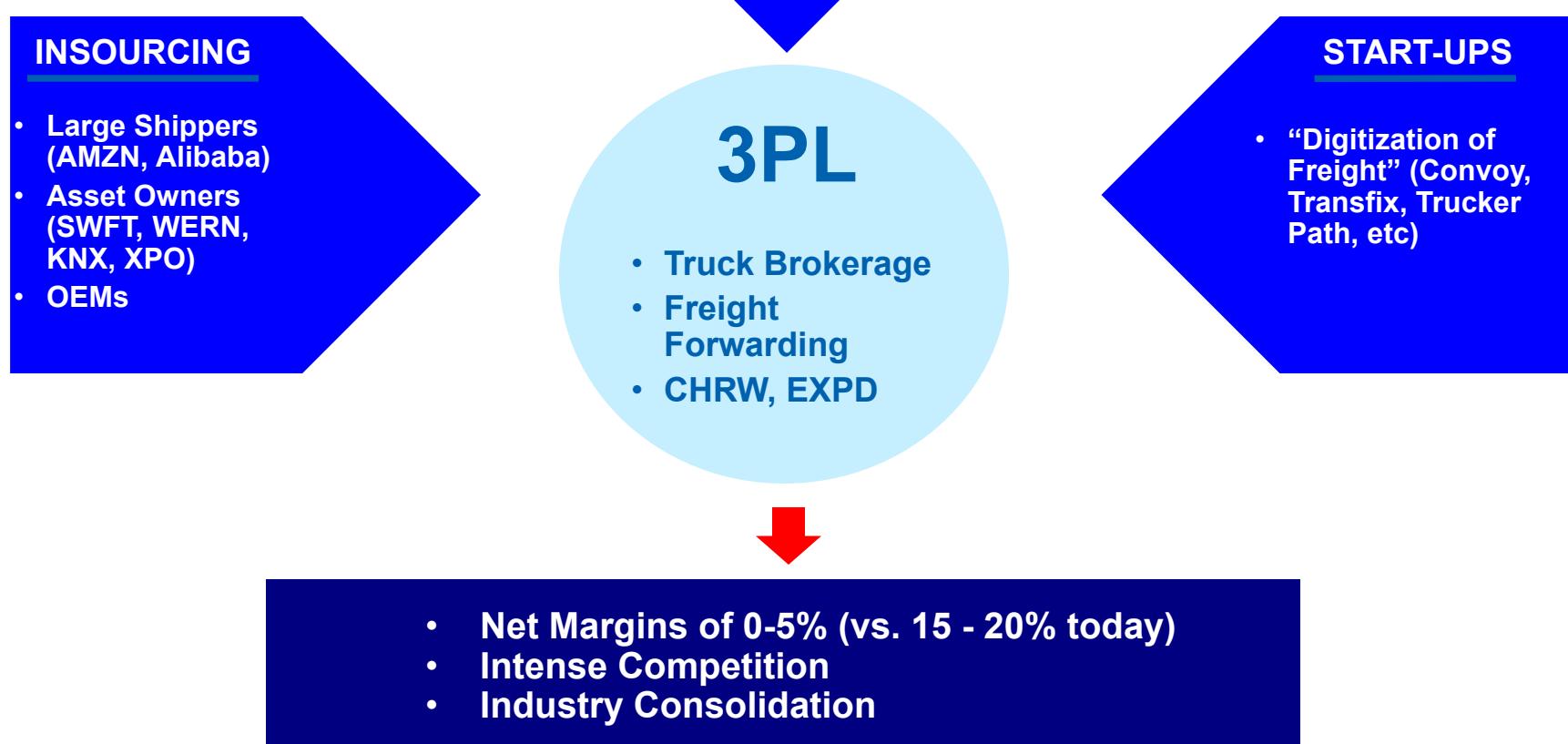
- Intelligent trucks: ADAS (advanced driver assistance systems), platooning and autonomous driving
- Fuel efficiency regulation
- Fleet management systems

Phase	1	2	3	4	5
	ADAS	Platooning	YOU ARE HERE Autonomous	Autonomous + Electric	Fully Autonomous + EV
Autonomous Level	1/2	3	4	4	5
Timing of Implementation	Immediate	2018	2021-2023	2021-2023	2025 - 2030
Implementation Cost	\$150-500 per truck	\$500-1000 up front	\$10,000 per truck	\$30,000 per truck	\$20,000 per truck (net of cab cost reductions)
Benefits	• 30-50% Insurance Savings	• 5-15% fuel efficiency improvement	• 30-50% overall op. cost reduction • 2x productivity • Industry consolidation	• 60-70% overall op. cost reduction • 2x productivity • Industry consolidation	• 80% op. cost reduction • 2x productivity • Industry consolidation • Savings are easier to achieve
Payback Period	~2 months	~1 month	~3 months	~5 months	~4 months

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FOUNDATION

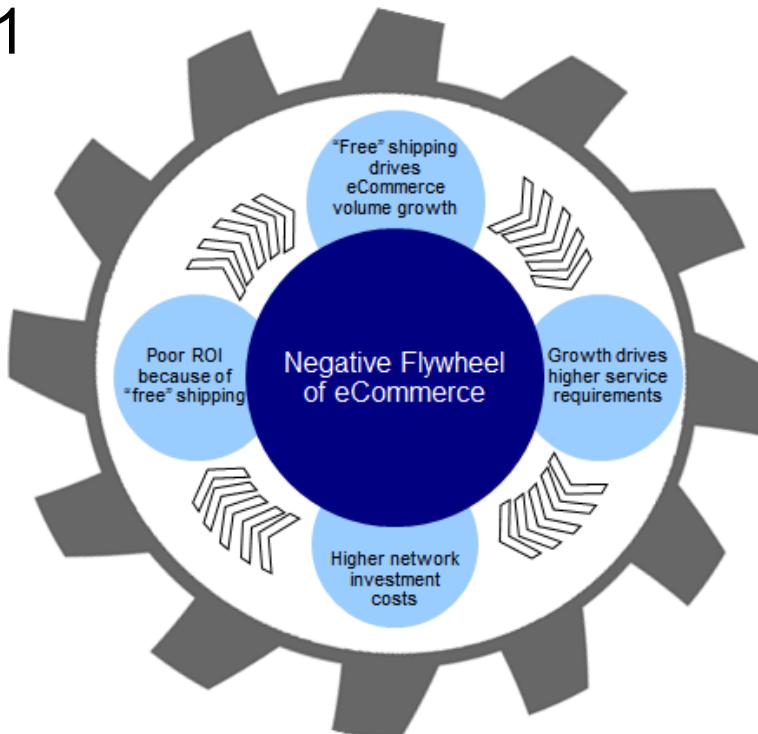
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Parcel

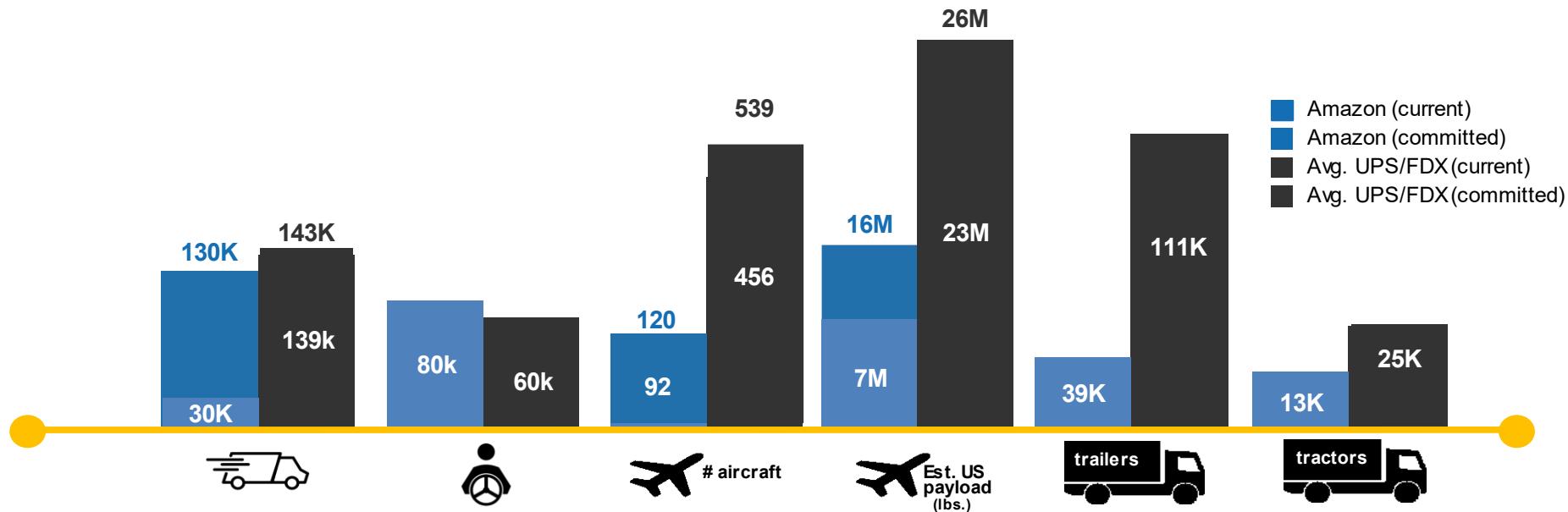
B2C may be the growth engine today but we see twin threats of selective insourcing by e-commerce giants and omni-channel shift enabling last mile competition. UPS/FDX may need to grow rapidly or shrink to ensure LT success. FDX appears to have a better starting point for reinvention.

Efforts to Serve eCommerce Likely Add More Costs Than Revenue in 2021



We believe Parcels now have to manage the “negative flywheel of eCommerce” as they face eroding pricing power from “free shipping” while having to grapple with increasing network investment costs to meet customer demands. We believe capex is likely to remain elevated as a % of revenues in coming years.

AMZN's Commitments to Increase Its Capacity by 2024-2025 Re-Affirms Our View that Logistics as a Service is Coming...



Freight Transportation Valuation

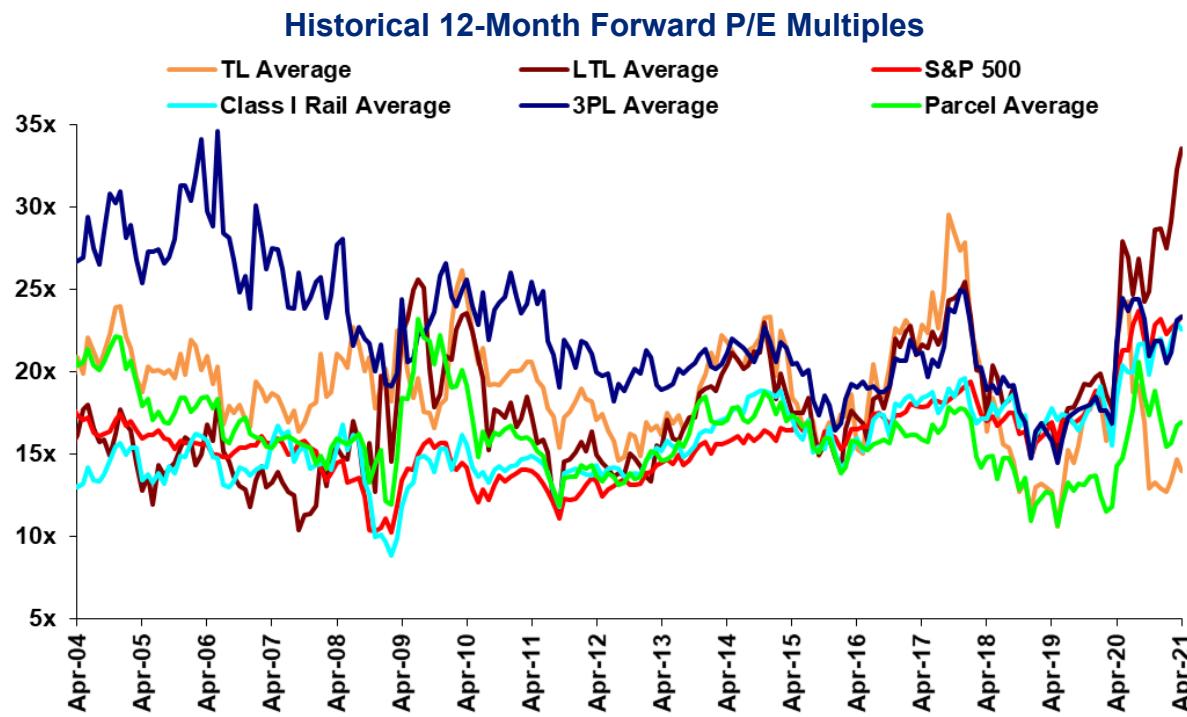
Freight Transportation Valuation

DCF/FCF

P/E

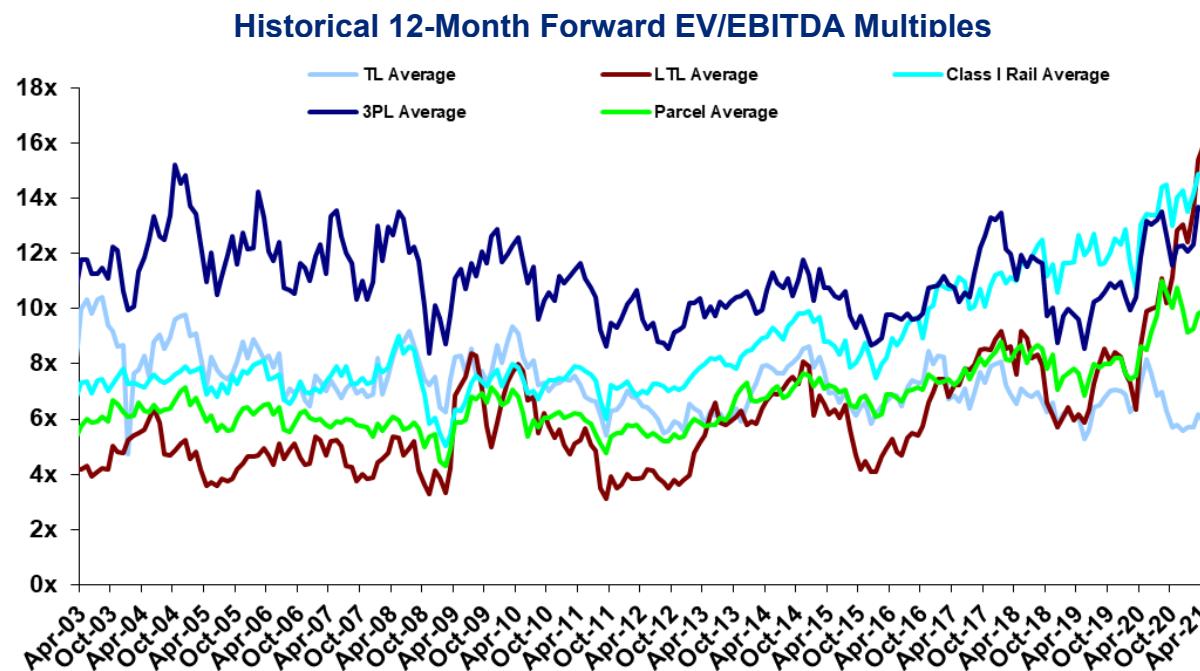
EV/EBITDA

Price / Earnings Multiple Valuation Across Transport Verticals



Looking across transport verticals, TLs and 3PLs have historically traded at a premium to Parcel and Class I Rail names on 12-month forward P/E

Enterprise Value / EBTIDA Valuation Across Transport Verticals

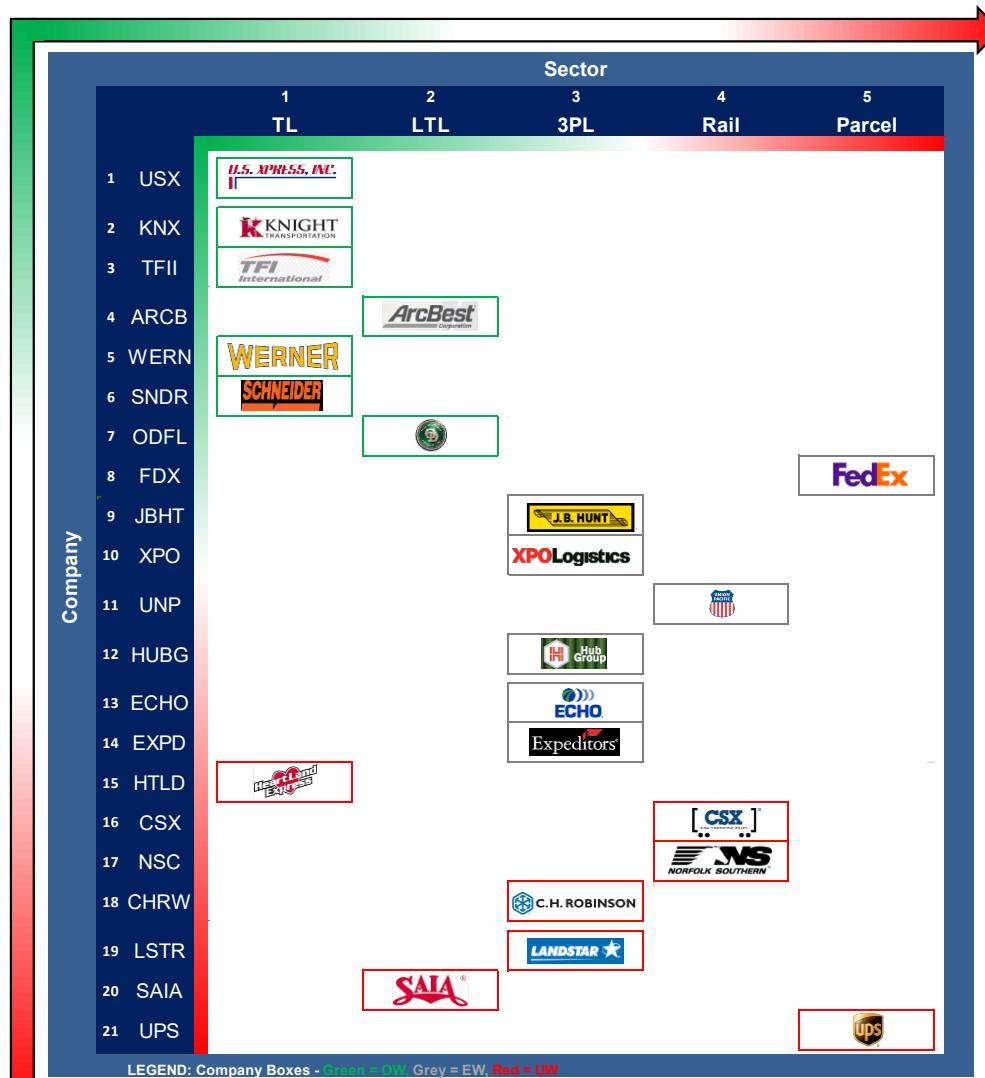


Looking across transport verticals, LTLs have historically traded at the lowest 12-month forward EV/EBITDA multiples

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Freight Transportation Overview



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Comp Sheet

Company	Currency	Price at 23-Apr	MS PT	Upside to PT (%)	MS Rating	Market Cap		MS EPS		MS EPS Growth Rate		Consensus EPS		Dividend Yield
						LC	US\$	2021e	2022e	2021e	2022e	2021e	2022e	
Rails														
CSX Corporation	USD	103.11	62	(39.9%)	UW	78.1	78.1	4.04	4.25	11%	5%	4.36	4.96	1.1%
Norfolk Southern Corp.	USD	282.00	165	(41.5%)	UW	76.5	76.5	10.62	11.68	16%	10%	11.29	12.89	1.4%
Union Pacific Corp.	USD	223.54	180	(19.5%)	EW	148.5	148.5	9.23	10.05	13%	9%	9.57	10.82	1.7%
3rd Party Logistics														
C.H. Robinson Worldwide Inc.	USD	99.78	55	(44.9%)	UW	13.1	13.1	3.74	3.80	1%	2%	4.38	4.73	2.0%
Echo Global Logistics Inc	USD	31.68	26	(17.9%)	EW	0.8	0.8	1.59	1.87	19%	17%	1.83	1.90	N/A
Expeditors International of Wash	USD	110.84	88	(20.6%)	EW	18.7	18.7	4.17	3.87	2%	-7%	4.25	4.36	0.9%
Hub Group Inc	USD	65.98	55	(16.6%)	EW	2.3	2.3	2.75	3.16	26%	15%	3.13	3.85	N/A
J.B. Hunt Transport Services Inc	USD	169.20	140	(17.3%)	EW	17.9	17.9	5.66	6.39	15%	13%	6.60	7.62	0.7%
Landstar System Inc	USD	171.73	90	(47.6%)	UW	6.6	6.6	6.23	6.32	25%	1%	8.44	8.28	0.5%
XPO Logistics, Inc.	USD	136.87	120	(12.3%)	EW	15.3	15.3	5.69	6.54	91%	15%	5.41	6.29	N/A
Truckload														
Heartland Express Inc.	USD	18.87	18	(4.6%)	UW	1.5	1.5	0.99	1.03	13%	4%	0.99	1.07	0.4%
Knight Transportation Inc.	USD	46.74	60	28.4%	OW	7.7	7.7	3.50	3.93	28%	12%	3.57	3.46	0.9%
Schneider National Inc.	USD	24.35	30	23.2%	OW	4.3	4.3	1.58	1.82	N/A	15%	1.59	1.73	1.1%
US Xpress Enterprises, Inc	USD	10.03	15	49.6%	OW	0.5	0.5	1.16	1.37	186%	18%	0.99	1.30	N/A
Werner Enterprises	USD	45.41	56	23.3%	OW	3.1	3.1	3.34	3.51	29%	5%	3.21	3.34	0.9%
TFI International Inc.	USD	79.34	100	26.0%	OW	7.4	7.4	3.92	5.27	17%	35%	3.75	4.61	1.2%
LTL														
ArcBest Corp	USD	72.53	90	24.1%	OW	1.8	1.8	4.20	5.37	30%	28%	4.15	4.67	0.4%
Old Dominion Freight Line Inc	USD	257.76	270	4.7%	OW	29.9	29.9	7.37	8.82	30%	20%	7.59	8.71	0.3%
Saia, Inc.	USD	241.89	125	(48.3%)	UW	6.4	6.4	6.55	7.18	26%	10%	6.81	8.05	N/A
Parcel														
FedEx Corporation	USD	277.74	250	(10.0%)	EW	73.7	73.7	15.77	14.55	116%	-16%	18.87	20.88	0.9%
United Parcel Service	USD	178.96	80	(55.3%)	UW	155.6	155.6	8.30	7.67	1%	-8%	8.91	9.60	2.3%

Source: Morgan Stanley Research; Thomson Reuters; Stock Price as of 4/23/21. For valuation methodology and risks associated with any recommendation, rating or price target referenced in this report, please contact the Client Support Team as follows: US/Canada +1 800 303-2495; Hong Kong +852 2848-5999; Latin America +1 718 754-5444 (U.S.); London +44 (0)20-7425-8169; Singapore +65 6834-6860; Sydney +61 (0)2-9770-1505; Tokyo +81 (0)3-6836-9000. Alternatively you may contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY 10036 USA.

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Industrials Spring Training Teach-In

Comp Sheet

Company	P / E			EV / EBITDA			EV / Sales			FCF Yield		Operating Margins	
	2021e	2022e	10-Yr. Avg.	2021e	2022e	10-Yr. Avg.	2021e	2022e	10-Yr. Avg.	2021e	2022e	2017e	2018e
Rails													
CSX Corporation	25.5x	24.3x	15.9x	14.9x	14.5x	7.9x	8.1x	7.9x	3.0x	4.0%	4.1%	41.7%	41.6%
Norfolk Southern Corp.	26.6x	24.2x	15.7x	16.0x	15.2x	8.0x	7.7x	7.5x	3.0x	2.7%	2.8%	35.5%	36.2%
Union Pacific Corp.	24.2x	22.2x	16.8x	16.8x	15.6x	8.4x	8.8x	8.3x	3.4x	3.5%	3.6%	42.2%	43.4%
3rd Party Logistics													
C.H. Robinson Worldwide Inc.	26.7x	26.3x	20.1x	18.2x	17.2x	12.8x	0.8x	0.8x	0.9x	3.6%	4.2%	4.0%	4.3%
Echo Global Logistics Inc	19.9x	16.9x	20.0x	9.4x	8.1x	9.1x	0.3x	0.3x	0.4x	5.3%	6.5%	2.1%	2.4%
Expeditors International of Wash	26.6x	28.6x	21.5x	18.3x	19.9x	11.8x	1.8x	1.9x	1.2x	3.8%	3.7%	9.3%	9.1%
Hub Group Inc	24.0x	20.9x	17.7x	9.0x	7.9x	9.9x	0.6x	0.6x	0.4x	2.2%	3.3%	3.5%	3.9%
J.B. Hunt Transport Services Inc	29.9x	26.5x	20.8x	16.3x	15.2x	9.1x	2.1x	2.0x	1.4x	1.4%	2.1%	7.7%	8.1%
Landstar System Inc	27.5x	27.2x	19.8x	17.7x	17.8x	11.0x	1.4x	1.4x	0.9x	3.2%	3.9%	7.0%	6.7%
XPO Logistics, Inc.	NM	NM	NM	11.0x	9.9x	9.9x	1.1x	1.0x	NM	4.6%	6.0%	5.1%	5.6%
Truckload													
Heartland Express Inc.	19.1x	18.4x	21.5x	6.5x	6.1x	7.6x	2.1x	2.0x	2.2x	6.0%	5.5%	15.9%	15.7%
Knight Transportation Inc.	13.3x	11.9x	18.7x	5.6x	4.8x	7.4x	1.4x	1.2x	1.7x	6.6%	7.8%	15.6%	16.3%
Schneider National Inc.	15.4x	13.4x	17.2x	5.7x	5.0x	N/A	0.8x	0.7x	N/A	7.0%	6.2%	7.9%	8.3%
US Xpress Enterprises, Inc	8.6x	7.3x	8.4x	5.8x	5.2x	N/A	0.6x	0.6x	N/A	NM	4.2%	5.2%	5.6%
Werner Enterprises	13.6x	12.9x	16.9x	6.0x	5.5x	5.1x	1.3x	1.2x	0.8x	5.5%	5.1%	12.0%	12.1%
TFI International Inc.	20.3x	15.0x	-	8.0x	6.2x	6.6x	1.1x	1.0x	N/A	8.0%	9.5%	7.6%	9.4%
LTL													
ArcBest Corp	17.3x	13.5x	-	6.8x	5.6x	4.7x	0.6x	0.5x	0.3x	4.2%	7.3%	4.7%	5.5%
Old Dominion Freight Line Inc	35.0x	29.2x	17.2x	19.9x	17.2x	8.2x	6.2x	5.4x	1.5x	1.9%	3.2%	25.0%	26.0%
Sala, Inc.	36.9x	33.7x	17.3x	16.6x	14.9x	5.6x	3.2x	2.9x	0.6x	1.1%	1.0%	11.7%	12.0%
Parcel													
FedEx Corporation	17.6x	19.1x	14.1x	9.6x	9.9x	5.9x	1.1x	1.2x	0.8x	1.8%	2.5%	6.2%	5.4%
United Parcel Service	21.6x	23.3x	16.8x	14.8x	15.4x	7.3x	2.1x	2.0x	1.2x	2.5%	1.2%	8.7%	8.5%

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Industrials Spring Training Teach-In

Industry: Airlines

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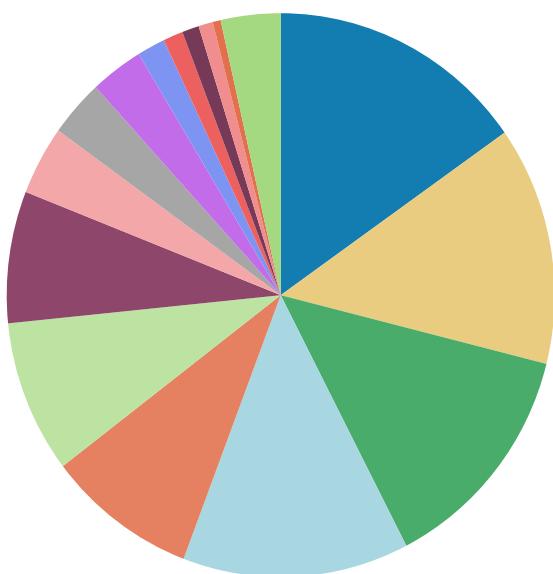
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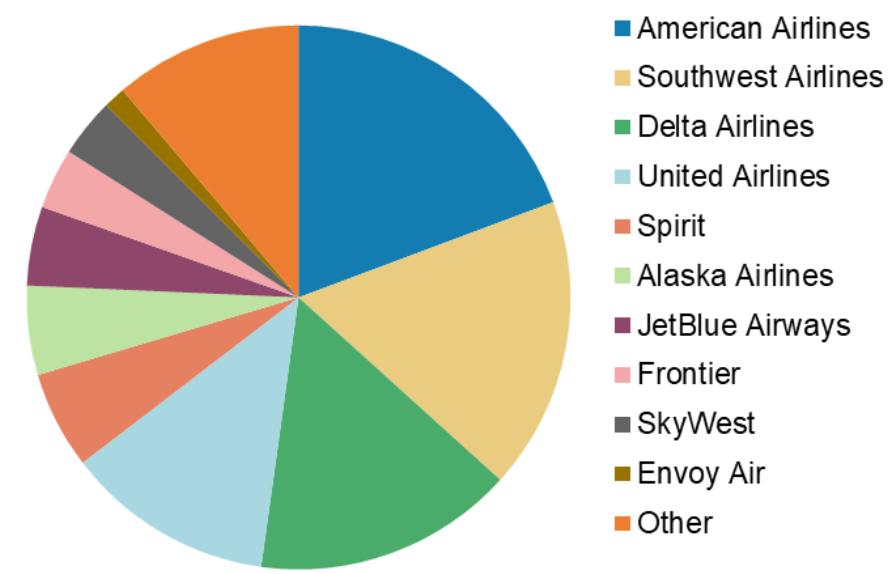
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Industry Structure is More Concentrated Today

2007 Domestic Capacity Market Share



2020 Domestic Capacity Market Share



Source: Company Data, OAG, Morgan Stanley Research.

Airline Characteristics

Legacy Carriers vs. Lower-Cost Carriers

Legacy Carriers

- First Class / Business Class Seating
- Substantial Corporate Travel Exposure
- Hub-and-Spoke Networks
- Wide Range of Origins & Destinations via Short and Long Haul Flights
- Higher International Exposure
- Typically Operate a Wide Variety of Aircraft
- Use of Main Airports with Exclusive Lounges

Lower-Cost Carriers

- Low Fares
- Point-to-Point Flying
- High Flight Frequencies
- Single Passenger Class
- Unbundled Fare Structure, More “Ancillary” Revenue Sources
- Most Operate a Single Type of Aircraft
- Shorter Haul Flights
- Use of Secondary Airports

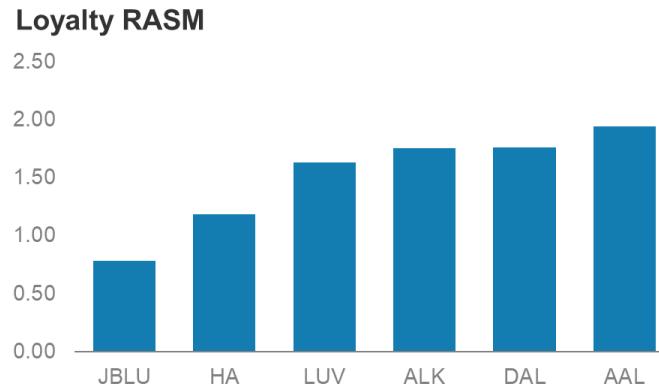
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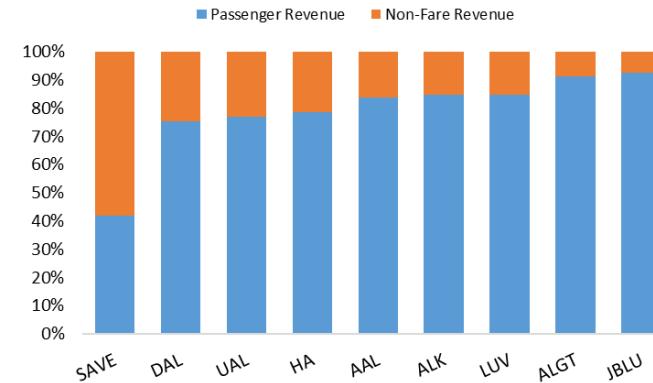
Sources of Revenue

- Passenger Ticket Fares
- Carry-on Bag / Checked Baggage
- Change / Cancellation Fee
- Frequent Flyer Program
- Preferred Boarding
- Seat Choice / Preferred Seats, Comfort / Space
- Entertainment, Internet / Wi-Fi, Movies
- Meals, Snacks, and Beverages
- Credit Card Program
- Cargo Revenue

Airline Loyalty RASM



Passenger and Non-Fare Revenue Breakout



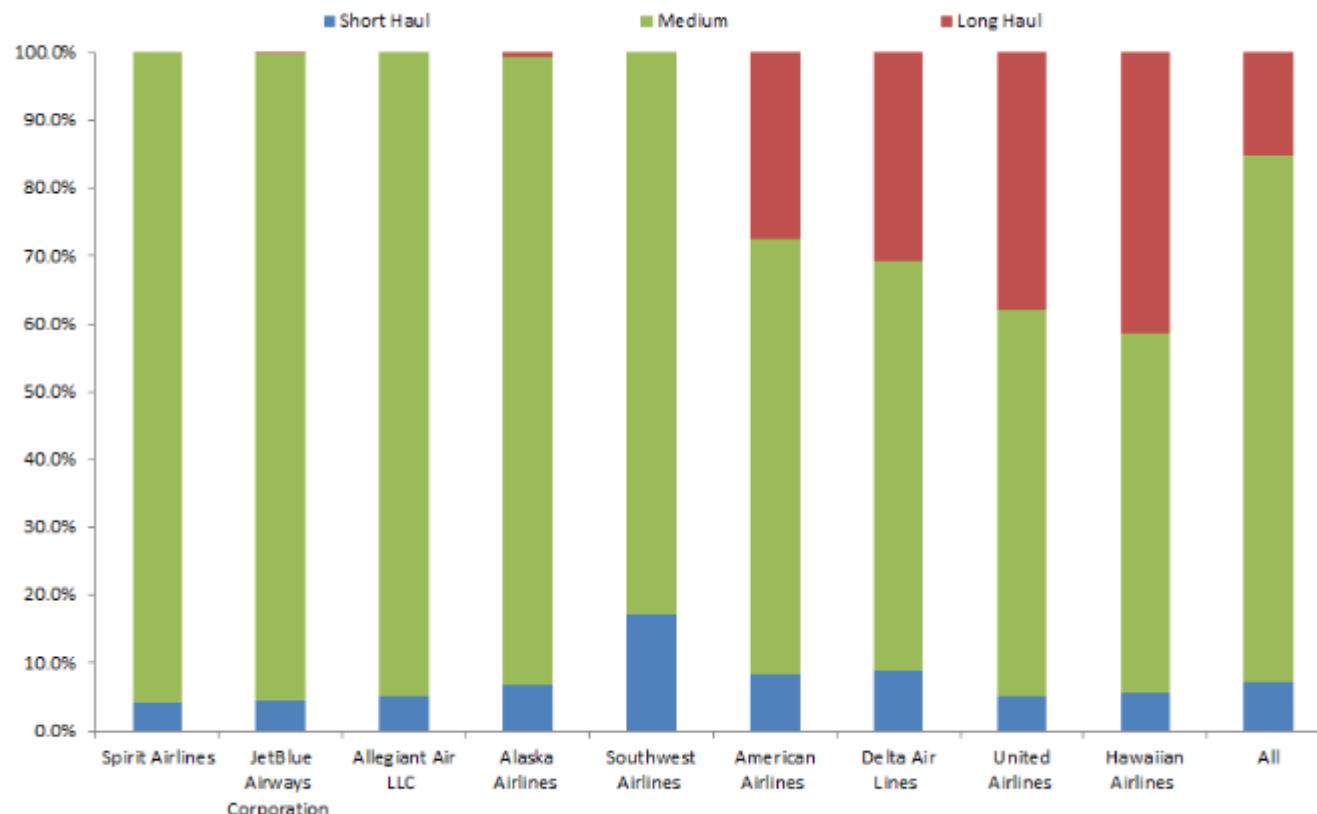
Legacy carriers charge a higher ticket price which include “extras” that low-cost carriers generally do not include in their ticket price. Ultra low-cost carriers have an “unbundled” fare structure

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Short/Medium/Long-Haul Flying by Airline

Short/Medium/Long-Haul Flying By Airline



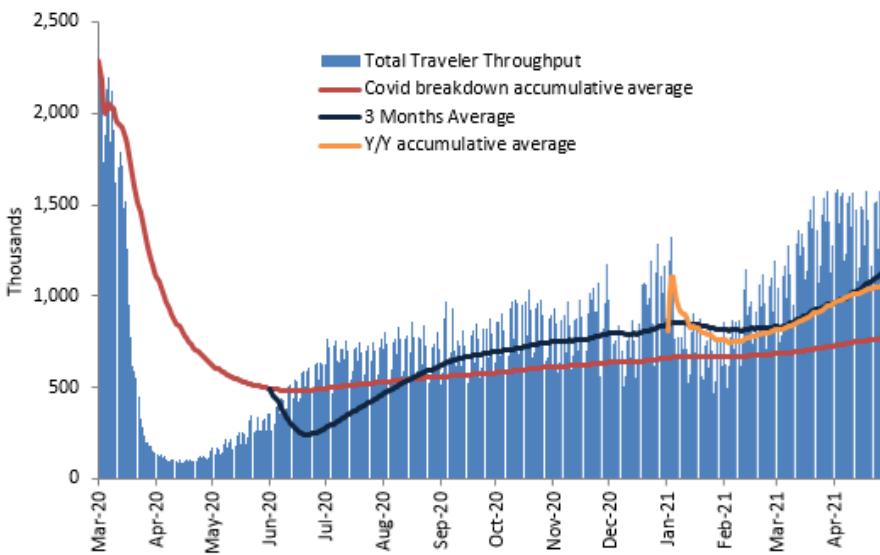
Source: OAG, Morgan Stanley Research

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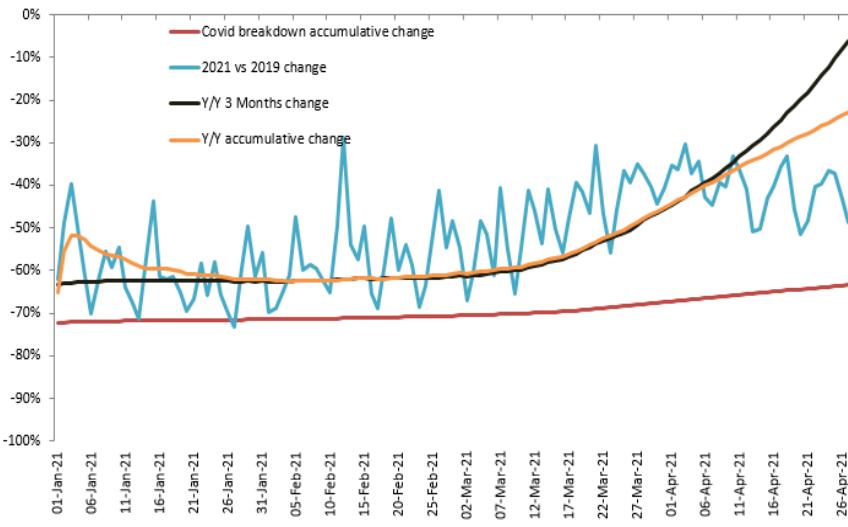
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TSA Checkpoint Passenger Trends

TSA Checkpoint Passenger Numbers



TSA Checkpoint Passengers Y/2019

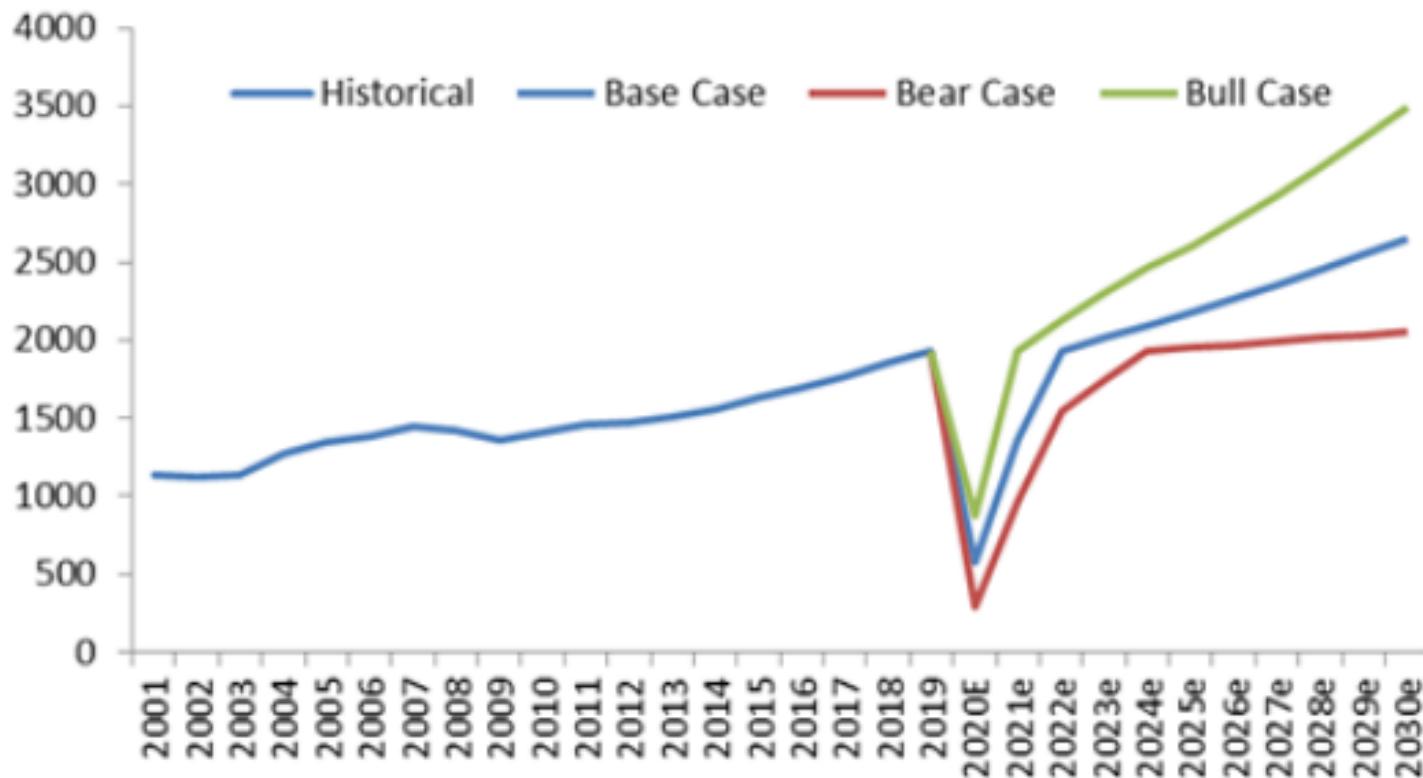


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Expected Airline Industry Recovery

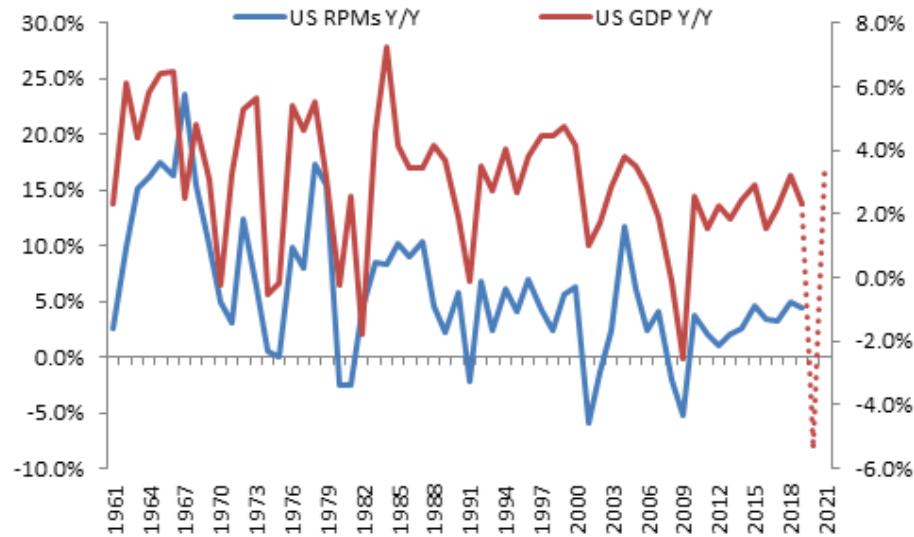
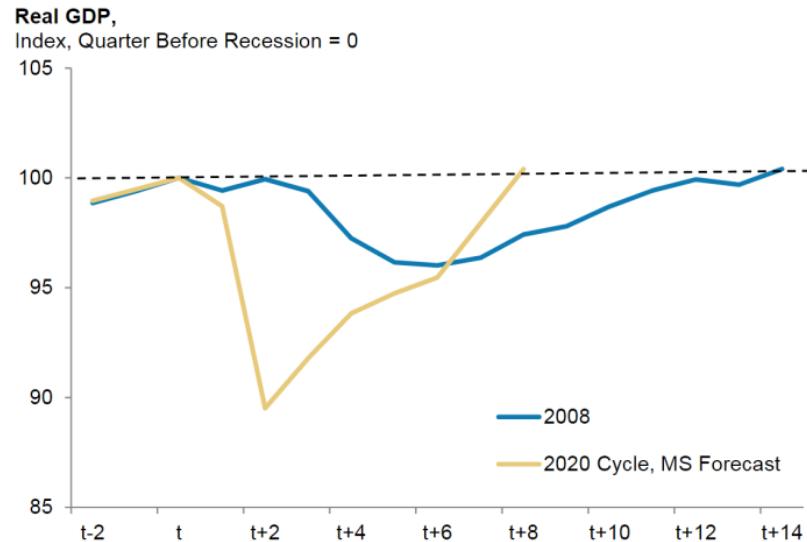
North America RPKs



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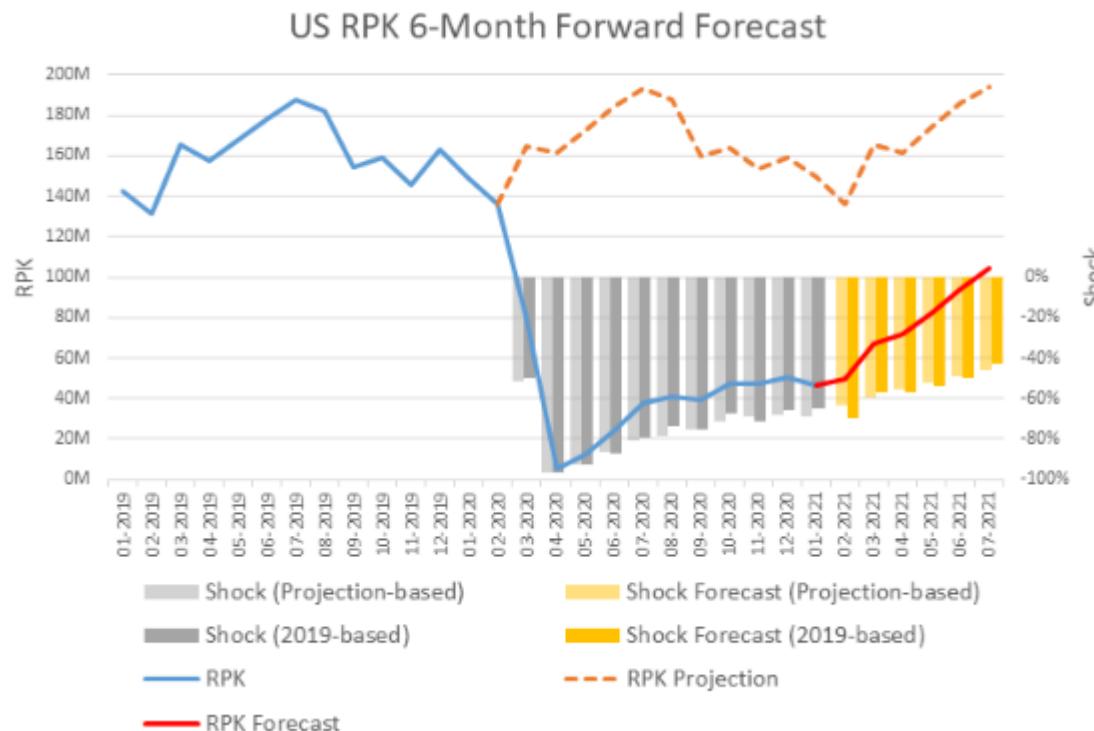
Expected Macro Snapback



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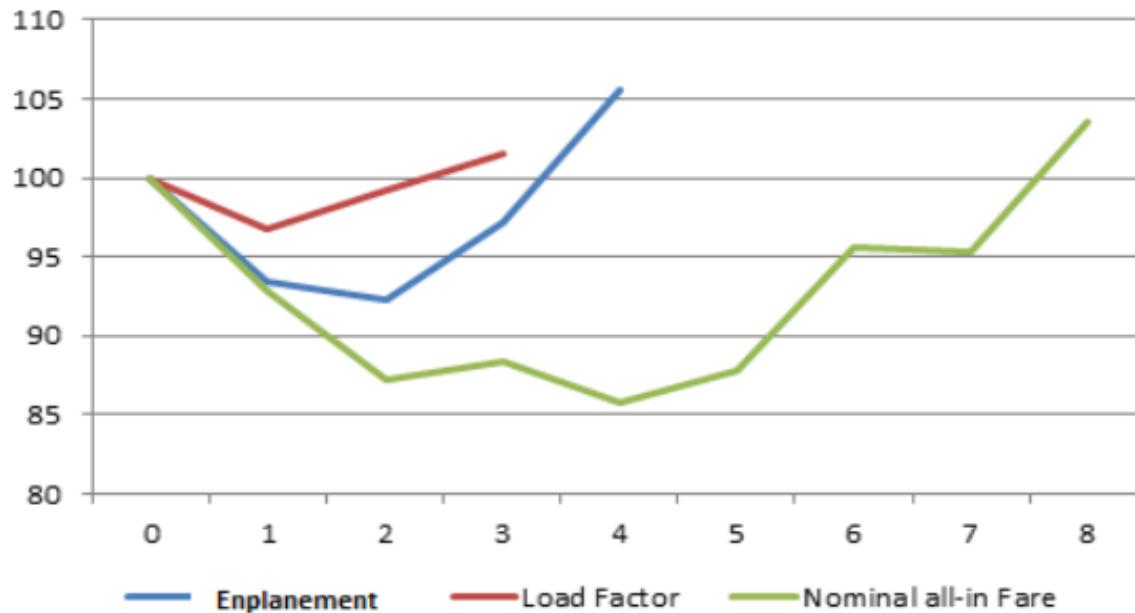
MS PAIRfect Index: Short Term Demand Recovery



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2001 Rebound (years): Enplanements, Load factor and Fares: Will 2021 Be the Same?

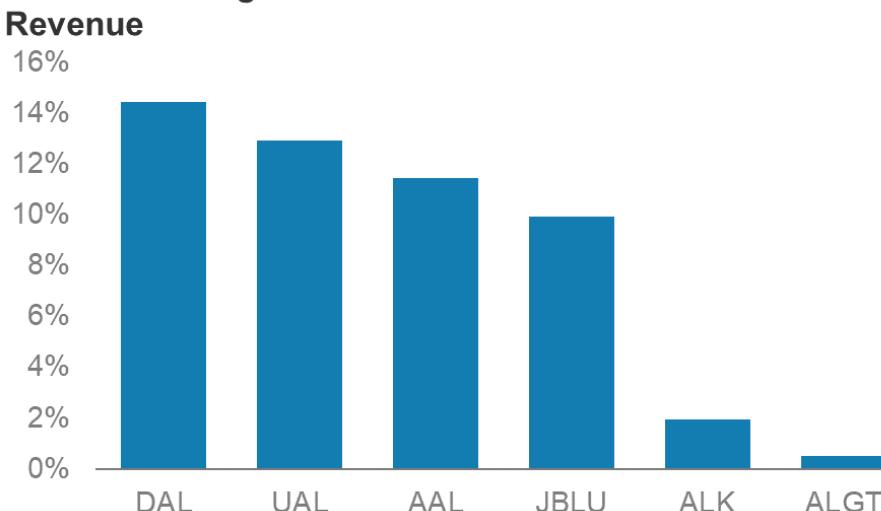


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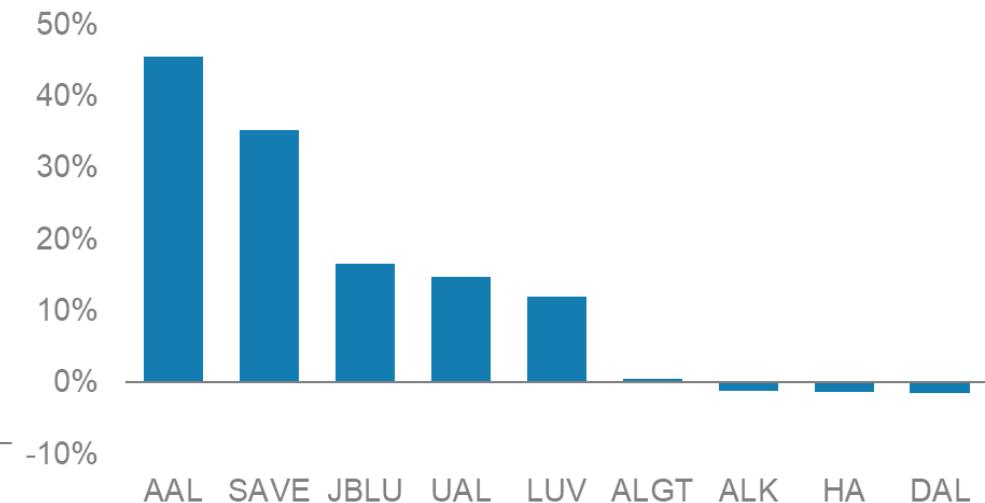
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Net Debt and Share Count Change Across Peers

Net Debt Change Since 2019 as % of 2019 Revenue



Diluted Share Count Change 2019 vs. Current



Source: Morgan Stanley Research, Company Data

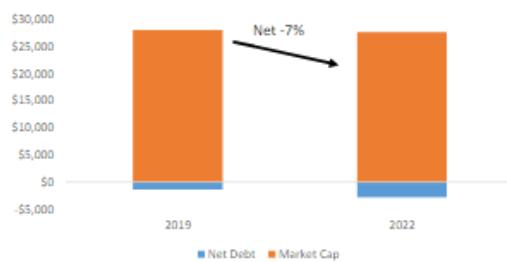
Note: JBLU current sharecount is adjusted for equity raise and convert issuance and AAL current sharecount is updated for recent equity issuance

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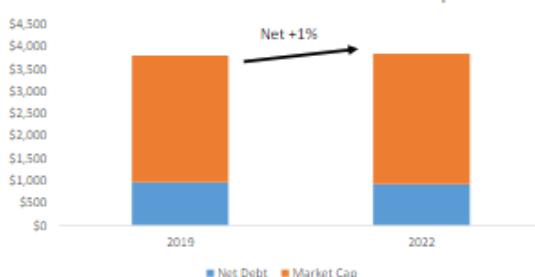
Normalized Enterprise Values (Current Market Cap + 2022YE Net Debt)

LUV EV Build - Net Debt vs. Market Cap



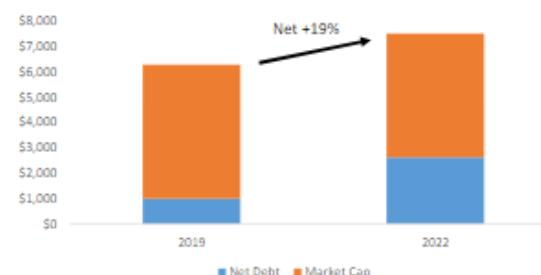
Source: Company data, Morgan Stanley Research. \$ in Millions

ALGT EV Build - Net Debt vs. Market Cap



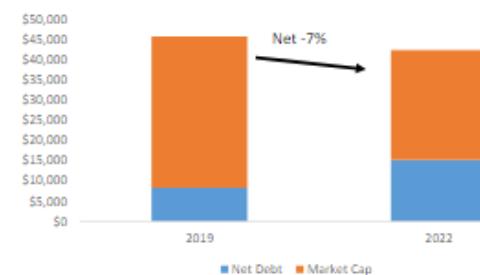
Source: Company data, Morgan Stanley Research. \$ in Millions

JBLU EV Build - Net Debt vs. Market Cap



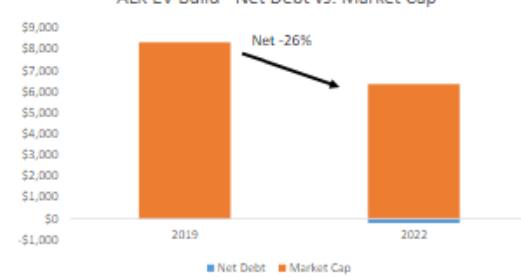
Source: Company data, Morgan Stanley Research. \$ in Millions

DAL EV Build - Net Debt vs. Market Cap



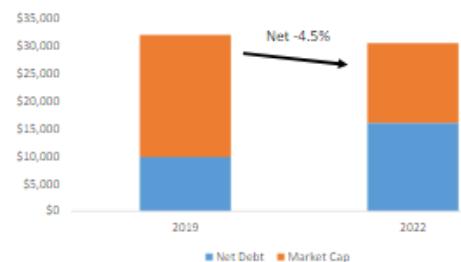
Source: Company data, Morgan Stanley Research. \$ in Millions

ALK EV Build - Net Debt vs. Market Cap



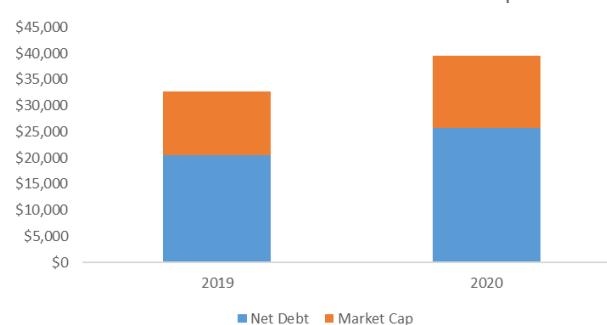
Source: Company data, Morgan Stanley Research. \$ in Millions

UAL EV Build - Net Debt vs. Market Cap

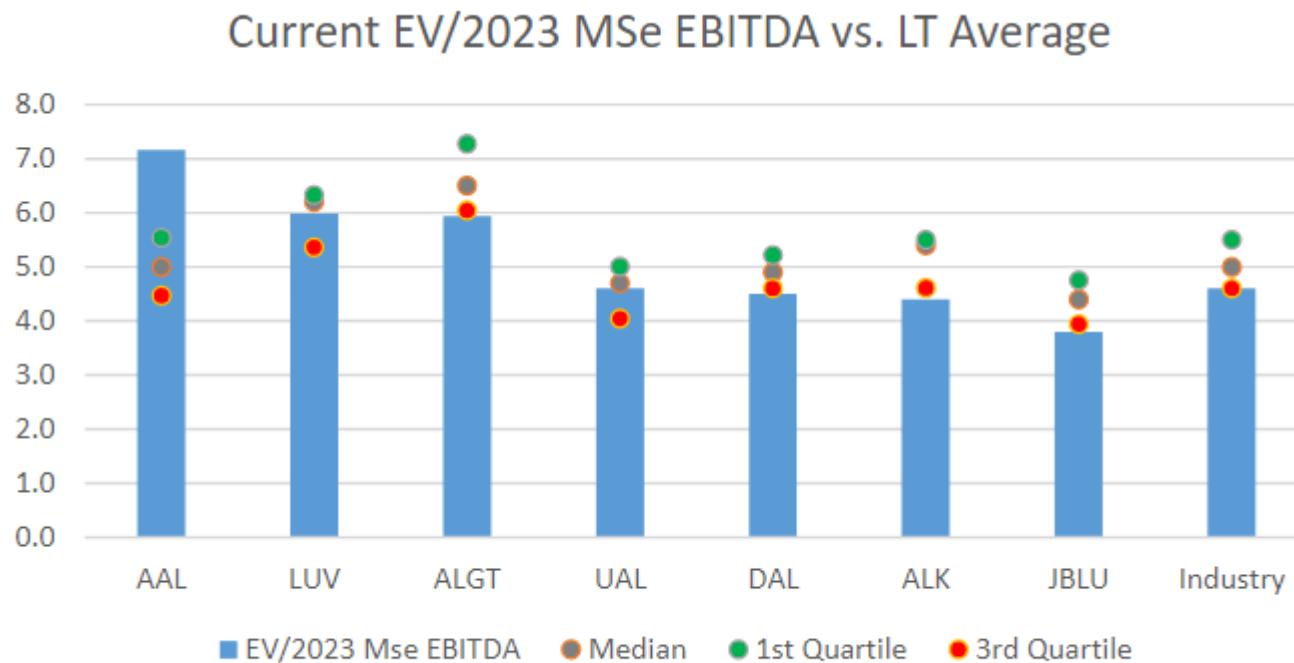


Source: Company data, Morgan Stanley Research. \$ in Millions

AAL EV Build - Net Debt vs. Market Cap



Enterprise Value / 2023 Mse EBITDA vs. Long-Term Average

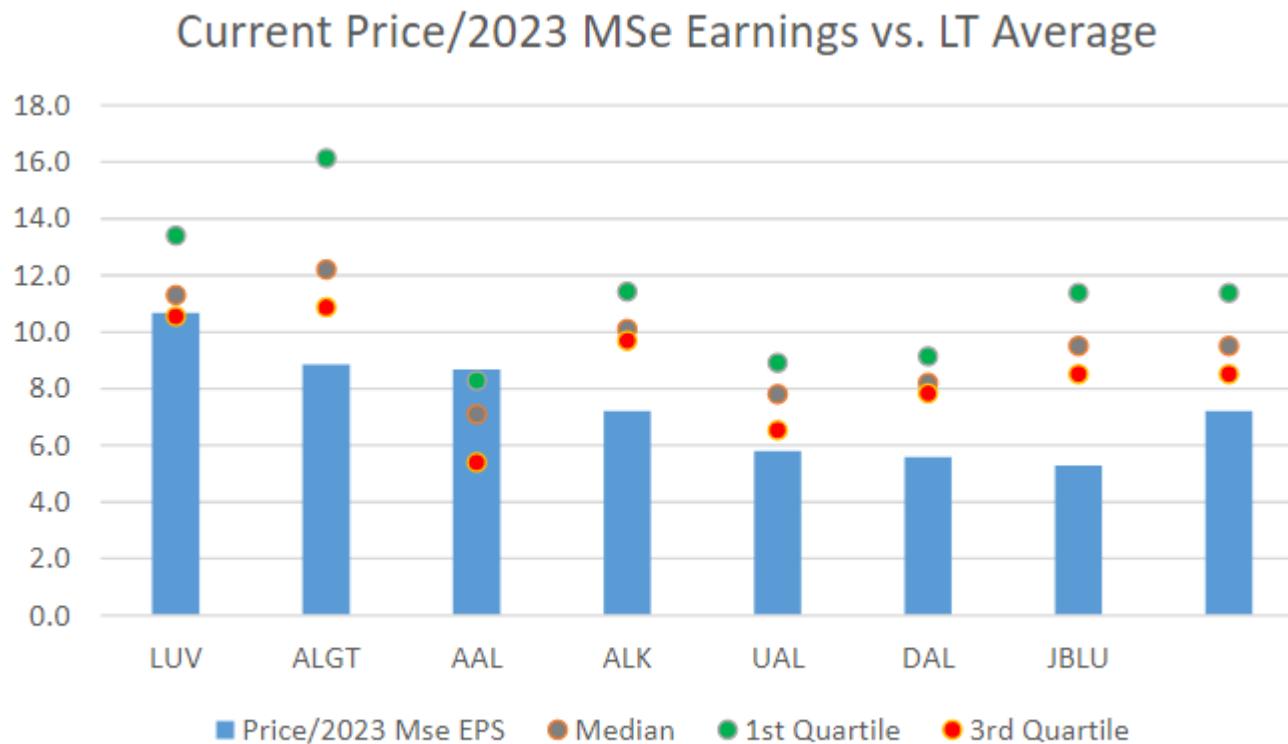


Source: Refinitiv, Morgan Stanley Research

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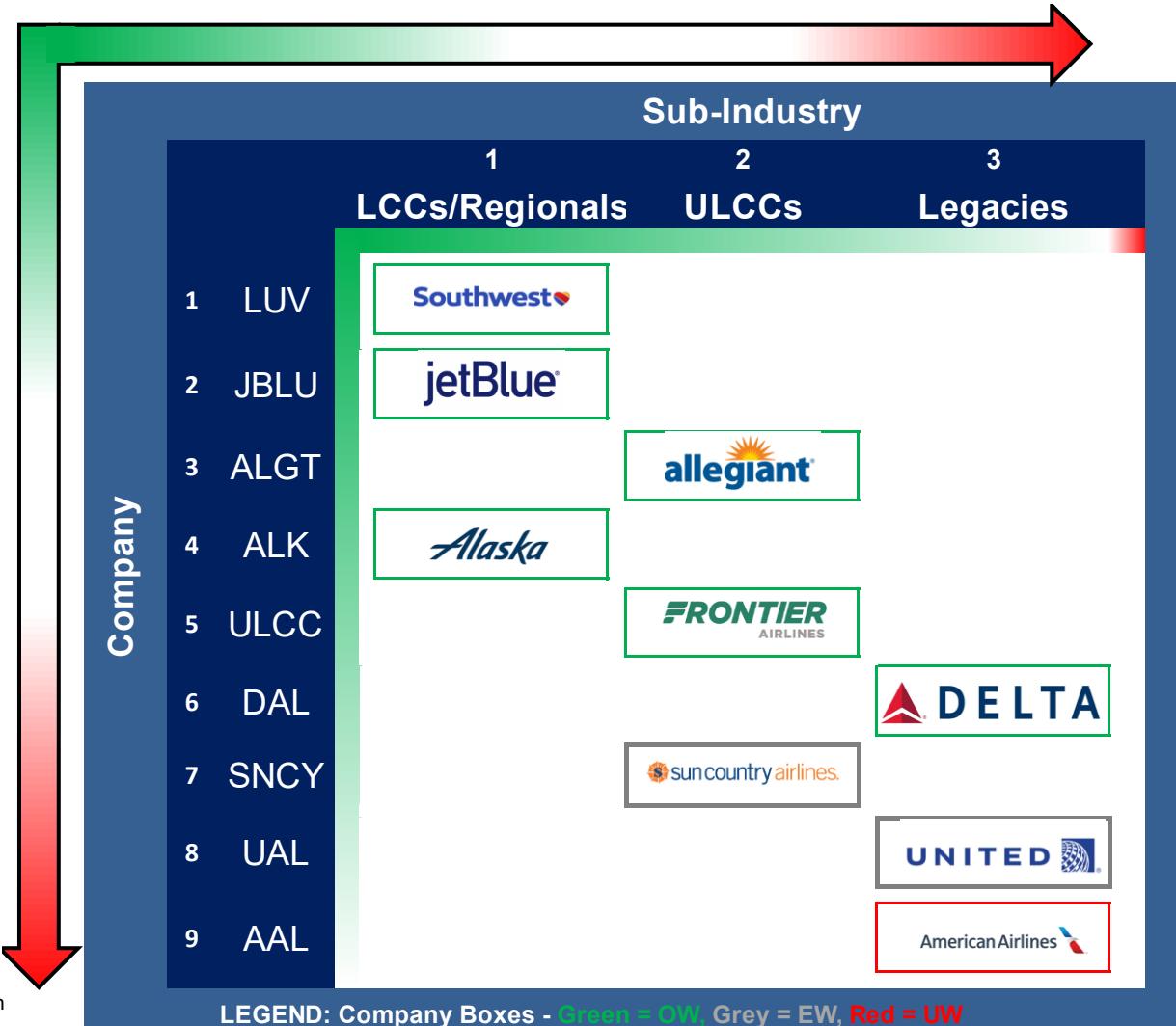
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Price / 2023 Mse Earnings Multiple Valuation Across Peers



Source: Refinitiv, Morgan Stanley Research

Airlines Overview



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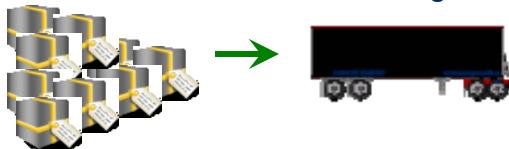
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APPENDIX

Truckload Business Model

As the name suggests, one shipment fills the whole truck

1. Shipper prepares shipment: Multiple items consolidated into one large trailer

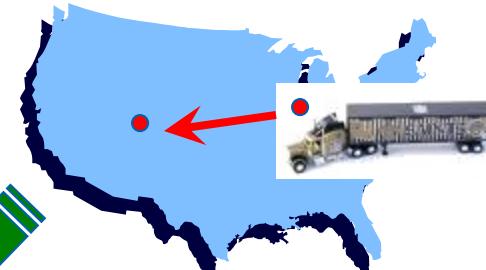


2. Carrier picks up trailer from shipper

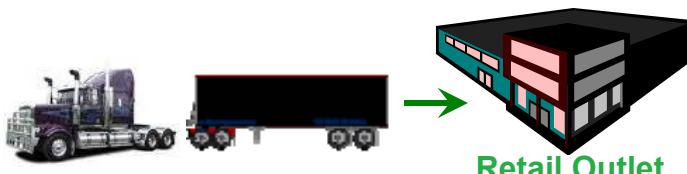


3. Point-to-point:
Same truck / drivers utilize public highways / roads to drive to destination

No network or sorting of freight



4. Final Delivery:
Drop off trailer at destination (distribution center, store, etc.)



5. Driver drives to next pick-up location for next load (deadhead)

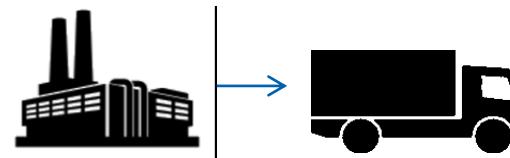


Less-Than-Truckload Business Model

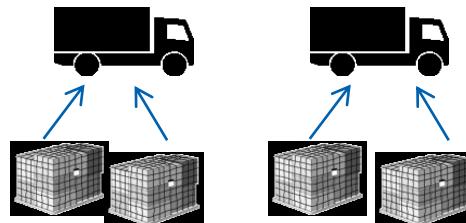
1. Pickup and Delivery driver picks up local shipments, usually palletized freight



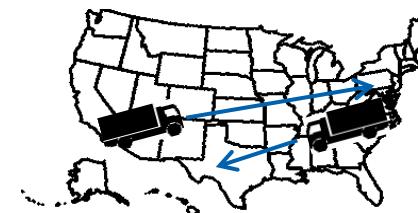
2. Shipments delivered to local terminal



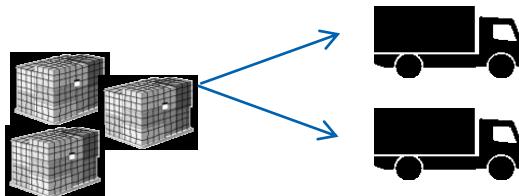
3. Sort shipments for line haul:
Shipments sorted and loaded onto trailers by destination



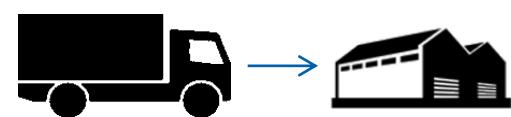
4. Line haul shipments to local terminal



5. Shipments resorted onto local pickup and delivery trucks



6. Local pickup and delivery delivers shipment on route



Truck Broker Business Model

Truck broker serves as the intermediary between asset-based carriers and shippers

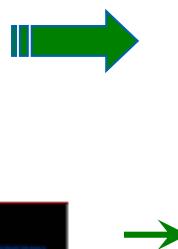
1. Shippers submit truck requests to Broker
 - Requests sent via phone, web, or Enterprise Resource Planning (ERP)



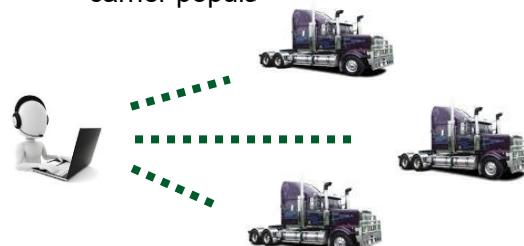
3. Broker procures capacity
 - Prior to receiving payment from shipper
 - Goal is to gain profit on spread of price paid to carrier vs. received from shipper



5. Broker coordinates shipment and payment
 - Transmit shipper information
 - Arrange payment
 - Shipper can track shipments and analyze spend



2. Broker provides list of carriers and/or rates
 - Large database provides access to quotes from large carrier population



4. Shipper and carrier are matched
 - Web based interface allows for easy and streamlined view of carrier
 - Transactions are either contractual or transactional



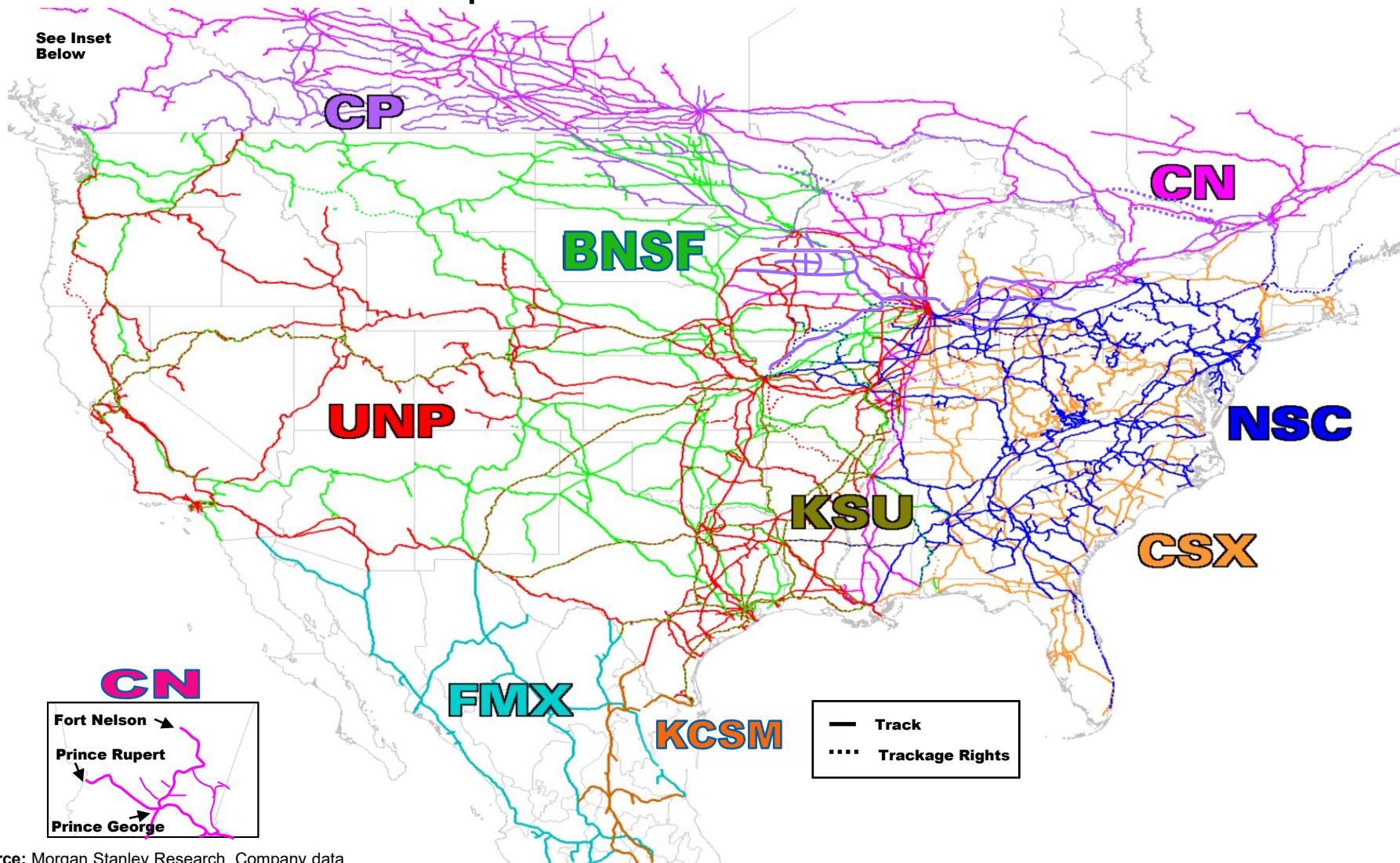
6. Point-to-Point and Final Delivery
 - Carrier picks up trailer from shipper
 - Drop off trailer at destination (distribution center, store, etc)



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Class I Railroad Map



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Airlines Geographic Capacity Exposure

■ North America ■ Asia-Pacific ■ LatAm & Caribbean ■ Europe ■ Middle East & Africa



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Electrical Equipment and Multi-Industry



Source: Shutterstock

Morgan Stanley does and seeks to do business with companies covered in Morgan Stanley Research. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of Morgan Stanley Research. Investors should consider Morgan Stanley Research as only a single factor in making their investment decision.

For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.

Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 25, 2021, unless otherwise noted.

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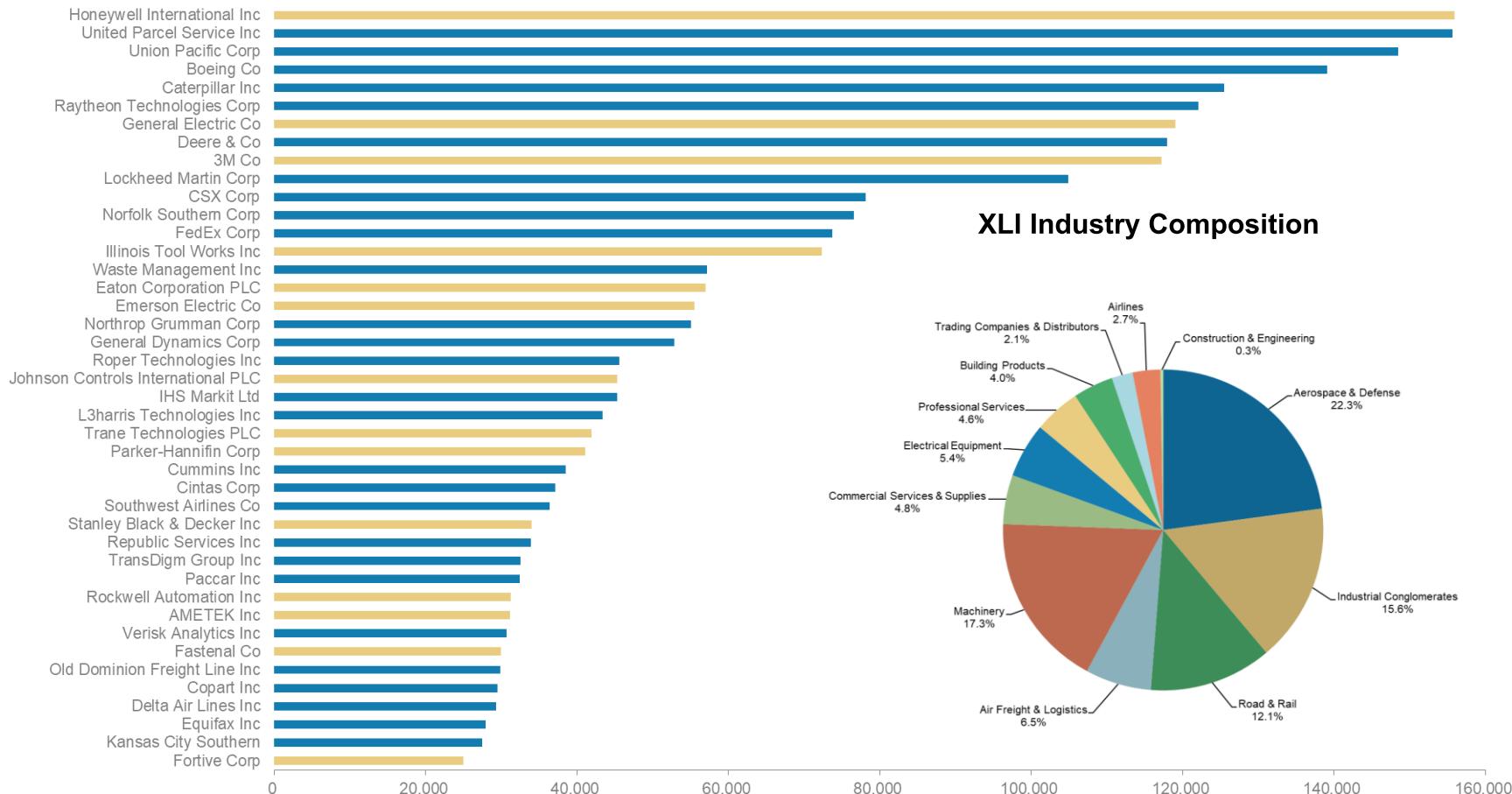
Morgan Stanley & Co. LLC



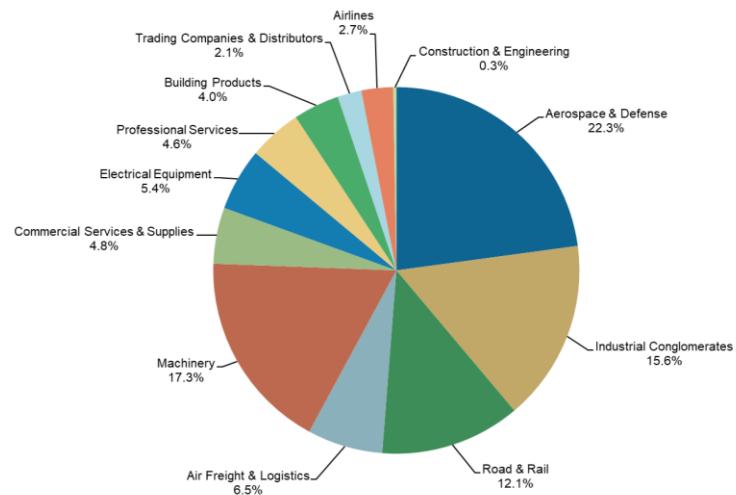
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Josh.Pokrzewinski@morganstanley.com

Multi-Industry Stocks Are Among the Largest US Industrials

Industrial Select Sector (XLI) - Individual Holdings Ranked by Market Cap*



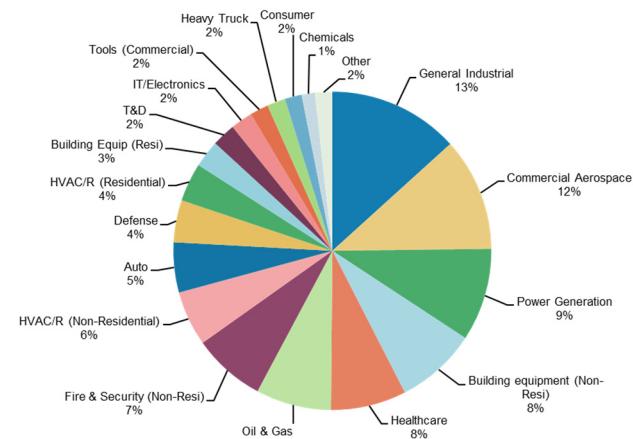
XLI Industry Composition



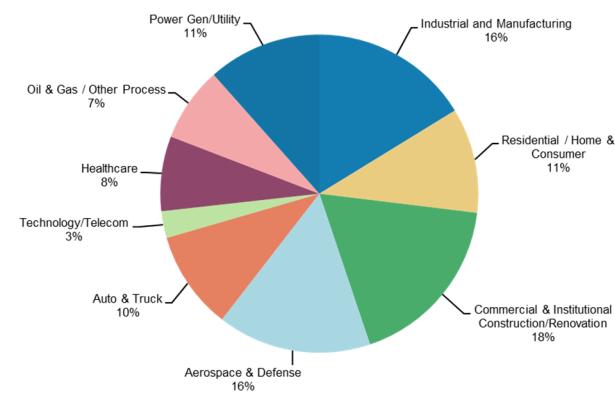
Source: Morgan Stanley Research, Thomson Reuters. Yellow denotes EE/MI coverage.

Multi-Industry End Market and Cycle Exposures

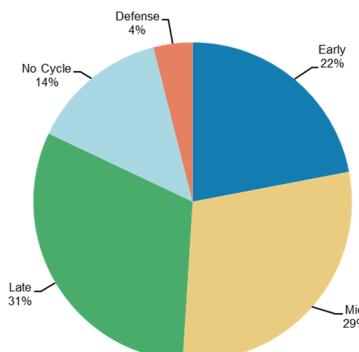
Detailed End Market Exposure



Consolidated End Market Exposure



Cycle Exposure



Source: Company Data, Morgan Stanley Research.

What Drives Multi-Industry Revenue?

Multi-Industry Sales Are Driven by Global GDP

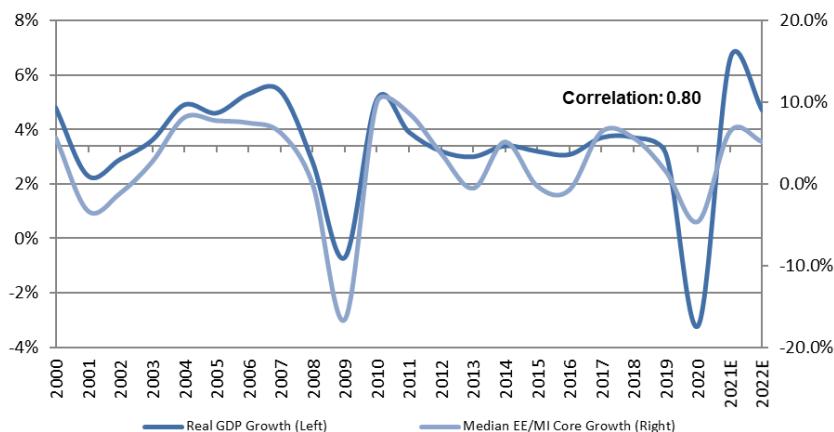
Global Growth Outlook

The global economy exited 2020 with solid momentum. Our economists expect global GDP to surpass its pre-COVID path (i.e. where GDP should have been absent the 2020 shock) by 3Q21

The MS Global Economics Team forecasts 7% global GDP growth in 2021

Real GDP (% SAAR)	2014	2015e	2016	2017	2018	2019	2020	2021e	2022e
Global*	3.4%	3.4%	3.1%	3.7%	3.7%	3.1%	-3.2%	6.6%	4.6%
G10	1.7%	2.0%	1.6%	2.2%	2.2%	1.7%	-5.1%	5.4%	4.3%
US	2.4%	2.5%	1.6%	2.3%	2.9%	2.3%	-3.5%	7.5%	4.4%
Euro Area	0.9%	1.4%	1.7%	2.5%	1.8%	1.2%	-6.8%	4.0%	4.5%
Japan	0.0%	1.0%	1.0%	1.6%	0.8%	0.7%	-4.8%	2.7%	2.4%
UK	2.8%	2.7%	1.8%	1.7%	1.4%	1.4%	-9.8%	4.8%	7.4%
EM	4.8%	4.4%	4.2%	4.7%	4.8%	4.1%	-1.7%	7.4%	4.8%
China	7.4%	7.0%	6.7%	6.9%	6.6%	6.1%	2.3%	9.0%	5.4%
India	7.2%	7.7%	7.9%	6.3%	7.3%	5.3%	-7.0%	10.5%	6.5%
Brazil	0.1%	-1.5%	-3.6%	0.7%	1.1%	1.1%	-4.1%	3.5%	3.0%
Russia	0.6%	-5.0%	-0.2%	1.5%	2.3%	1.3%	-3.0%	3.4%	3.2%

Since 2000, the Multis group has shown a ~0.80 correlation to Global GDP growth, with a higher level of cyclicity (~1.2x median multiplier).



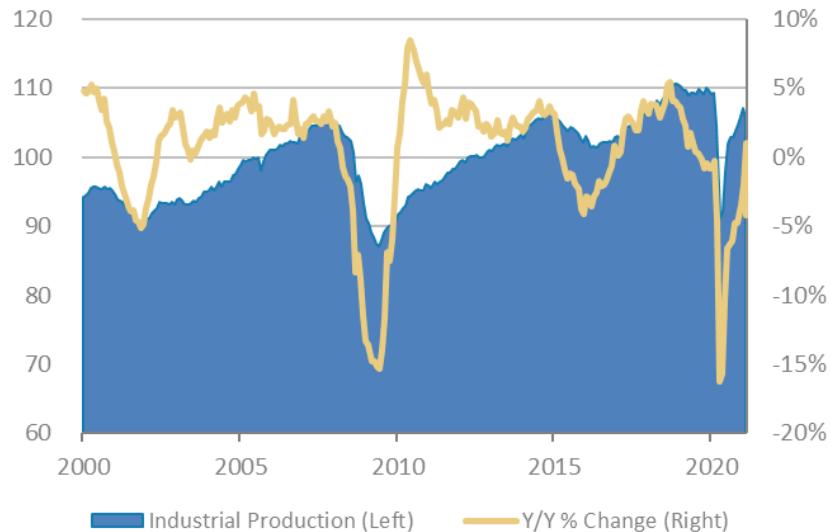
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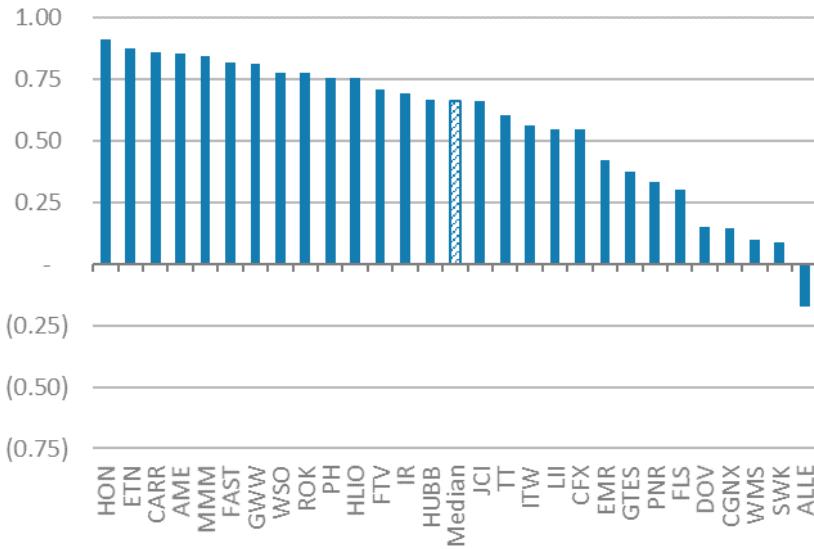
US Industrial Production Is Another Important Proxy

Industrial production: a measure of output in the industrial sector of the economy, which includes manufacturing, mining, electric and gas industries. The industrial sector, together with construction, accounts for the bulk of the variation in national output over the course of the business cycle. The US IP index measures real output of the industrial economy and is expressed as a percentage of real output in a base year, currently 2007.

US Industrial Production has recovered quickly off the 2020 trough, though it has yet to inflect to positive Y/Y growth.



Broadly, the group shows a high degree of correlation to US Industrial Production (0.66 median since 2000), with greatest correlation at HON, ETN, CARR, AME, and MMM.



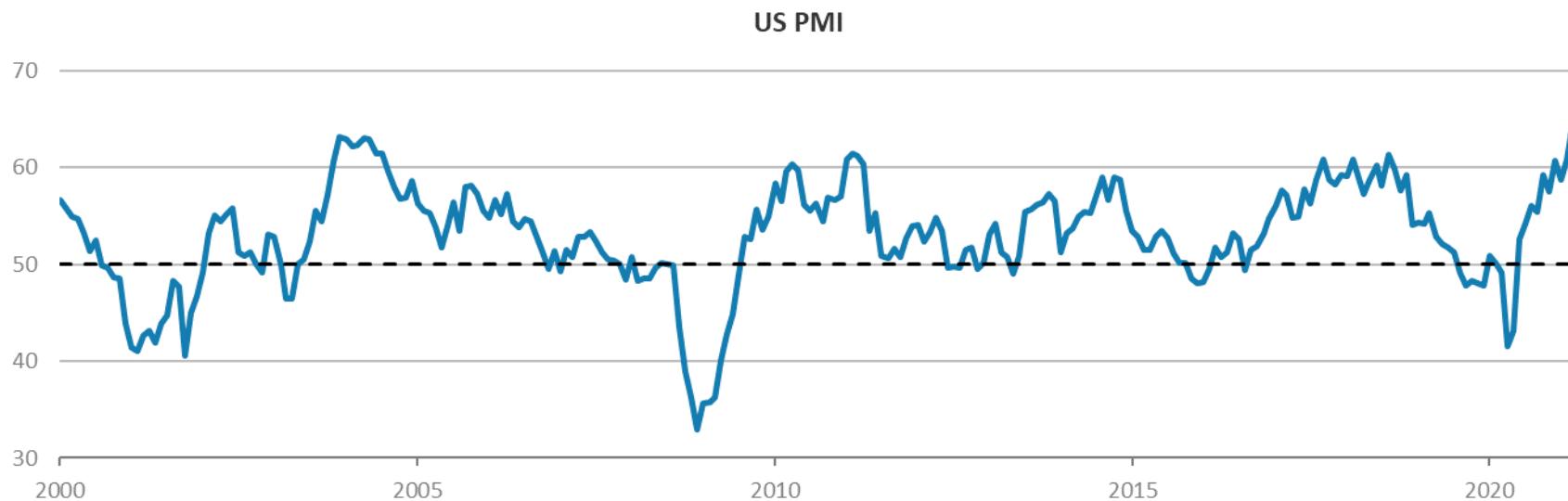
Source: Morgan Stanley Research, Federal Reserve, Thomson Reuters.

PMIs Are Closely Tracked as a Barometer of Future Sales

ISM / Purchasing Managers Index (PMI): Data for the US ISM are collected from more than 300 purchasing and supply executives from across the country, who respond to a monthly questionnaire designed to elicit fact, not opinion, about changes in production, new orders, new export orders, imports, employment, inventories, prices, lead-times, and the timeliness of supplier deliveries, comparing the current month to the previous month.

The PMI is constructed as a diffusion index, which has the properties of a leading indicator and shows the prevailing direction of an indicator change and the scale of that change. A PMI reading >50% indicates that the manufacturing economy is generally expanding; <50%, it is generally declining.

US PMIs Have Continued Higher Despite Several Months of Peak PMI Concerns



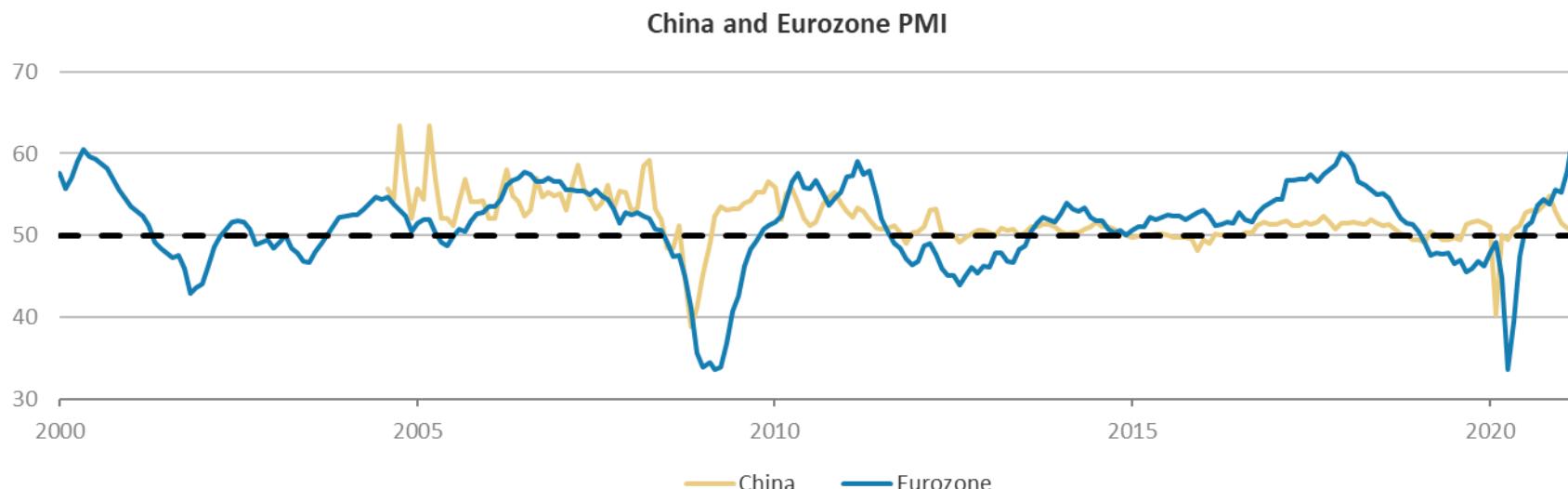
Source: Morgan Stanley Research, ISM, Thomson Reuters.

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The PMI is constructed as a diffusion index, which has the properties of a leading indicator and shows the prevailing direction of an indicator change and the scale of that change. A PMI reading >50% indicates that the manufacturing economy is generally expanding; <50%, it is generally declining.

China and Eurozone PMIs also saw V-shaped recoveries: Eurozone continues to trend higher, while China moderating towards 50

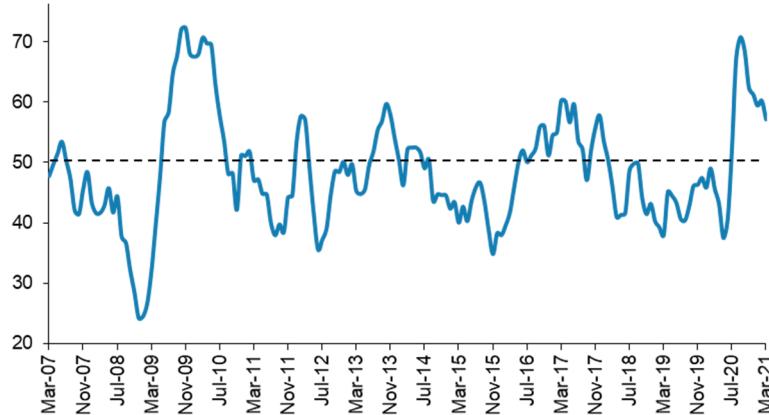


Our Proprietary CAPMI Index Focuses on Important Industrial KPIs

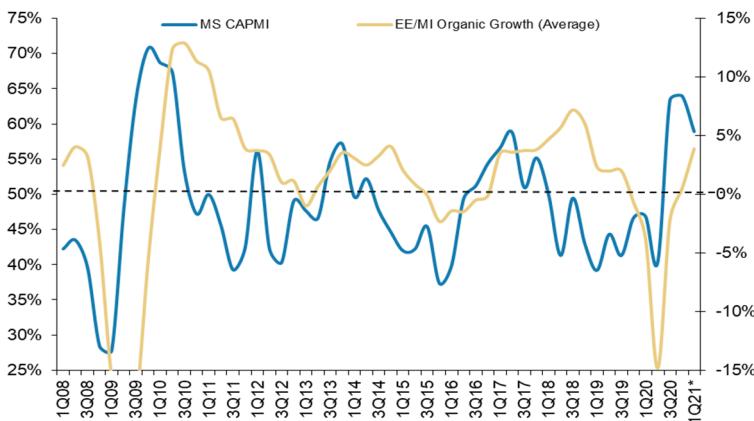
The Morgan Stanley Capital Goods Momentum Index (CAPMI) is a diffusion index that measures the month-over-month momentum of 48 key global macro and industry indicators. Overall, the index composition is largely consistent with our companies' geographic exposure, with 42% from North America, 19% Europe, 19% APAC and 21% Global. It also includes KPI's for the major end markets to which our companies are exposed, including Aerospace, Automotive, Construction, Oil & Gas, HVAC, Power and Technology.

The index has a central value of 50; a reading of 50 indicates that the overall trend is stable on a monthly sequential basis. A reading over 50 indicates accelerating growth, while a reading below 50 indicates decelerating growth. However, we prefer to look at the second derivative of the index: i.e. a clear upward trend in the diffusion index below 50 is often a more powerful indicator than a downward trend below 50 – it's really all about acceleration and deceleration of the index.

Our MS CAPMI index fell 3pts to a March reading of 57. We believe recent weakness is temporary (weather / supply driven) and view industrial demand as strong and still accelerating.



CAPMI tends to lead EE/MI organic growth by 6-9 months. 9 consecutive months in expansion territory suggests industrial momentum continues to pick up through 2021



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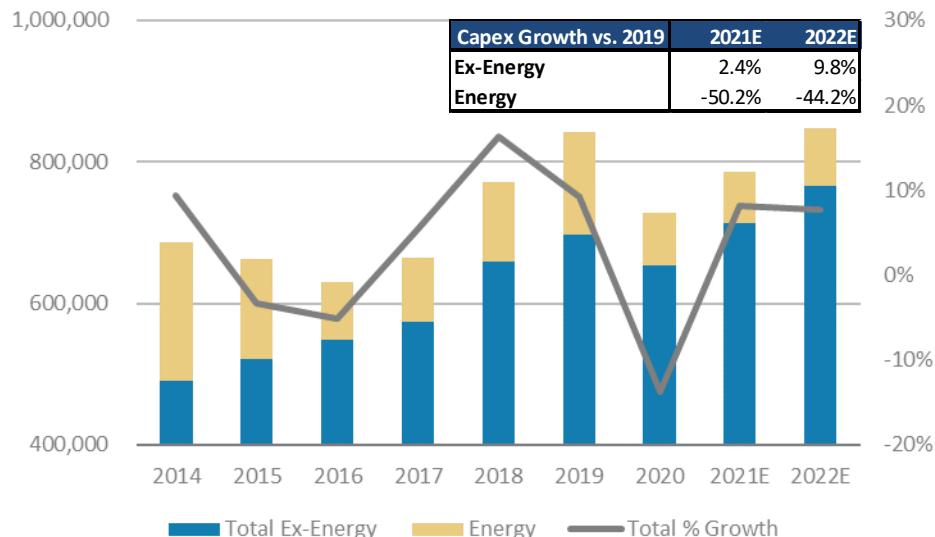
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Capex is the Ultimate Driver of Demand

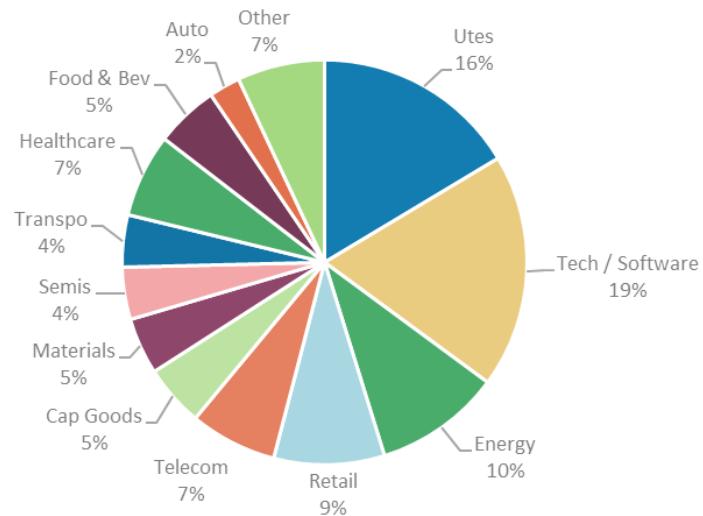
Post GFC Capital Spending Has Been Disappointing, Driven by Technology, Reluctance to Invest Amid Shorter, Shallower Cycles, and the Prior Buildout of Industrial Capacity in China.

Of the major capital accumulating industries we track, we see secular change affecting more than 50% of the dollars spent. Oil & gas oversupply and difficulty in managing shocks has depressed spending. Utilities are transitioning to renewable energy and hardening the aging grid. Autos need to transition to EV production.

Total S&P 1500 Capex 2014-2022E (\$Bn)



Capex Breakdown by Industry

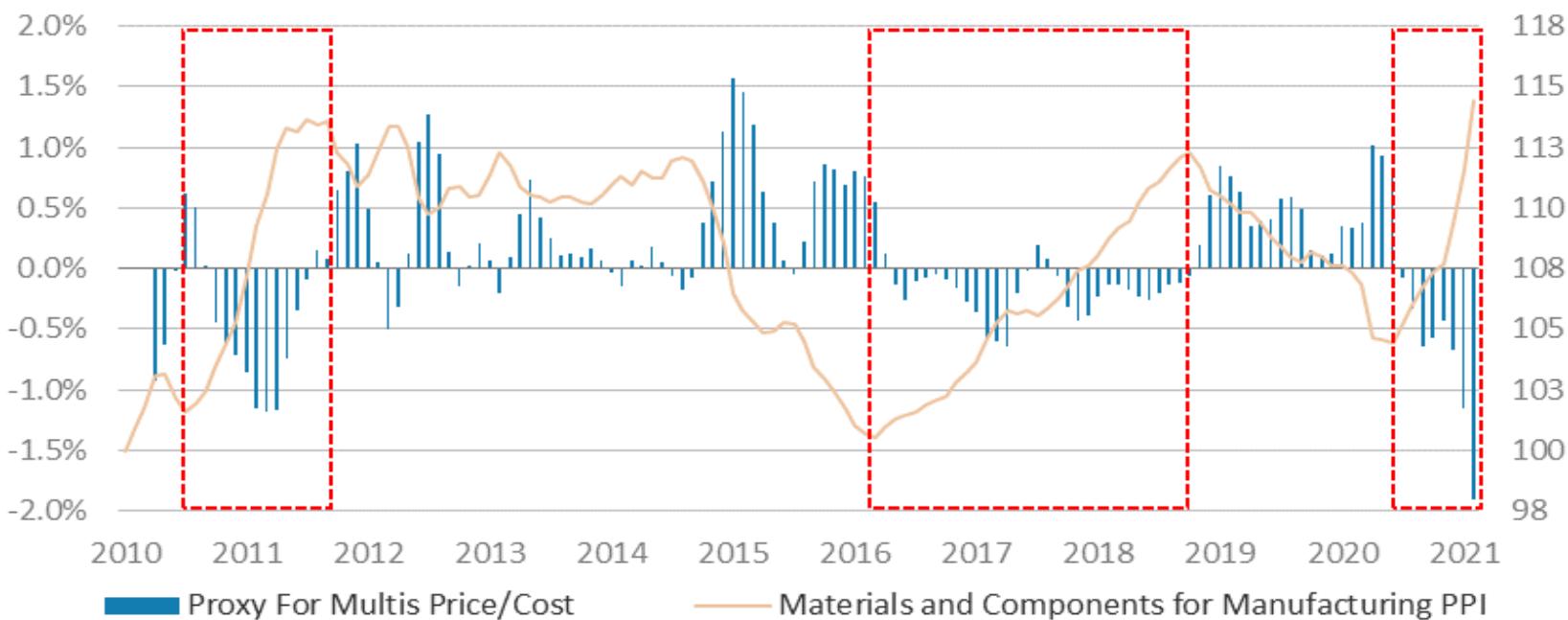


Source: Morgan Stanley Research, Thomson Reuters.

Right Place, Wrong Time On Inflation?

Key takeaways from our PPI analysis:

1. *Inflation is much stronger than in past recoveries.*
2. *Pricing for a basket of EE/MI products is moving higher, but at too slow a pace relative to input costs.*
3. *The speed of inflation and uneven ability to pass that through to end customers supports our view on stronger capex this year.*



Source: US Bureau of Labor Statistics, Morgan Stanley Research. Note: "Multis" PPI includes finished goods PPIs of Welding Equipment, AC / Refrigeration Equipment, Turbines, Fans / Blowers, Elevators / Lifts, Pumps / Compressors, Mining Equipment, Electrical Switchgear, Material Handling, Aircraft Engines & Parts, O&G Field Equipment, Industrial Valves, Measuring / Dispensing Equipment, Power Tools, Electrical Equipment, Heavy Duty Truck and Auto Parts.

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The Best Industrial Cycle in a Decade

We See Pent Up Spending and Strong Thematic Growth as Drivers of Above-Trend Industrial Demand

Easy comparisons aren't from 2020, or even 2019. The industrial slowdown began in late 2018 but capex has been slow for a decade. The biggest themes in the sector today are likely to drive significant investment over years if not decades based on sizeable installed bases and changes in behavior.

Near-Shoring and Automation

- *New technologies, supply chain scrutiny, and inflation set to drive outsized investment*

Electrification

- *EVs, renewable energy, and grid complexity drive intelligence and capacity upgrades vs. a consolidated market accustomed to GDP-type growth*

Building Modernization

- *ESG imperatives, technology, government incentives meet the reality of domain expertise in a \$350B super cycle*

Aero “Cut and Paste” Maintenance Cycle

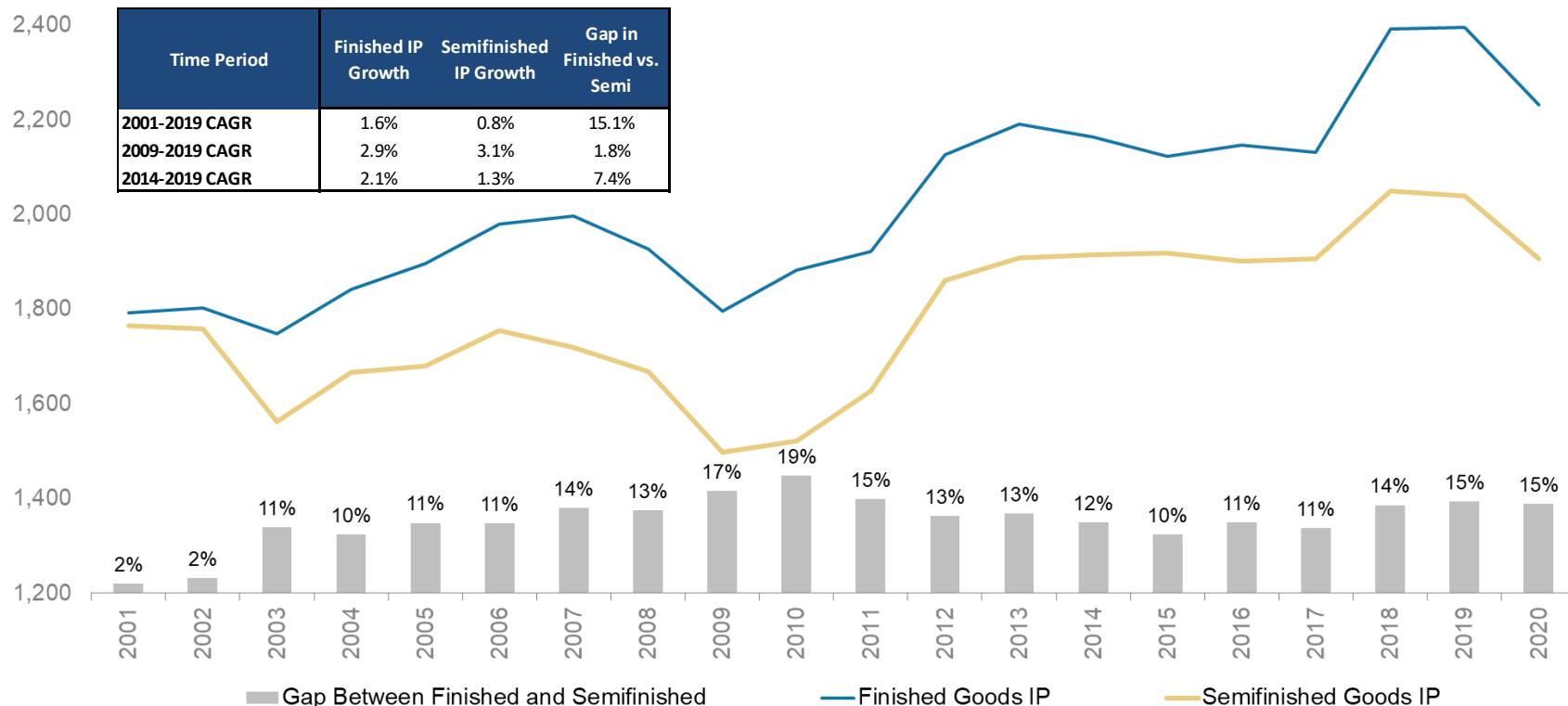
- *COVID defers 2 years of maintenance and drives spending levels above pre-COVID trajectory*

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Near-Shoring / Automation

A reversal of the gap between finished and semi-finished goods (i.e. components) indicates potential for a significant increase in US output from near-shoring



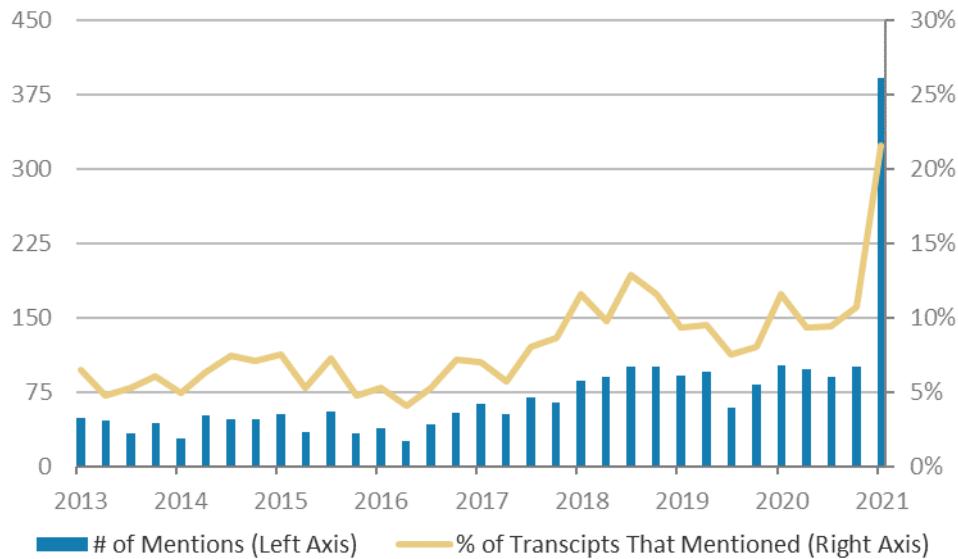
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Near-Shoring / Automation (Cont'd)

- *"Shortage / Constraint" mentions are more than 4x higher in 1Q21 than the average quarter over the last few years.*
- *These supply chain issues are likely playing a key role into the speed of inflation in this cycle, which supports our view on stronger capex, as demand appears to be accelerating faster than supply-chains can keep up with.*

Mentions of "Shortages" and "Constraints" in earnings / conf. transcripts



Source: AlphaSense, Morgan Stanley Research

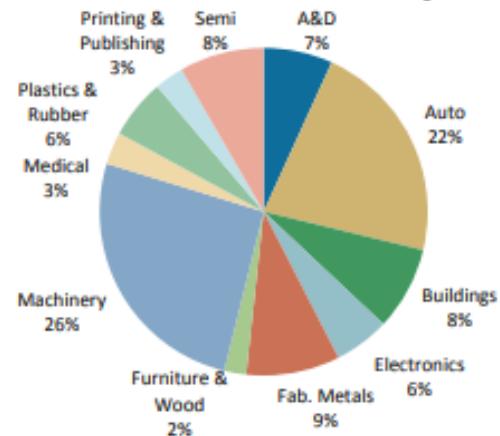


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Near-Shoring / Automation (*Cont'd*)

Discrete Automation Spending by End Market



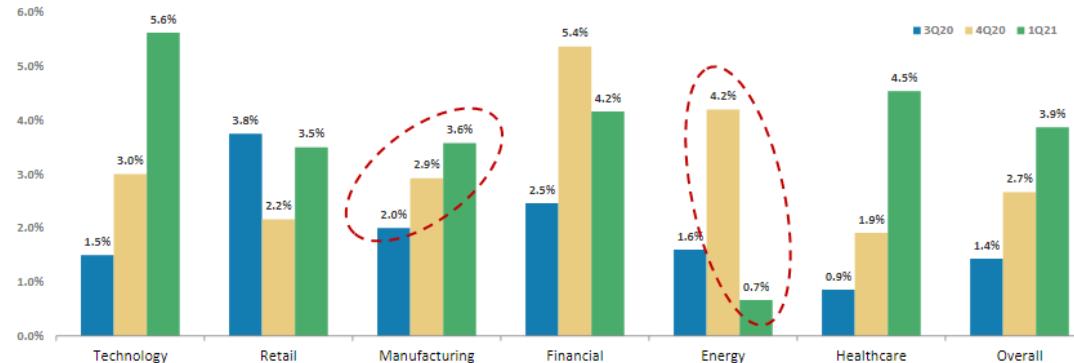
ROK Monthly Product Order Trends: Sep'19 – Dec'20

Global Daily Average Product Orders



Manufacturing IT Spend per CIO Survey

2021 External IT Spending Growth Expectations by Vertical



Source: AlphaWise, Morgan Stanley Research. n=100 (US and EU data).

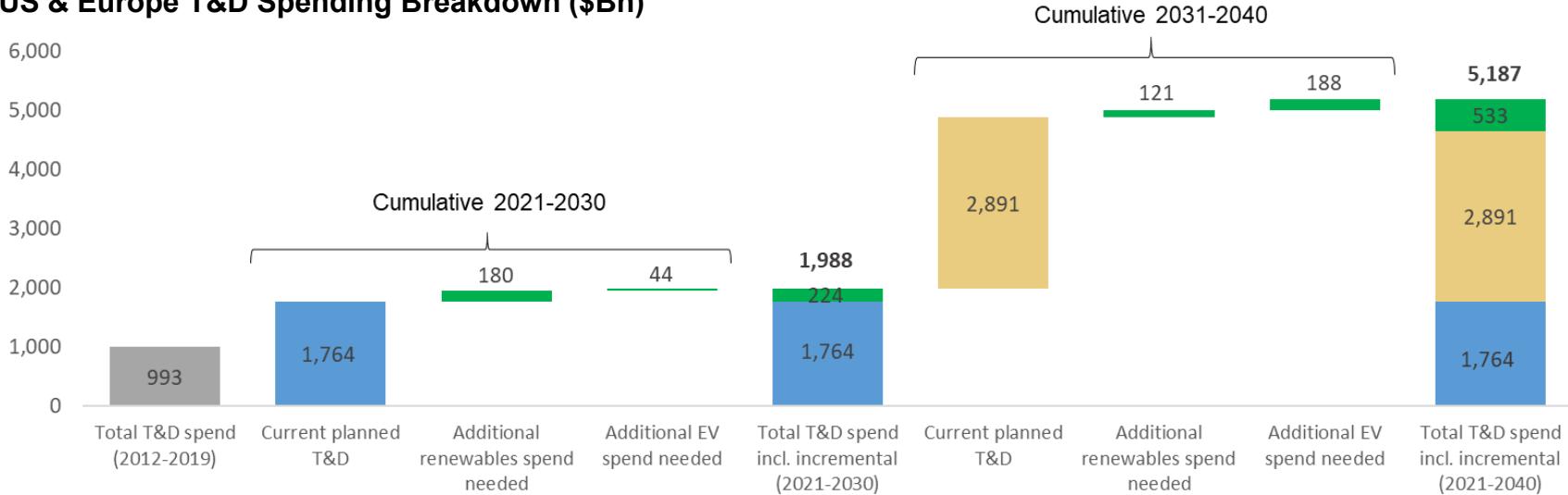
Source: Company Data, Morgan Stanley Research

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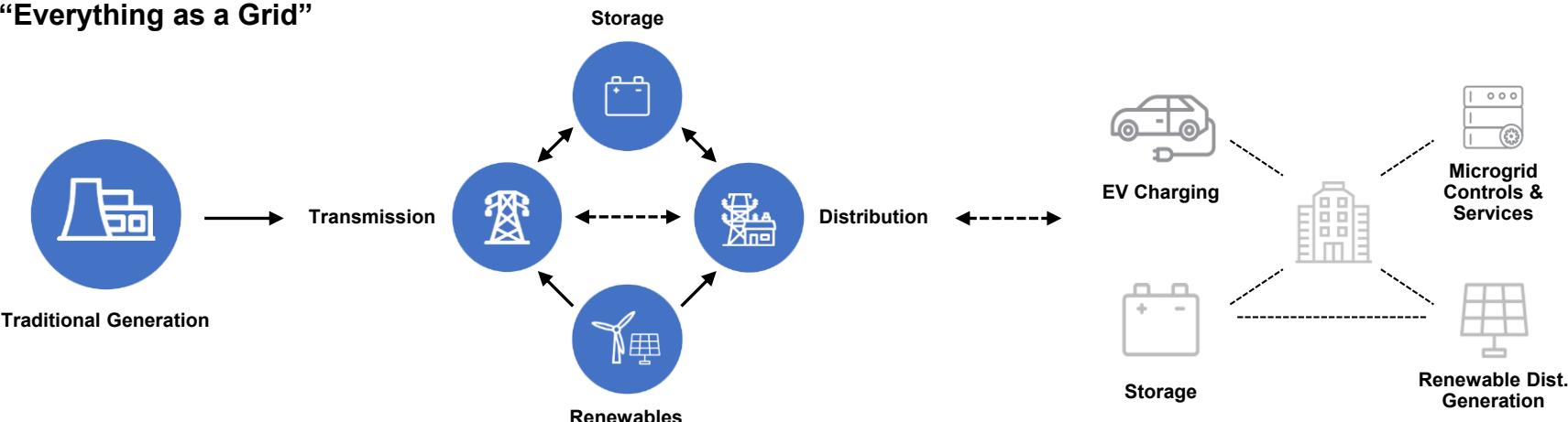
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Electrification

US & Europe T&D Spending Breakdown (\$Bn)



“Everything as a Grid”

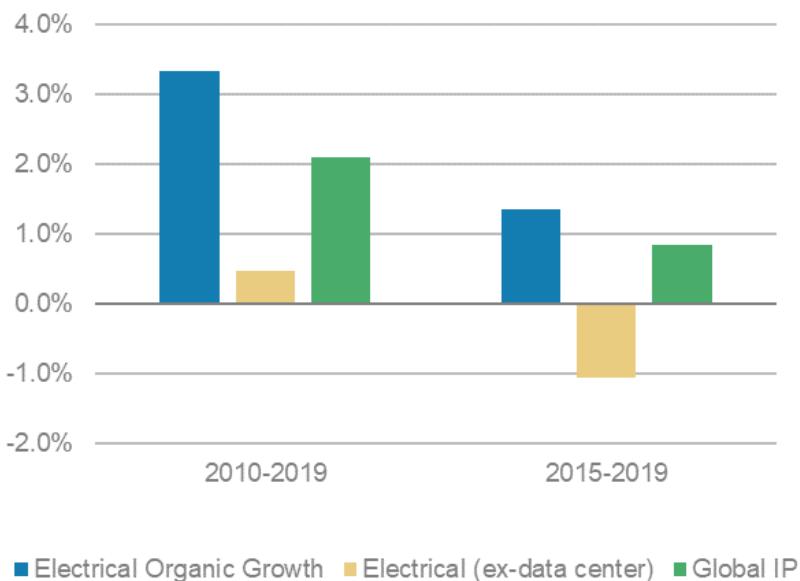


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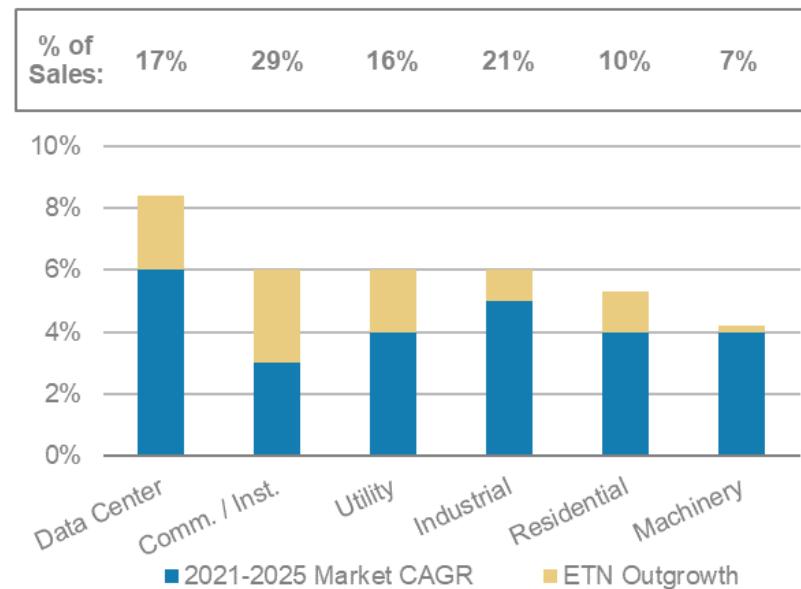
Industrials Spring Training Teach-In

Electrification (*cont'd*)

While ETN Electrical has outpaced IP, strong double-digit growth in Data Center over the past decade has been the primary driver. Ex-data center, ETN Electrical has lagged.



2021-2025E CAGR Per Company Guidance: More than 80% of ETN Electrical is expected to grow at least 6% through 2025



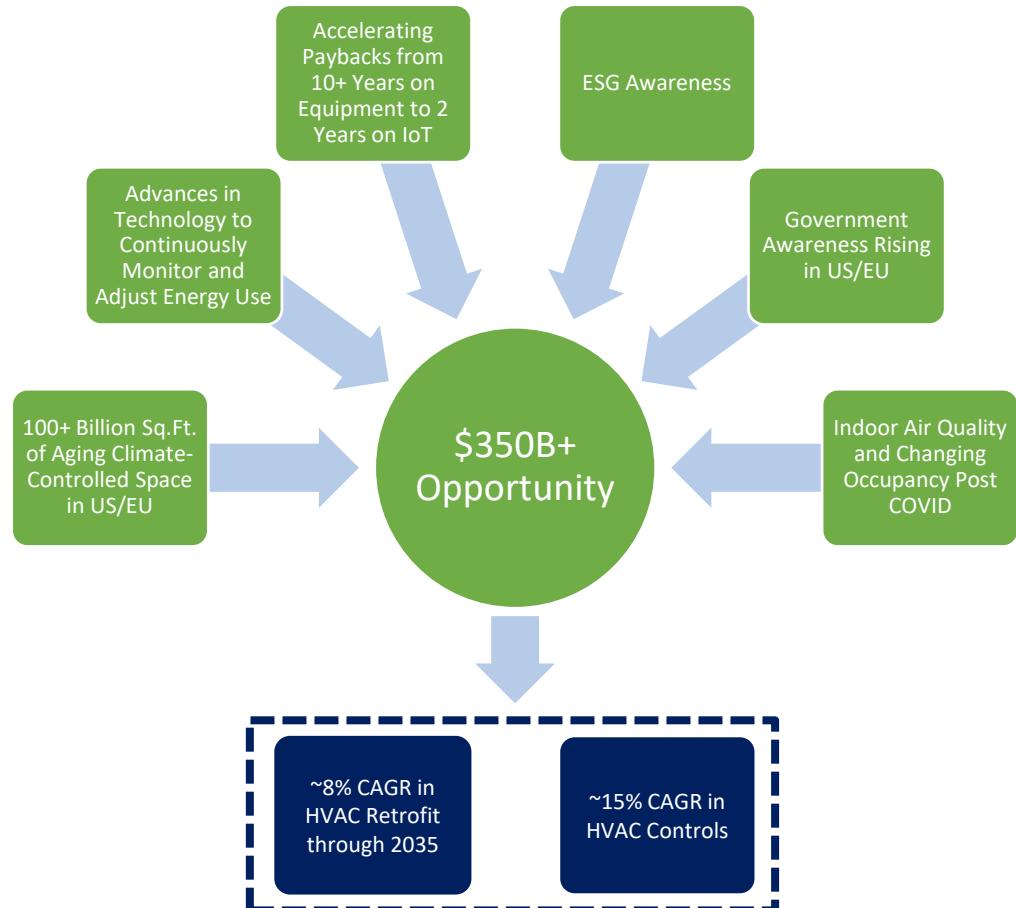
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Industrials Spring Training Teach-In

Building Modernization

We see six factors converging at once to drive a significant upgrade cycle:

1. **100B+ square feet of gaining climate controlled space in the US and EU**
2. **Advances in technology to continuously monitor and adjust energy use**
3. **Accelerating paybacks from 10+ years on equipment to 2 years on IoT**
4. **ESG awareness**
5. **Government awareness rising in the US and EU**
6. **Indoor air quality and changing occupancy post-COVID**

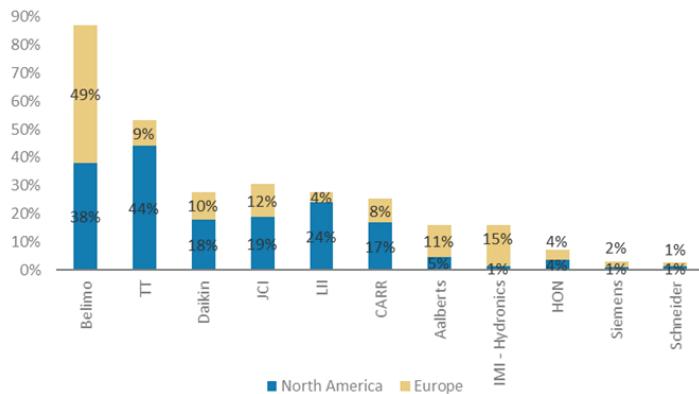


May 2021

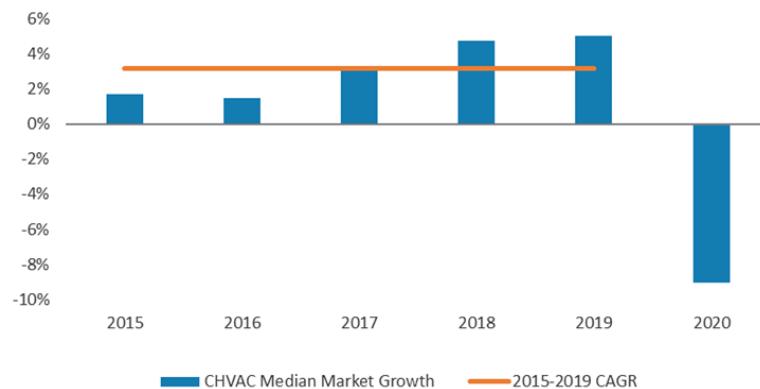
Industrials Spring Training Teach-In

Building Modernization (*cont'd*)

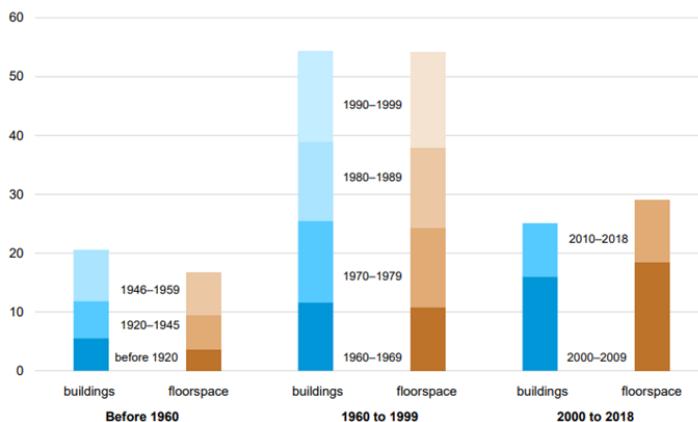
Small number of players



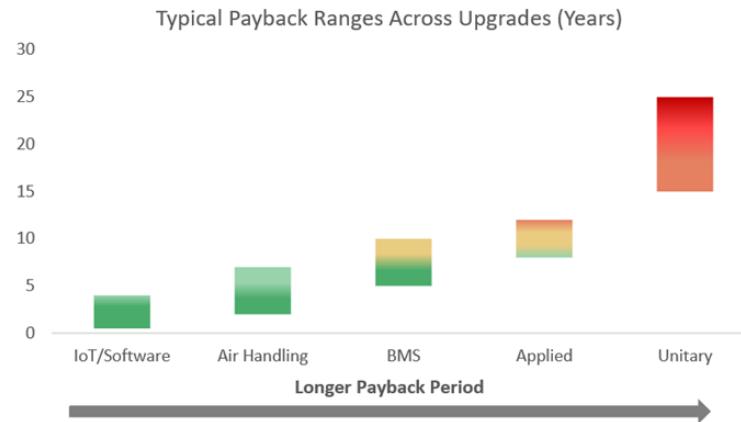
CHAVC historical growth is L-MSD prior to COVID



Share of buildings / floor space by year constructed

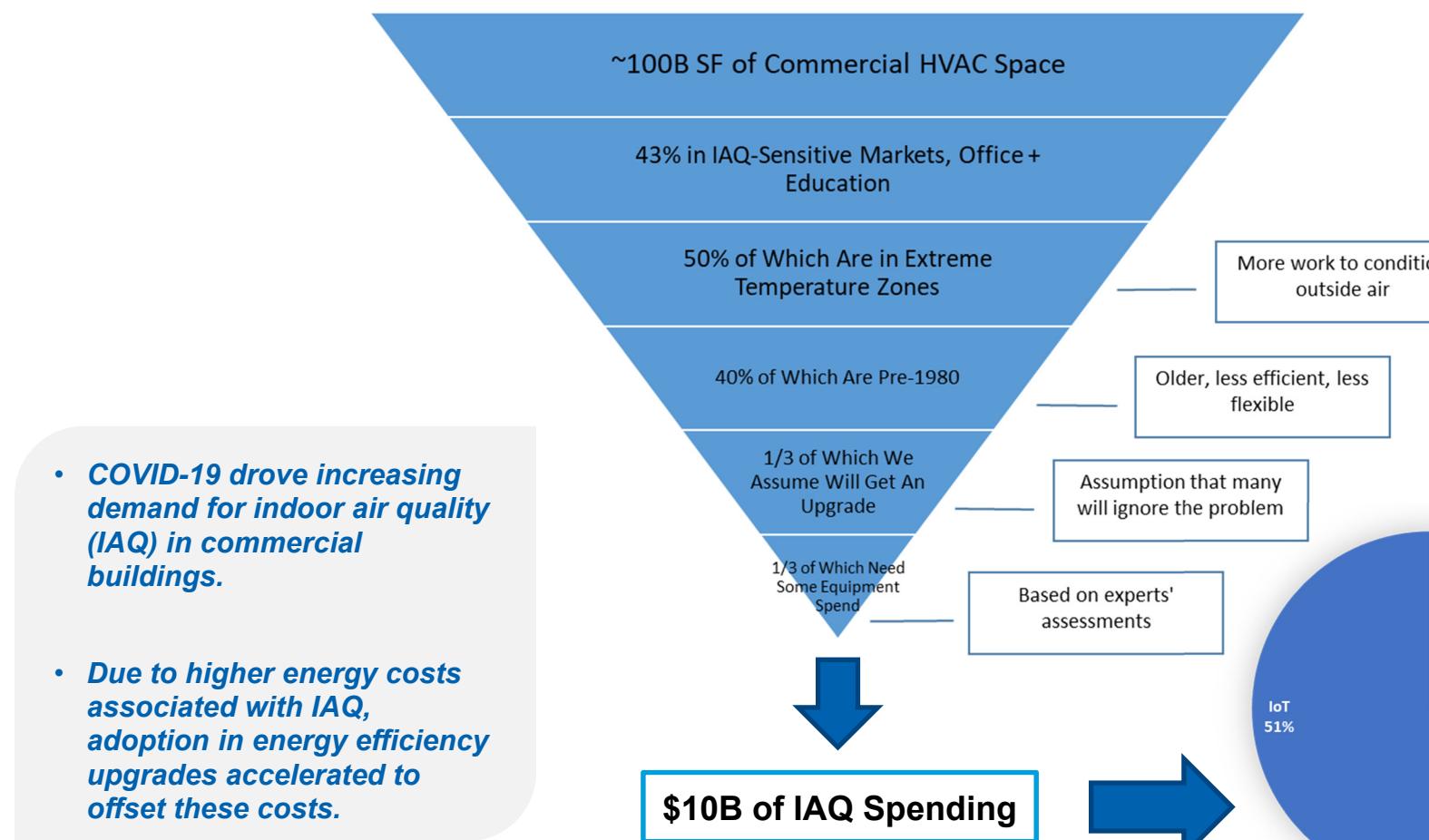


CHAVC paybacks heavily favor technology vs. equip



Source: EIA, Company data, Morgan Stanley Research

Building Modernization (cont'd)



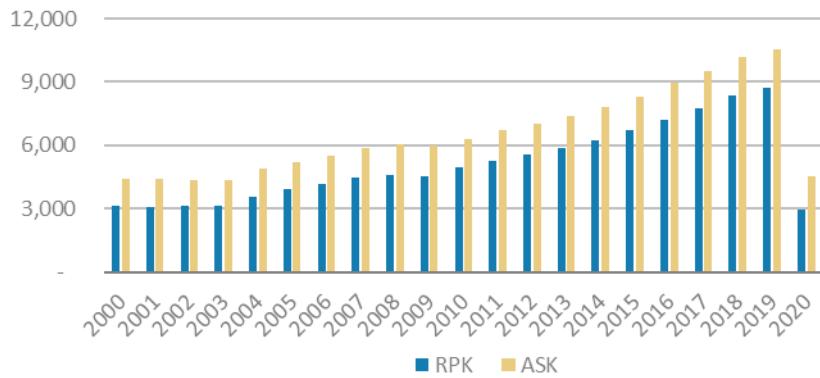
Source: EIA, Morgan Stanley Research

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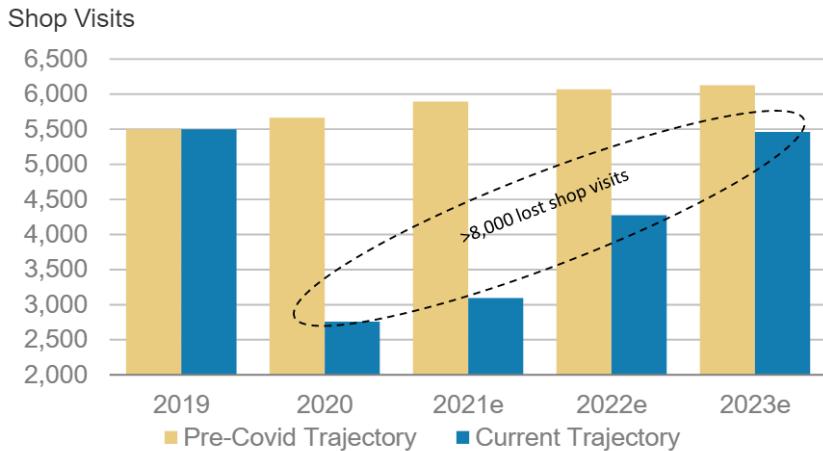
Industrials Spring Training Teach-In

Aerospace

Global RPKs and ASKs Since 2000

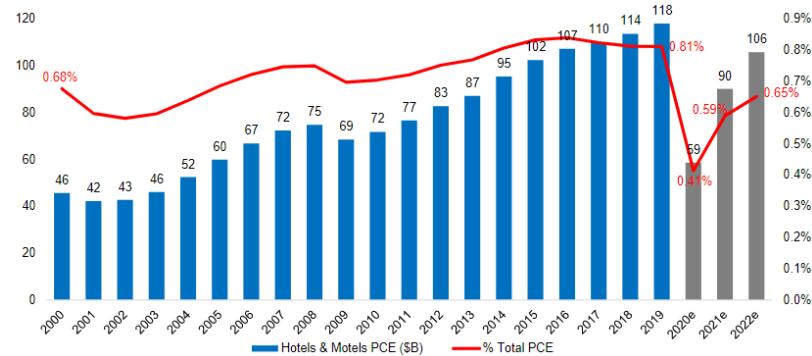


GE/CFM shop visits: 2020/2021 shop visits are being rolled into the next cycle



Source: IATA, Company data, Morgan Stanley Research

Hotels & Motels (proxy for travel) PCE



PCE Forecast Y/Y Growth

Nominal (% Y/Y)	2019	2020	2021	2022
GDP	4.0	-2.5	7.3	6.3
PCE	3.9	-2.6	8.0	6.1
Durable Goods	3.6	5.8	6.6	1.7
Auto Parts	4.1	6.0	-6.4	8.0
Consumer Electronics	7.3	13.0	3.6	1.6
Home Furnishings	4.6	6.4	3.8	1.7
Home Improvement	0.7	13.3	2.6	0.5
Sporting Goods	8.3	18.8	-0.8	2.9
Nondurable Goods	3.0	2.4	5.2	3.5
Beauty	5.2	0.5	4.2	2.2
Clothing & Footwear	2.3	-12.2	13.9	2.8
Grocery	2.7	10.7	-0.8	1.3
Services	4.3	-5.4	9.0	8.0
Foodservice	4.1	-14.4	13.3	11.7
Hotels & Motels	3.8	-50.3	53.7	17.4
Casino Gambling	3.9	-28.3	39.8	7.4

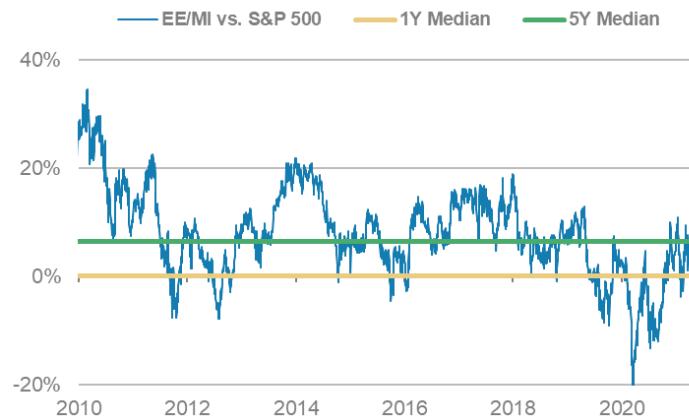
Our Favorite Names and Group Thesis Today

May 2021

Industrials Spring Training Teach-In

We Have an Attractive Industry View on US Electrical Equipment and Multi-Industry

EE/MI vs. S&P 500 Relative NTM P/E



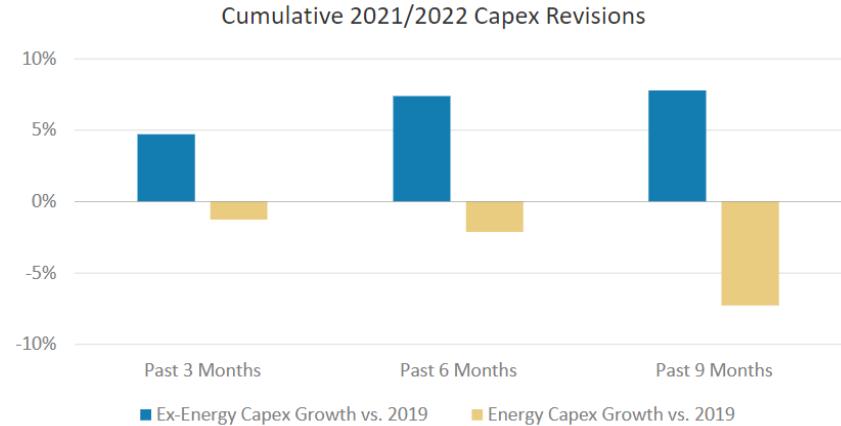
Inventory/Sales Data



Cyclicals vs. Defensives Relative NTM P/E

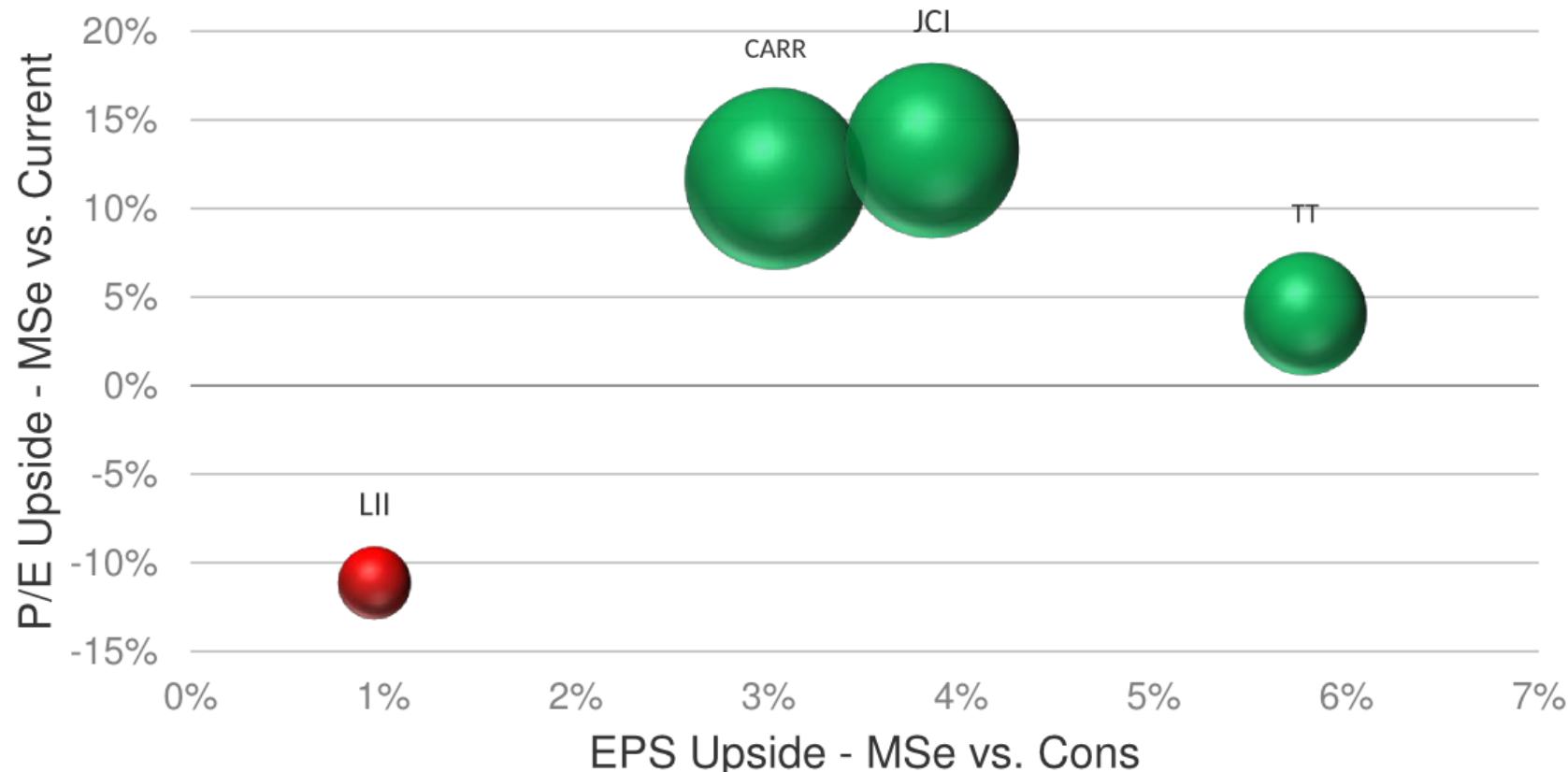


Capex Revisions: Energy vs. Ex-Energy



Top Picks: JCI and ROK

HVAC Sensitivity on ESG Thematic SOTP Valuation and Earnings Upside



Note: EPS Upside is Relative to Consensus 2022, P/E Upside is MSe Multiple vs. Current Multiple. Size of bubble represents the valuation upside/downside in \$B.

Source: Refinitiv, Morgan Stanley Research

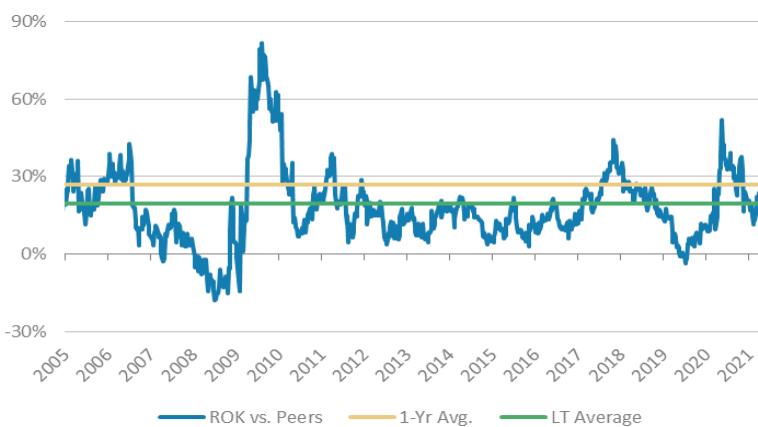
Top Picks: JCI and ROK

Leader in North American Automation

- 50% market share in PLCs (programmable logic controllers), an automation cornerstone

Order Intake is Exceptional

- \$2B in product orders in March quarter, which are unlikely to go backward seasonally or cyclically. Products are 2/3 of the business.
- Consensus assumes \$7.4B and \$7.8B in FY22/23 revenue despite a N/T path to \$8B+



Bear Case	Base Case	Bull Case
\$230 Valuation 23.5x NTM EPS ~2% CAGR 2019-2023	\$313 Price Target 28.5x NTM EPS ~5% CAGR 2019-2023	\$375 Valuation 31.0x NTM EPS ~6% CAGR 2019-2023
<ul style="list-style-type: none">Growth driven purely by maintenance activity with minimal new projects/ expansions2021 growth below the low end of the range as activity get pushed to the rightStock trades at 22.5x NTM EPS based on a ~5% discount to peers given the weak fundamentals in this scenario resulting in meaningful multiple contraction	<ul style="list-style-type: none">Expansion and maintenance projects pick up, with increased software attachments2021 growth towards the high end of the range as capex spending picks up across ROK's multiple verticalsStock trades at 28.5x NTM EPS based on a ~15% premium to peers, below its one-year ~27% average, and five year ~20% average	<ul style="list-style-type: none">Large project activity resumes along maintenance and expansion, with attached software offerings2021 growth above high end of the range as the supply chain normalizes and orders convert at a faster paceStock trades at 31.0x NTM EPS base on a ~25% premium to peers, in-line with its one-year average

May 2021

Industrials Spring Training Teach-In

Electrical Equipment / Multi-Industry Comps Table

Company	Rating	Market Cap		Ent. Value	Price Target	% Upside	EV/EBITDA				Earnings Per Share				P/E				Organic Growth				Operating Margin				FCF Yield				
		2019	2020				2021E	2022E	2019	2020	2021E	2022E	2019	2020	2021E	2022E	2019	2020	2021E	2022E	2019	2020	2021E	2022E	2019	2020	2021E	2022E			
Anetek Inc.	OW	\$135.01	\$31,086	\$32,361	\$135	0.0%	22.9x	24.4x	22.1x	20.8x	\$4.19	\$3.95	\$4.37	\$4.75	32.2x	34.2x	30.9x	28.4x	2%	-13%	7%	5%	22.8%	23.6%	24.6%	25.2%	3.3%	3.9%	2.8%	3.4%	
Carrier Global	OW	\$44.47	\$38,335	\$45,773	\$53	19.2%	14.9x	17.8x	13.8x	13.8x	\$2.48	\$1.67	\$2.30	\$2.30	17.9x	26.7x	19.3x	19.3x	1%	-5%	7%	4%	13.5%	10.5%	12.6%	13.9%	4.7%	3.5%	4.1%	4.7%	
Eaton	OW	\$142.97	\$57,113	\$64,112	\$155	8.4%	16.1x	20.4x	17.8x	16.3x	\$5.76	\$4.24	\$5.72	\$6.75	24.8x	33.7x	25.0x	21.2x	0%	-11%	6%	6%	14.5%	13.0%	14.8%	15.9%	4.8%	4.4%	3.9%	4.7%	
Ingersoll-Rand	OW	\$51.62	\$21,453	\$23,672	\$54	4.6%	19.8x	22.0x	18.6x	17.0x	\$1.64	\$1.49	\$1.90	\$2.12	31.4x	34.6x	27.2x	24.3x	-3%	-13%	2%	5%	10.1%	3.0%	9.5%	11.0%	1.4%	4.0%	3.8%	4.2%	
Johnson Controls	EW	\$62.90	\$45,240	\$52,501	\$73	16.1%	15.6x	16.4x	14.9x	14.9x	\$2.14	\$2.28	\$2.73	\$2.73	29.4x	27.6x	23.0x	23.0x	3%	-8%	7%	28%	9.6%	9.9%	10.7%	42.9%	3.5%	4.5%	4.1%	5.3%	
Parker-Hannifin	OW	\$318.12	\$41,194	\$47,815	\$355	11.6%	18.5x	17.6x	15.3x	14.4x	\$13.08	\$12.92	\$15.42	\$16.99	24.3x	24.6x	20.6x	18.7x	-3%	-12%	9%	21%	14.8%	15.8%	16.9%	69.6%	4.3%	5.8%	5.1%	5.9%	
Rockwell Automation	OW	\$269.06	\$31,062	\$32,778	\$300	11.5%	22.1x	23.9x	21.7x	19.6x	\$8.70	\$8.10	\$9.12	\$10.50	30.9x	33.2x	29.5x	25.6x	1%	-10%	12%	22%	19.7%	19.1%	18.8%	80.0%	3.4%	3.6%	3.5%	4.0%	
Stanley Black & Decker	OW	\$209.09	\$33,559	\$37,931	\$220	5.2%	15.1x	14.0x	12.7x	12.3x	\$8.41	\$9.05	\$10.30	\$11.00	24.9x	23.1x	20.3x	19.0x	3%	-1%	7%	4%	13.5%	14.6%	15.3%	15.4%	3.4%	5.1%	4.9%	4.9%	
Trane Technologies	OW	\$175.33	\$41,325	\$43,327	\$187	6.7%	20.4x	22.5x	19.0x	20.6x	\$4.28	\$4.43	\$5.60	\$6.59	40.9x	39.6x	31.3x	26.6x	7%	-3%	7%	6%	13.2%	13.1%	14.4%	15.3%	3.9%	3.0%	3.5%	3.1%	
Advanced Drainage Systems	EW	\$115.01	\$8,181	\$9,070	\$112	-2.6%	39.1x	25.1x	16.0x	15.4x	\$1.21	\$3.22	\$3.22	\$3.68	95.0x	na	35.8x	31.2x	4%	9%	9%	3%	9.3%	nm	18.6%	20.5%	1.6%	3.2%	5.0%	2.0%	
Allegion	EW	\$138.35	\$12,260	\$13,298	\$149	7.7%	19.7x	20.4x	19.8x	19.0x	\$4.89	\$5.11	\$5.25	\$5.60	28.3x	27.1x	26.4x	24.7x	5%	-5%	4%	5%	20.8%	21.0%	20.7%	21.2%	3.2%	3.5%	3.6%	4.2%	
Colfax	EW	\$45.21	\$6,086	\$8,265	\$45	-0.5%	14.4x	17.8x	13.8x	12.9x	\$2.02	\$1.40	\$2.08	\$2.36	22.4x	32.4x	21.7x	19.2x	1%	-6%	12%	3%	14.3%	11.8%	13.6%	14.4%	0.1%	3.0%	4.1%	4.8%	
Dover	OW	\$148.14	\$21,070	\$23,596	\$159	7.3%	17.8x	18.7x	15.5x	14.6x	\$5.94	\$5.67	\$6.95	\$7.45	24.9x	26.1x	21.3x	19.9x	4%	-7%	10%	4%	14.8%	14.7%	16.4%	16.9%	3.5%	4.4%	4.0%	4.5%	
Emerson	EW	\$92.46	\$55,281	\$60,737	\$90	-2.7%	16.0x	16.1x	15.1x	15.1x	\$3.64	\$3.62	\$3.82	\$3.82	25.4x	25.6x	24.2x	24.2x	2%	-8%	5%	20%	18.5%	20.1%	19.6%	78.6%	4.5%	5.2%	4.6%	5.0%	
Fastenol	EW	\$52.18	\$29,826	\$29,897	\$53	1.6%	24.9x	23.1x	22.4x	20.7x	\$1.38	\$1.49	\$1.54	\$1.69	37.9x	35.0x	34.0x	30.9x	8%	6%	3%	9%	19.8%	20.2%	20.2%	20.4%	2.0%	3.1%	2.3%	2.8%	
Flowserve	EW	\$40.32	\$5,283	\$5,945	\$40	-0.8%	10.8x	12.6x	14.2x	12.1x	\$2.20	\$1.76	\$1.45	\$1.85	18.3x	22.9x	27.8x	21.8x	5%	-5%	-5%	6%	11.3%	10.0%	9.0%	10.4%	4.6%	4.8%	3.5%	4.1%	
Fortive	EW	\$73.96	\$24,909	\$26,204	\$76	2.8%	12.8x	22.1x	21.6x	20.2x	\$3.48	\$3.06	\$2.52	\$2.75	21.3x	24.2x	29.4x	26.9x	2%	0%	7%	5%	21.9%	21.7%	22.5%	23.1%	4.4%	5.1%	4.5%	4.9%	
Gates Corp.	EW	\$17.39	\$5,081	\$7,651	\$18	3.5%	12.5x	15.1x	11.0x	10.3x	\$0.93	\$0.68	\$1.10	\$1.25	18.6x	25.4x	15.9x	13.9x	-6%	-8%	15%	3%	12.6%	10.1%	14.8%	15.7%	5.4%	4.9%	4.8%	7.1%	
Hayward Holdings	EW	\$17.48	\$4,192	\$5,380	\$19	8.7%	23.2x	23.2x	20.7x	19.3x	\$0.59	\$0.59	\$0.46	\$0.56	29.6x	29.6x	38.0x	31.0x	19%	19%	14%	5%	18.5%	18.5%	19.1%	19.8%	5.5%	5.5%	2.3%	3.7%	
Helios Technologies	EW	\$72.22	\$2,340	\$2,776	\$76	5.2%	21.9x	22.9x	16.7x	15.5x	\$2.43	\$2.24	\$3.00	\$3.30	29.8x	32.3x	24.1x	21.9x	-2%	-11%	9%	6%	17.1%	15.2%	16.4%	17.2%	2.8%	4.1%	3.5%	4.5%	
Honeywell	EW	\$224.50	\$153,858	\$162,798	\$246	9.6%	20.3x	24.1x	20.7x	18.3x	\$8.16	\$7.11	\$8.05	\$9.25	27.5x	31.6x	27.9x	24.3x	5%	-11%	7%	6%	18.9%	17.6%	18.5%	20.1%	3.7%	3.3%	3.5%	4.4%	
Hubbell	EW	\$191.12	\$10,346	\$11,683	\$197	3.1%	15.6x	16.8x	15.4x	14.2x	\$8.13	\$7.58	\$8.22	\$9.16	23.5x	25.2x	23.3x	20.9x	2%	-9%	7%	5%	14.6%	14.5%	14.5%	15.0%	4.8%	5.4%	4.6%	5.1%	
3M	EW	\$202.20	\$115,669	\$129,605	\$200	-1.1%	15.3x	14.7x	14.3x	13.2x	\$8.79	\$8.85	\$9.39	\$10.36	23.0x	22.8x	21.5x	19.5x	-1%	-2%	5%	3%	21.3%	21.3%	21.6%	22.8%	4.5%	5.6%	4.5%	4.8%	
Pentair	EW	\$64.31	\$10,652	\$11,489	\$69	7.3%	20.6x	20.6x	17.7x	17.1x	\$2.38	\$2.50	\$2.95	\$3.07	27.0x	25.7x	21.8x	21.0x	-1%	1%	9%	2%	17.5%	17.1%	18.1%	18.3%	2.7%	4.7%	4.2%	4.7%	
Watsco	EW	\$292.27	\$11,221	\$11,554	\$266	-9.0%	28.4x	26.0x	23.4x	23.0x	\$6.51	\$7.04	\$8.00	\$8.37	44.9x	41.5x	36.5x	34.9x	1%	3%	4%	2%	7.7%	7.9%	8.3%	8.4%	3.2%	5.0%	1.3%	2.9%	
W.W. Grainger	EW	\$423.56	\$21,972	\$24,049	\$427	0.8%	14.6x	15.7x	13.9x	12.8x	\$17.31	\$16.18	\$18.61	\$21.33	24.5x	26.2x	22.8x	19.9x	3%	4%	6%	7%	12.1%	11.2%	11.8%	12.1%	3.5%	4.1%	3.8%	4.9%	
Cognex	UW	\$85.67	\$15,497	\$15,125	\$68	-20.6%	90.3x	63.8x	51.9x	50.6x	\$0.80	\$1.12	\$1.31	\$1.33	107.5x	76.3x	65.2x	64.3x	-10%	12%	16%	10%	19.7%	26.5%	28.7%	26.5%	1.5%	1.5%	1.5%	1.5%	
Illinois Tool Works	UW	\$228.52	\$72,063	\$77,622	\$189	-17.3%	20.0x	23.5x	17.9x	17.0x	\$7.74	\$6.63	\$7.91	\$8.59	29.5x	34.5x	28.9x	26.6x	-2%	-10%	11%	5%	24.1%	22.9%	24.5%	24.9%	3.6%	3.5%	3.7%	4.4%	
Lennox	UW	\$334.46	\$12,557	\$13,690	\$258	-22.9%	20.1x	23.6x	21.7x	20.7x	\$11.19	\$9.93	\$10.88	\$11.95	29.9x	33.7x	30.7x	28.0x	5%	-4%	4%	3%	16.4%	14.0%	14.7%	15.0%	2.2%	4.1%	2.7%	3.6%	
MS EE/MI Universe Median							3.5%	19.1x	20.5x	17.2x	15.9x					27.3x	29.6x	26.8x	24.2x	2%	-5%	7%	5%	14.8%	14.7%	16.4%	17.7%	3.5%	4.1%	3.8%	4.5%

Source: Morgan Stanley Research, Company Data, Thomson Reuters.

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May 2021

Industrials Spring Training Teach-In

North America Metals & Mining

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For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.

Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 28, 2021, unless noted otherwise.

Metals and Bulks We Cover Globally

commodity (4Q21 vs 1Q21)	12-mth view	bearish (<10%)	neutral (+/-10%)	bullish (>+10%)
* Hard coking coal	/			
Lithium carbonate	/\			
Uranium	/\/\			
Cobalt	/\/\			
Palladium	/\/\			
* Aluminium	/\/\			
* Copper	/\/\/\			
Lead	/\{\			
Platinum	/\/\/\			
* Silver	/\/\/\			
* Alumina	/\/\/\			
* Gold	/\/\/\			
* Zinc	/\/\/\			
Nickel	/\/\/\			
Manganese ore	/\/\/\			
Thermal coal	/\/\~			
* Iron ore	/\~			

Types of Metals & Mining Companies

Diversified Miners



Teck

GLENCORE

RioTinto



Pure-plays Metals & Mining



CLIFFS



FREEPORT-McMoRAN



SOUTHERN COPPER



Partners



GERDAU

NUCOR



KAISER ALUMINUM

Counter Cyclicals



Investing in/Trading Metals & Mining Equities - Part 1

Need a strong view on

Global Economy (especially US and China)

S/D models: Keep close eye on global supply

Price forecast

Relevant political, country, and asset level risks

Basic way to model Metals & Mining companies

Volume * (Commodity Price – Unit Cost)

Also consider

Operating and/or financial leverage

Pension liabilities

Capex cycle

Dividend policy

Forecasting Metals Prices: Copper Case Study

1 Supply – Bottom-up analysis of mine by mine production

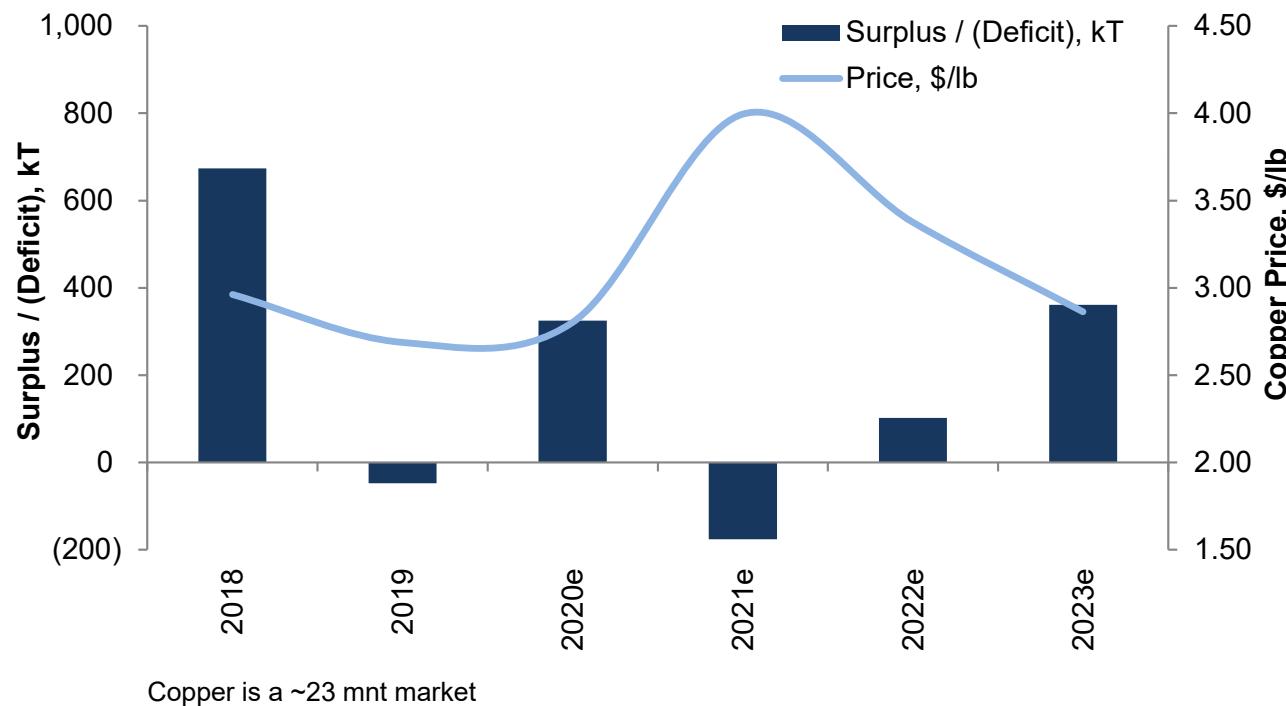
	2019	2020	2021e	2022e	2023e	2024e	2025e	2026e	2027e
Batu Hijau	59	100	150	150	150	150	135	80	80
Grasberg	315	376	620	750	780	750	700	700	700
Wetar SxEw	28	8	20	15	6	0	0	0	0
Indonesia	402	484	790	915	936	900	835	780	780
Asia	2,753	2,876	3,214	3,383	3,472	3,578	3,561	3,637	3,740
Global Mine Production	20,592	20,626	21,502	22,509	23,304	23,335	23,330	23,481	23,879

2 Demand – Typically top-down based on GDP, IP, etc. or bottom-up for one/two years for specific countries

	2019	2020	2021e	2022e	2023e	2024e	2025e	2026e	2027e
China	11,500	12,133	12,133	12,436	12,685	12,938	13,326	13,566	13,810
Growth rate, %	3.5%	5.5%	0.0%	2.5%	2.0%	2.0%	3.0%	1.8%	1.8%
Asia	15,157	15,426	15,741	16,178	16,529	16,870	17,346	17,672	18,002
Growth rate, %	1.9%	1.8%	2.0%	2.8%	2.2%	2.1%	2.8%	1.9%	1.9%
World	22,908	22,630	23,572	24,246	24,762	25,247	25,889	26,371	26,859
Growth rate, %	-0.5%	-1.2%	4.2%	2.9%	2.1%	2.0%	2.5%	1.9%	1.8%

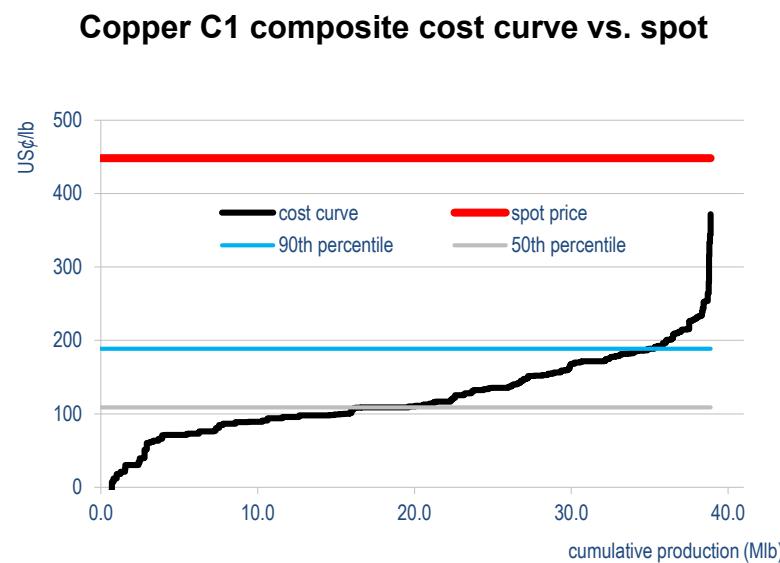
Forecasting Metals Prices: Copper Case Study

- 3 The supply-demand model determines if the market is heading towards a (bigger/smaller) surplus or (bigger/smaller) deficit, which determines directional pricing

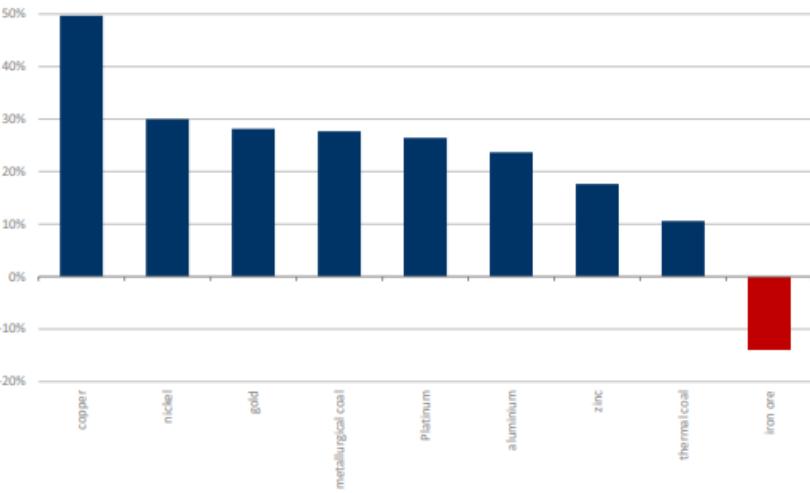


Forecasting Metals Prices: Copper Case Study

- 4 In a balanced market, the cost curve, in theory, determines the long-term price (marginal cost of production). In a market in deficit long-term prices are driven by the incentive price (10-15% post tax IRR)



Incentive price (real 2020\$) vs current industry marginal cost



Investing in/Trading Metals & Mining Equities- Part 2

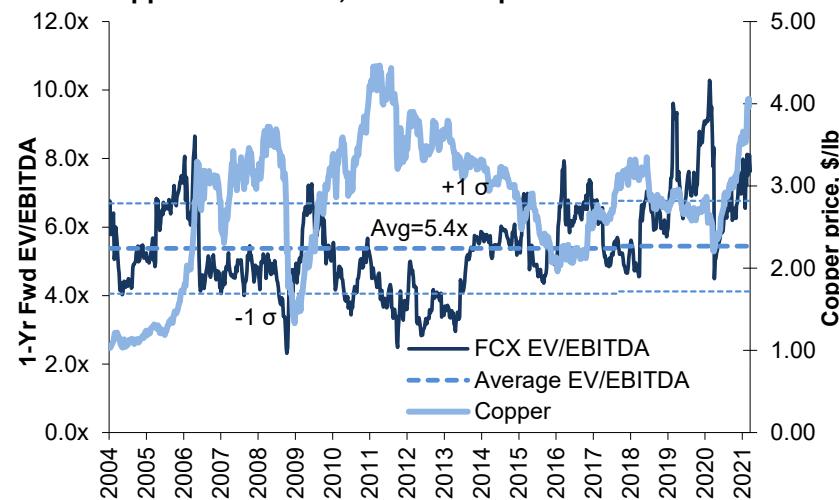
Valuation tools for metals/mining companies

- Multiples: EV/EBITDA expands with lower prices, contracts with higher prices. Sustainable FCF yield is very relevant
- DCF/NAV: May or may not be the primary tool, typically gives upside to current market price
- Gold stocks: Valued using NAV, trade at a premium to other metals stocks because they have low/negative market beta and therefore a low WACC (~5%)

Miners trade cheaper than Industrials on EV/EBITDA

- Sustainable ROE, esp. if earnings streams are volatile
- Cash conversion can be lower
- M&A offsetting declining assets
- Mean reversion- capacity restarts/addition at higher prices
- Boom to bust cycles

When Copper Prices Rise, FCX's Multiple Contracts



Metals & Bulks

Metals & Bulks: Key Industry Themes

1

China's 2060 carbon neutrality pledge will spur a new supply-side reform in the country, which will have a material impact on global metals & mining markets

2

Aluminum, an industry with heavy power consumption and high emissions in China, will benefit from declining supply and healthy demand

3

Electrification (EVs, renewable energy etc.) will drive significant copper demand. We estimate consumption from power and automotive to grow 7% p.a. to 2030

4

Metallurgical coal is our preferred commodity near term as ex-China demand increases while supply remains unchanged

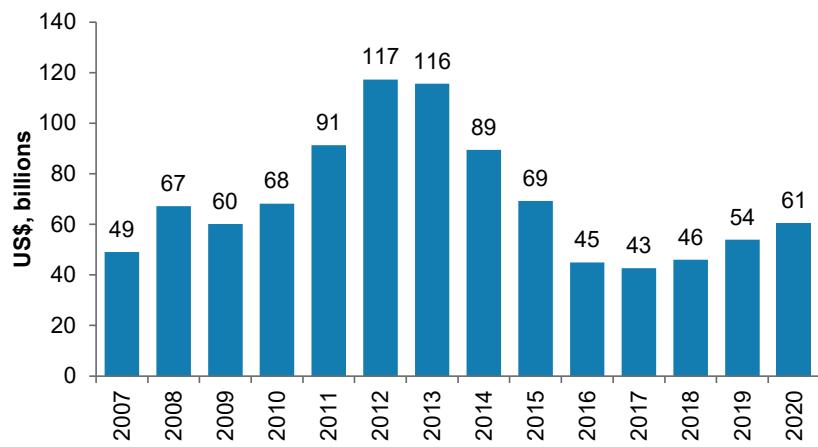
5

Heightened focus on ESG practices (particularly E and S) by M&M companies has important implications on project development and costs, and hence on future commodity supply growth and incentive prices

Attractive Risk Reward Coming Off A Global Recession

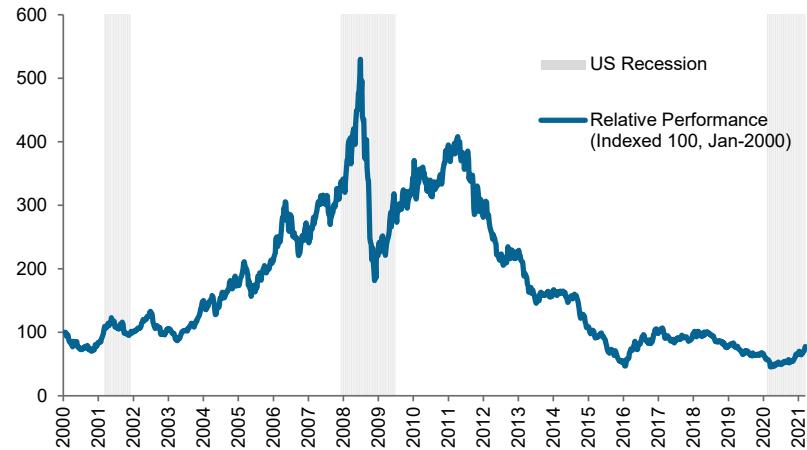
- Metals & Mining sector's relative performance is still at decades low
- Relative valuation has retraced to 2008-09 lows
- The global capex had been recovering, but still below average in recent years

Global Metals & Mining Capex

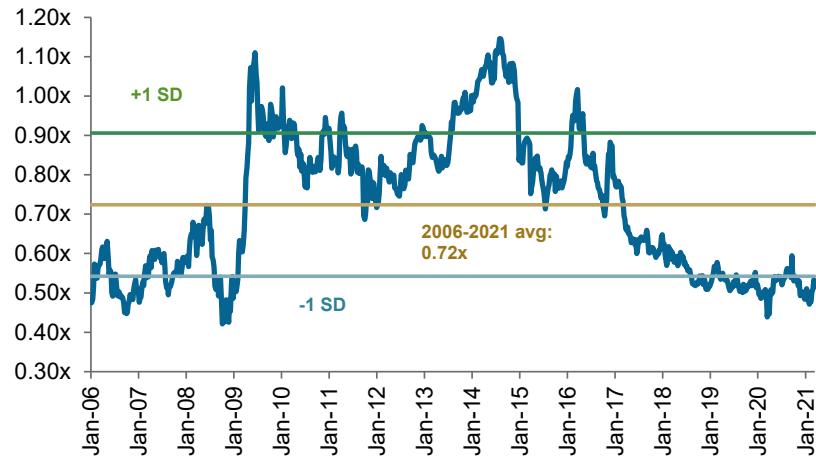


Source: Bloomberg, Thomson Eikon, Company Data, Morgan Stanley Research estimates.

S&P M&M vs S&P 500



Relative EV/EBITDA S&P M&M vs S&P 500

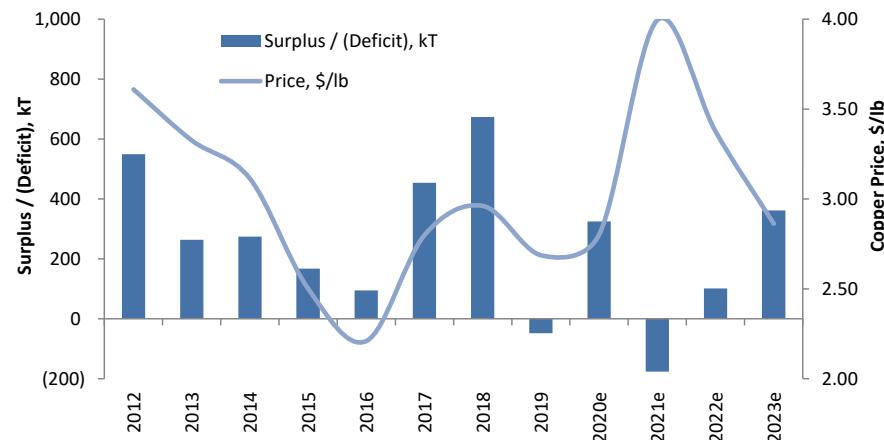


Copper- Supply Growth is Downside Risk in 2022-23

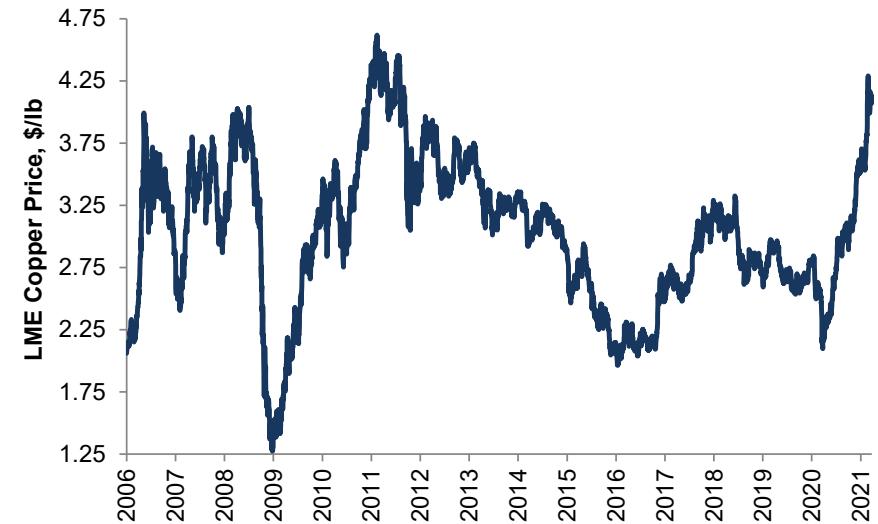
Our view: We forecast a long-term price of \$3.22/lb (nominal) in 2026 vs. spot ~\$4.48/lb

- A large number of copper mine projects are due to enter production in 2022-23, temporarily pushing the copper market into surplus.
- Strong demand growth forecast over the next several years (MSe 1.7% CAGR 2019-30) will absorb this supply relatively quickly.
- Copper is one of the most challenging metals to mine, which hampers supply growth.
- Water access has become a serious issue for miners, particularly in Chile, and broader environmental scrutiny is rising.

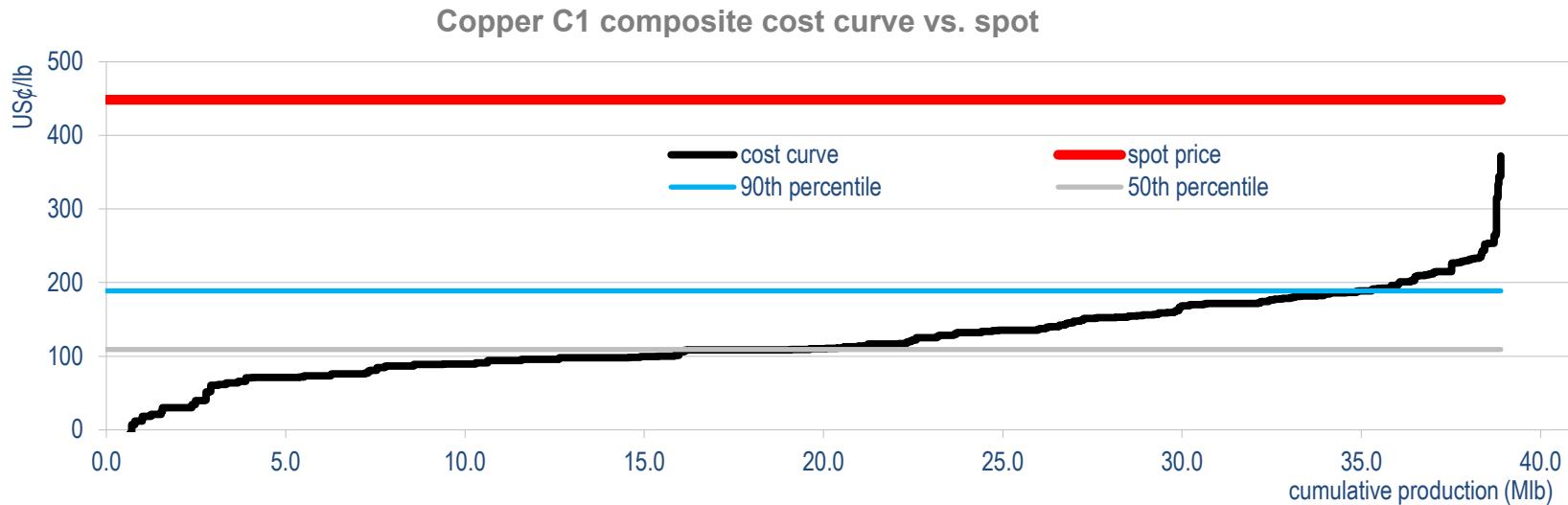
Supply Demand vs. Pricing



Copper Price Over Last 15 Years



China is ~1/2 of Copper Demand, but ~1/10 of Production

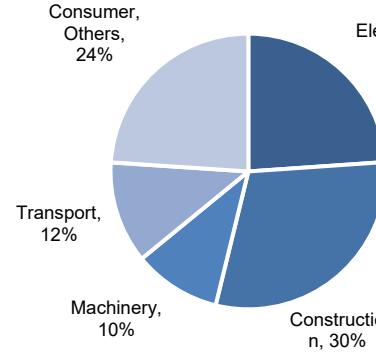


Top Suppliers

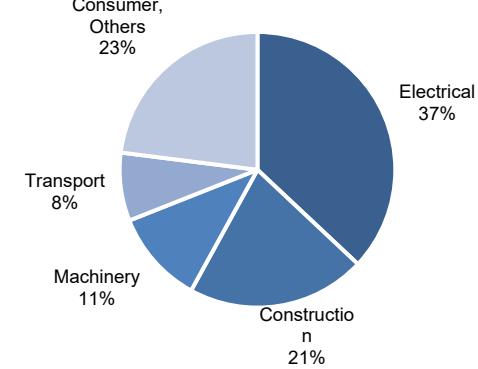
Country	2020 Mine Supply	Country	2020 Refined Demand
Chile	28%	China	54%
Peru	10%	USA	7%
China	8%	Germany	5%
USA	6%	Japan	4%
DRC	8%	South Korea	3%
ROW	40%	ROW	28%
Total (kT)	20,626	Total (kT)	22,630

Top Consumers

Global End Markets



China End Markets

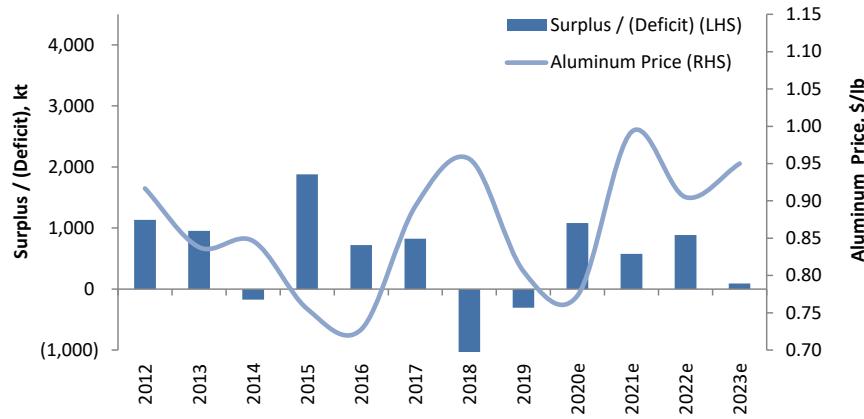


Aluminum- Structural Support as China De-Carbonizes

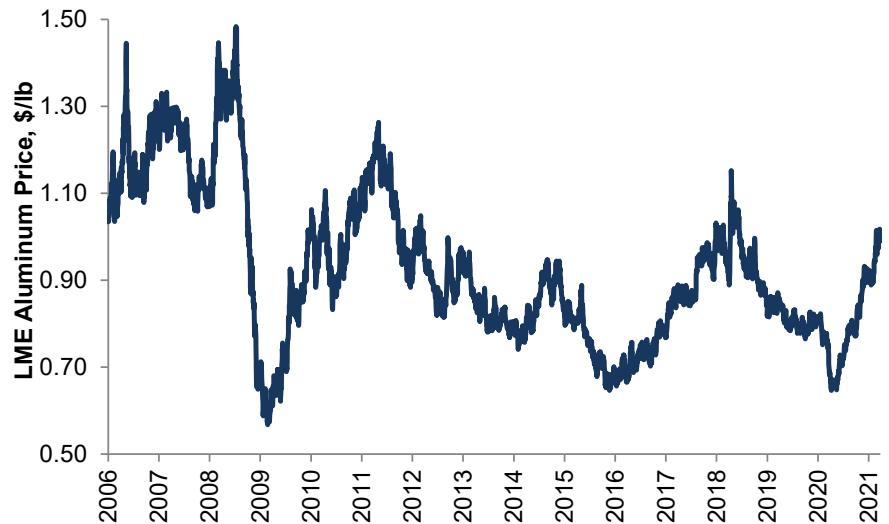
Our view: We forecast a long-term price of \$1.06/lb (nominal) in 2026 vs. spot ~\$1.09/lb

- Aluminum demand typically tracks ahead of GDP as the metal gains share from steel and copper.
- The aluminum cost curve is heavily tied to power (coal) and crude oil costs.
- China's decarbonisation policies could have longer term implications for the market as coal-fired power costs rise and fresh investment in coal-fired smelting capacity is not likely to be approved.
- China appears likely to stick to its 45Mtpa primary capacity cap, which will severely limit domestic supply growth beyond 2023e.

Supply Demand vs. Pricing

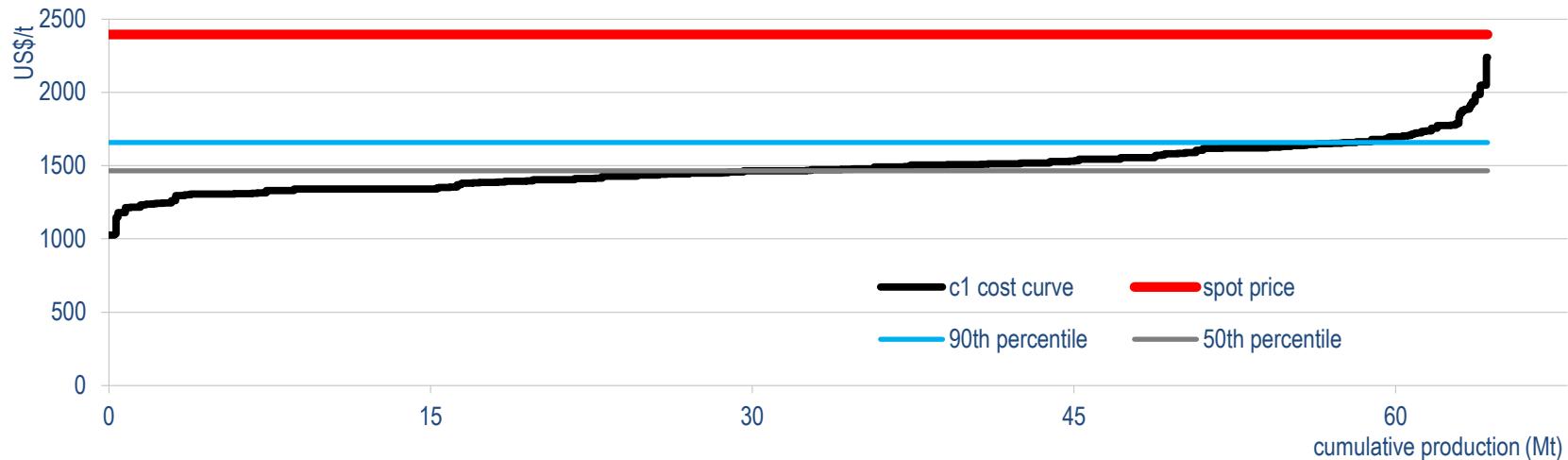


Aluminum Price Over Last 10 Years



Aluminum Structural Support as China De-Carbonizes

Aluminum C1 cost curve vs. spot

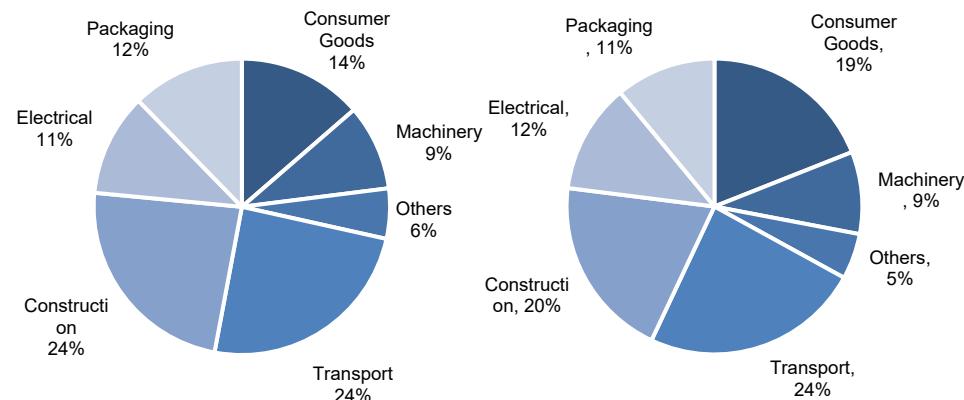


Top Suppliers

Country	2020 Smelter Production	Country	2020 Primary Demand
China	57%	China	60%
Russia	6%	USA	8%
Canada	5%	Germany	3%
India	6%	Japan	3%
Australia	2%	India	3%
ROW	24%	ROW	24%
Total (kT)	64,866	Total (kT)	63,783

Top Consumers

Global End Markets



May 2021

Industrials Spring Training Teach-In

Iron Ore (Seaborne)

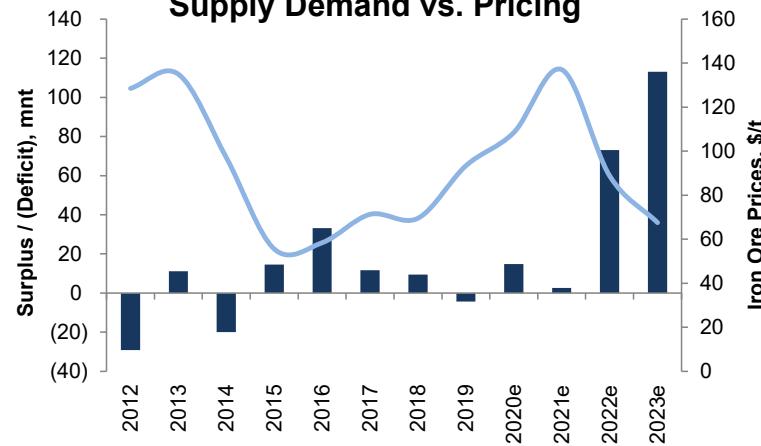
Top Suppliers

Country	2020 Supply
Australia	41%
Brazil	16%
China	12%
India	9%
N. America	5%
ROW	17%
Total (Mnt)	2,252

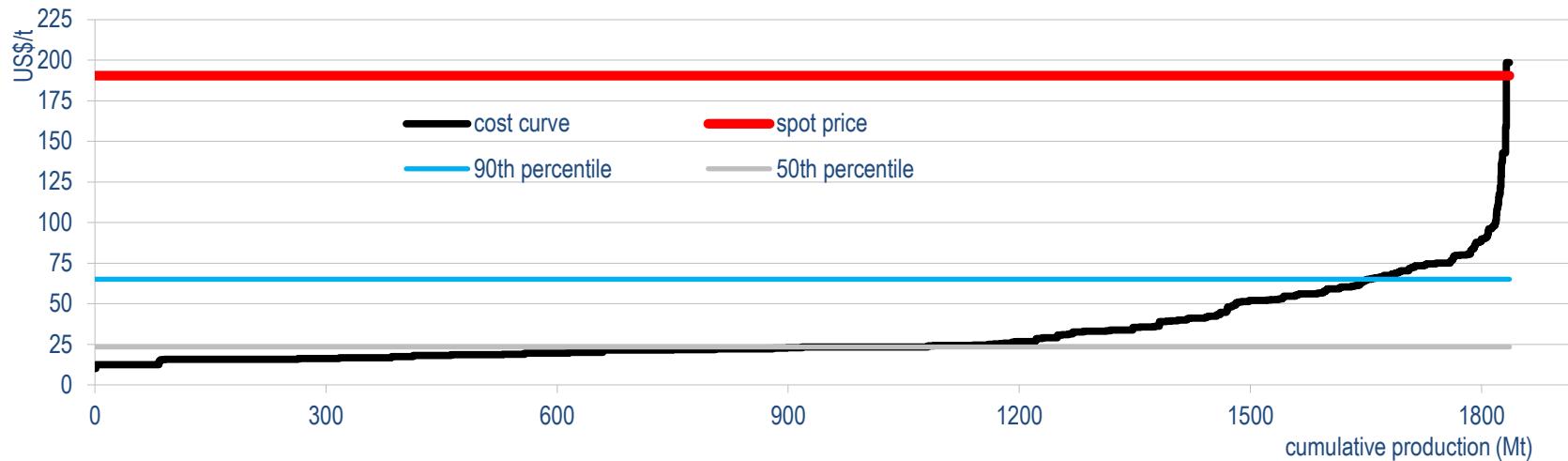
Top Consumers

Country	2020 Demand
China	63%
EU-28	5%
CIS	6%
Japan	4%
India	7%
ROW	15%
Total (Mnt)	2,282

Supply Demand vs. Pricing



Iron ore total cost curve vs. spot



Metallurgical Coal (Seaborne)

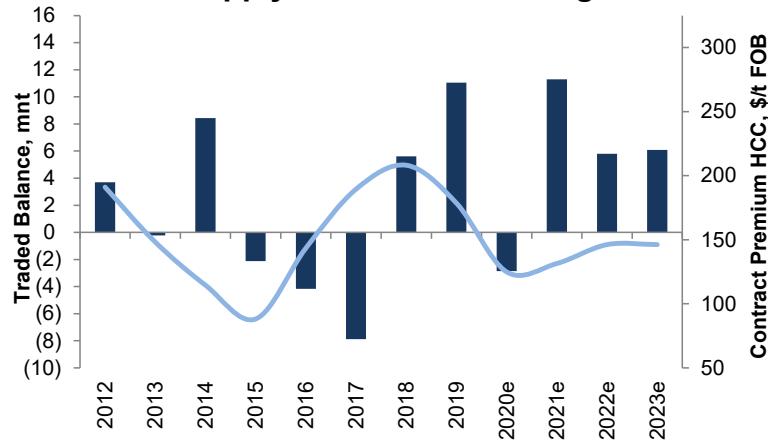
Top Suppliers

Country	2020 Supply
Australia	56%
USA	12%
Canada	11%
Mongolia	8%
Russia	8%
ROW	5%
Total (Mnt)	289

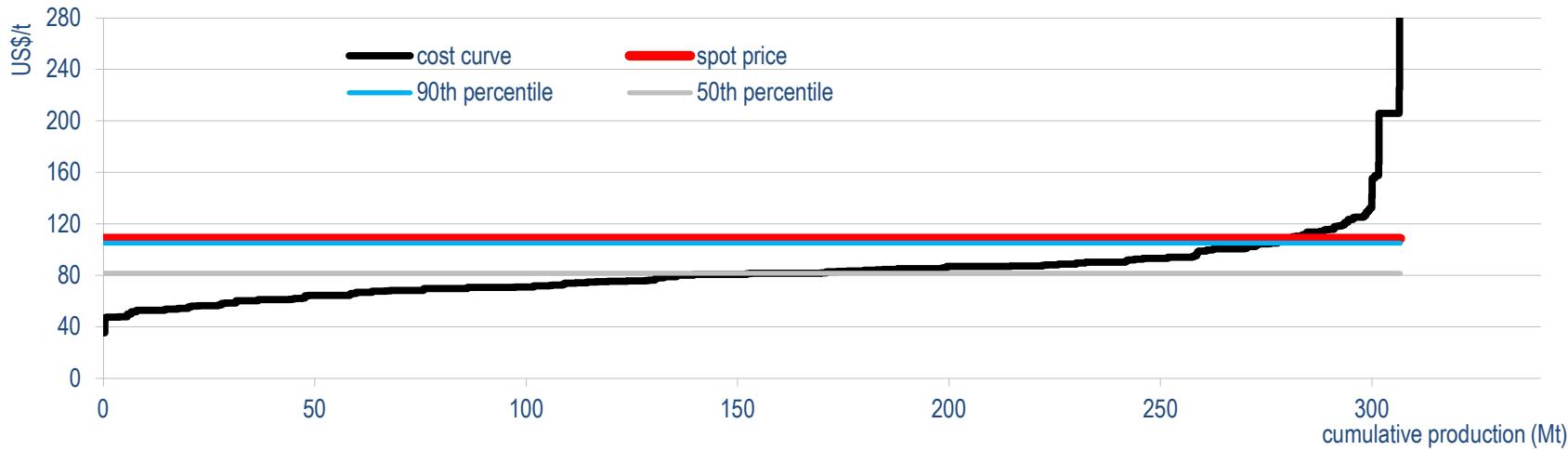
Top Consumers

Country	2020 Demand
EU-25	14%
Japan	16%
China	25%
India	20%
S. Korea	10%
ROW	15%
Total (Mnt)	291

Supply Demand vs. Pricing

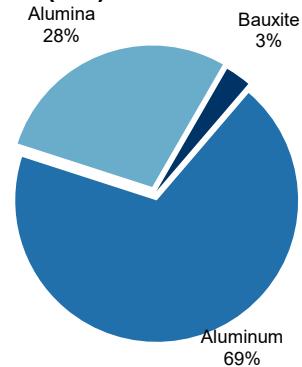


Metallurgical coal total cost curve vs. spot

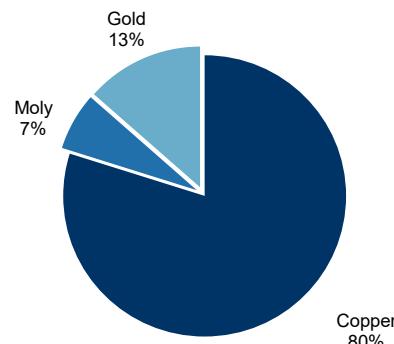


Revenue by Key End Markets/Commodities

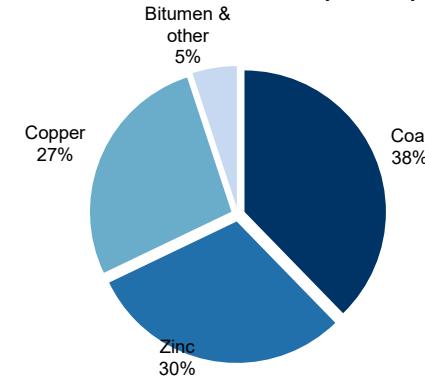
Alcoa (AA)



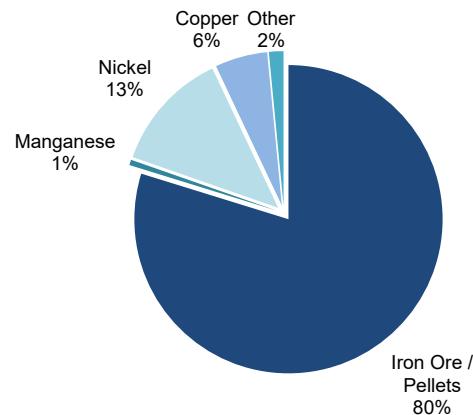
Freeport (FCX)



Teck Resources (TECK)

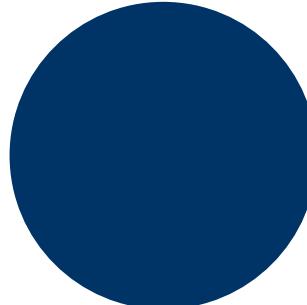


Vale (VALE)

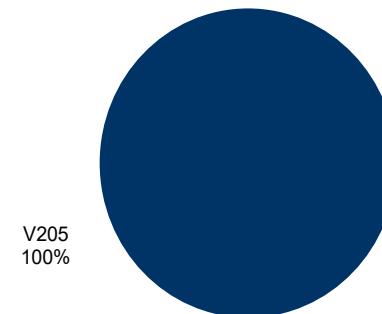


MP Materials (MP)

Rare
Earths
100%



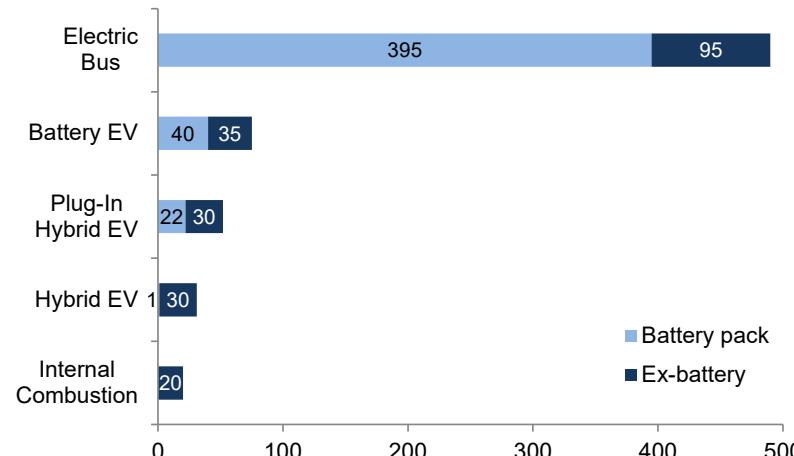
Largo Resources (LGO)



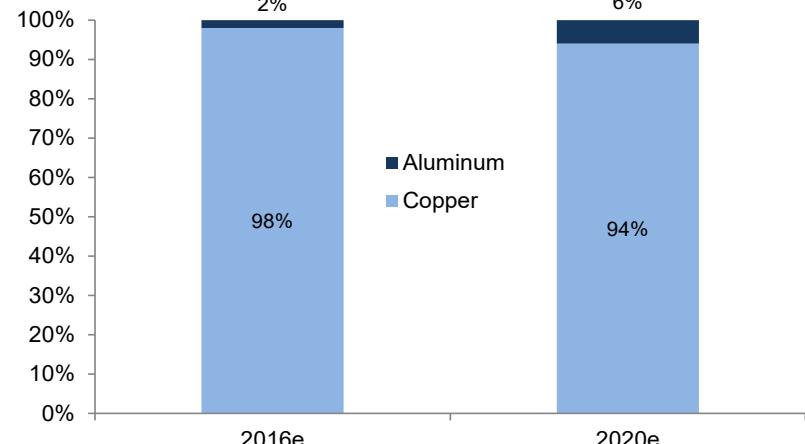
Key Metals Required to Meet Demand from EVs

Metal	Electric Vehicles (EV)				Infrastructure	
	Battery	Wiring	Drivetrain	Auto Body	EV Charging	Power Grid
Lithium	✓					
Cobalt	✓					
Nickel	✓					
Copper		✓	✓		✓	✓
Aluminum		✓		✓	✓	✓
Steel				✓	✓	✓
Electrical Steels			✓			✓

Copper Consumption by Vehicle Type (kg/vehicle)



Copper Faces Some Substitution Threats in Wiring



Top Pick: VALE. Too Cheap to Ignore

PRICE TARGET US\$22.00

Our 2021YE PT is derived using the average of a multiple valuation (50%) and a DCF model (50%). In the first approach, we use a P/E multiple of 8.5x, 21% below Vale's 2014-18 historical avg., on our 2022E EPS. The discount is equivalent to 100% of the avg. discount, relative to their historical multiple, at which British Petroleum and Volkswagen traded after their environmental incidents. In our DCF model, we use a 8.6% WACC and a 0% growth rate.



RISK REWARD CHART



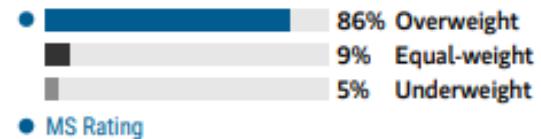
Key: — Historical Stock Performance ● Current Stock Price ♦ Price Target

Source: Thomson Reuters, Morgan Stanley Research

OVERWEIGHT THESIS

- We remain OW the stock due to strong iron ore momentum and cheap valuation vs. peers and historical average.
- The continuation of high iron ore prices during 2021 will likely result in the payment of extraordinary dividends in September.
- We project Vale to post solid FCF in the coming years, despite lower iron ore price forecasts and future payouts on the Brumadinho accident, which should allow the company to return excess cash to shareholders via dividends/buybacks.
- Finally, the stock's risk-reward is still skewed to the upside.

Consensus Rating Distribution



Source: Thomson Reuters, Morgan Stanley Research

Risk Reward Themes

Earnings Quality:	Positive
Macroeconomics:	Positive
Special Situation:	Positive

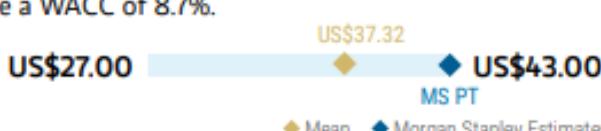
View descriptions of Risk Rewards Themes [here](#)

Top Pick: AA. Benefits From Constructive Outlook

PRICE TARGET US\$43.00

We use an average of EV/EBITDA (50%) and a DCF (50%) to determine our target. We use a pension-adjusted EV/EBITDA multiple of 7.5x on our 2022e EBITDA, in line with AA's long term historical average. In the DCF, we use a WACC of 8.7%.

Consensus Price Target Distribution

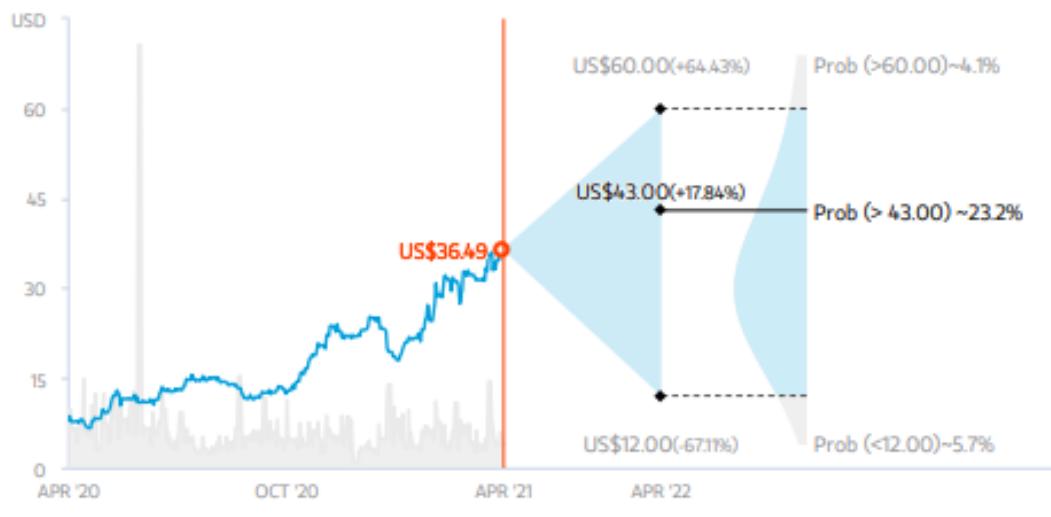


Source: Thomson Reuters, Morgan Stanley Research

OVERWEIGHT THESIS

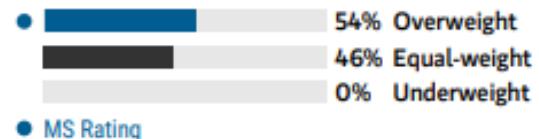
Alcoa has taken steps to shore up profitability through its recent portfolio review and is, in our view, well positioned to benefit from a constructive outlook for aluminum, supported by China's supply side reform. On the back of this bullish outlook, we expect accelerating FCF generation and potential shareholder returns.

RISK REWARD CHART AND OPTIONS IMPLIED PROBABILITIES (12M)



Source: Thomson Reuters, Morgan Stanley Research, Morgan Stanley Institutional Equities Division. The probabilities of our Bull, Base, and Bear case scenarios playing out were estimated with implied volatility data from the options market as of 28 Apr, 2021. All figures are approximate risk-neutral probabilities of the stock reaching beyond the scenario price in either three-months' or one-years' time. View explanation of Options Probabilities methodology [here](#)

Consensus Rating Distribution



Source: Thomson Reuters, Morgan Stanley Research

Risk Reward Themes

Out of consensus:	<i>Positive</i>
Pricing Power:	<i>Positive</i>
Self-help:	<i>Positive</i>

View descriptions of Risk Rewards Themes [here](#)

Steel

Global Steel Market: Key Industry Themes

1

China is the largest producer and consumer of steel. Efforts to reduce the country's GHG emissions will result in supply cuts and cost increases. Lower steel exports from China are supportive of higher prices globally.

2

Lower steel exports from China are supportive of higher prices globally.

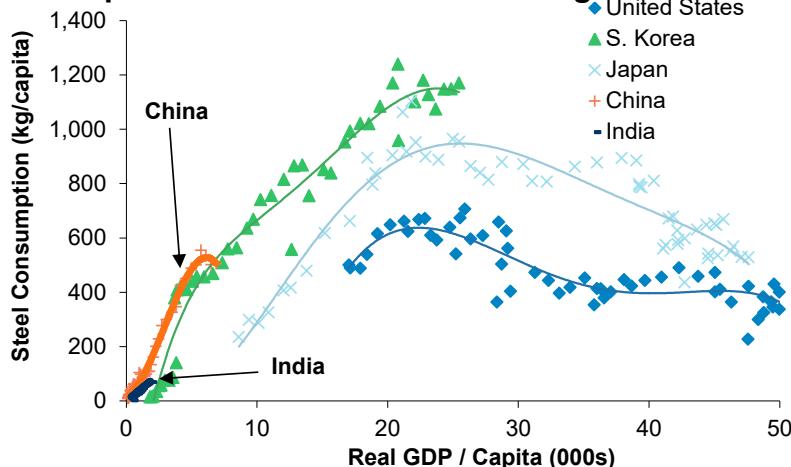
3

Lower emissions will likely increase the usage of scrap in the steelmaking process, which may lead to increases in scrap prices, but other alternatives like HBI, DRI, pig iron are available to offset higher scarp costs (at least partially)

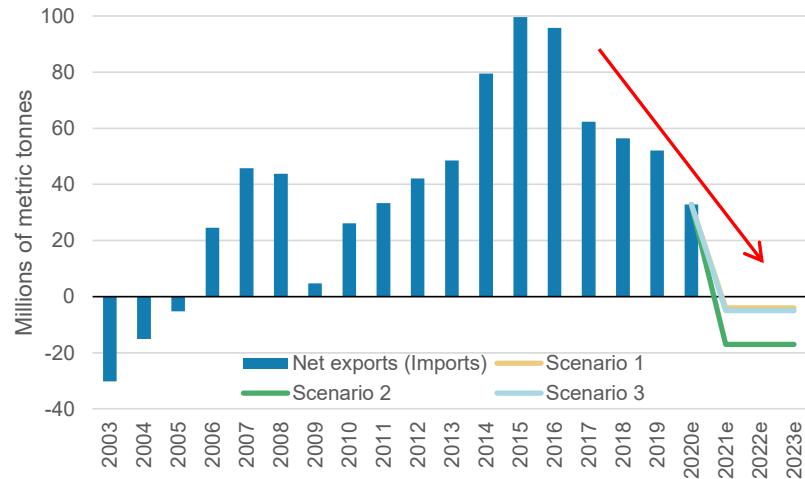
Global Steel Market: Chinese Exports Are Key...

- China is the largest producer and consumer of steel globally and urbanization is the biggest driver for demand.

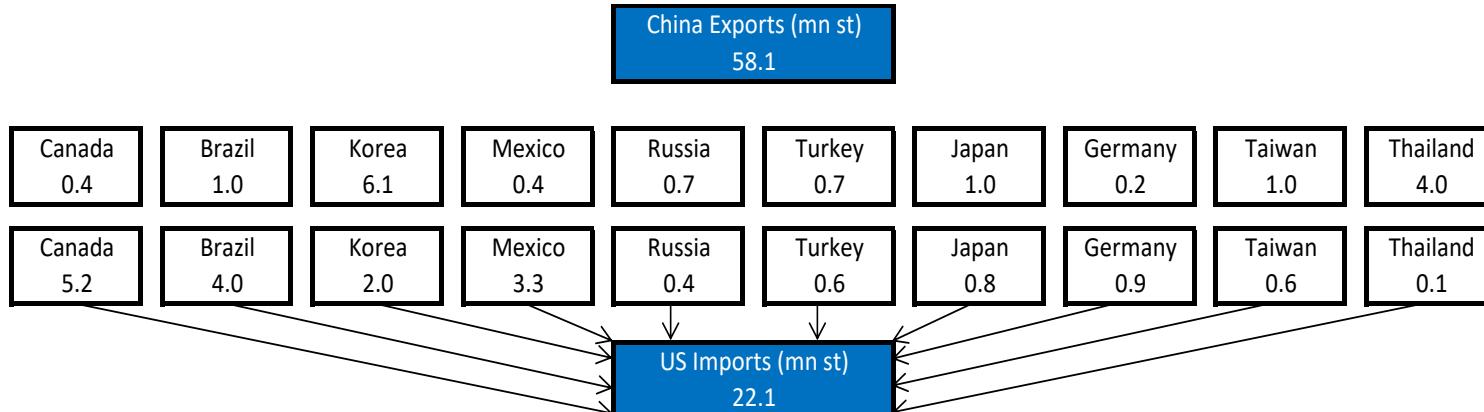
Per capita demand in China is leveling off



China Steel Product Net Exports



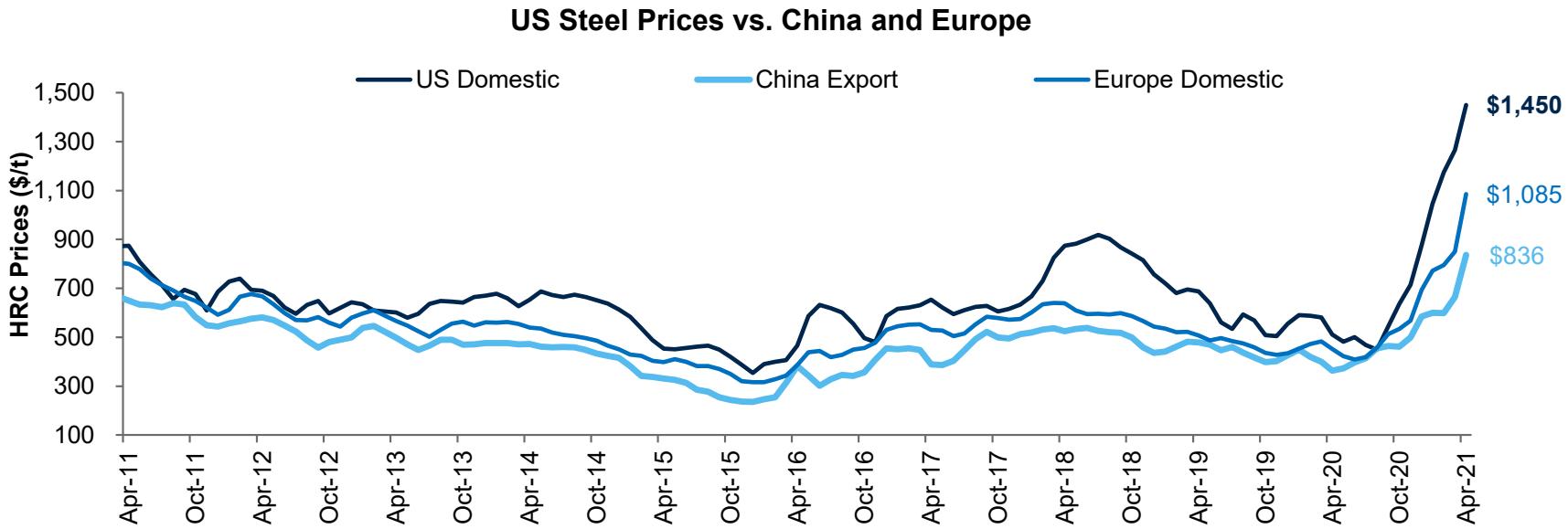
China is the Largest Steel Exporter, US is the Largest Steel Importer



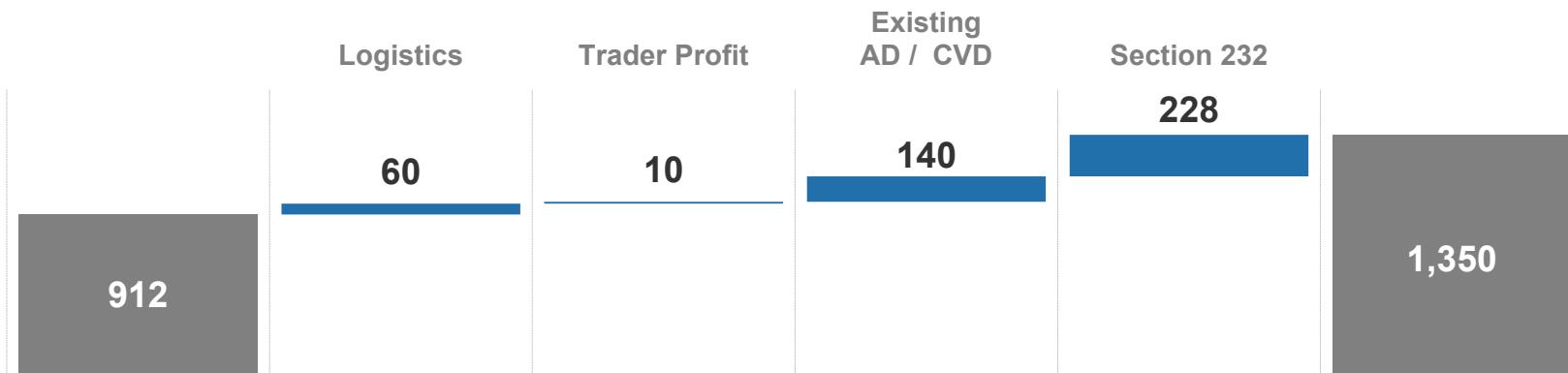
Global Steel Market: ... But Prices Are Regional

- Key steel producing countries include China, US, Japan, Russia, Ukraine, Turkey and India
- Steel markets are more regionalized than other base metals and prices typically differ from one region to another

Top Suppliers		Top Consumers	
Country	2020 Supply	Country	2020 Demand
China	57%	China	56%
EU-28	7%	EU-28	8%
N. America	5%	N. America	7%
Japan	4%	Other APAC	6%
Russia/CIS	5%	India	5%
ROW	21%	ROW	18%
Total (Mnt)	1,862	Total (Mnt)	1,739

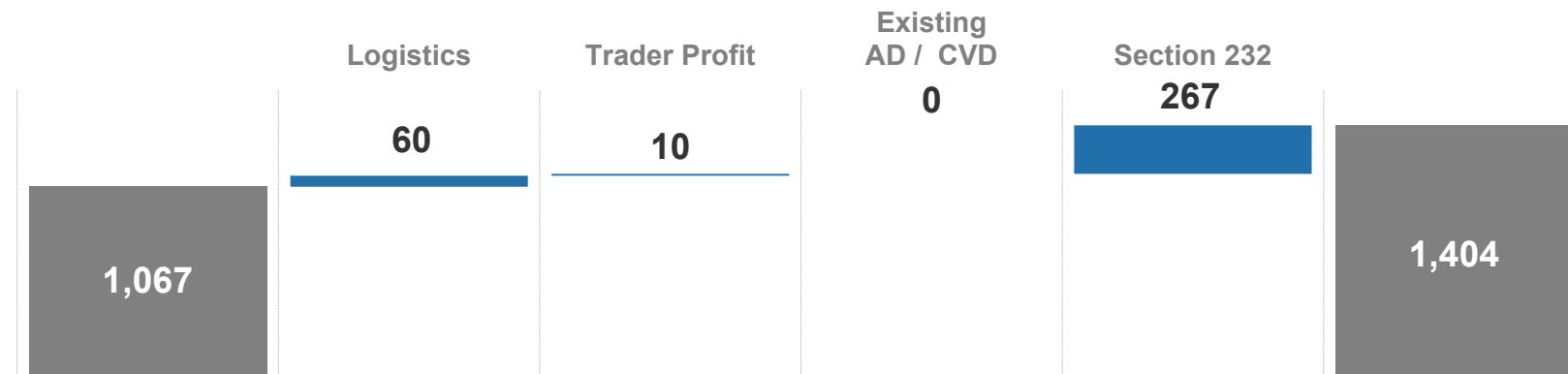


Imports Parity Pricing Mechanism – HRC Example



Turkey export
price - HRC

Implied Houston
Price



N. Europe Export
Price - HRC

Implied Midwest
Price

US Steel Market: Key Industry Themes

1

Prices are at all-time record highs due to a combination of (1) demand recovery post Covid-19, (2) many higher-cost assets idled during lockdown have not been restarted, (3) healthy utilization rates globally mean low availability of imported product in the US.

2

New, lower cost capacity additions are coming online in the US starting in 2H21, and will likely take share from both older assets and imports.

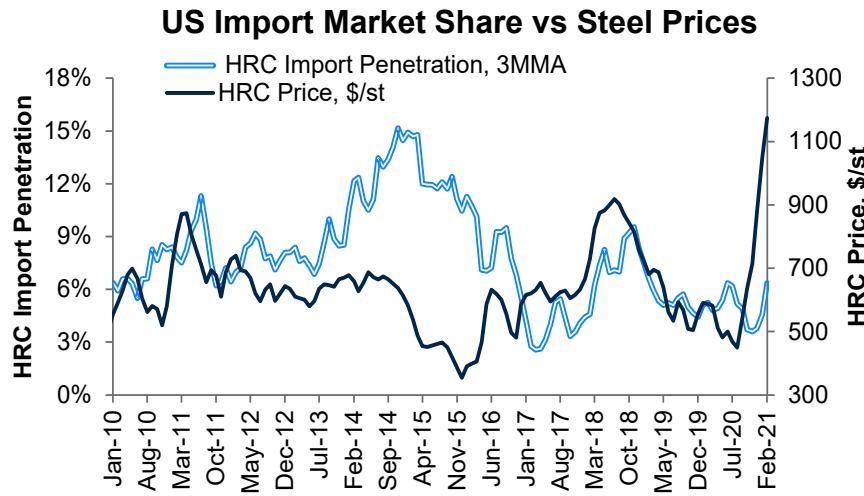
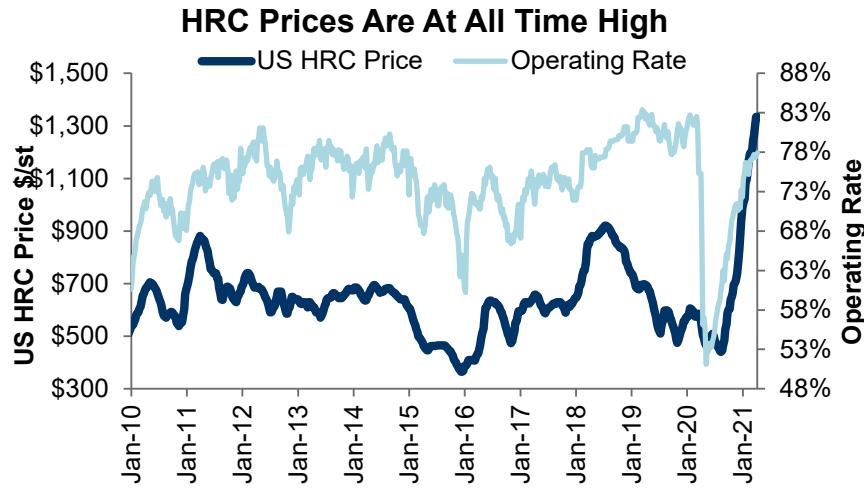
3

Construction is the largest end market for US demand, and could benefit from higher Infrastructure spending in the future

Flat Rolled Prices At All-Times High On Supply Discipline

Our view:

- US flat-rolled steel products reached all-time high prices in 2021 due to (1) strong demand recovery following the Covid-19 shutdowns in 2020, (2) supply discipline and (3) strong prices globally / low import availability.
- Incremental production from Electric Arc Furnaces (EAF) will come online starting 2H21, but elsewhere supply discipline should continue.
- The US is a mature source of scrap supply.
- EAFs (scrap-based steel supply) were typically the low cost supplier in the US, but that could change if increased demand for scrap sends the raw material price higher.



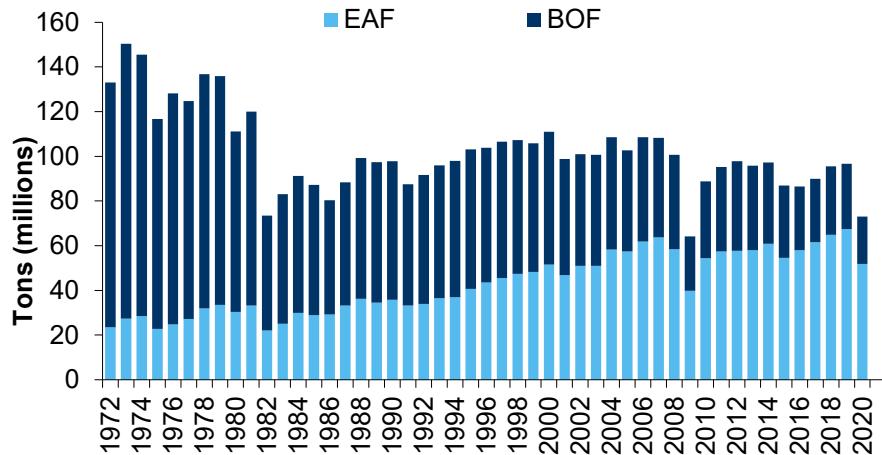
US Steel Market: Capacity

- Section 232 tariffs sent steel prices in the US to record highs, which led to capacity restarts and greenfield projects.
- ~10Mt of new / incremental production will come online starting on 2H21, continuing the capacity shift to EAF from BOF.
- The Covid-19 lockdown prompted numerous asset idlings (mainly BOFs), and many have not restarted yet.

Steelmaking Capacity Additions Announced in the US

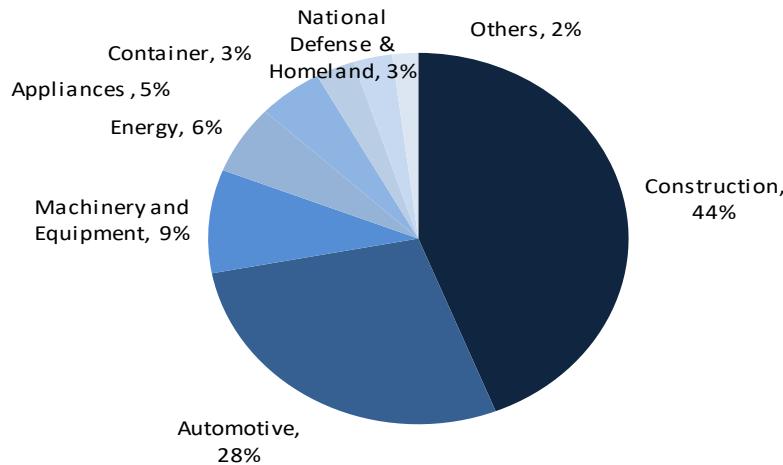
Installed Capacity Additions (Removals)	2019	2020e	2021e	2022e	2023e	2024e	Notes
AK Steel	-	(1,910)	-	-	-	-	Ashland closure
ArcelorMittal	-	-	-	1,500	-	-	Greenfield EAF at Calvert
Big River Steel Llc	-	-	1,500	-	-	-	Phase 2
Bluescope	-	-	-	850	-	500	Delta 850mtpy EAF expansion, potential +500mtpy debottleneck
CMC Steel	-	(525)	-	-	454	-	Closing Rancho Cucamonga; New Mesa micromill
Nucor	190	887	-	800	300	-	Sedalia, Frostproof, Plate mill
Nucor Steel Gallatin	-	-	1,450	-	-	-	Sheet mill expansion with second EAF addition
Steel Dynamics Inc	-	-	2,720	-	-	-	Sinton sheet mill
United States Steel Corp	-	725	725	-	-	-	Fairfield EAF
US - Net Additions	190	(823)	6,395	3,150	754	500	
Total steelmaking capacity ('000 metric tonnes)	113,595	112,772	119,167	122,317	123,070	123,570	
Total steelmaking capacity ('000 short tons)	125,217	124,309	131,359	134,831	135,662	136,213	

EAF-Based Production Has Been Taking Share in the US

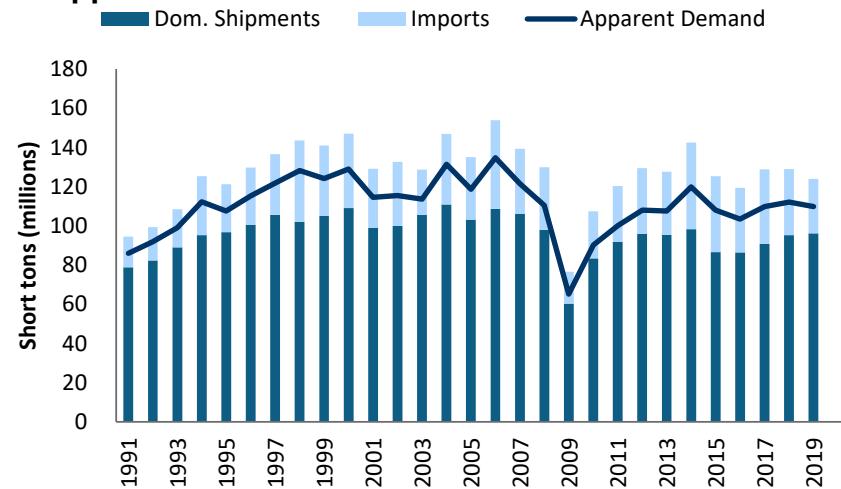


US Steel Market: Demand

US End Markets, 2019



US Apparent Demand



End-Market Exposure by Company

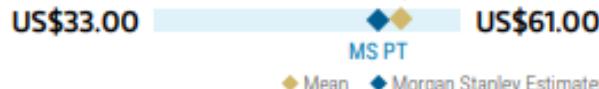
	STLD	NUE	X
Construction	47%	43%	24%
Automotive / Transportation	19%	21%	46%
Machinery / Ag Equipment	6%	16%	9%
Energy	7%	17%	8%
Industrial	23%	3%	12%

Top Pick: STLD. Converting FCF Into Shareholder Returns

PRICE TARGET US\$53.00

Our price target is determined as the average of EV/EBITDA (50%) and a DCF (50%). We use an EV/EBITDA multiple of 6.3x on our 2022e EBITDA. The target multiple is in line with STLD's historical average. In the DCF, we use a WACC of 6.9%.

Consensus Price Target Distribution



Source: Thomson Reuters, Morgan Stanley Research

OVERWEIGHT THESIS

Steel Dynamics is nearing the end of a multi-year investment cycle centered around the construction of a new, state-of-the-art steelmaking mill which comes online in mid-2021, positioning STLD's FCF generation to increase from 2021 onwards. The company has a proven track record of shareholder returns, and is poised to deliver greater returns for investors, especially through share buybacks.

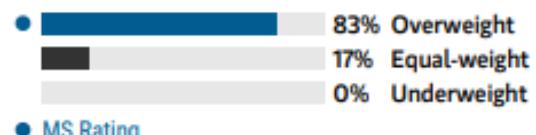
RISK REWARD CHART AND OPTIONS IMPLIED PROBABILITIES (12M)



Key: — Historical Stock Performance ● Current Stock Price ◆ Price Target

Source: Thomson Reuters, Morgan Stanley Research, Morgan Stanley Institutional Equities Division. The probabilities of our Bull, Base, and Bear case scenarios playing out were estimated with implied volatility data from the options market as of 28 Apr, 2021. All figures are approximate risk-neutral probabilities of the stock reaching beyond the scenario price in either three-months' or one-years' time. View explanation of Options Probabilities methodology [here](#)

Consensus Rating Distribution



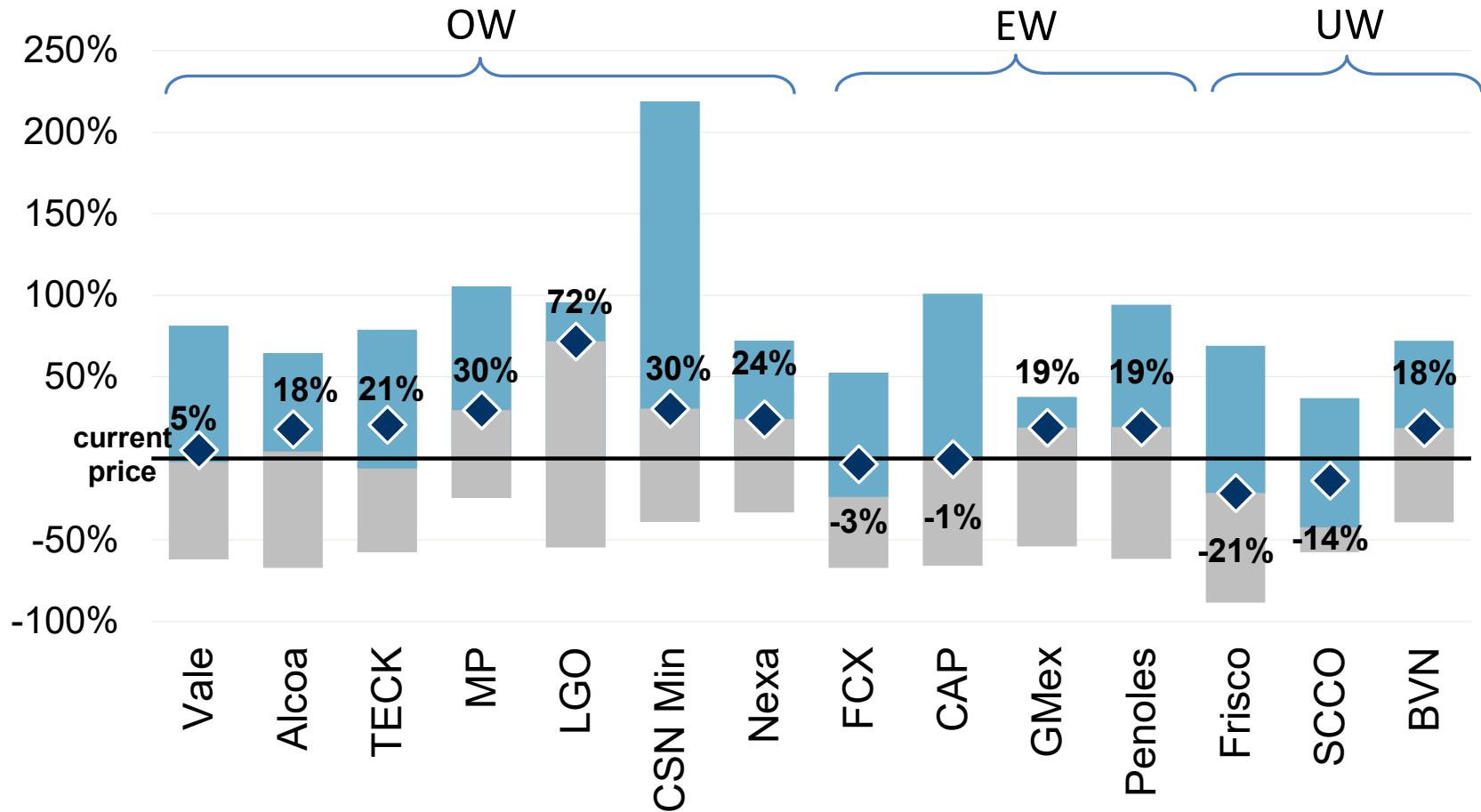
Source: Thomson Reuters, Morgan Stanley Research

Risk Reward Themes

Earnings Quality:	<i>Positive</i>
Self-help:	<i>Positive</i>
Share Gain:	<i>Positive</i>

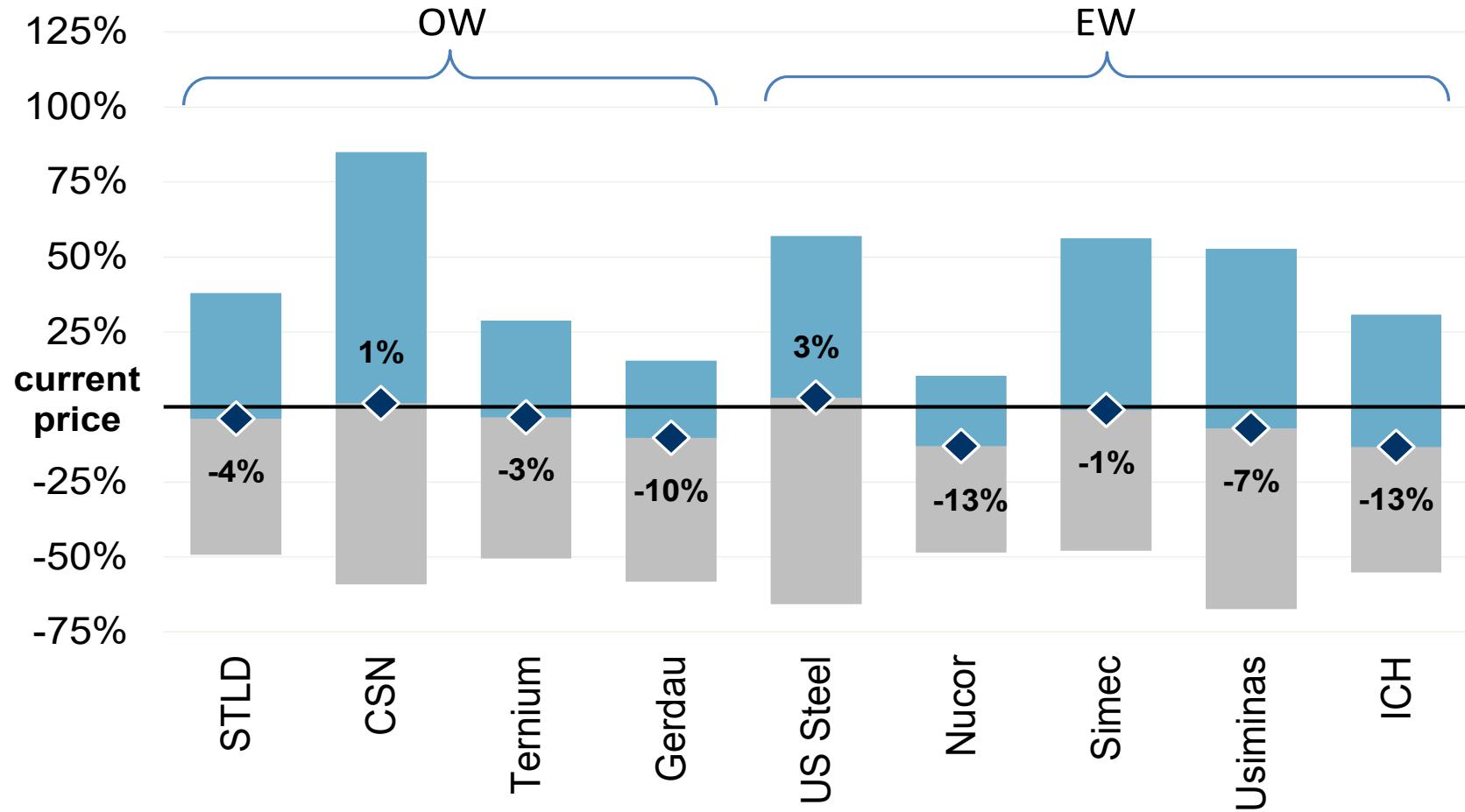
View descriptions of Risk Rewards Themes [here](#)

Risk Reward Across America Mining Coverage



For valuation methodology and risks associated with any recommendation, rating or price target referenced in this report, please contact the Client Support Team as follows: US/Canada +1 800 303-2495; Hong Kong +852 2848-5999; Latin America +1 718 754-5444 (U.S.); London +44 (0)20-7425-8169; Singapore +65 6834-6860; Sydney +61 (0)2-9770-1505; Tokyo +81 (0)3-6836-9000. Alternatively you may contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY 10036 USA.

Risk Reward Across America Steel Coverage



For valuation methodology and risks associated with any recommendation, rating or price target referenced in this report, please contact the Client Support Team as follows: US/Canada +1 800 303-2495; Hong Kong +852 2848-5999; Latin America +1 718 754-5444 (U.S.); London +44 (0)20-7425-8169; Singapore +65 6834-6860; Sydney +61 (0)2-9770-1505; Tokyo +81 (0)3-6836-9000. Alternatively you may contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY 10036 USA.

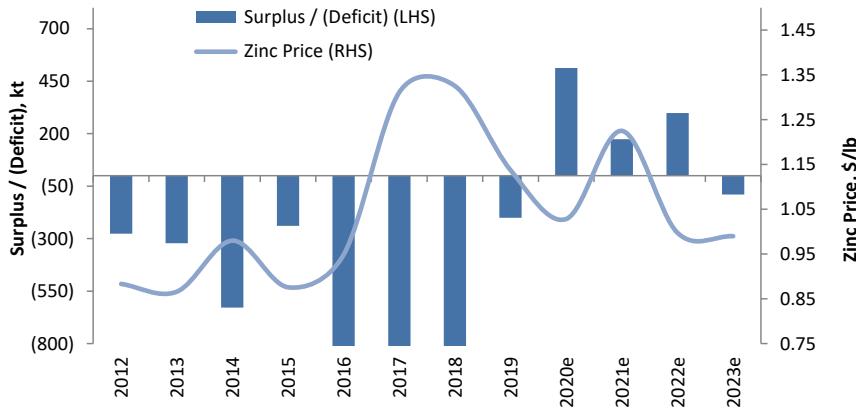
Appendix

Zinc- Surplus Overhang

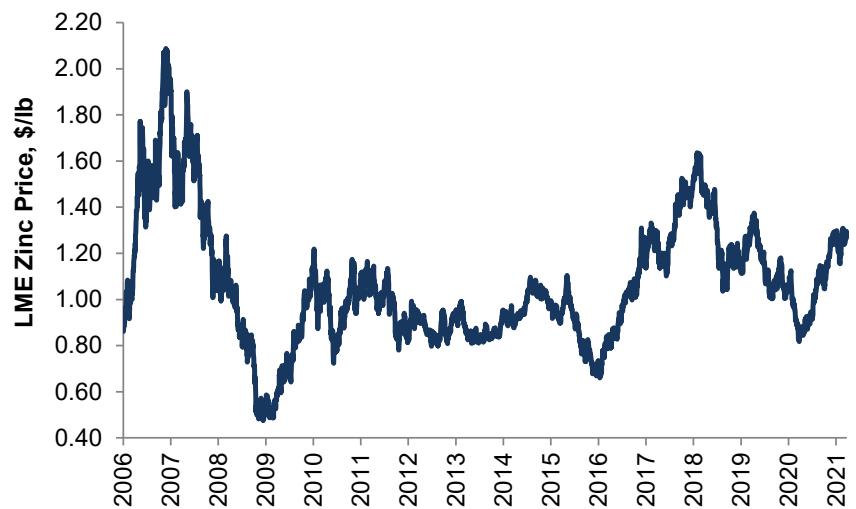
Our view: We forecast a long-term price of \$1.20/lb (nominal) in 2026 vs. spot ~\$1.32/lb

- Zinc demand is tied to construction and automotive production, as its primary use is a coating for outdoor steel.
- Fresh risk to China supply has emerged as emissions controls in Inner Mongolia force mines and smelters to cut output.
- Automotive, manufacturing and consumer goods sectors have been key drivers through 1Q21, while short-term logistics disruptions have encouraged inventory build and kept prices supported.
- We forecast a persistent surplus in zinc's metal market as the concentrate market returns to balance, weighing on price.

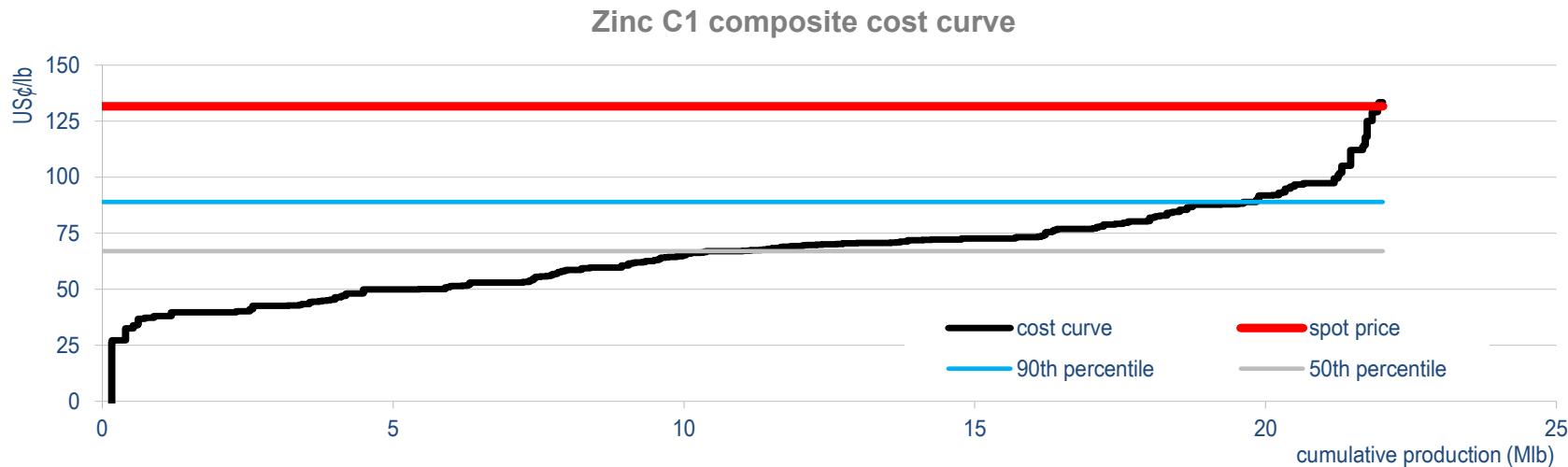
Supply Demand vs. Pricing



Zinc Price Over Last 10 Years



Zinc- Surplus Overhang

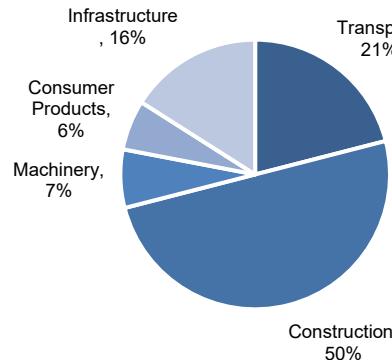


Top Suppliers

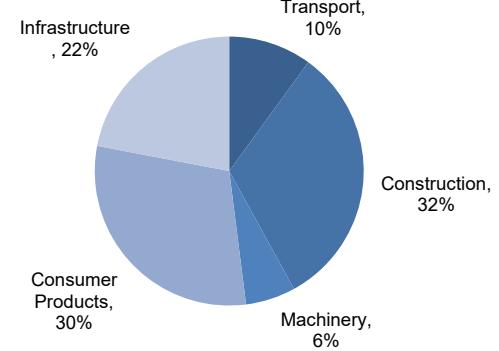
Country	2020 Mine Production	Country	2020 Refined Demand
China	35%	China	52%
Australia	11%	USA	7%
Peru	10%	South Korea	4%
India	6%	India	4%
USA	6%	Germany	3%
ROW	33%	ROW	31%
Total (kT)	12,262	Total (kT)	13,052

Top Consumers

Global End Markets



China End Markets

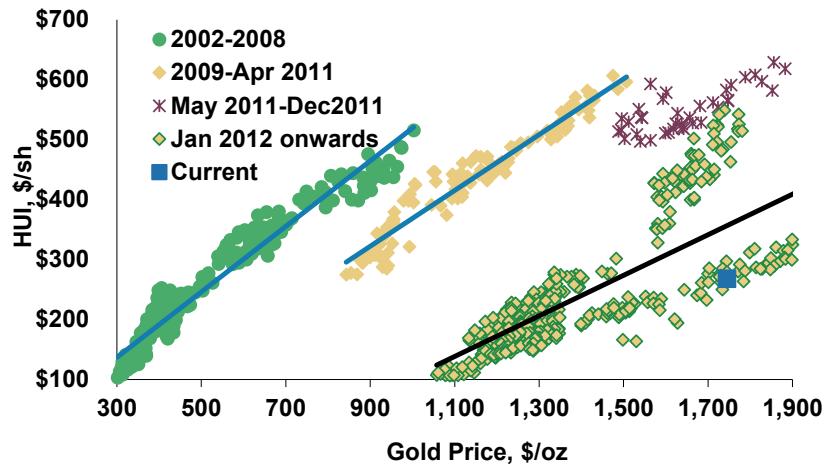


Gold- Driven by Real Rates

Ways to Invest in Gold

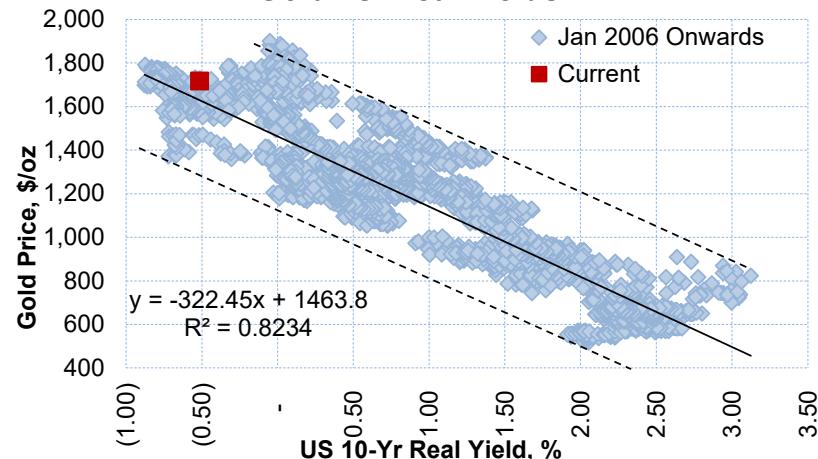
- Physical
- Physical backed ETF
- Gold miners (Stock-picker's market)
- Gold royalty/streaming companies
- Gold levered ETF

Gold Equities (HUI) Have De-rated vs. Historical Levels

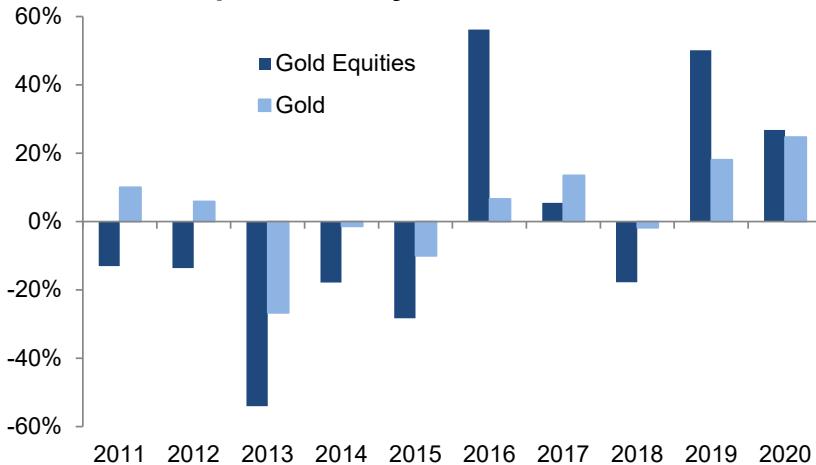


Source: Bloomberg, Thomson Reuters, Morgan Stanley Research

Gold vs. Real Yields



Gold Equities Yearly Performance vs. Gold



Morgan Stanley

May 2021

FOUNDATION

Industrials Spring Training Teach-In

Chemicals

MORGAN STANLEY RESEARCH
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For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.

Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices are as of April 27, 2021, unless otherwise noted.

90% of Investor Focus In Chemicals Is on These End Markets...

Petrochemicals (DOW, LYB, OLN, WLK, CE, et al.)

- Feedstocks: NGLs (ethane, propane, butane)
- Upstream: Ethylene/Propylene
- Downstream: Polyethylene/Polypropylene/Chlor-Alkali/Acetic Acid/VAM

Agriculture (NTR, CF, IPI, MOS, FMC, CVTA)

- Fertilizer: Nitrogen, Phosphate, & Potash
- Seeds & Crop Chemicals

Industrial Gas (APD, LIN)

Paints & Coatings (PPG, RPM, SHW, AXTA)

Diversified Chemicals (CE, DD, EMN, AVNT)

Titanium Dioxide or TiO₂ (CC, TROX, VNTR)

Lithium (ALB)

Hygiene/Water Treatment (DSEY, ECL)

But Today We're Going to Focus On Four Key Debates...

1. Agriculture (NTR, CF, IPI, MOS, FMC, CVTA)

- Fertilizer: Nitrogen (CF) and Phosphate (MOS) markets – How to think about improved farmer economics versus the marginal cost of production of fertilizer production? Where will prices/margins mean revert?

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- Polyethylene (DOW, LYB, WLK): Hard or soft landing post Winter Strom Uri? Is it all about supply or is there a demand story as well?

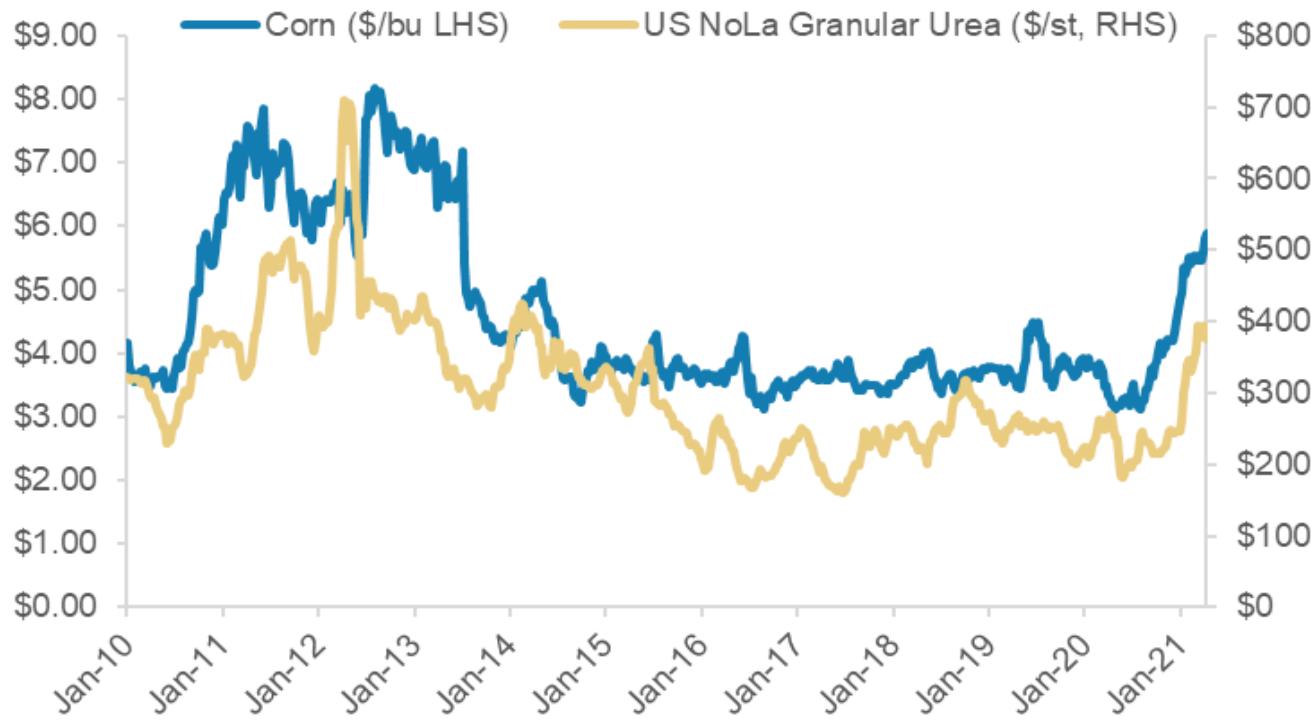
3. Paints & Coatings (PPG, RPM, SHW, AXTA)

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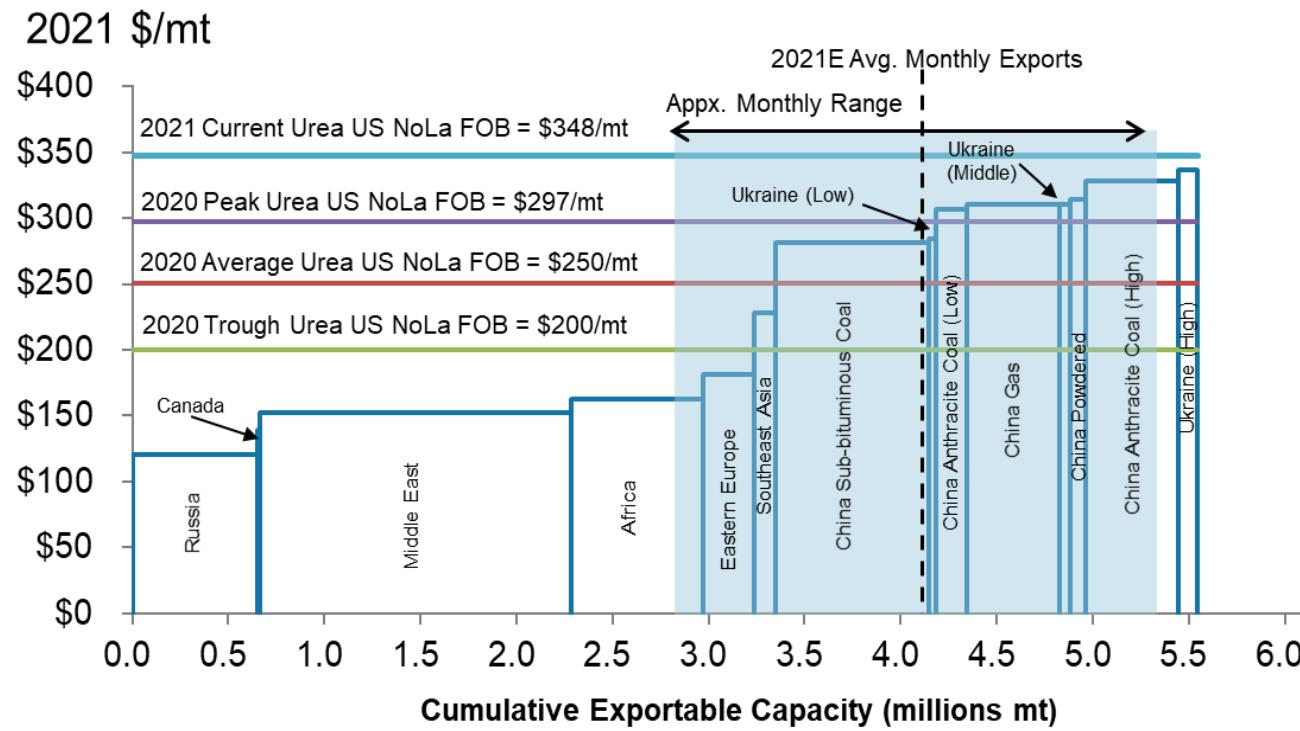
4. ESG

- Our variant perception: “Maintenance ESG” versus “Growth ESG”
- Four “Big Ideas”

What Drives Nitrogen Prices? CBOT Corn Price Or Marginal Cost Curve?



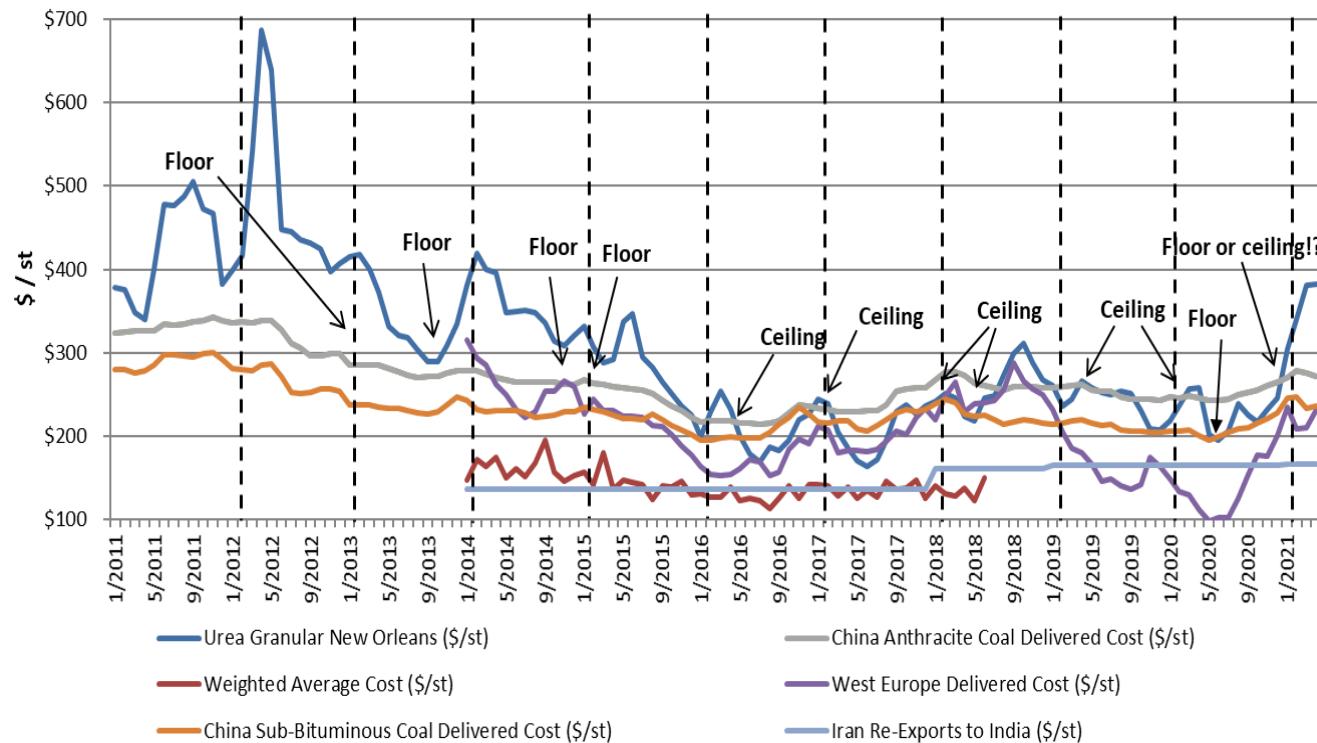
Urea Export Cost Curve



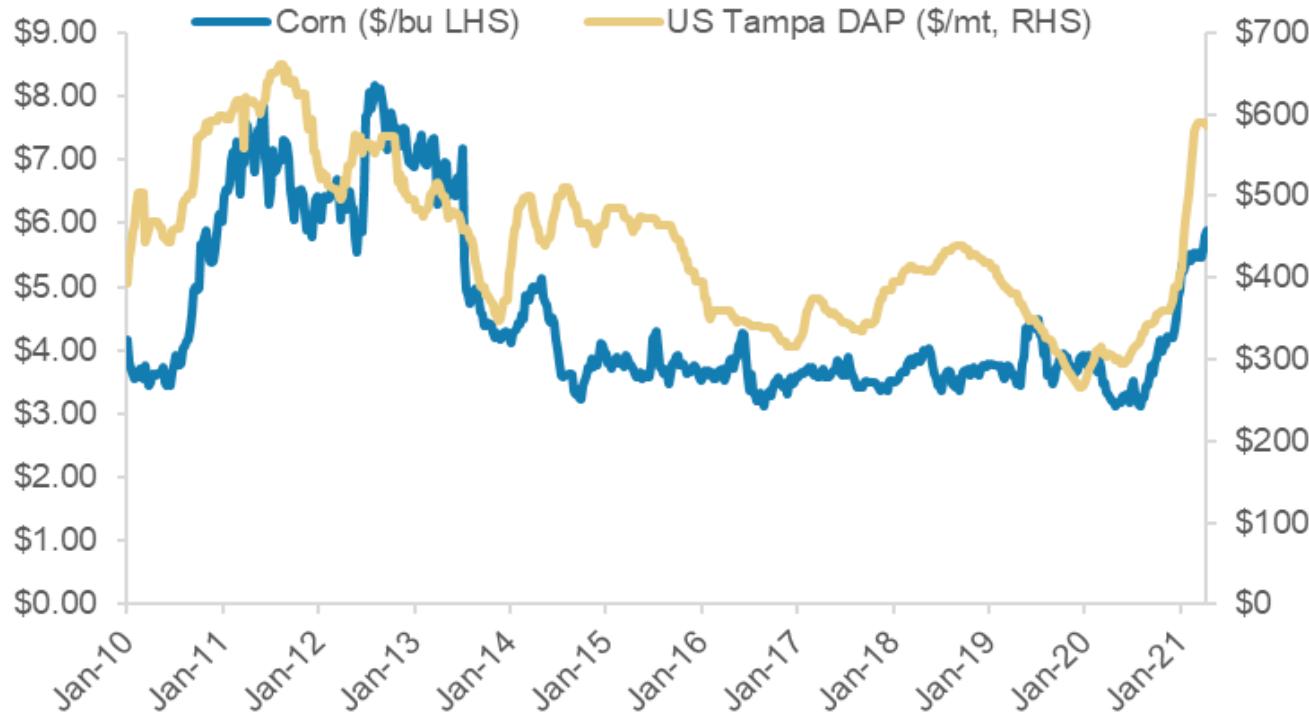
May 2021

Industrials Spring Training Teach-In

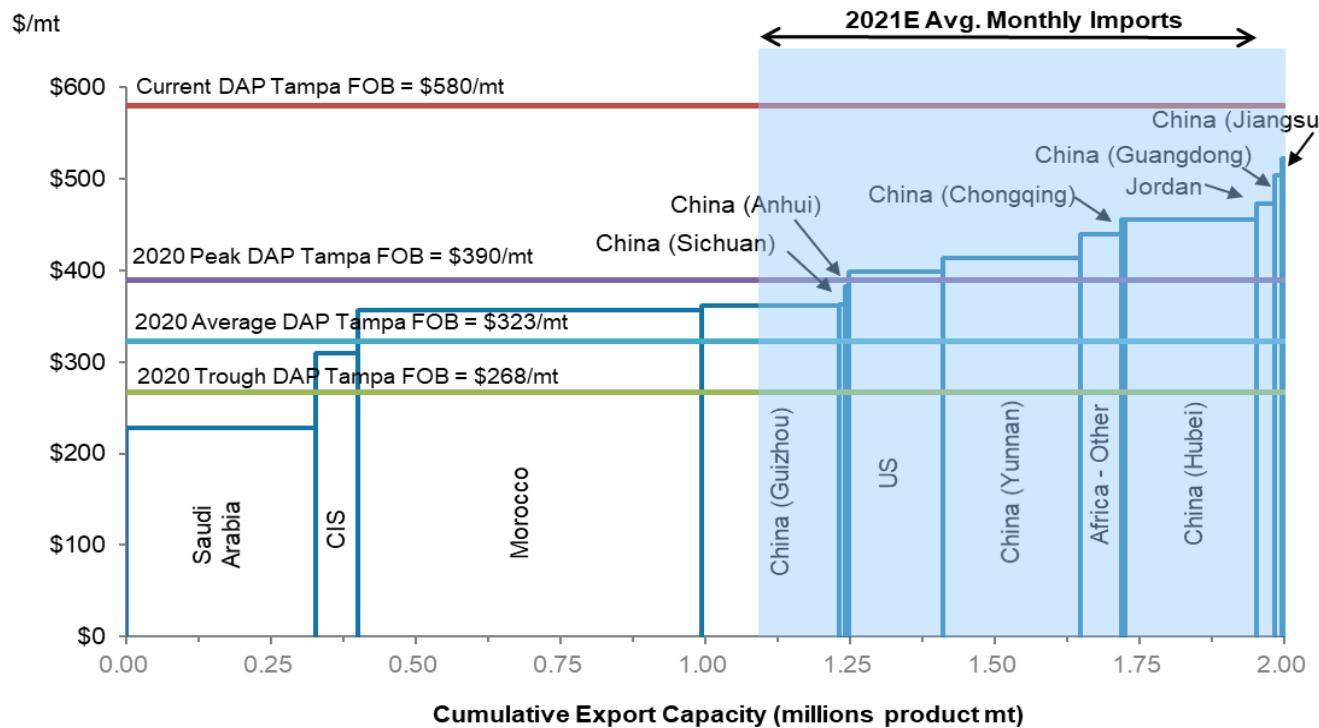
Urea Floor/Ceiling Chart – Market Price vs. Marginal Cost Of Production



Tampa DAP versus CBOT Corn



Phosphate Export Cost Curve



May 2021

Industrials Spring Training Teach-In

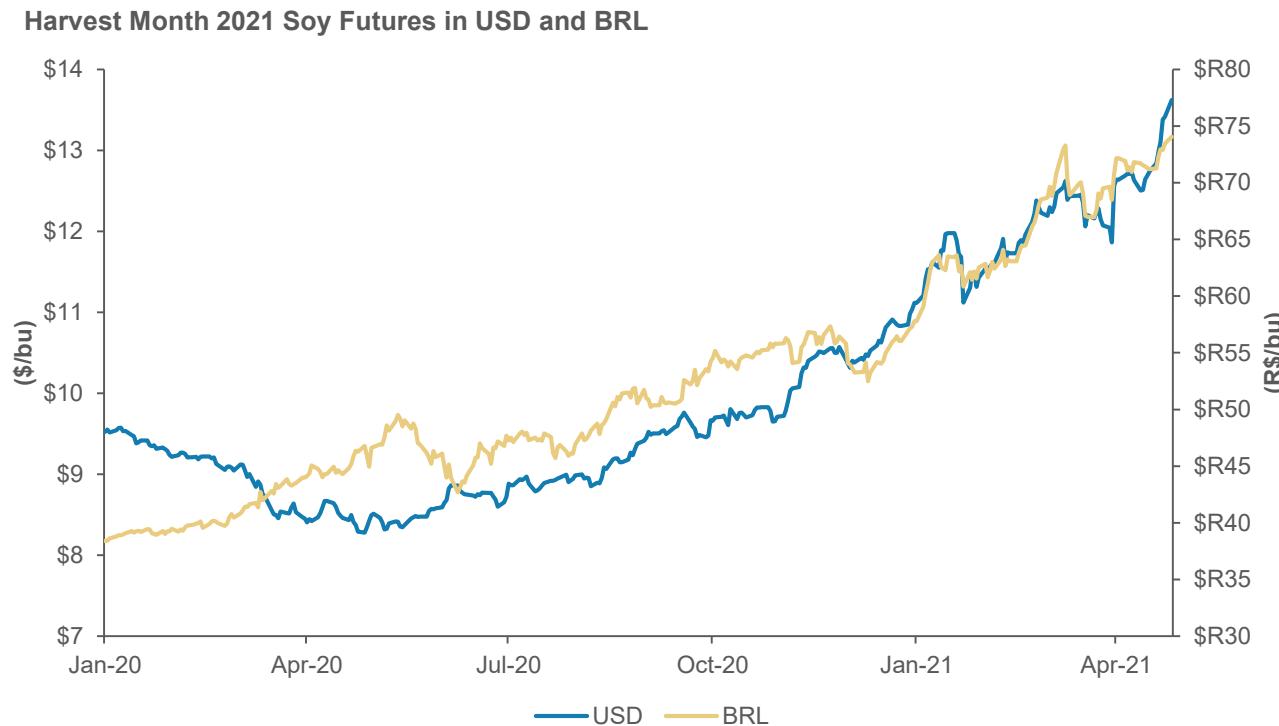
It Isn't Just Corn/Soy & MCP: USD/BRL Relationship Also Very Important For Fertilizer Demand Growth



May 2021

Industrials Spring Training Teach-In

Weakening BRL Provided Improved Economics To Brazilian Farmers Prior to Soy Price Improvement



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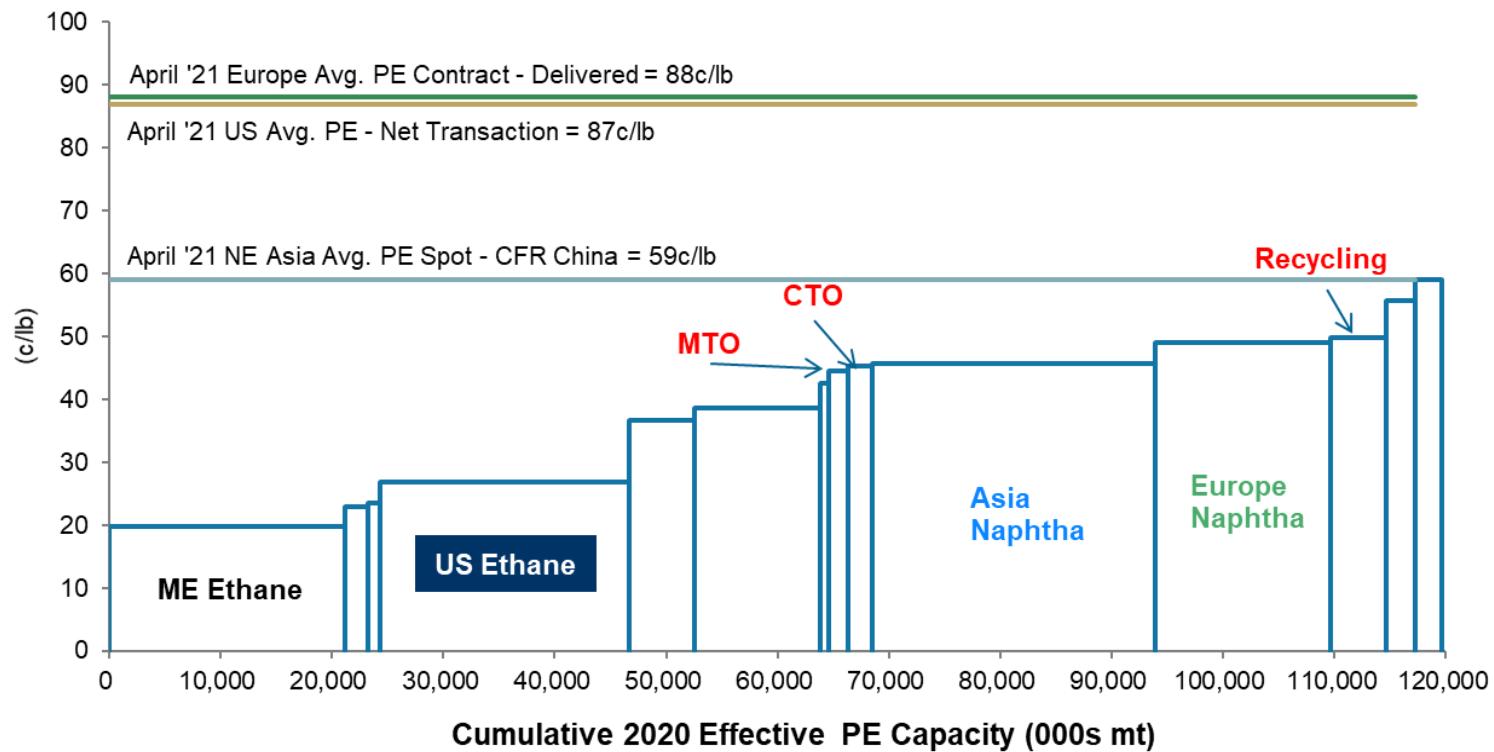
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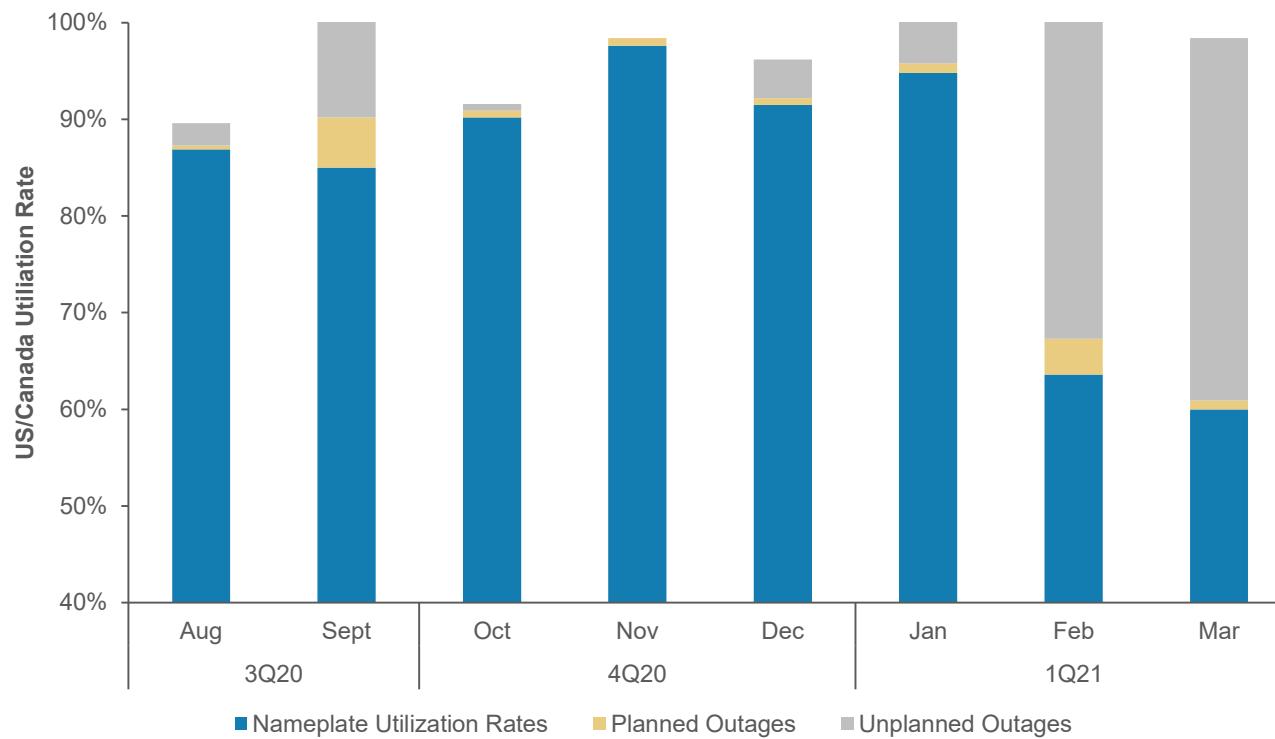
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Global Polyethylene (PE) Cost Curve Assuming \$65/bbl Oil and \$3.00/MMBtu



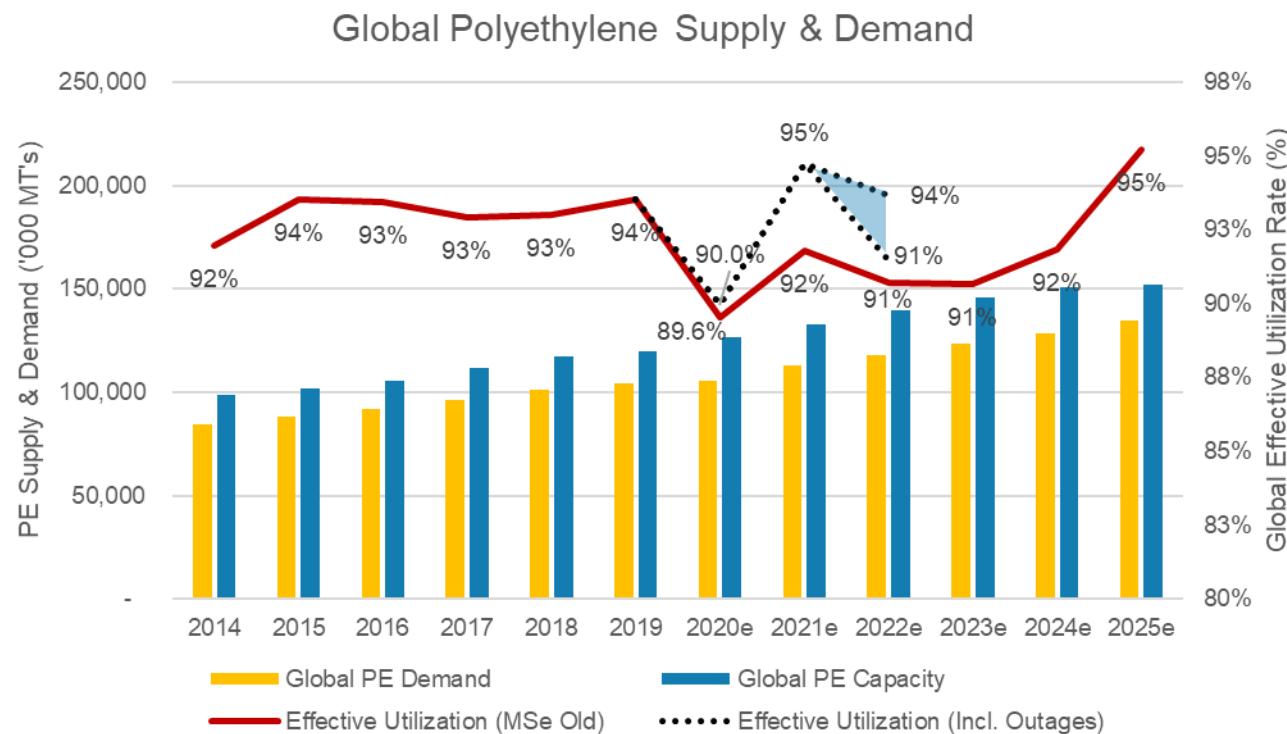
US/Canada Monthly Effective Utilization Rate and Lost Production

US/Canada Lost Production by Month



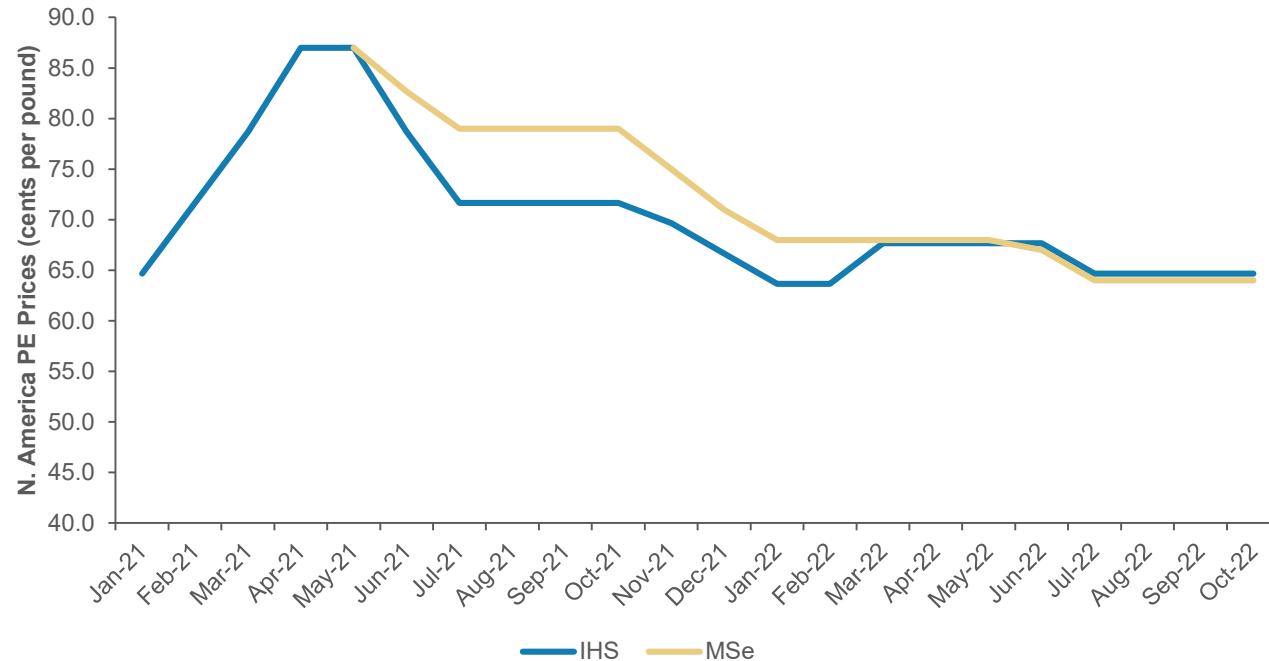
Global PE S&D: 2-8 Weeks of Demand May Shift to 2022, Resulting in 91-94% Global Effective Utilization Rates

Global Polyethylene Supply and Demand



PE Price Forecast - We Estimate a Softer Landing for PE Prices Over The Near-Term

PE Price Estimates, (MSe vs. IHS)



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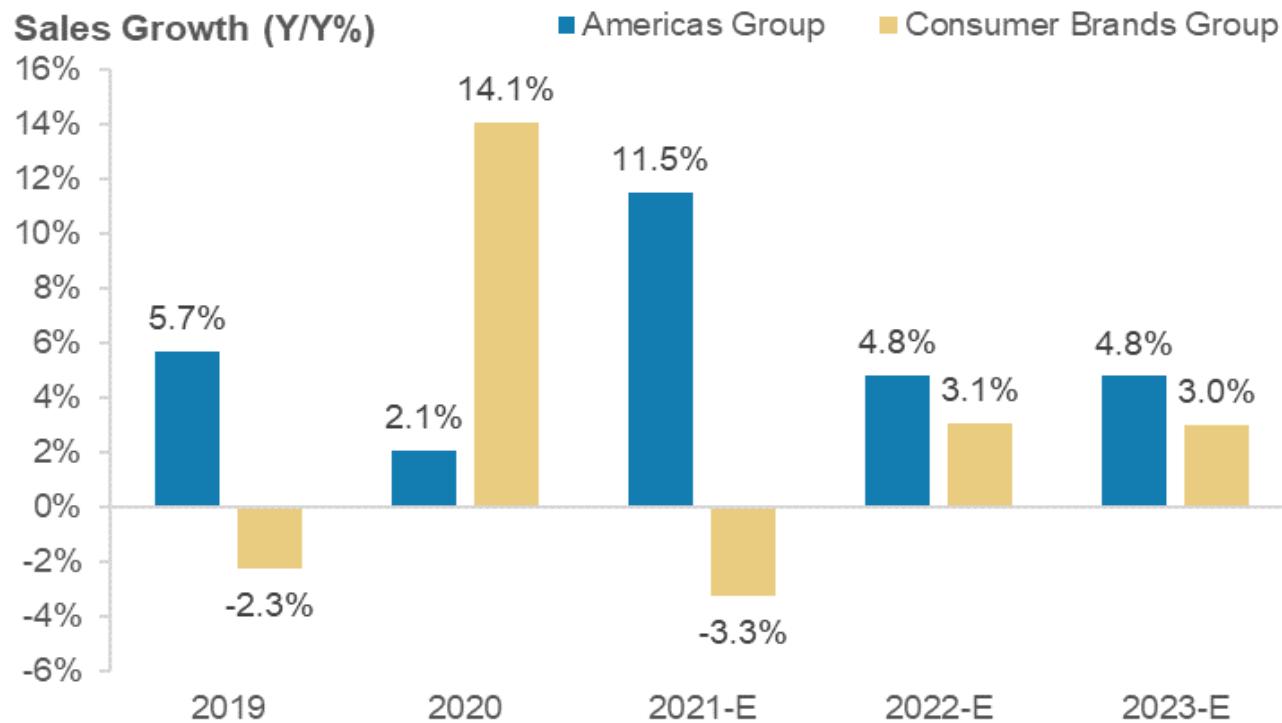
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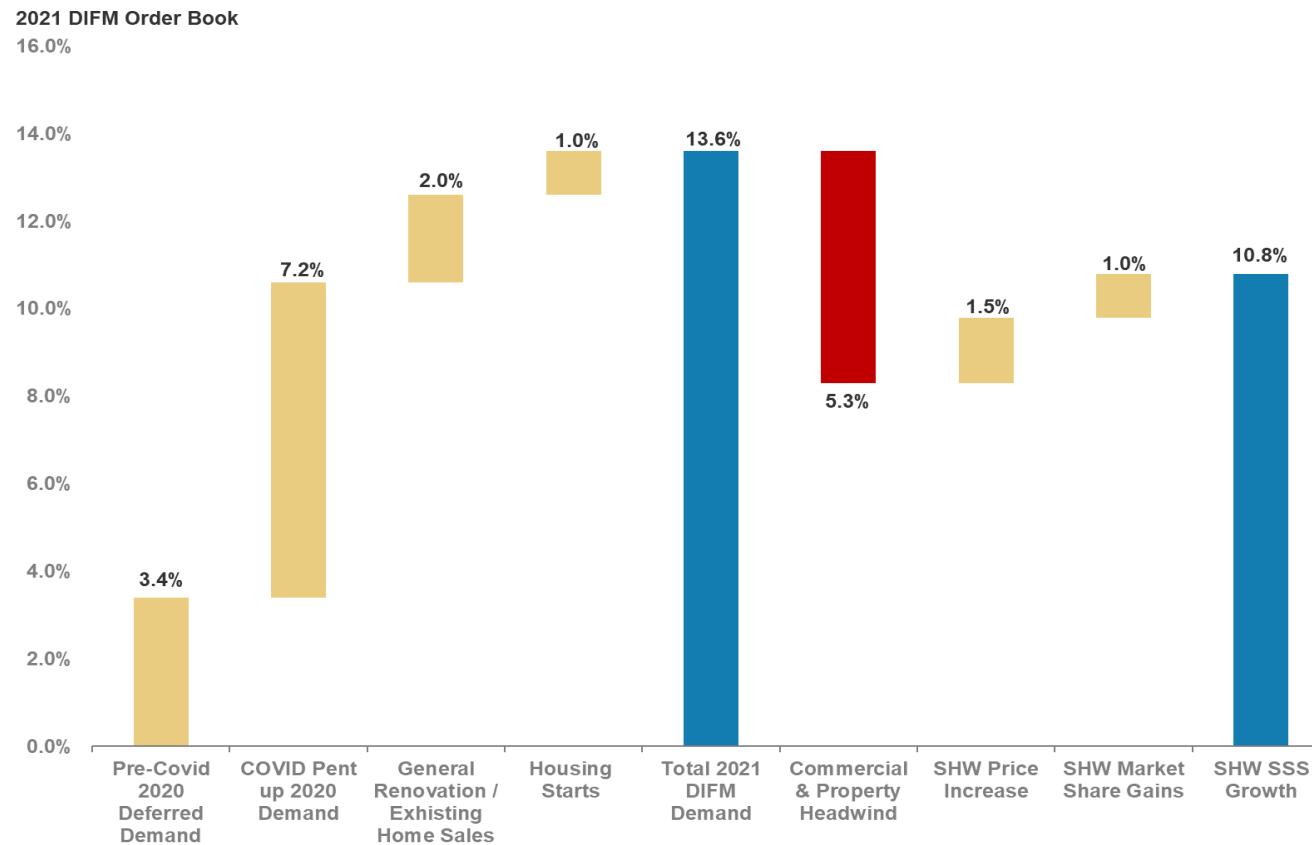
Sherwin-Williams' Americas Group vs. Consumer Brands Group Sales Growth



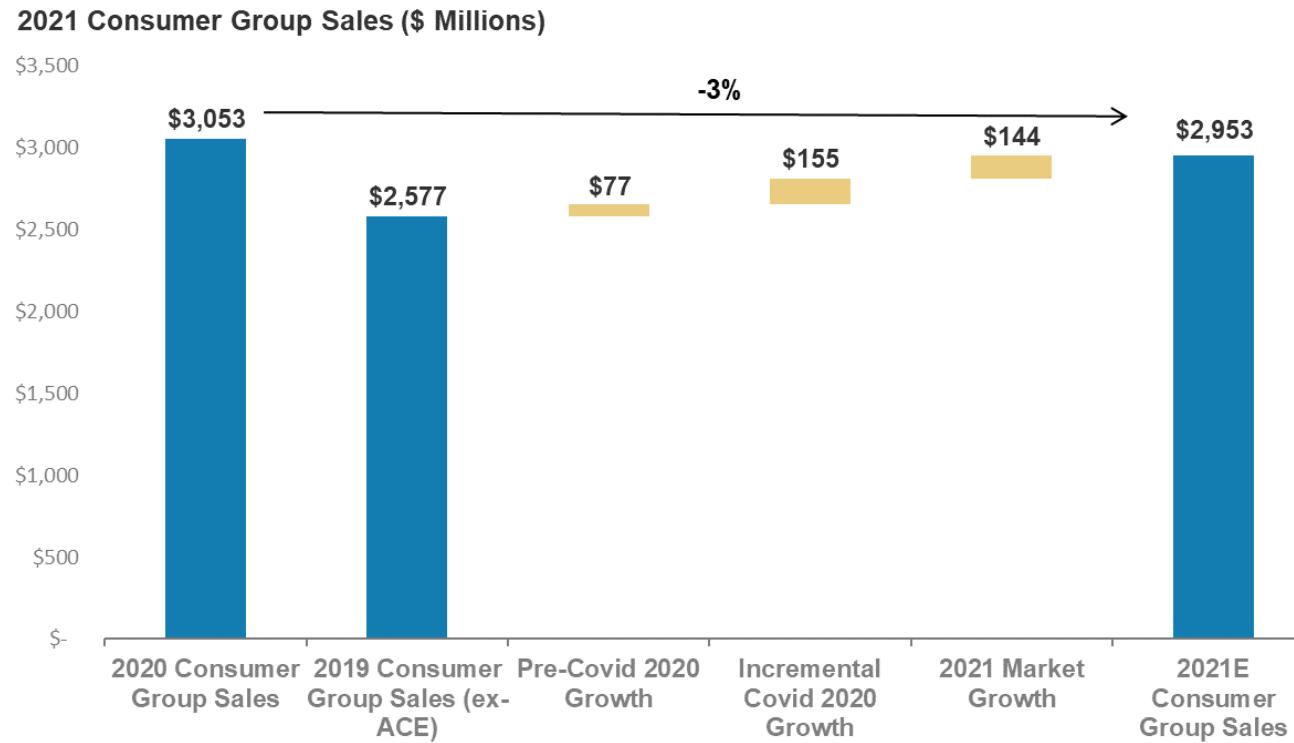
Building Sherwin Williams' 2021 Paint Store Order Book

Building Sherwin's 2021 Order Book		
Step 1: What were our pre-COVID 2020 growth expectations?		
End Market:	<u>Change (% or \$)</u>	
DIFM	4.0%	\$613
DIY	1.5%	\$110
Step 2: What are our updated 2020 growth expectations?		
End Market:	<u>Change (% or \$)</u>	
DIFM	0.6%	\$95
DIY	16.6%	\$1,218
Step 3: Calculate implied incremental DIY and "pent-up" DIFM demand		
End Market:	<u>Change (% or \$)</u>	
DIFM	3.4%	\$518
DIY	15.1%	\$1,108
Step 4: Translate incremental DIY demand to pent-up DIFM demand		
Scenarios:	<u>Change (% or \$)</u>	
Scenario 1: Pent-up DIFM % Chg = Incremental DIY % Chg	15.1%	\$2,313
Scenario 2: Pent-up DIFM % Chg = Incremental DIY \$ Chg	7.2%	\$1,108
Step 5: Build-up Sherwin's 2021 SSS order book		
Pre-COVID DIFM Deferred Demand	3.4%	3.4%
(+) Pent-up DIFM Demand	7.2%	15.1%
(+) General Renovation Demand (incl EHS)	2.0%	4.0%
(+) New Housing Start Driven Demand	1.0%	3.0%
(+) Market Share Gains	1.0%	2.0%
(=) 2021 SSS growth range	14.6%	27.5%
(-) Commercial / property mtc weakness	-4.5%	-8.0%
Net order book for 2021	10.1%	19.5%

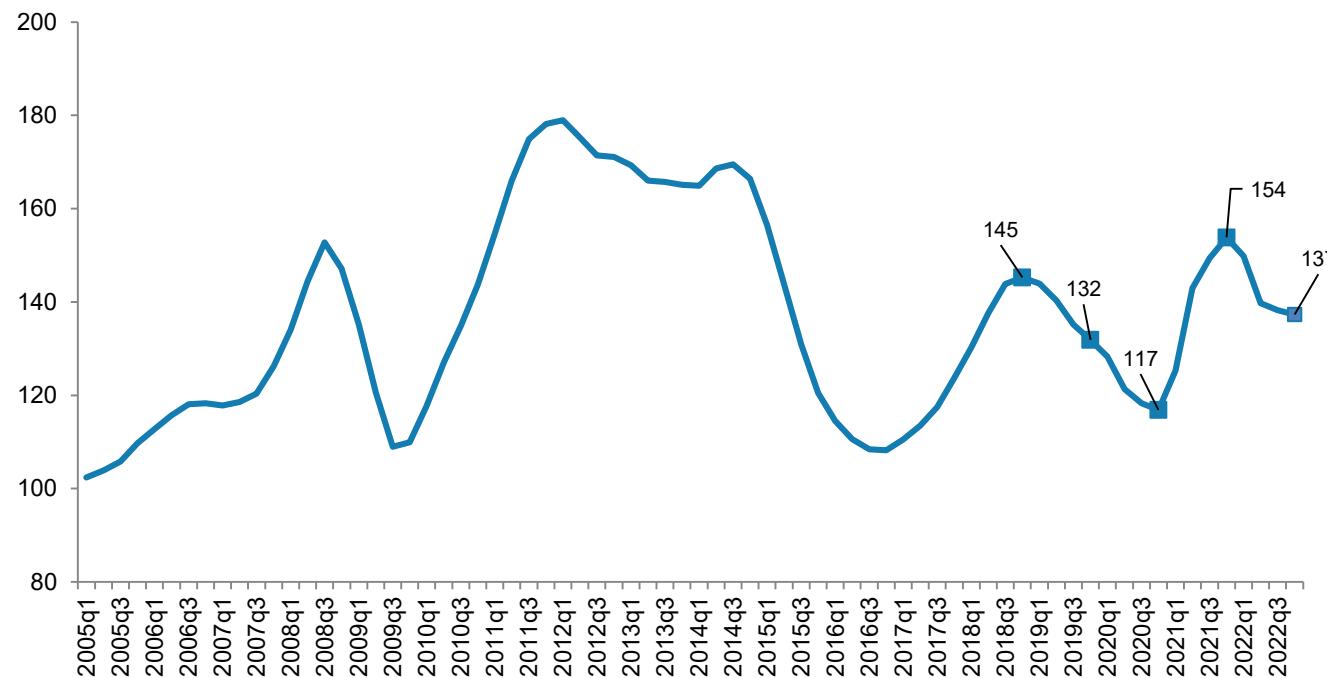
2021 DIFM Order Book & Sherwin's SSS Build



Bridging Pre/Post COVID DIY Paint Trends



Coatings Raw Material Input Costs Are Rising

MS Coatings Raw Materials Index (LTM Average)

Sherwin's TAG Segment Pricing vs. Margins



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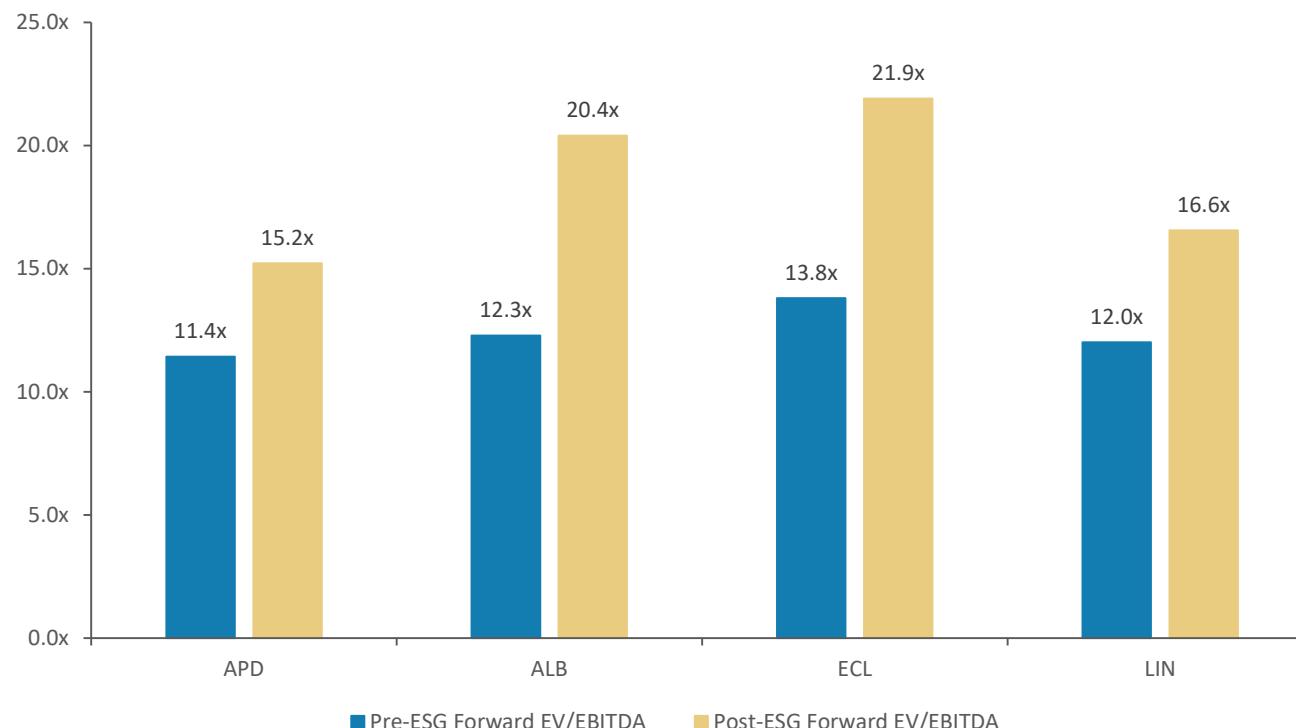
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We Have Already Seen Favorable ESG Narratives Drive Re-Ratings In the Chemicals Sector

Forward EV/EBITDA Valuation of Chemical Companies Pre/Post-ESG Ratings Evolution



Four "Big Ideas" in Chemicals ESG With Potential to Establish New TAMs and Drive Valuations Higher

Recycling

Molecular recycling of post-consumer plastic, new methods for traditional mechanical recycling, and post-consumer resin purification processes

Bioplastics

Bioplastics reduce carbon intensity of plastics production by using bio-based feedstocks

Green ammonia and/or green hydrogen production

Carbon capture and sequestration

Carbon capture and sequestration at the manufacturing plant level and now potentially on the farm

Industry Comps 1/2

Ticker	Company	Local	Current	Market	Enterprise	Dividend	FCF Yield			EV/EBITDA				P/E			
		Currency	Price	Cap	Value	Yield	FY 2021	FY 2022	FY 2023	FY 2020	FY 2021	FY 2022	FY 2023	FY 2020	FY 2021	FY 2022	FY 2023
AGRICULTURE & FERTILIZERS																	
ADM	Archer-Daniels-Midland Co	USD	61.82	34,527	43,886	2.5%	7.4%	6.0%	3.3%	12.7x	11.5x	11.2x	10.3x	17.9x	15.9x	15.6x	15.0x
BG	Bunge Ltd	USD	88.34	12,451	19,465	2.3%	7.8%	4.5%	3.6%	10.3x	10.4x	10.4x	10.5x	13.2x	13.7x	13.8x	13.7x
CF	CF Industries Holdings Inc	USD	48.99	10,506	16,465	2.5%	10.0%	9.3%	8.4%	12.5x	9.2x	10.0x	10.0x	40.8x	18.7x	21.2x	20.6x
CTVA	Corteva Inc	USD	49.16	36,410	33,959	1.1%	2.8%	4.5%	4.8%	17.2x	13.8x	12.1x	11.2x	34.9x	25.6x	21.5x	18.6x
FMC	FMC Corp	USD	118.67	15,350	18,072	1.6%	4.0%	5.2%	5.0%	14.4x	13.2x	12.1x	11.2x	19.1x	16.7x	14.8x	13.0x
INGR	Ingredion Inc	USD	93.15	6,262	7,874	2.8%	3.7%	6.5%	6.8%	9.3x	8.4x	8.1x	8.0x	15.7x	14.0x	13.0x	12.6x
IPI	Intrepid Potash Inc	USD	32.62	439	445	0.0%	5.5%	3.9%	NA	25.2x	9.3x	9.0x	9.5x	NA	43.1x	37.8x	70.9x
NTR	Nutrien Ltd	USD	55.60	31,682	41,588	3.4%	6.7%	8.0%	8.1%	11.5x	9.1x	8.8x	8.4x	31.8x	19.5x	18.3x	16.7x
MOS	Mosaic Co	USD	35.55	13,498	17,676	0.6%	6.1%	6.0%	6.6%	12.0x	6.7x	7.4x	7.2x	76.8x	13.2x	14.8x	14.1x
ICL	Icl Group Ltd	USD	6.26	8,120	10,696	1.7%	3.6%	5.4%	6.5%	12.4x	8.6x	8.6x	7.9x	33.4x	17.2x	17.4x	15.7x
Average						1.8%	5.7%	5.9%	5.9%	13.8x	10.0x	9.8x	9.4x	31.5x	19.8x	18.8x	21.1x
DIVERSIFIED CHEMICALS																	
ALB	Albemarle Corp	USD	169.75	19,813	22,839	0.9%	NA	NA	0.9%	28.1x	27.4x	21.3x	17.8x	42.1x	48.5x	34.0x	26.5x
ASH	Ashland Global Holdings Inc.	USD	93.67	5,683	7,042	1.2%	5.9%	6.2%	4.8%	14.0x	11.7x	10.7x	10.2x	36.6x	18.4x	16.1x	14.5x
CBT	Cabot Corp	USD	56.20	3,182	4,280	2.5%	4.4%	6.9%	7.2%	11.3x	7.6x	7.3x	7.0x	28.9x	13.8x	12.9x	11.8x
CE	Celanese Corp	USD	156.53	17,630	20,505	1.7%	5.2%	6.2%	6.6%	14.4x	an	9.9x	9.3x	21.9x	12.1x	12.3x	10.9x
DD	Dupont De Nemours Inc	USD	77.08	41,201	61,034	1.6%	4.9%	5.0%	4.9%	12.1x	15.5x	14.6x	13.9x	23.2x	22.3x	19.1x	17.1x
DSEY	Diversey Holdings Ltd	USD	17.48	5,317	8,466	0.0%	0.9%	4.3%	5.6%	NA	19.6x	18.0x	16.4x	NA	49.2x	25.8x	21.3x
ECL	Ecolab Inc	USD	218.41	62,482	67,944	0.8%	2.3%	3.0%	3.3%	27.9x	24.0x	21.2x	19.7x	54.0x	42.6x	35.6x	31.7x
EMN	Eastman Chemical Co	USD	115.78	15,806	20,945	2.4%	6.7%	7.3%	7.4%	12.1x	10.1x	9.8x	9.6x	19.6x	14.6x	13.6x	12.5x
GRA	W R Grace & Co	USD	68.37	4,526	6,215	1.9%	4.9%	5.7%	6.9%	14.8x	11.7x	10.5x	9.6x	26.2x	18.0x	15.3x	13.3x
HUN	Huntsman Corp	USD	28.84	6,392	7,094	2.2%	3.3%	6.7%	6.8%	11.3x	7.1x	6.5x	6.2x	30.8x	13.0x	11.3x	10.2x
IFF	International Flavors & Fragrance	USD	142.59	35,483	39,363	2.1%	3.6%	4.1%	5.4%	37.6x	15.4x	13.5x	12.4x	25.5x	24.1x	21.6x	19.7x
KRA	Kraton Corp	USD	41.07	1,320	2,217	0.0%	7.8%	NA	NA	8.6x	8.3x	7.6x	7.0x	34.4x	21.8x	16.4x	14.9x
AVNT	Avient Corp	USD	50.32	4,594	5,832	1.7%	4.6%	5.1%	3.4%	15.6x	11.3x	10.4x	9.8x	30.5x	20.6x	17.5x	14.9x
PQG	PQ Group Holdings Inc	USD	14.57	1,995	3,261	0.0%	4.0%	4.5%	4.8%	8.1x	14.5x	12.7x	12.7x	21.9x	40.8x	27.9x	22.9x
ESI	Element Solutions Inc	USD	20.55	5,078	6,300	1.0%	5.6%	6.6%	NA	15.3x	13.8x	12.9x	12.3x	21.9x	17.5x	15.6x	14.4x
Average						1.3%	4.6%	5.5%	5.2%	16.5x	14.1x	12.5x	11.6x	29.8x	25.2x	19.7x	17.1x

Industry Comps 2/2

Ticker	Company	Local	Current	Market	Enterprise	Dividend	FCF Yield			EV/EBITDA				P/E			
		Currency	Price	Cap	Value	Yield	FY 2021	FY 2022	FY 2023	FY 2020	FY 2021	FY 2022	FY 2023	FY 2020	FY 2021	FY 2022	FY 2023
PAINTS & COATINGS																	
AXTA	Axalta Coating Systems Ltd	USD	32.45	7,559	10,199	0.0%	5.8%	7.2%	7.8%	13.8x	10.8x	10.0x	9.4x	27.4x	16.9x	15.0x	13.4x
FUL	HB Fuller Co	USD	68.16	3,551	5,228	1.0%	6.3%	7.1%	7.8%	13.2x	11.3x	10.6x	10.2x	26.0x	19.2x	16.8x	14.6x
MAS	Masco Corp	USD	63.57	16,141	17,836	0.9%	4.8%	5.5%	5.7%	12.4x	11.9x	11.3x	10.9x	20.7x	18.9x	17.0x	15.6x
PPG	PPG Industries Inc	USD	172.23	40,809	45,228	1.2%	3.9%	4.8%	5.4%	19.0x	14.8x	13.7x	13.0x	30.3x	21.5x	19.6x	17.9x
RPM	RPM International Inc	USD	94.34	12,218	14,283	1.6%	5.0%	4.5%	4.9%	18.9x	15.2x	14.2x	12.9x	31.9x	22.7x	21.0x	18.3x
SHW	Sherwin-Williams Co	USD	269.49	72,123	80,188	0.8%	3.3%	3.6%	4.0%	23.2x	21.2x	19.8x	18.5x	33.2x	30.5x	27.7x	24.8x
Average						0.9%	4.8%	5.5%	5.9%	16.8x	14.2x	13.3x	12.5x	28.3x	21.6x	19.5x	17.4x
INDUSTRIAL GASES																	
APD	Air Products and Chemicals In	USD	289.79	64,124	66,319	2.1%	0.6%	2.0%	2.3%	18.3x	16.9x	15.2x	14.1x	34.6x	32.1x	27.8x	25.5x
LIN	Linde PLC	USD	290.21	151,732	166,397	1.5%	2.8%	3.1%	3.5%	19.3x	17.5x	16.5x	16.7x	35.9x	31.2x	28.1x	25.4x
Average						1.8%	1.7%	2.5%	2.9%	18.8x	17.2x	15.8x	15.4x	35.2x	31.6x	28.0x	25.4x
COMMODITY CHEMICALS / PETROCHEMICALS																	
DOW	Dow Inc	USD	62.65	46,799	60,070	4.5%	8.2%	9.8%	9.7%	11.1x	6.4x	7.0x	6.9x	41.5x	11.4x	13.2x	12.3x
LYB	LyondellBasell Industries NV	USD	104.91	35,073	48,698	4.0%	8.7%	8.2%	9.6%	13.5x	6.9x	7.4x	7.1x	21.8x	8.4x	9.0x	8.4x
MEOH	Methanex Corp	USD	39.37	2,996	NULL	0.4%	8.7%	3.9%	8.0%					NA	16.4x	23.6x	13.8x
OLN	Olin Corp	USD	42.05	6,671	10,345	1.9%	12.7%	12.5%	17.0%	17.8x	6.4x	6.7x	6.7x	NA	11.5x	12.6x	12.3x
TSE	Trinseo SA	USD	63.36	2,436	3,018	0.5%	11.5%	12.3%	16.1%	10.7x	4.9x	5.4x	6.4x	34.1x	8.5x	10.8x	11.5x
WLK	Westlake Chemical Corp	USD	94.30	12,083	14,871	1.1%	6.7%	6.7%	7.3%	12.1x	7.3x	7.9x	7.6x	44.8x	13.7x	16.1x	15.4x
Average						2.1%	9.4%	8.9%	11.3%	13.0x	6.4x	6.9x	6.9x	35.6x	11.7x	14.2x	12.3x
TITANIUM DIOXIDE																	
KRO	Kronos Worldwide Inc	USD	17.51	2,023	2,155	4.1%	3.1%	5.1%	4.5%	14.0x	10.1x	9.1x	9.0x	33.7x	19.7x	16.8x	16.2x
CC	Chemours Co	USD	31.02	5,124	8,047	3.2%	6.7%	8.1%	9.7%	9.4x	7.2x	6.4x	5.9x	17.5x	10.8x	8.7x	7.6x
TROX	Tronox Holdings PLC	USD	21.94	3,354	6,229	1.5%	5.5%	12.5%	16.8%	9.5x	7.3x	6.5x	6.0x	38.3x	14.1x	10.3x	8.9x
VNTR	Venator Materials PLC	USD	4.83	518	1,261	0.0%	NA	6.1%	9.3%	9.8x	6.4x	5.4x	5.0x	NA	22.9x	9.5x	7.9x
Average						2.2%	5.1%	8.0%	10.1%	10.7x	7.7x	6.9x	6.5x	29.8x	16.9x	11.3x	10.2x
PAPER & PACKAGING																	
BLL	Ball Corp	USD	92.90	30,478	36,974	0.6%	1.2%	1.8%	3.0%	19.0x	16.8x	15.2x	13.8x	31.8x	27.0x	23.6x	20.4x
BERY	Berry Global Group Inc	USD	61.61	8,249	17,483	0.0%	11.3%	12.9%	14.5%	8.3x	7.9x	7.7x	7.5x	13.7x	11.4x	10.3x	9.5x
CCK	Crown Holdings Inc	USD	109.80	14,812	22,692	0.7%	2.0%	3.6%	5.5%	13.1x	12.1x	11.9x	11.1x	19.3x	16.0x	15.0x	13.3x
SEE	Sealed Air Corp	USD	48.30	7,401	10,613	1.3%	7.0%	7.4%	8.9%	10.2x	9.6x	9.1x	8.7x	15.7x	14.4x	13.2x	12.2x
Average						0.7%	5.4%	6.4%	8.0%	12.7x	11.6x	11.0x	10.3x	20.1x	17.2x	15.5x	13.8x

May 2021

Industrials Spring Training Teach-In

Paper & Packaging

MORGAN STANLEY RESEARCH
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Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 27, 2021, unless otherwise noted.

Agenda

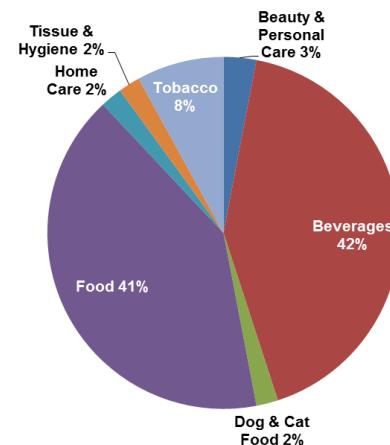
1. Industry Overview
2. Key Themes
3. Plastic Packaging
4. Metal Packaging
5. Paper Packaging
6. COVID-19 Demand Implications

1. Industry Overview

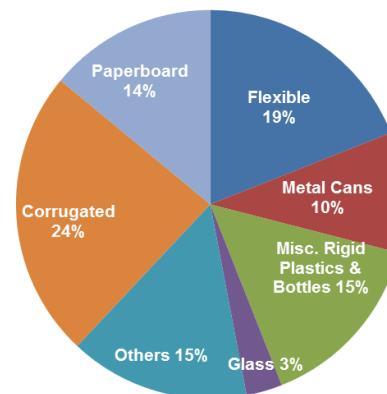
Paper & Packaging Industry Overview

- Packaging companies convert raw materials such as plastic, metal, or paper into products like plastic bottles or metal cans
- US packaging market valued at ~\$177B in 2019
- Stable consumer end markets like beverage, food, and household & personal care
 - ~83% of US packaging demand is driven by the food & beverage market
- 4 key substrates utilized in the industry: metal, plastic, glass, & paper
- Generally divided between two subsectors: rigid packaging and flexible packaging
 - **Rigid:** High stiffness, impact resistance, barrier properties (metals cans, glass bottles)
 - **Flexible:** Package whose shape can be readily changed (plastic pouches, paper bags)

US Packaging Industry by End Use (Retail)



US Packaging Industry by Substrate



Source: U.S. Census Bureau ASM Census and FPA estimates for 2018 total revenue, Morgan Stanley Research

4 Key Substrates: Metal, Plastic, Glass, & Paper



Metal
Packaging



Plastic
Packaging



Glass
Packaging

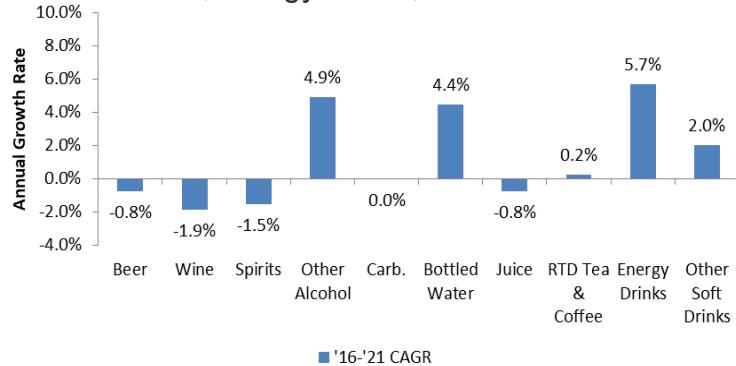


Paper
Packaging

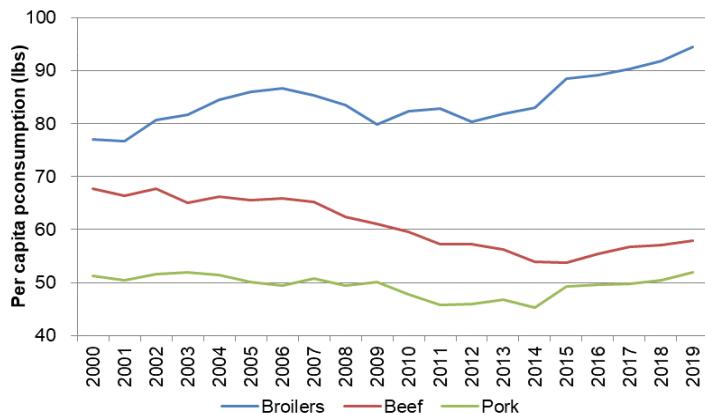


Key Trends by Packaging End Market

Beverages: High growth categories include hard seltzers, energy drinks, and bottled water

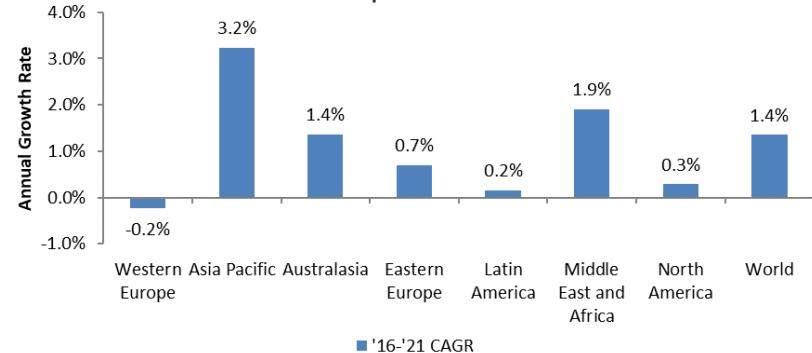


Fresh Food: In 2017-19, domestic consumption per capita has risen ~1-2% in chicken, beef, and pork

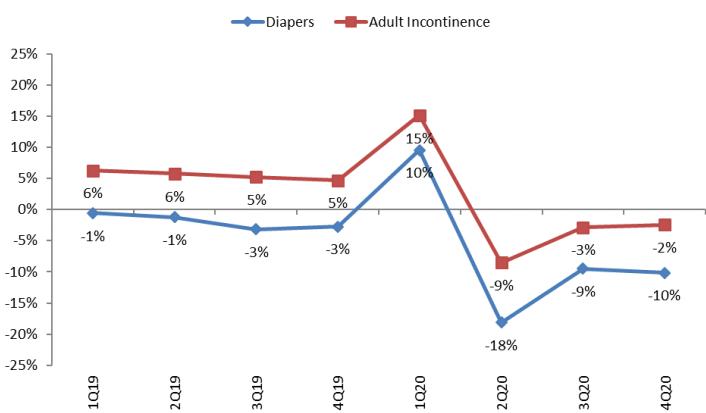


Source: Euromonitor, USDA, Nielsen, Morgan Stanley Research

Packaged Food: Shift in consumption toward fresh foods vs. processed food

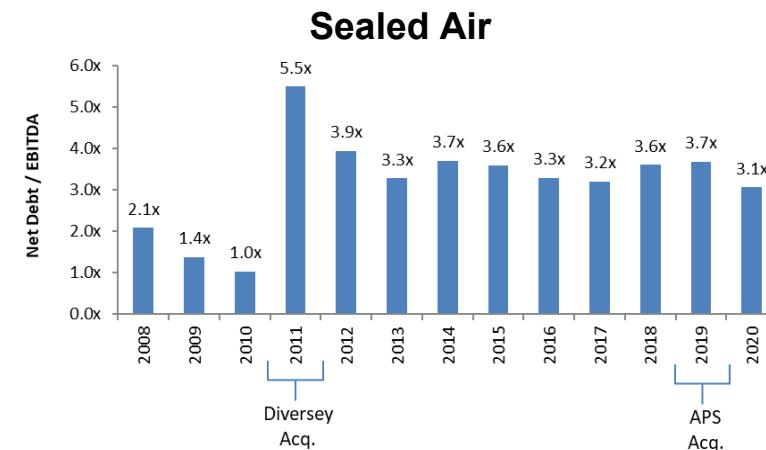
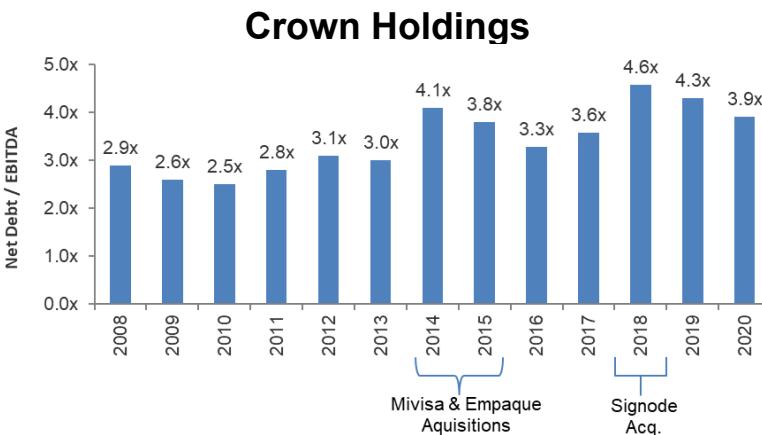
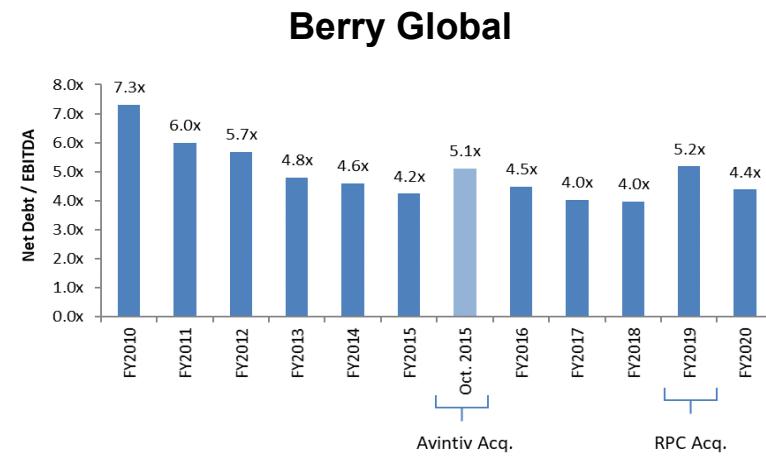
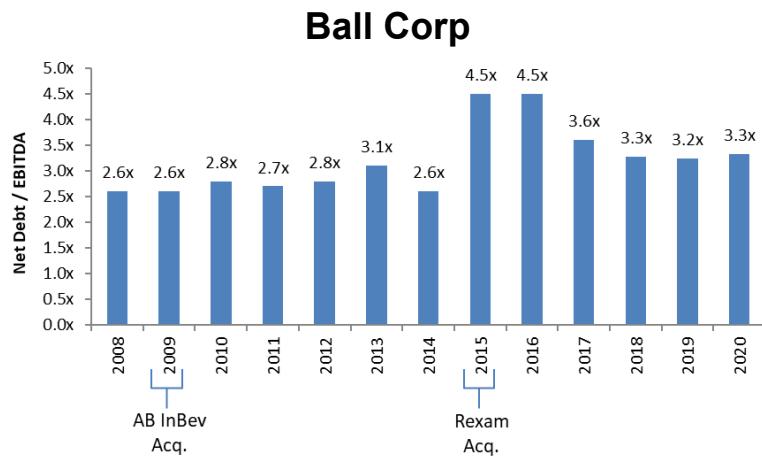


Personal Care: Adult incontinence has consistently outpaced diaper volume growth



2. Key Themes

Trend #1: Debt-Financed M&A and Gradual Delevering

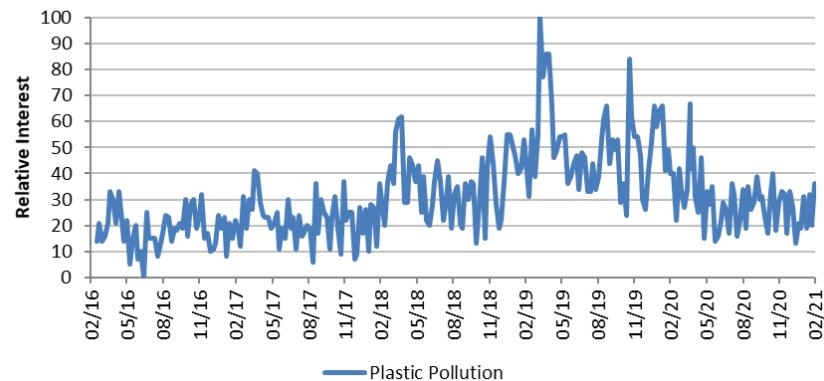


Source: Company Data, Morgan Stanley Research

Trend #2: Growing Importance of Sustainability

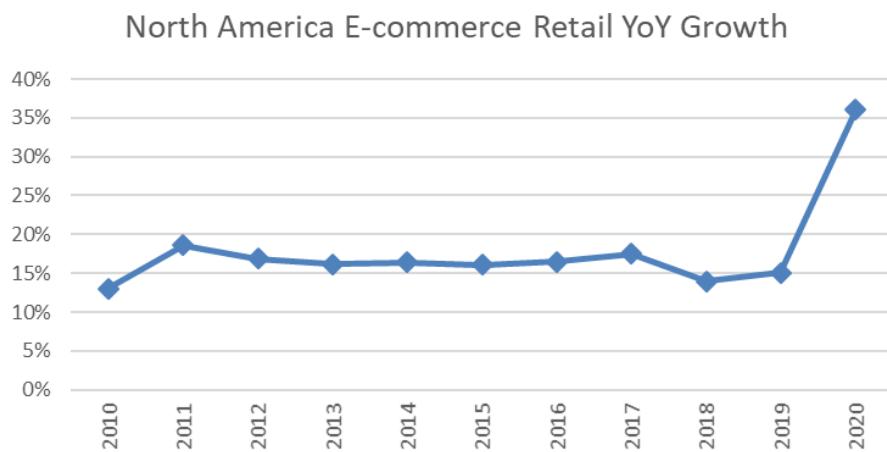
- Consumer interest in plastic pollution spiked to all-time highs in 2019
- Increasing emphasis on sustainable solutions that increase the life cycle of packaging products and reduce the environmental impact
- Companies have reduced environmental impact through lightweighting, increasing recyclable material content, changing to eco-friendly substrates, and investing in new resin recycling technologies
- Several restrictions on single-use plastic items globally
- Strict regulations in Europe
 - UK plans to implement a tax on plastic packaging that doesn't contain at least 30% recycled content by 2022
 - EU is aiming for all plastic packaging to be reusable or recyclable by 2030

US Plastic Sustainability Search Interest



Trend #3: Evolution In E-commerce Packaging

- While e-commerce has been steadily increasing over the past decade, growth accelerated in 2020 due to COVID-19
- Packaging designed for brick-and-mortar retail is often suboptimal for online fulfillment due to being oversized or having expensive aesthetics
- Amazon focused on optimizing packaging
 - Frustration Free Packaging/SIOC – products shipped in their own packaging
 - Streamlined Packaging – lightweight plastic mailers replacing boxes
 - Amazon Day Program – all orders delivered one day per week

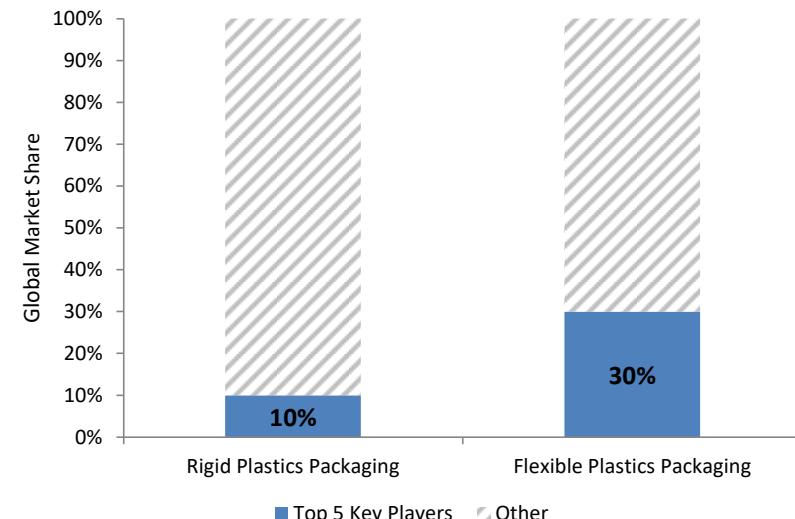


3. Plastic Packaging

Plastic Packaging is a Fragmented Market

- **Key Domestic Players:** Berry, Sealed Air, AptarGroup
- Plastic packaging is a much more fragmented market relative to metal, glass, or paper packaging
- Top 5 players in rigid plastics have ~10% global market share
- Top 5 players in flexible plastics have ~30% global market share
- We have seen large-scale M&A activity in plastic packaging in recent years
 - March 2019: Berry's ~\$4.4B acquisition of RPC
 - August 2018: Amcor / Bemis ~\$6.8B merger
- Berry has made 47 acquisitions to date

Global Plastic Packaging Market Share



Resins are the Biggest % of COGS and a Pass-Through

- Resins represent the largest percentage of COGS for plastic packaging companies
 - Resins as a % of COGS: ~50% for Berry, ~30% for Sealed Air, <50% for Aptar (50% includes aluminum/rubber)
 - Pounds of resin purchased: ~7.0B for Berry, ~1.0B for Sealed Air
- Plastic packaging companies typically have partial pass through arrangements with their customers
 - Pass Through %: ~70% for Berry, ~25% for Sealed Air; Aptar is less sensitive vs. peers
 - Time of Pass Through: 30 day lag for Berry, 90-180 day lag for Sealed Air, 30-90 day lag for Aptar
- Resin prices have short-term impact on earnings despite partial pass through arrangements

Resin Data			
	Annual Purchases (pounds)	Purchase Price Lag	Contractual Pass Through %
Berry			
Consumer Packaging NA	1.0B - Polypropylene	1 Month Lag	92.5%
Health, Hygiene, & Spec.	1.0B - Polypropylene	1 Month Lag	92.5%
Engineered Materials	2.5B - Polyethylene	No Lag - Spot Contracts	30.0%
Consumer Packaging Intl.	2.5B - Polyethylene	1 Month Lag	92.5%
Total	7.0B	Varies by Segment	70.0%
Sealed Air			
Food Care ⁽¹⁾	.75B - Polyethylene	~3-6 Month Lag	32.5%
Product Care	.25B - Polyethylene	No Lag	0.0%
Total	1.0B	~3-6 Month Lag	24.4%
Aptar			
Beauty + Home	N/A	1-3 Month Lag	N/A
Pharma	N/A	1-3 Month Lag	N/A
Food + Beverage	N/A	1-3 Month Lag	N/A
Total	N/A	1-3 Month Lag	N/A

(1) 60-65% of Sealed Air's Food Care business within North America is on formula resin pass-through pricing, implying 30-35% of total Food Care.
 Source: Company Data, Morgan Stanley Research

Organic Volume Growth Has Recently Improved

- Organic volumes have trended between +1% to +7% in recent quarters
- Segment growth rates by company have been driven by underlying end market trends, pandemic-related impacts, and product innovation
 - **Berry Consumer Packaging:** Growth has been driven by strength in grocery stores
 - **Berry Health, Hygiene & Specialties:** Growth driven by sharp acceleration in wipe/mask/gown demand
 - **Sealed Air Protective:** Growth driven by e-commerce demand surge and industrial rebound
 - **Aptar Pharma:** Growth driven by COVID/vaccines, decongestants, and central nervous system drug conversions

Plastic Volume Growth Rates by Segment												
	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20
Berry⁽¹⁾	-2%	-1%	-2%	-2%	-3%	-3%	-2%	-1%	2%	2%	4%	7%
Consumer Packaging NA	-1%	4%	2%	3%	3%	3%	1%	3%	0%	0%	6%	8%
Health, Hygiene & Spec.	-1%	-3%	-2%	-5%	-6%	-6%	-4%	-3%	3%	14%	12%	15%
Engineered Materials	-3%	-3%	-5%	-3%	-7%	-5%	-4%	-3%	2%	-8%	-1%	2%
Consumer Packaging Intl.	N/A	1%	4%									
Sealed Air	2%	1%	1%	2%	-1%	1%	-1%	-2%	2%	-4%	1%	3%
Food	2%	2%	3%	2%	0%	2%	2%	0%	5%	-2%	-2%	0%
Protective	3%	0%	-2%	0%	-4%	-2%	-5%	-4%	-2%	-8%	4%	7%
Aptar⁽²⁾	8%	11%	7%	7%	7%	3%	4%	-1%	-2%	-6%	2%	5%
Beauty + Home	8%	10%	5%	4%	3%	-3%	-1%	-5%	-9%	-13%	-5%	-2%
Pharma	6%	14%	12%	15%	15%	10%	13%	4%	7%	6%	11%	10%
Food + Beverage	10%	5%	4%	0%	3%	10%	2%	-1%	-2%	-15%	2%	13%

(1) Adjusted for BERY fiscal year; (2) Aptar reports core growth, a combination of volume & price

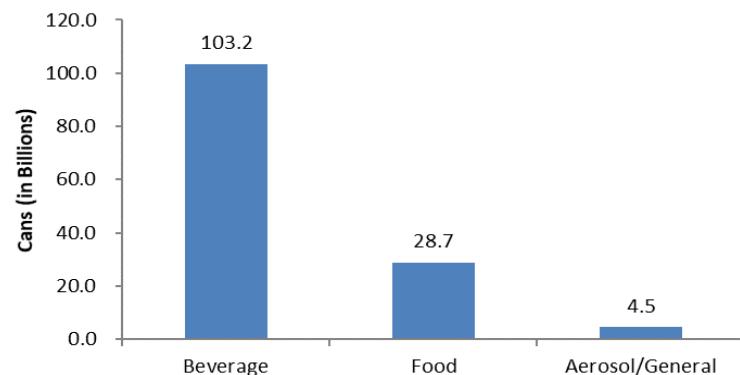
Source: Company Data, Morgan Stanley Research

4. Metal Packaging

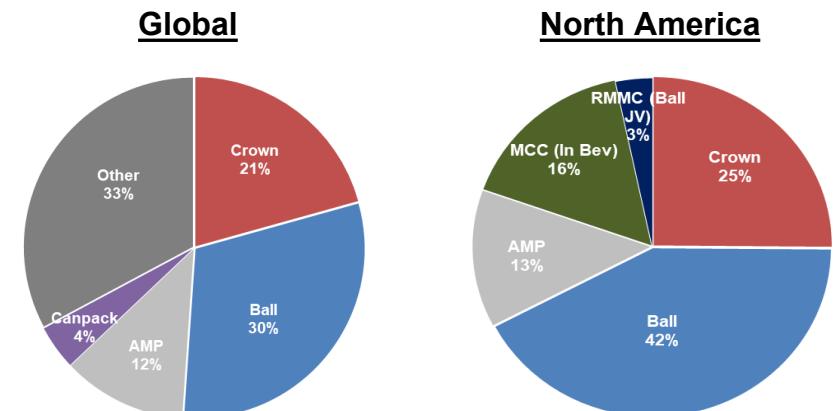
Metal Packaging is a Consolidated Market

- **Key Players:** Ball, Crown, Ardagh, Silgan
- North American market for metal packaging is ~136B cans per year
 - Beverage: ~103B cans (non-alcoholic: ~61B cans; alcoholic: ~42B cans)
 - Food: ~29B cans
 - Aerosol and general line: ~4-5B cans
- Top 3 beverage can global share: ~63%
- Top 3 beverage can NA share: ~80%
- Ball is the beverage can market leader with ~30% global market share
 - Market share increased from 20% previously due to June 2016 acquisition of Rexam, the former #1 player

North American Cans: Beverages, Food, and General Use



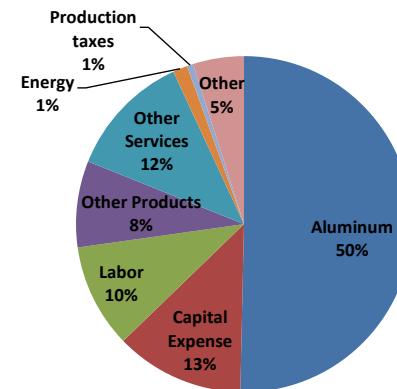
Beverage Can Market Share



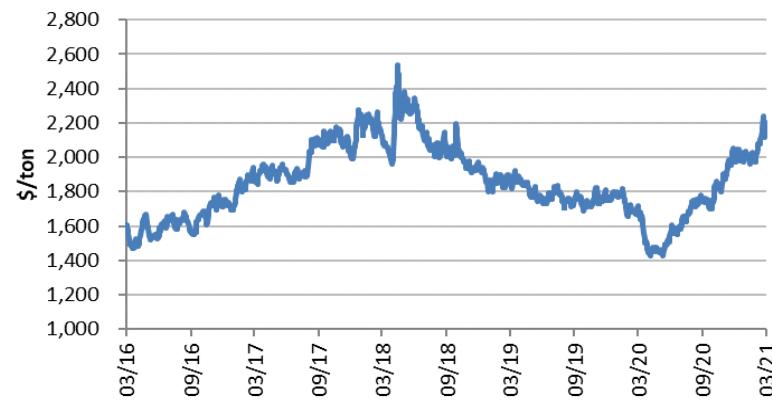
Aluminum is the Biggest % of COGS and a Pass-Through

- Aluminum represents ~50% of the cost of producing a beverage can
- Can producers limit raw material exposure by passing through nearly all metal prices to their end customers on a real-time basis
- Higher aluminum prices can artificially deflate margins due to the pass through (i.e., sales is higher but operating income does not change)
- Contracts also include annual selling price adjustments for non-metal raw materials to be passed through like freight, inks, and coatings based on a producer price index

Cost of a Beverage Can



LME Aluminum Prices (\$/t)



Source: LME, Morgan Stanley Research

Beverage Can Organic Volumes Have Accelerated

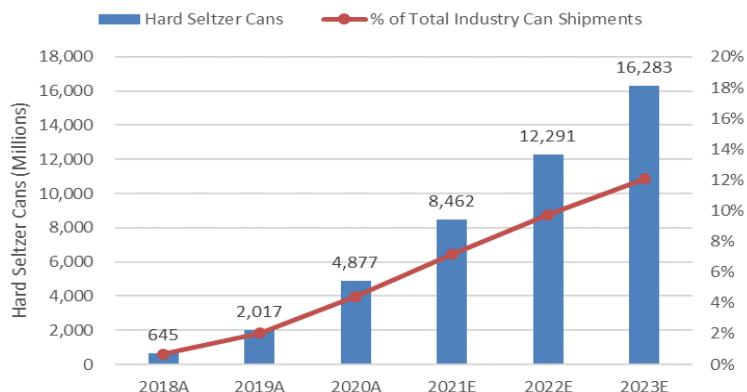
- Metal packaging stocks have performed favorably given a shift in narrative of 1-2% annual beverage can volume growth to 4-6+%
- North America beverage can volumes (domestic shipments + trade activity) grew ~12% in 2020, the highest in 25+ years
- North America, Europe, and South America have experienced strong specialty can demand and a favorable packaging mix shift
- Demand growth limited by supply, both Ball and Crown have invested heavily in new capacity

Metal Volume Growth Rates by Region												
	1Q18	2Q18	3Q18	4Q18	1Q19	2Q19	3Q19	4Q19	1Q20	2Q20	3Q20	4Q20
Ball	2%	2%	3%	4%	8%	5%	4%	2%	4%	-3%	9%	12%
North/Central America	-3%	-3%	2%	4%	6%	4%	3%	2%	4%	2%	6%	11%
South America	10%	5%	-3%	0%	11%	12%	5%	3%	1%	0%	30%	12%
Europe	6%	6%	10%	10%	10%	7%	4%	0%	5%	-8%	6%	20%
Crown	3%	4%	3%	5%	3%	2%	1%	7%	10%	-5%	8%	4%
Americas	4%	6%	6%	5%	3%	2%	-2%	8%	11%	-2%	14%	6%
Europe	-2%	-5%	-2%	-2%	3%	6%	5%	9%	10%	-12%	3%	8%
Asia Pacific	4%	4%	9%	11%	4%	5%	4%	2%	4%	-8%	-6%	-5%

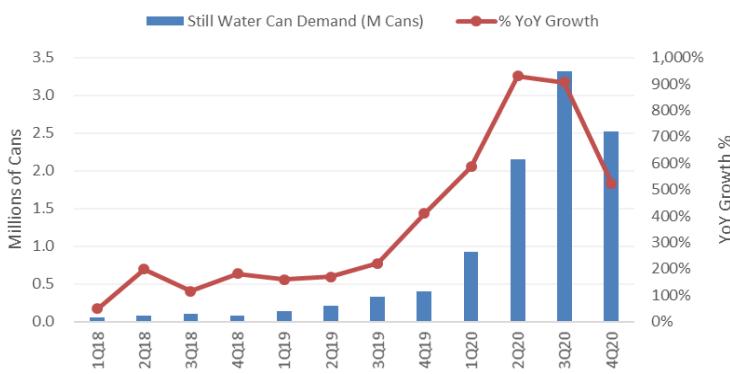
Source: Company Data, Morgan Stanley Research

Increasing % of Cans in New & Mature Beverage Categories

Hard Seltzer a Key Driver of Growth

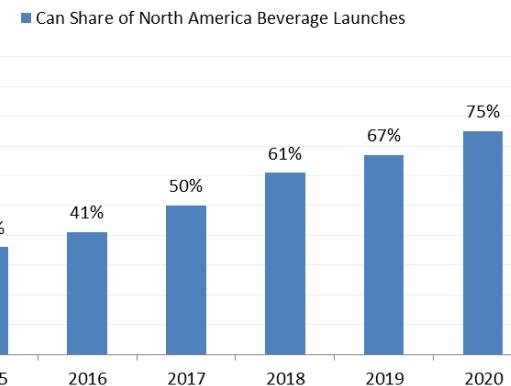


Significant Opportunity in Still Water

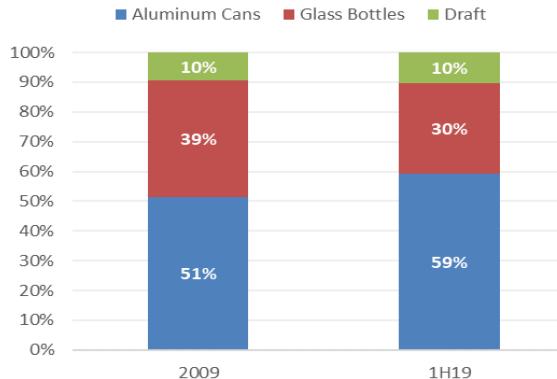


Source: CMI, Nielsen, IRI, Beer Institute, Morgan Stanley Research.

New Beverage Introductions: Can Market Share

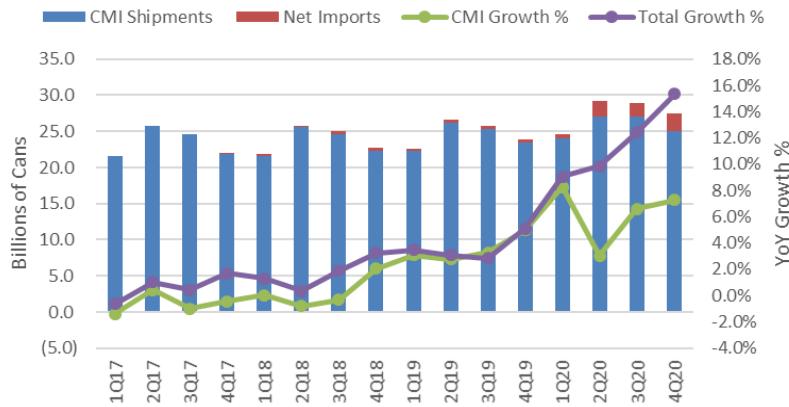


Beer Market Share by Substrate (2009 -> 1H19)

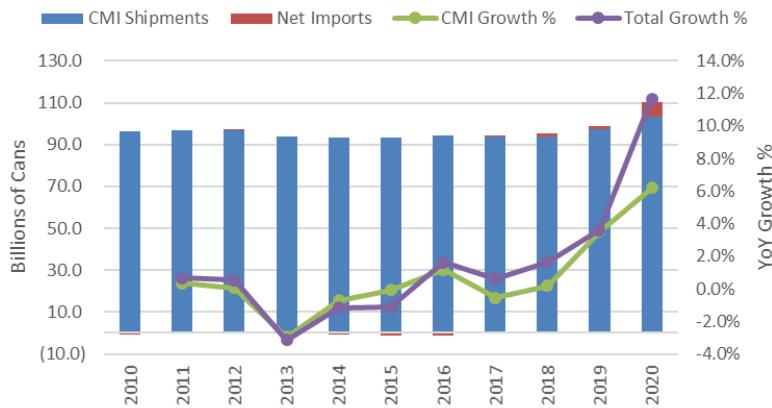


North America Import Activity Surged in 2020

Imports Contributed Materially to Growth

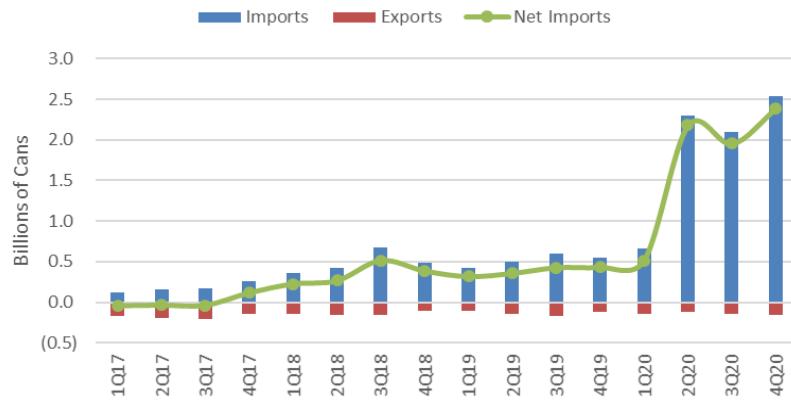


Industry Demand Grew ~12% in 2020

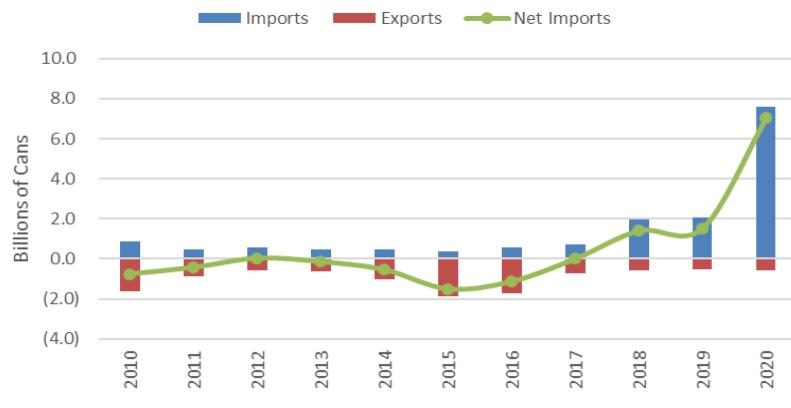


Source: CMI, USITA, Morgan Stanley Research.

Import Activity Surged in 2Q20-4Q20

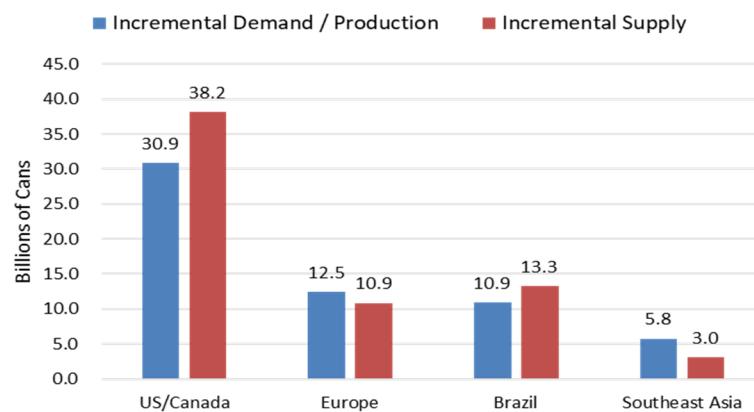


Net Imports were ~7B Units in 2020

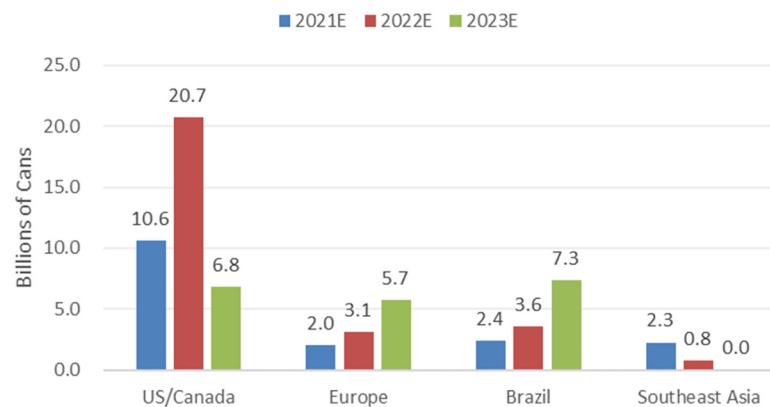


Significant New Supply to Support Robust Demand Growth

Majority of New Supply in US/Canada ('21-'23)

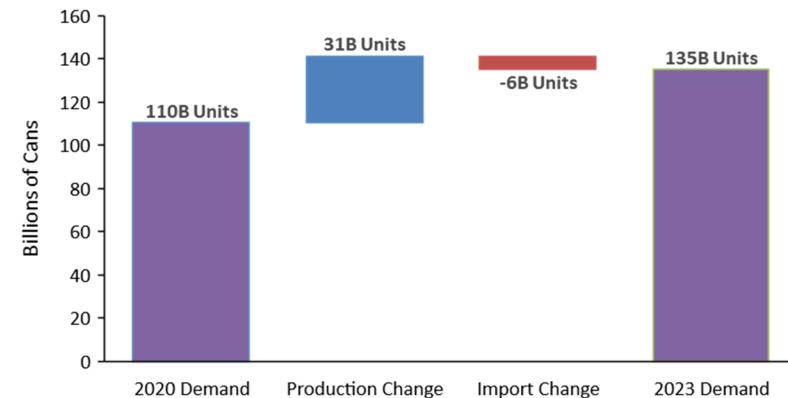


Supply of ~65B Units Coming Globally by 2023

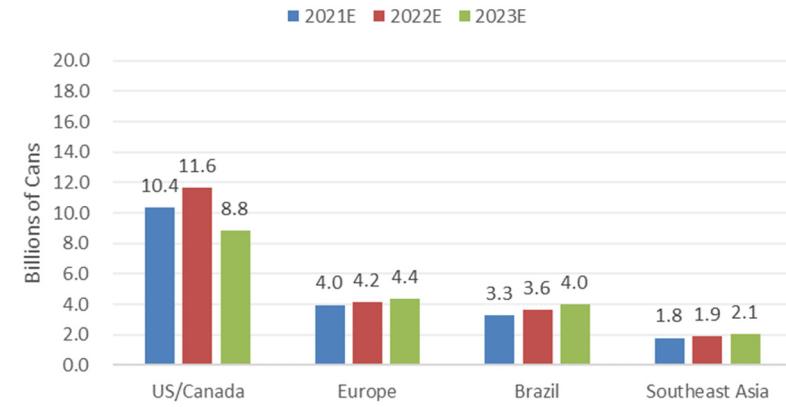


Source: Company Data, Morgan Stanley Research.

New US/Canada Supply to Replace Imports



Incremental Production of ~60B Units by 2023



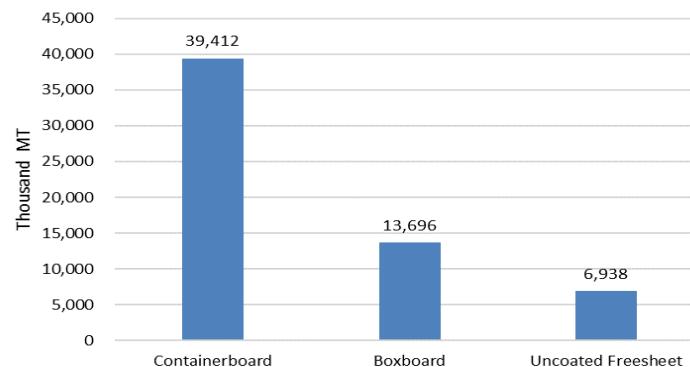
6. Paper Packaging

Paper Packaging Overview

- **Key Players:** International Paper, WestRock, Packaging Corp of America, Graphic Packaging
- North American paper packaging market consists of several key categories
 - Containerboard: ~39M MT
 - Boxboard: ~14M MT
 - Uncoated Freesheet: ~7M MT
- Highly consolidated market, with the top 3 players holding...
 - Containerboard: ~66% Share
 - Boxboard: ~59% Share
 - Uncoated Freesheet: ~68% Share

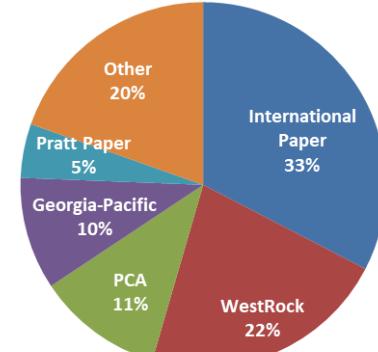
Source: RISI, Company Data, Morgan Stanley Research

North American Paper: Containerboard, Boxboard, and Uncoated Freesheet

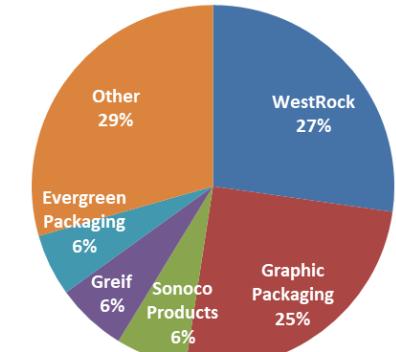


Market Share Breakdown by Paper Category

Containerboard



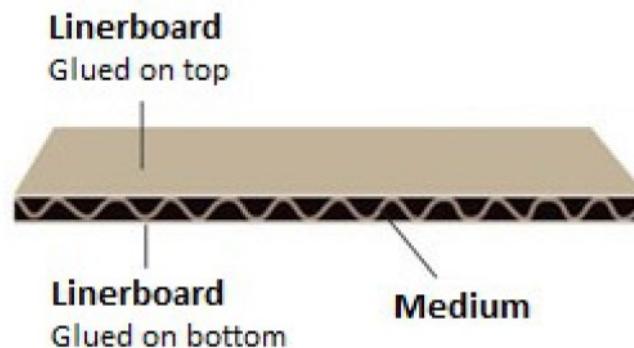
Boxboard



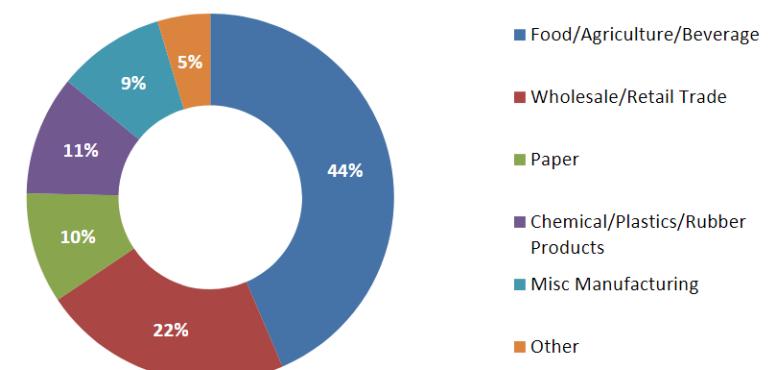
Containerboard Overview

- Containerboard is primarily used to make corrugated boxes (i.e., Amazon shipping box)
- There are two components of containerboard:
 - Linerboard: top & bottom layer of the board
 - Medium: wavy, ripple-like layer that gives the corrugated box its strength properties
- Containerboard can either be kraft (made from virgin fibers) or recycled (made from old corrugated boxes)
- Approximately 80-85% of North America containerboard production is integrated into corrugated boxes

Components of Containerboard



Corrugated Box Demand by End Market



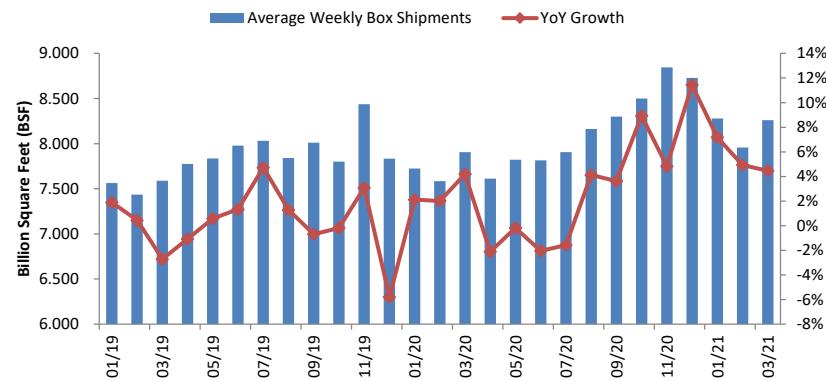
May 2021

Industrials Spring Training Teach-In

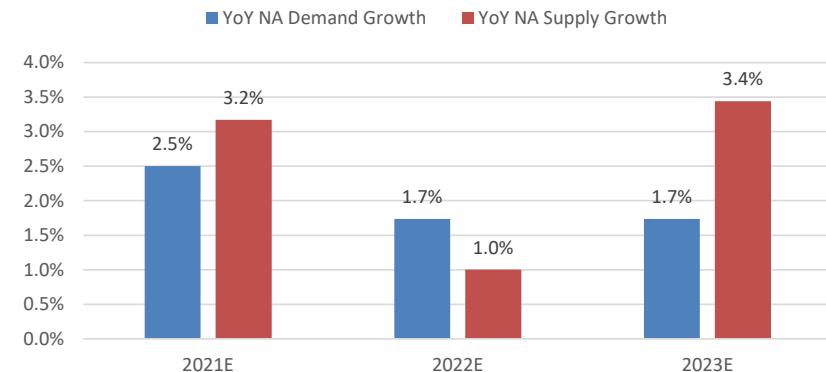
Sustainability of Tight Market Conditions a Key Debate in Containerboard

- Following weaker box demand in 1H20 (shipments +0.6%), trends accelerated sharply in 2H20 (shipments +5.2%), and have remained strong in 1Q21 (shipments +3.9%)
- Drivers of the demand surge include: e-commerce, at-home consumption, restocking, extended holiday season, industrial recovery
- Sustainability of market tightness continues to be a key question as tough 2H shipment comps are lapped and significant supply comes online in 2021+
- We expect operating rates to fall to ~92% by 2023 from ~94% in 2020 as incremental supply outpaces demand growth

Industry Box Shipments Accelerated in 2H20



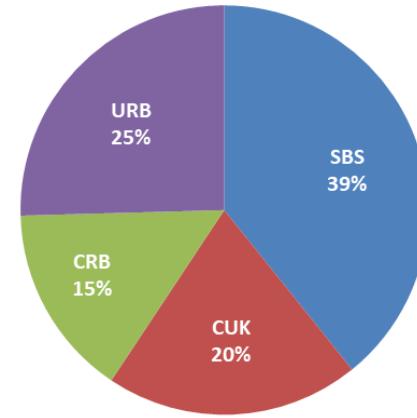
New Supply Will Outpace Demand Growth



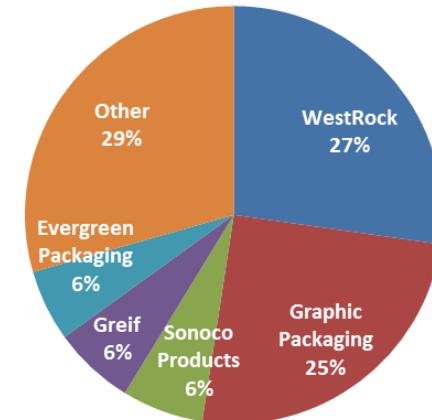
Boxboard Overview

- Boxboard is used in a wide range of paper based consumer products
- There are 4 types of boxboard with varying applications:
 - Coated Unbleached Kraft (CUK): Made from virgin materials, primarily used in beverage cartons due to strength properties
 - Solid Bleached Sulfate (SBS): Made from virgin materials, primarily used for folding cartons (food/healthcare) and paper cups/plates (foodservice)
 - Coated Recycled Board (CRB): Made from recycled materials, primarily used in dry foods & consumer paper products (tissues, napkins)
 - Uncoated Recycled Board (URB): Made from recycled materials, primarily used in industrial applications (tubes/cores, fiber drums)

US Boxboard Market Share by Type



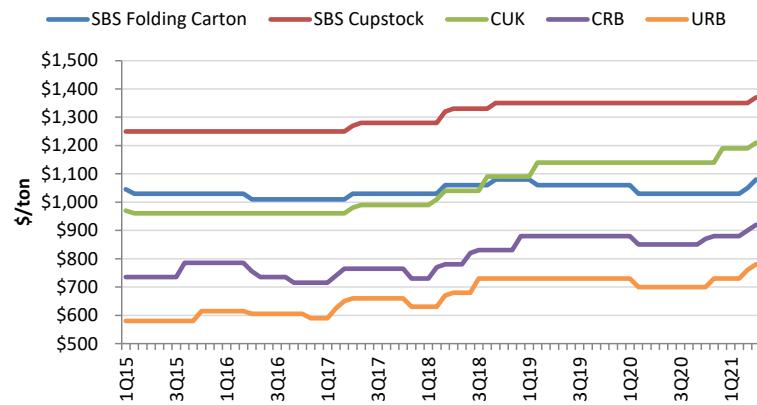
US Boxboard Market is Highly Consolidated



Pricing Improvements Across Boxboard Landscape

- In recent months, CRB, CUK, SBS, and URB have seen pricing uplifts, driven by strong demand trends (particularly within CUK), extended backlogs, and rising input costs
- Producers have also announced additional price increases across all grades, which, if successful, would take effect in the coming months
- Supply & demand dynamics are generally healthy across the boxboard landscape as capacity additions remain minimal
 - CUK market balances are most attractive due to (1) duopolistic market structure (GPK & WRK); (2) limited imports; and (3) strong exports

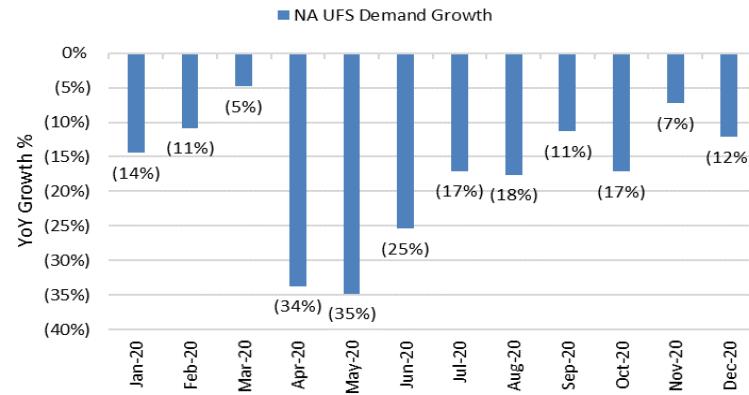
US Boxboard Pricing by Grade



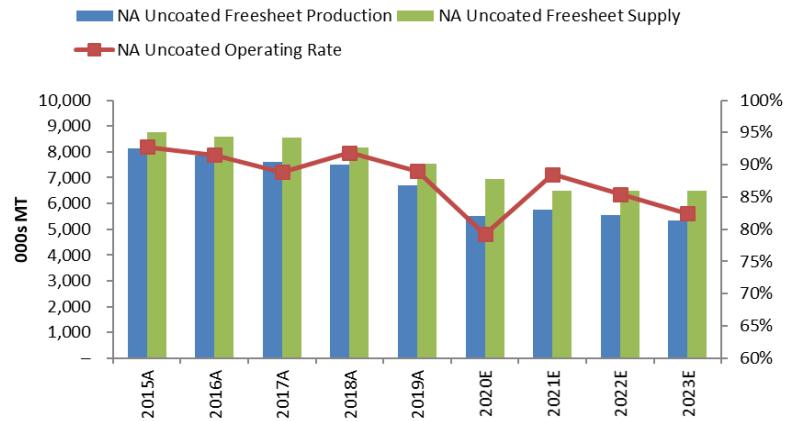
Uncoated Freesheet Demand Challenged by COVID

- Uncoated freesheet (UFS) is used for copy paper, books, envelope paper, and business form paper
- UFS is in secular decline; shipments have declined 3-4% annually over the past decade
- COVID accelerated structural demand issues and shipments declined 17-18% in 2020.
 - Challenges were driven by business/school closures and reduced commercial printing (direct mailing / advertising)
 - Historically demand has not rebounded following previous recessions (shipments -13% in 2009 followed by -1% in 2010)
- Producers are either shutting down capacity or converting machines to containerboard

UFS demand declined 17-18% in 2020



Operating Rates Likely to Remain Weak



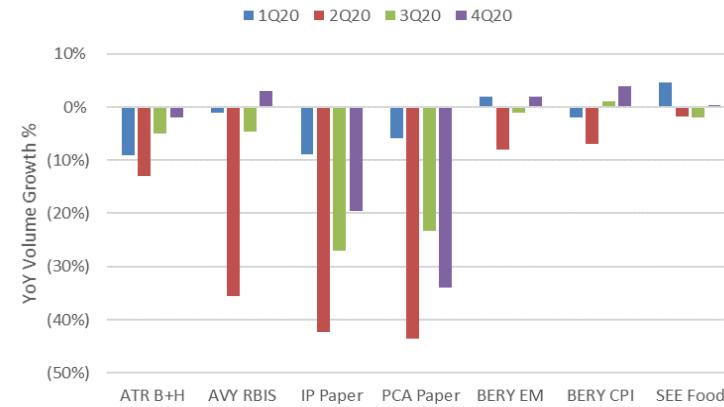
7. COVID-19 & Demand Implications

COVID-19 Impact on Demand in 2020

- Several segments negatively impacted
 - Travel Exposure: Aptar's Beauty + Home segment
 - Retail Exposure: Avery's RBIS segment
 - Paper Exposure: International Paper and PCA's printing paper segments
 - Industrial exposure: Berry's Engineered Materials & Consumer Packaging International segment
 - Foodservice exposure: Sealed Air's Food segment

- Several segments positively impacted
 - Beverages: Ball's & Crown's beverage can segments in North America (strong off-premise consumption)
 - Corrugated Box: International Paper's, WestRock's, & PCA's corrugated box businesses
 - Non-woven materials: Berry's Health, Hygiene and Specialties segment (wipes/masks/gowns)
 - Consumer Packaging: Graphic Packaging

Segment Volume Performance (Adverse Impact)



Segment Volume Performance (Beneficiaries)



Longer Term Demand Implications from COVID-19

- Demand for healthcare items will likely continue to remain elevated
 - Berry (+): nonwoven materials for masks & wipes
 - Aptar (+): stoppers for injectable vaccines, dispensing/packaging for hand sanitizers, antibacterial soaps / lotions
- E-commerce growth & adoption, online food shopping
 - Containerboard Companies (International Paper, Westrock, and Packaging Corp. of America) (+): corrugated boxes (NA industry box shipments up ~5.2% in 2H20 and +3.9% in 1Q21)
 - Sealed Air (+): fill-based protective packaging
- More at-home consumption of food & beverages due to virus concerns (less dining out) and higher levels of unemployment
 - Ball & Crown (+): beverage & food cans
 - Berry (+): packaged food films
 - Boxboard Companies (Graphic Packaging and Westrock) (+): folding cartons for packaged food & beverage
- More people working remotely
 - Paper Companies (International Paper and Packaging Corp. of America) (-): printing/writing paper

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Industry Comps

Comparables															
Company Name	Ticker	Stock				EBITDA Margin			2020-2022E CAGR			EV / EBITDA		Debt / EBITDA	
		Price 4/27/21	Market Cap.	Ent. Value	Div. Yield	2020E	2021E	2022E	Revenue	EBITDA	EPS	2021E	2022E	2021E	2022E
Metal Packaging															
Ardagh Group SA	ARD	\$27.56	\$6,514	\$12,115	2.1%	17%	18%	19%	7%	12%	24%	9.3x	8.5x	5.3x	4.8x
Ball Corp	BLL	\$92.90	\$30,478	\$36,974	0.6%	17%	17%	17%	10%	12%	16%	16.8x	15.2x	3.5x	3.2x
Crown Holdings Inc	CCK	\$109.80	\$14,812	\$22,692	0.7%	15%	16%	17%	0%	5%	13%	12.1x	11.9x	4.3x	4.2x
Silgan Holdings Inc	SLGN	\$43.10	\$4,758	\$7,600	1.1%	15%	16%	16%	5%	6%	9%	9.1x	9.0x	3.9x	3.8x
Peer Average					1.2%	16%	17%	17%	5%	9%	16%	11.8x	11.1x	4.3x	4.0x
Peer Median					0.9%	16%	16%	17%	6%	9%	15%	10.7x	10.4x	4.1x	4.0x
Peer Minimum					0.6%	15%	16%	16%	0%	5%	9%	9.1x	8.5x	3.5x	3.2x
Peer Maximum					2.1%	17%	18%	19%	10%	12%	24%	16.8x	15.2x	5.3x	4.8x
Plastic Packaging															
Aptargroup Inc	ATR	\$151.64	\$10,010	\$10,883	0.9%	20%	20%	21%	7%	8%	12%	16.9x	15.7x	1.8x	1.7x
Amcor PLC	AMCR	\$11.67	\$18,228	\$24,014	4.0%	15%	16%	16%	1%	4%	10%	12.0x	11.5x	3.2x	3.1x
Avery Dennison Corp	AVY	\$204.24	\$16,956	\$18,820	1.2%	15%	16%	16%	7%	9%	12%	16.0x	15.2x	1.8x	1.7x
Berry Global Group Inc	BERY	\$61.61	\$8,249	\$17,483	0.0%	18%	17%	18%	5%	4%	16%	7.9x	7.7x	4.6x	4.4x
Sealed Air Corp	SEE	\$48.30	\$7,401	\$10,613	1.3%	21%	21%	22%	5%	6%	9%	9.6x	9.1x	3.4x	3.2x
Peer Average					1.5%	18%	18%	19%	5%	6%	12%	12.5x	11.8x	3.0x	2.8x
Peer Median					1.2%	18%	17%	18%	5%	6%	12%	12.0x	11.5x	3.2x	3.1x
Peer Minimum					0.0%	15%	16%	16%	1%	4%	9%	7.9x	7.7x	1.8x	1.7x
Peer Maximum					4.0%	21%	21%	22%	7%	9%	16%	16.9x	15.7x	4.6x	4.4x
Glass Packaging															
O-I Glass Inc	OI	\$16.31	\$2,575	\$7,258	0.0%	16%	18%	18%	1%	6%	27%	6.8x	6.5x	4.8x	4.6x
Ardagh Group SA	ARD	\$27.56	\$6,514	\$12,115	2.1%	17%	18%	19%	7%	12%	24%	9.3x	8.5x	5.3x	4.8x
Peer Average					1.1%	17%	18%	18%	4%	9%	26%	8.1x	7.5x	5.0x	4.7x
Peer Median					1.1%	17%	18%	18%	4%	9%	26%	8.1x	7.5x	5.0x	4.7x
Peer Minimum					0.0%	16%	18%	18%	1%	6%	24%	6.8x	6.5x	4.8x	4.6x
Peer Maximum					2.1%	17%	18%	19%	7%	12%	27%	9.3x	8.5x	5.3x	4.8x
Containerboard/Paperboard Packaging															
International Paper Co	IP	\$57.09	\$22,427	\$25,089	3.6%	15%	16%	17%	3%	10%	27%	7.1x	6.6x	2.3x	2.1x
Packaging Corp of America	PKG	\$144.77	\$13,752	\$15,168	2.2%	18%	19%	20%	4%	8%	13%	11.1x	10.6x	1.8x	1.7x
Graphic Packaging Holding Co	GPK	\$18.01	\$5,118	\$9,000	1.7%	16%	16%	17%	3%	5%	16%	8.2x	7.7x	3.5x	3.3x
Sonoco Products Co	SON	\$65.11	\$6,550	\$7,669	2.6%	15%	15%	15%	2%	3%	6%	9.7x	9.3x	2.1x	2.1x
Westrock Co	WRK	\$54.52	\$14,367	\$23,072	2.4%	16%	17%	18%	4%	10%	31%	7.6x	6.8x	3.0x	2.6x
Peer Average					2.5%	16%	17%	17%	3%	7%	19%	8.7x	8.2x	2.5x	2.4x
Peer Median					2.4%	16%	16%	17%	3%	8%	16%	8.2x	7.7x	2.3x	2.1x
Peer Minimum					1.7%	15%	15%	15%	2%	3%	6%	7.1x	6.6x	1.8x	1.7x
Peer Maximum					3.6%	18%	19%	20%	4%	10%	31%	11.1x	10.6x	3.5x	3.3x

May 2021

Industrials Spring Training Teach-In

Aerospace & Defense Spring Training



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For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.

Disclosures in this report are as of May 4, 2021; stock recommendations and stock prices as of April 23, 2021, unless noted otherwise.

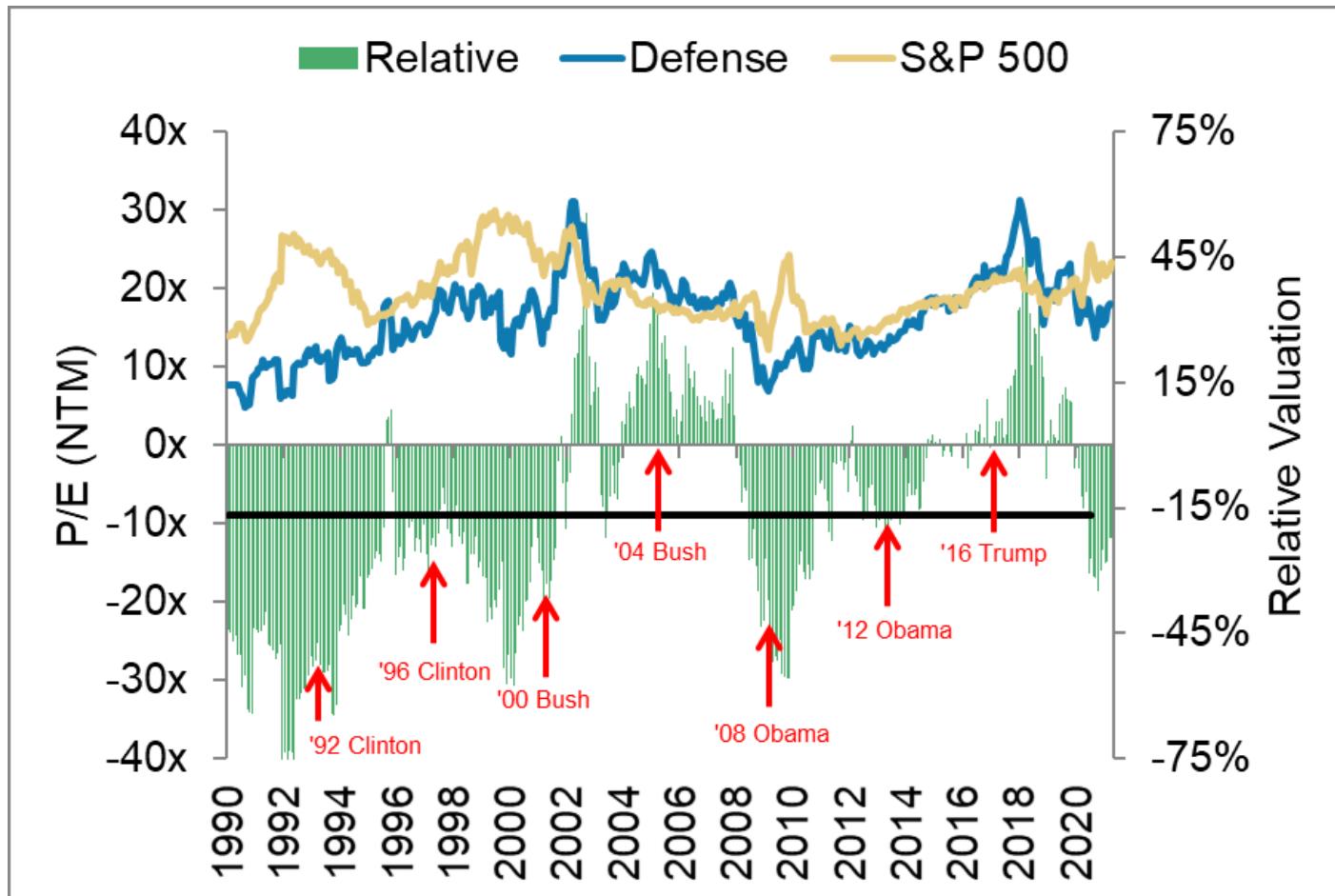
Morgan Stanley

May 2021

FOUNDATION

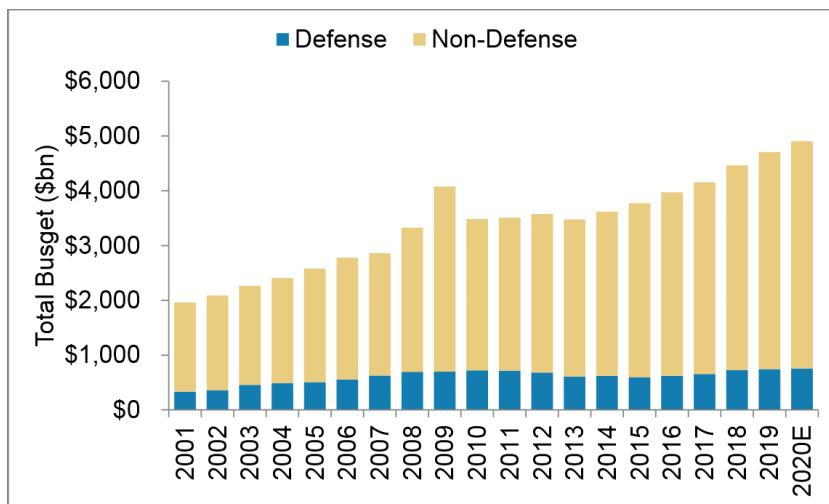
Spring Training DEFENSE

Defense: Historical P/E valuation of Defense industry across Presidencies

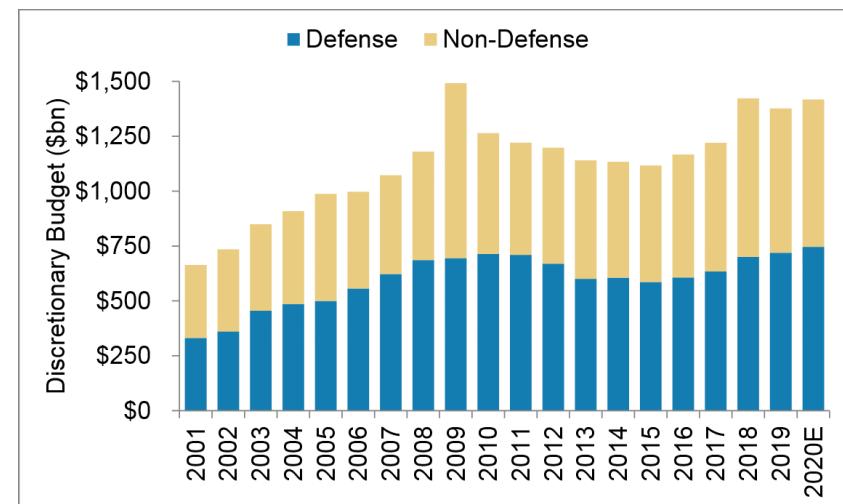


Defense: Defense is a Small Portion of the Total Federal Budget, but Roughly Half of All Discretionary Line Items

Total DoD Budget

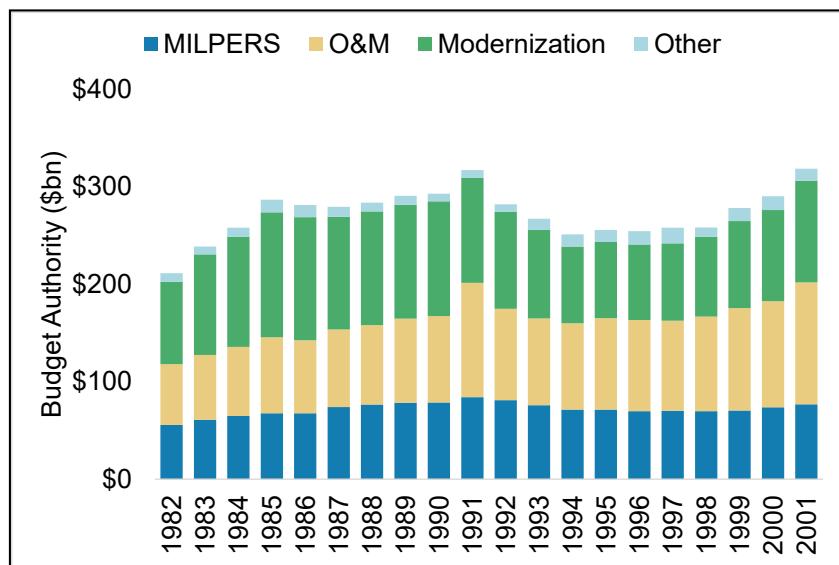


Discretionary Budget

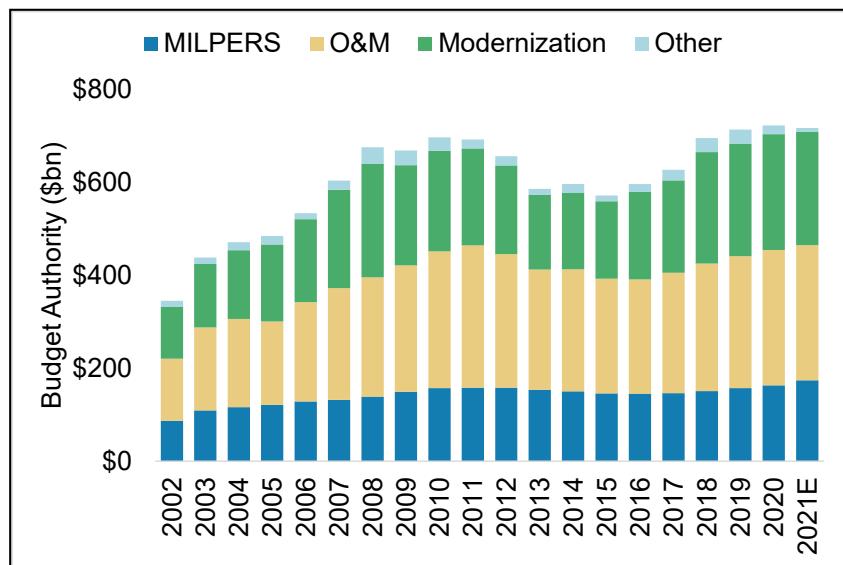


Defense: Modernization Budgets have Typically Experienced the Most Downward Pressure Following Major Conflicts

1982-2001



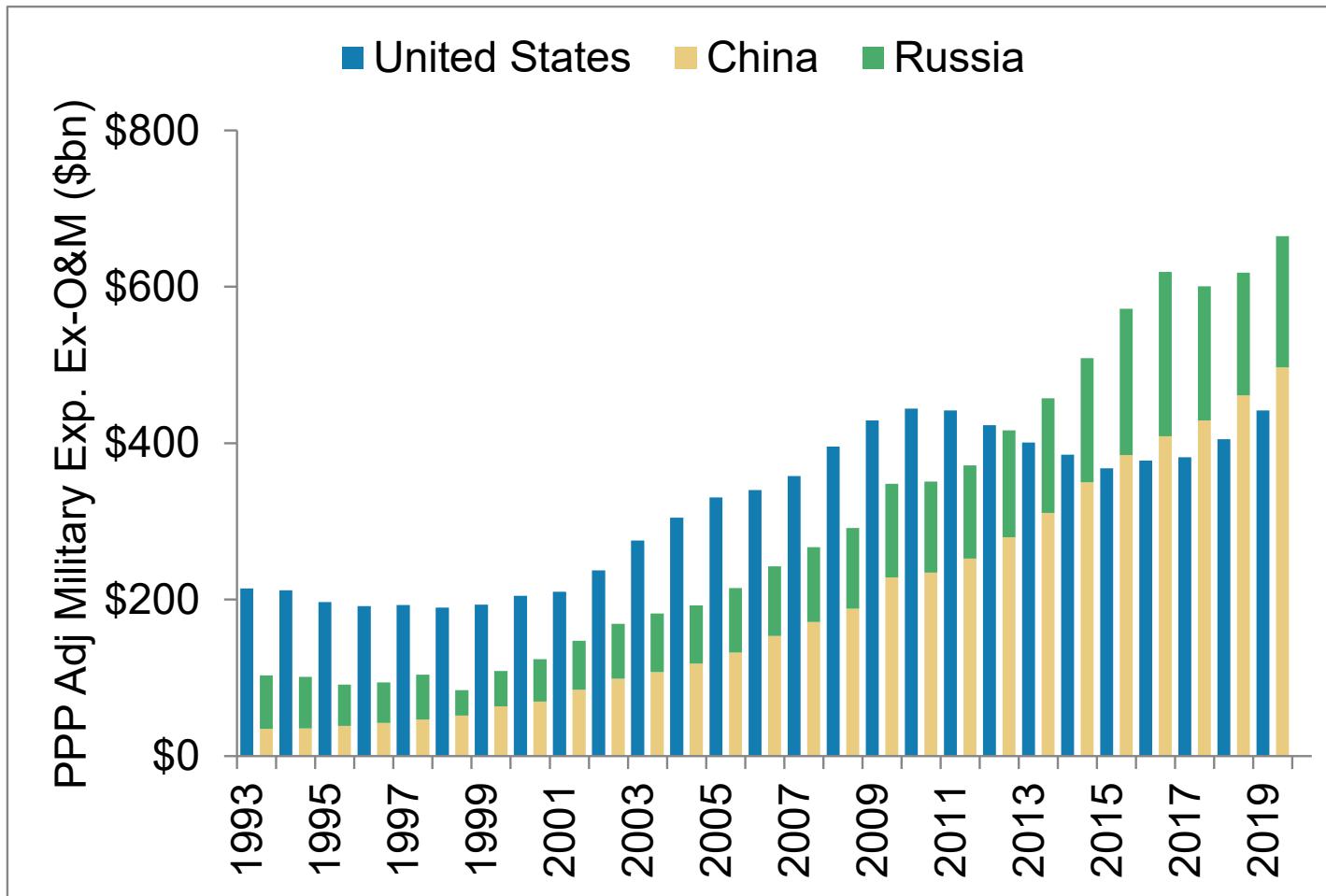
2002-2021E



Peak to Trough Declines

	1990s	2000s	Avg
MILPERS	-17%	-8%	-13%
O&M	-24%	-20%	-22%
Modernization	-34%	-34%	-34%

Defense: The U.S. Spends Less than China and Russia After Adjusting for Purchasing Power and Troop Deployments

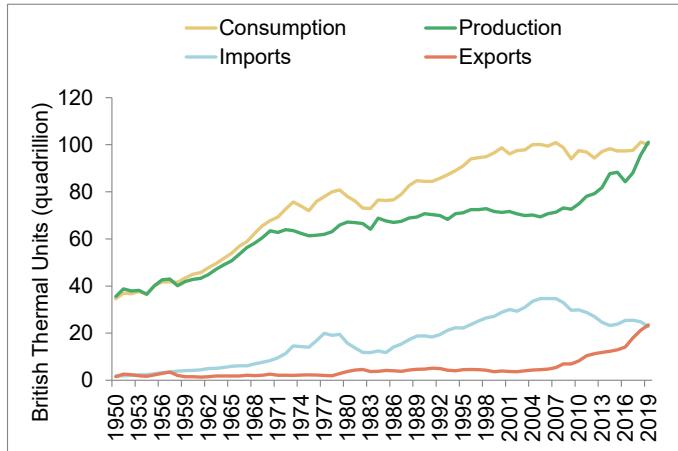


Source: Stockholm International Peace Research Institute (SIPRI), Morgan Stanley Research.

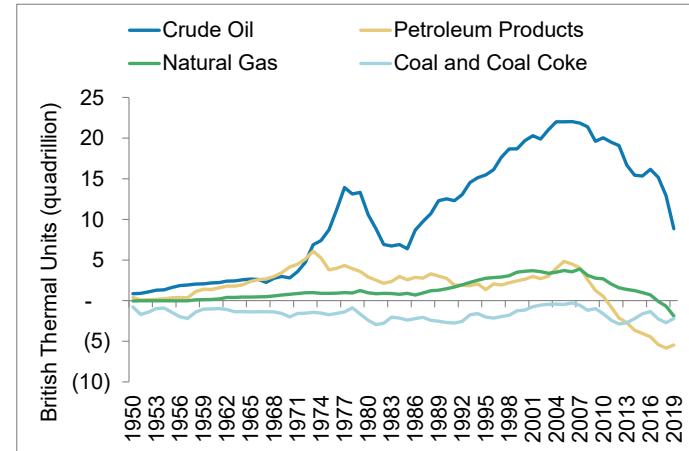
Data as of September 30, 2020

Defense: The U.S. Became a Net Energy Exporter in 2019

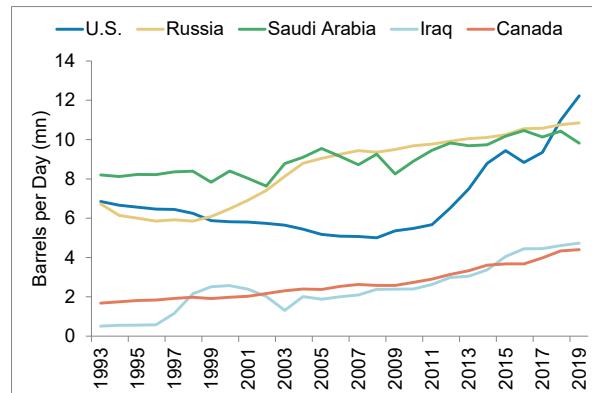
The U.S. Became a Net Energy Exporter in 2019



U.S. Energy Imports Peaked in 2005



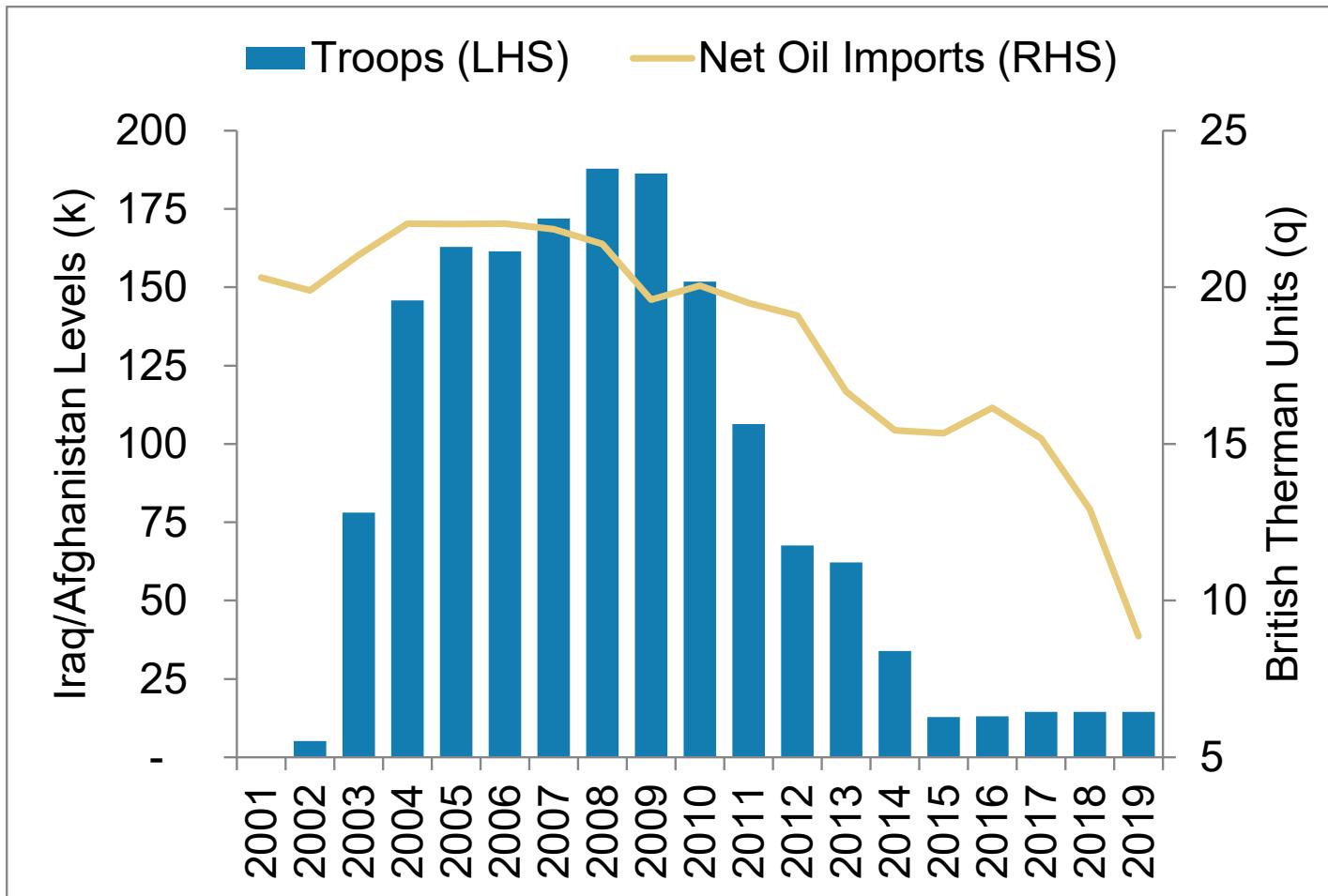
U.S. Crude Oil Production Rose Sharply Beginning in 2012



Source: U.S. Energy Information Administration, Morgan Stanley Research

Data as of August 31, 2020

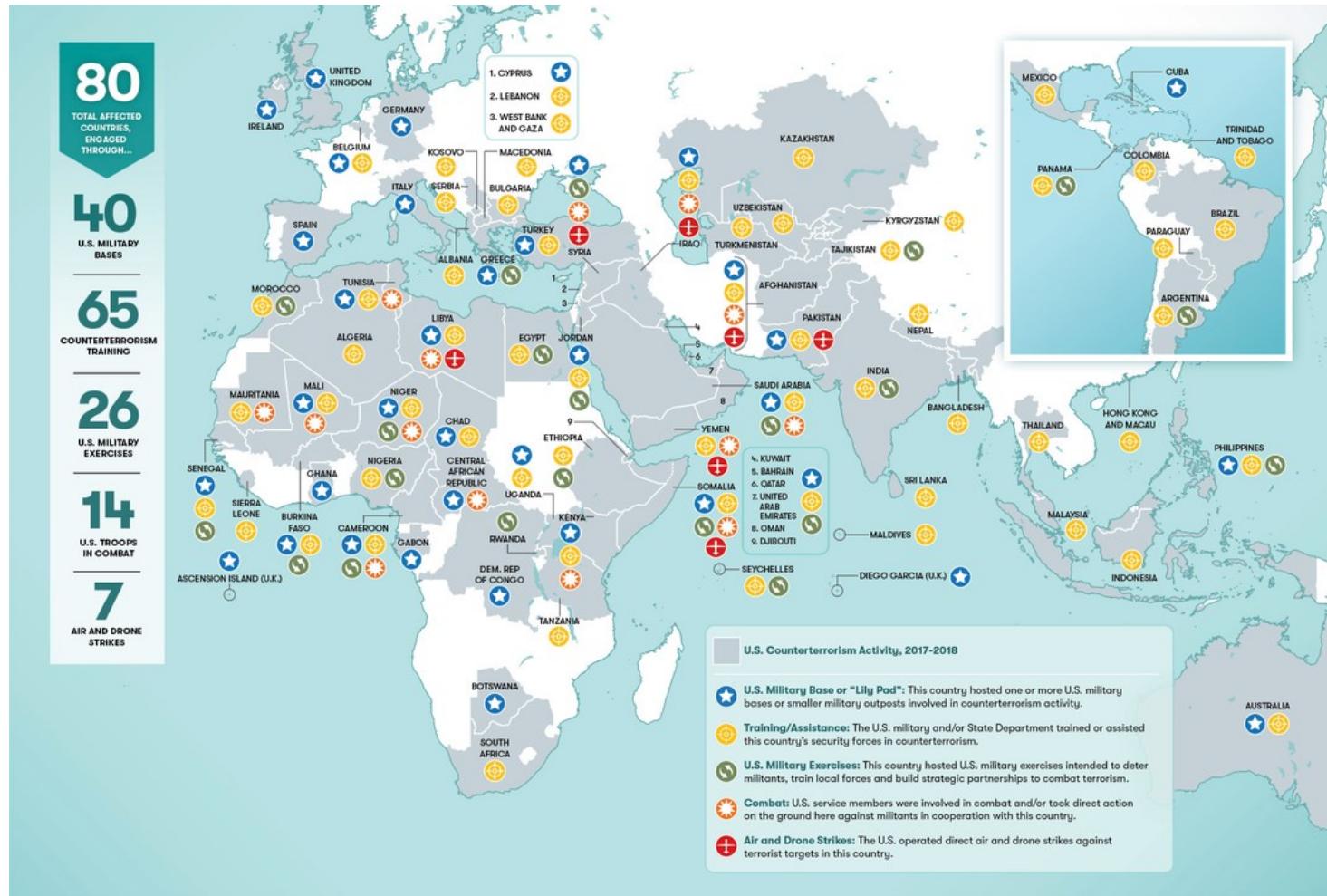
Defense: Deployed Troops to Iraq and Afghanistan Have Largely Tracked Net Oil Imports for the Last Decade



Source: U.S. Department of Defense, Congressional Research Service (CRS),
U.S. Energy Information Administration, Morgan Stanley Research.

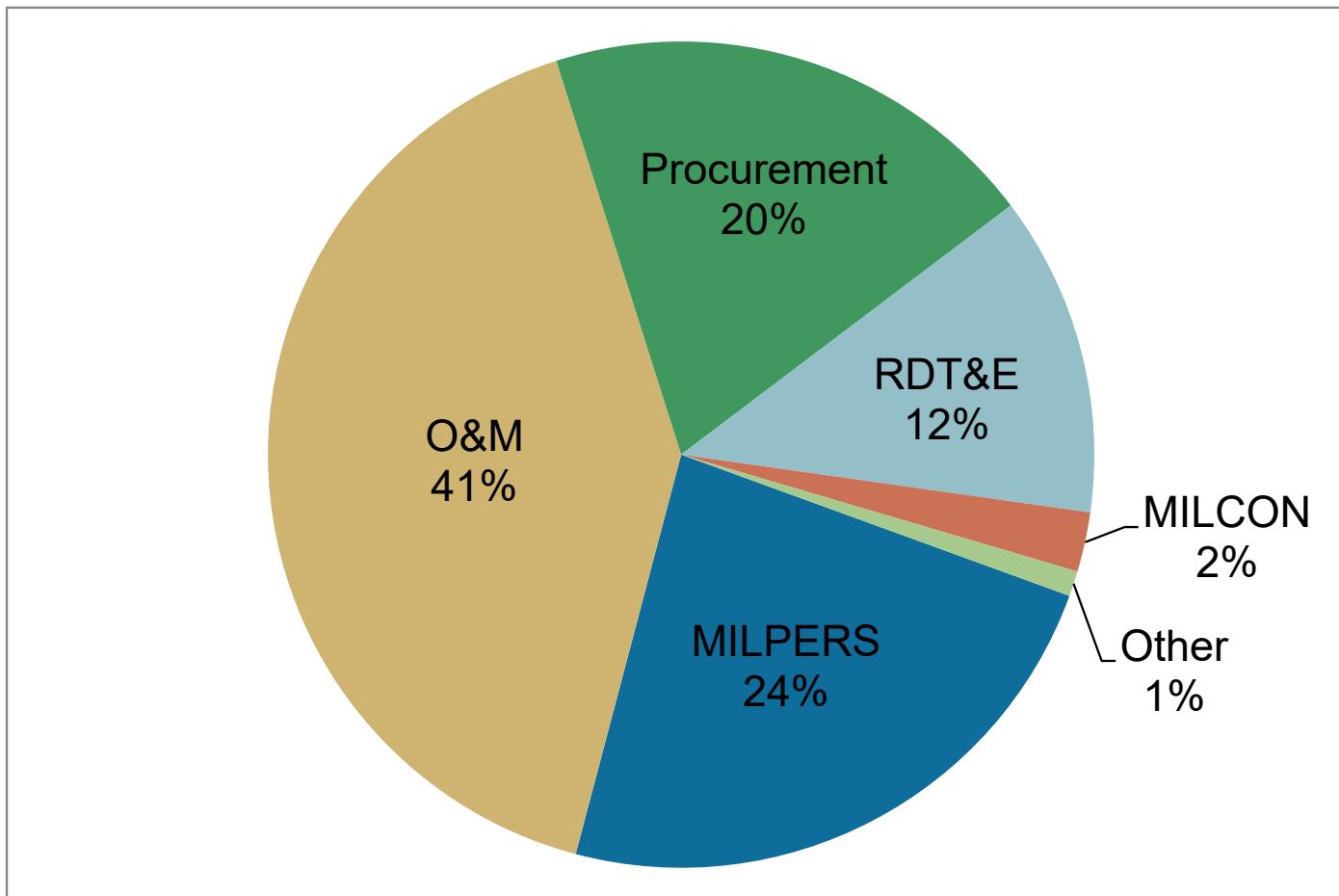
Data as of October 9, 2020

Defense: U.S. Military Posture has Largely Been Focused on Operations in the Middle East

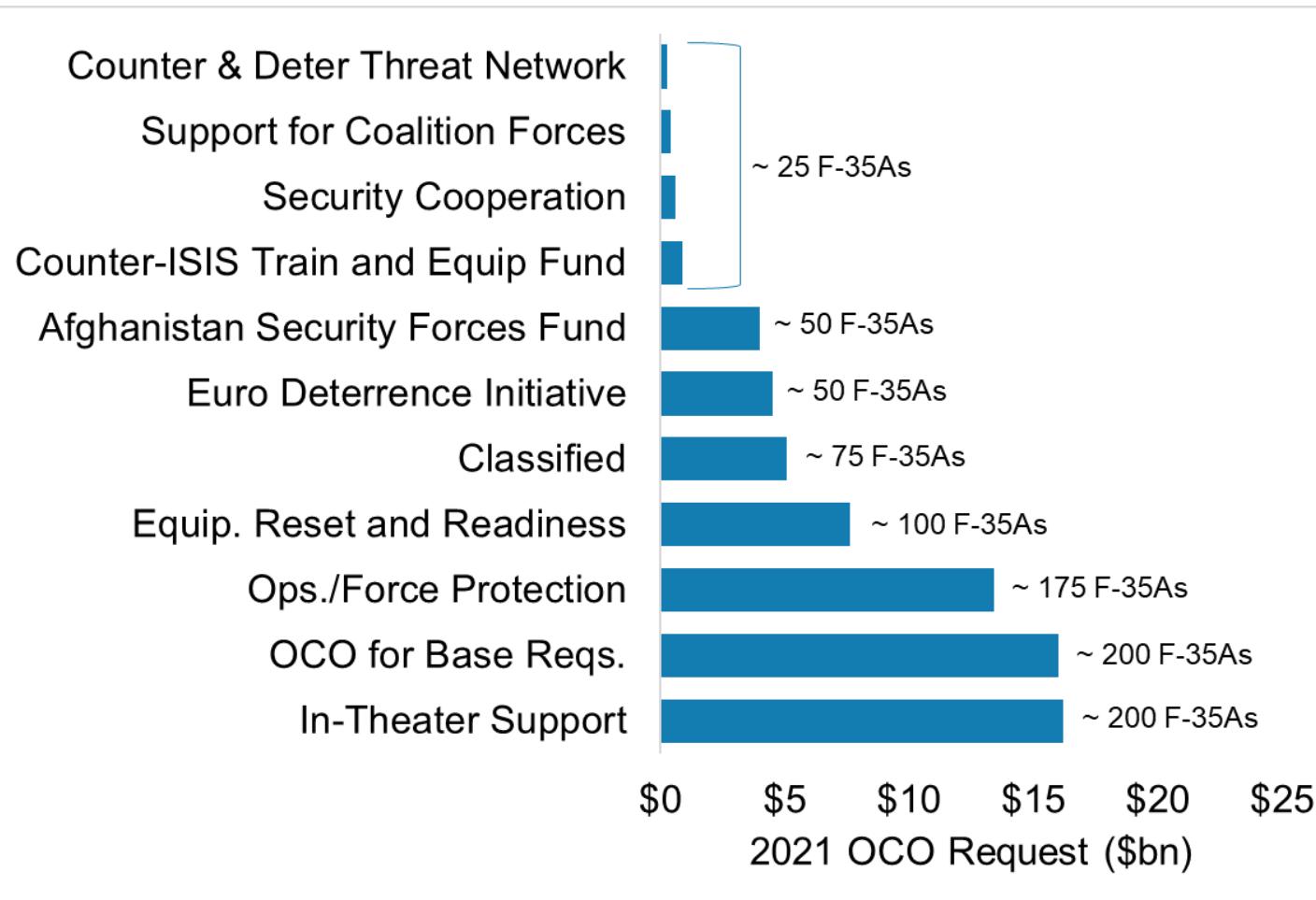


Source: Smithsonian, Brown University, 5W Infographics.

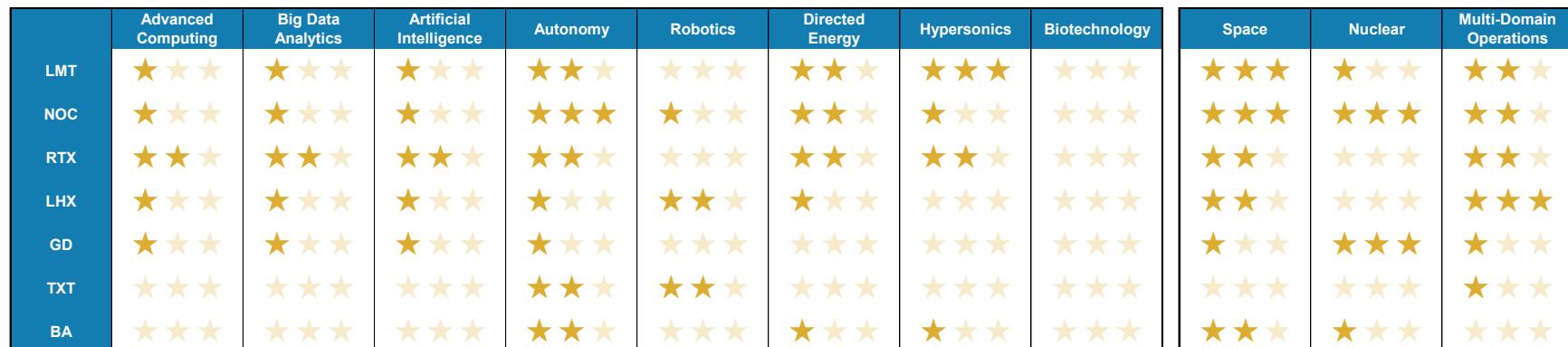
Defense: ~65% of the DoD Budget is for Operations and Personnel



Defense: ~\$69bn 2021 OCO Request Equates to Purchasing ~875 F-35s and Comprises ~10% of the Discretionary DoD Budget Request



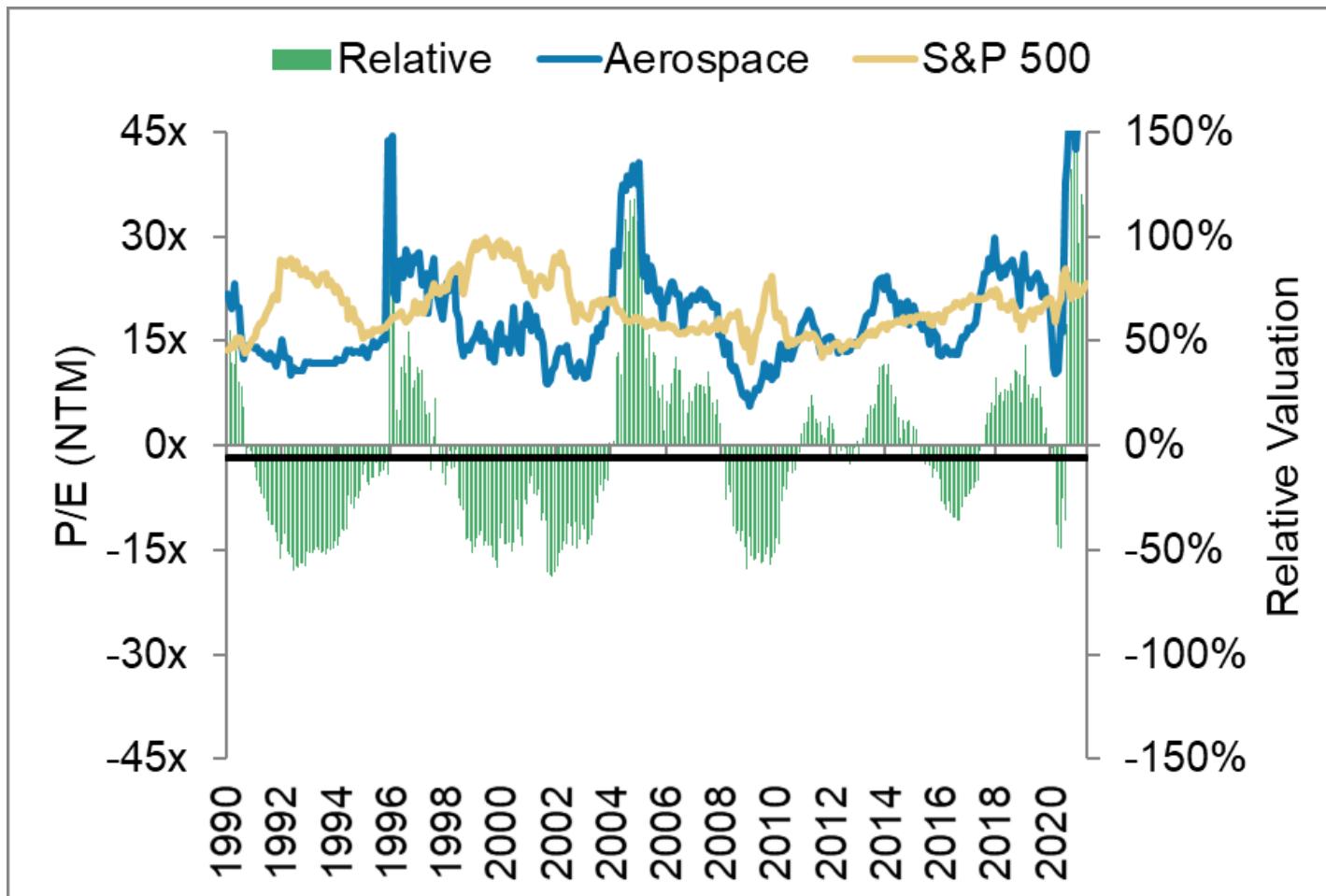
Defense: Relative Positioning based on Service and NDS Priorities Favors LMT and NOC



Source: DoD, Company Data, Morgan Stanley Research.

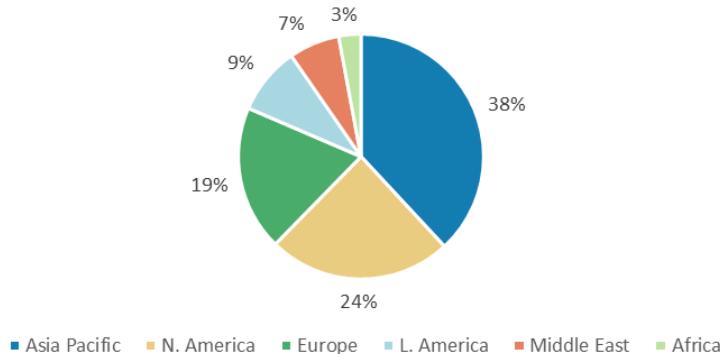
Spring Training Commercial Aerospace

Commercial Aerospace: Median P/E valuation typically 5-10% discounted vs. S&P

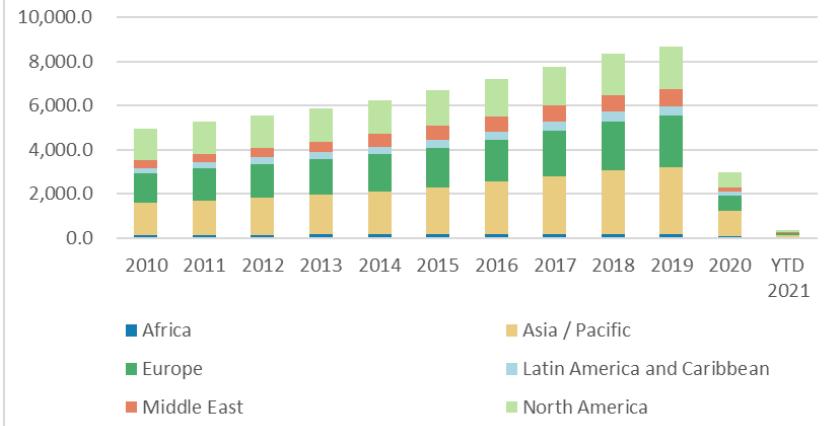


Commercial Aerospace: Regional RPKs led by Asia, Europe, and North America

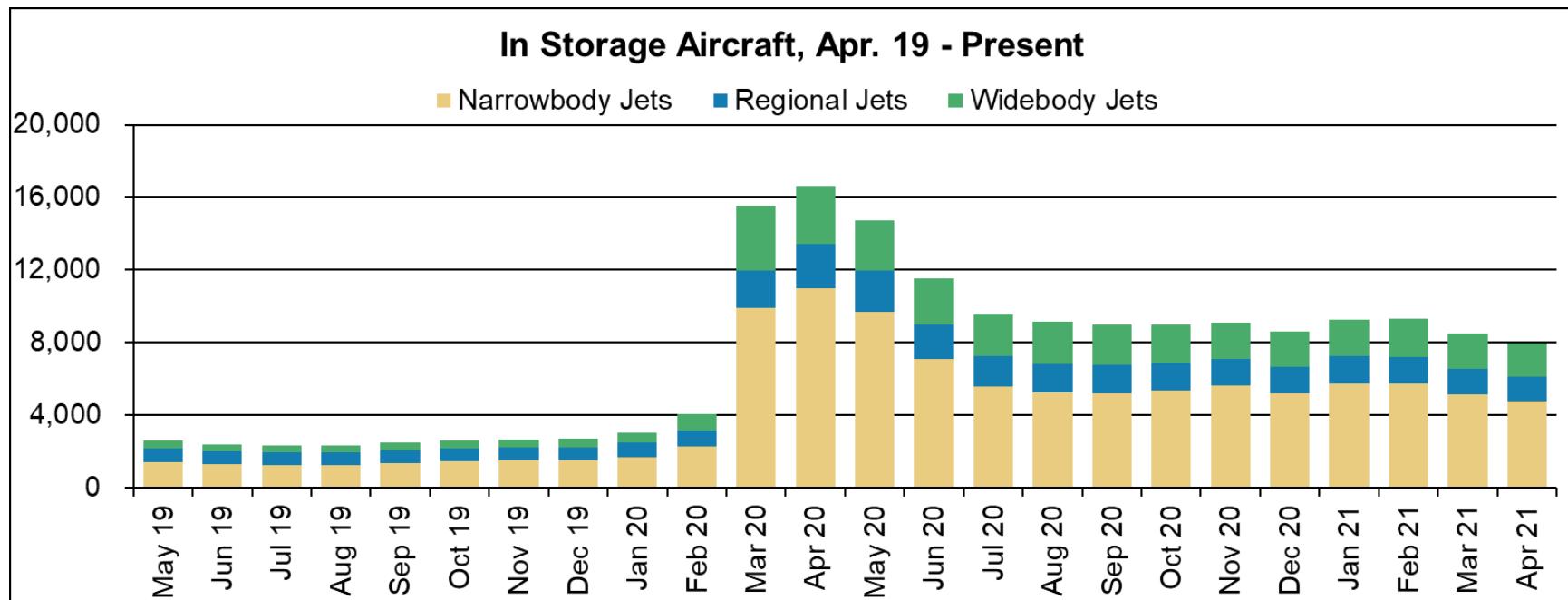
Normalized RPK Distribution by Region



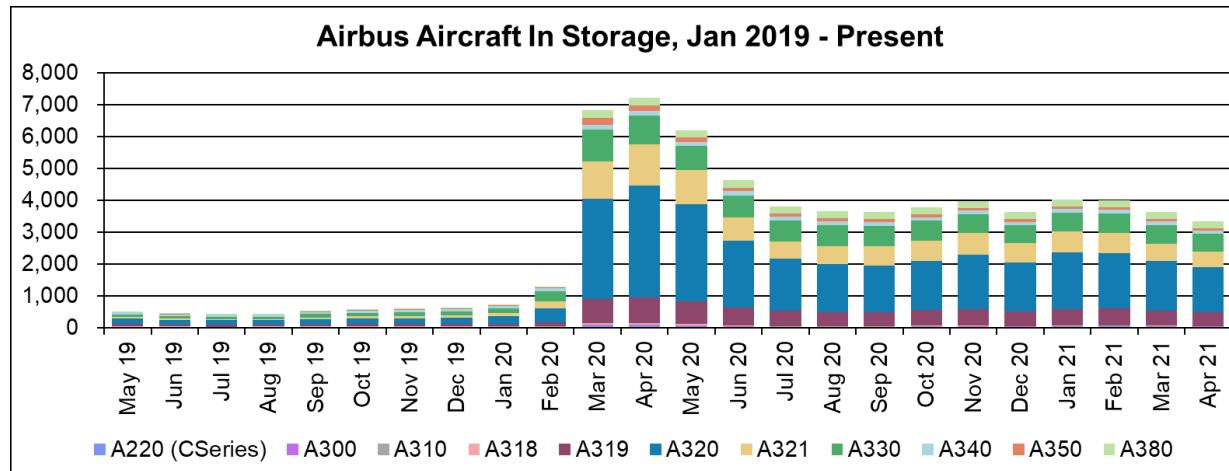
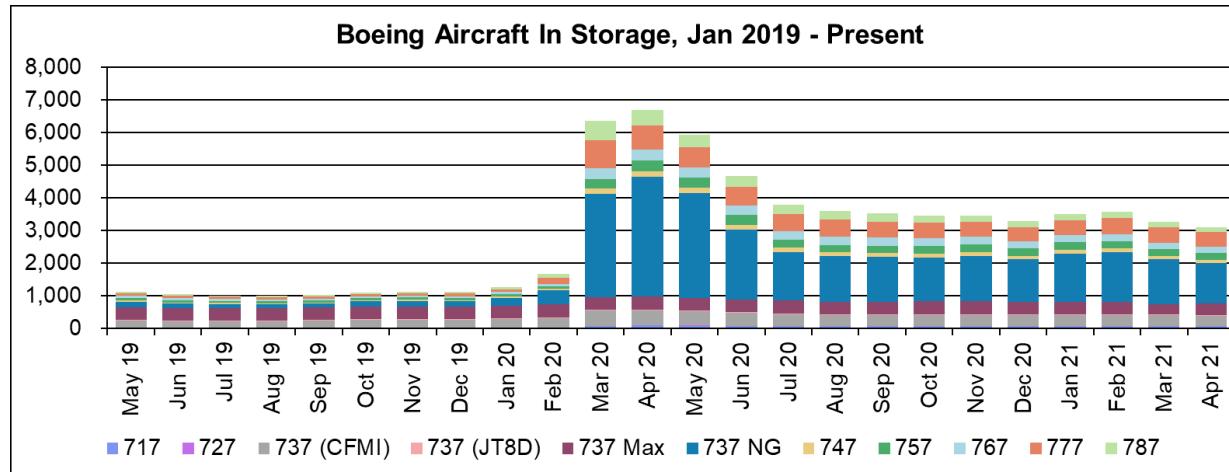
Annual RPK by Region



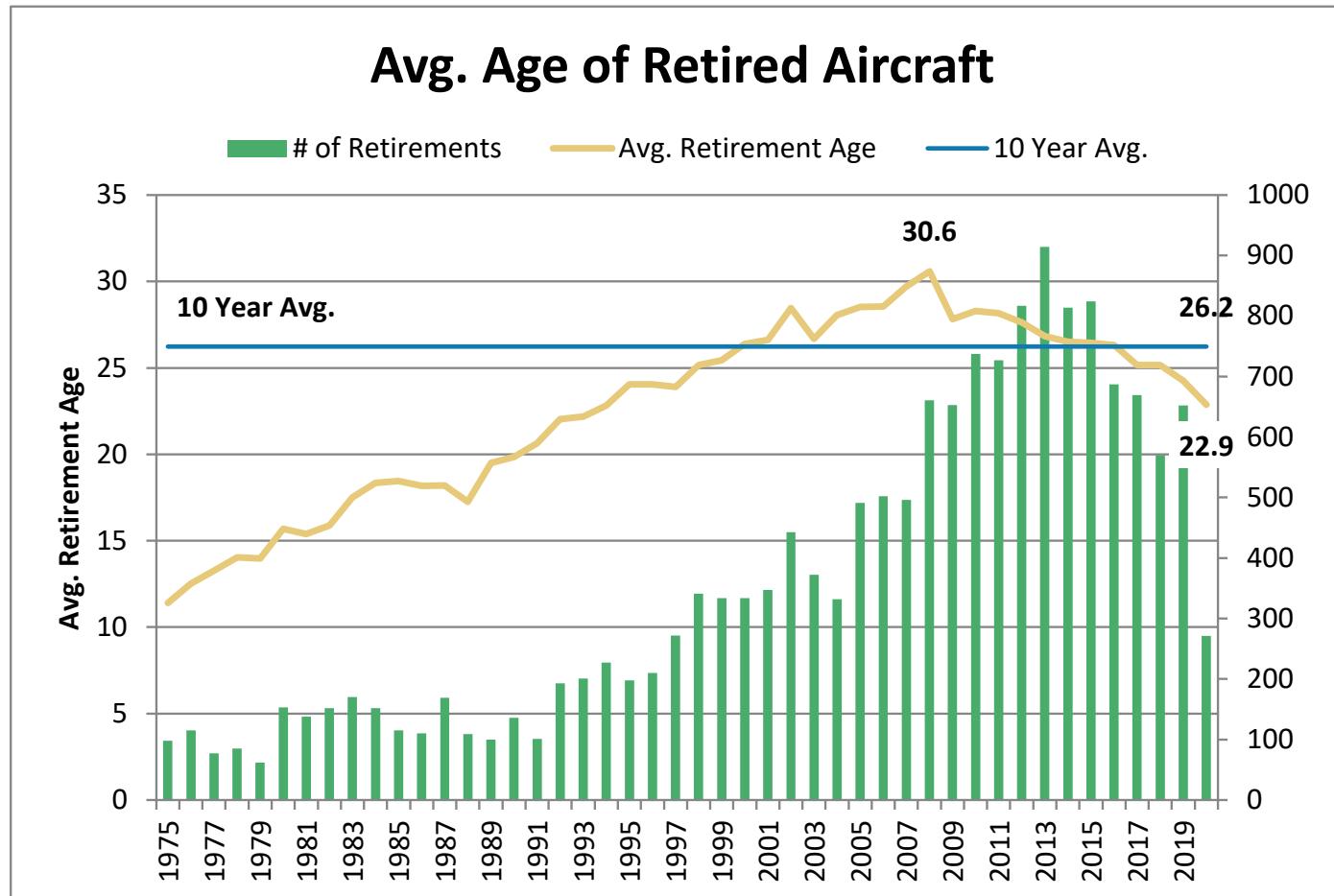
Commercial Aerospace: The Number of In Storage Aircraft Grew Significantly Post-COVID, now on Track towards Normalization



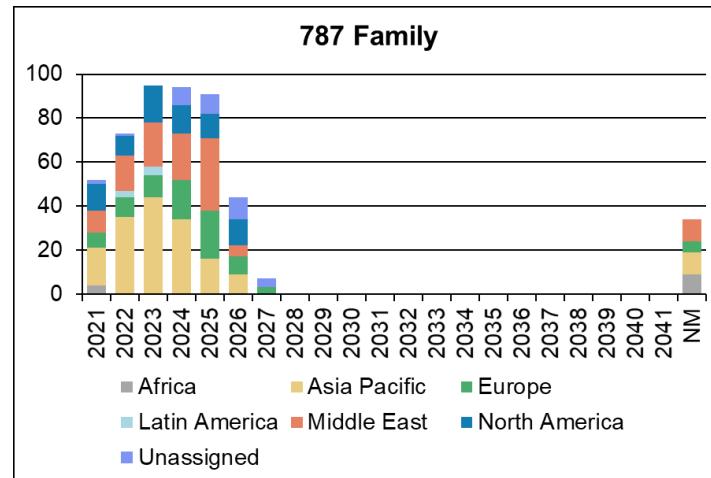
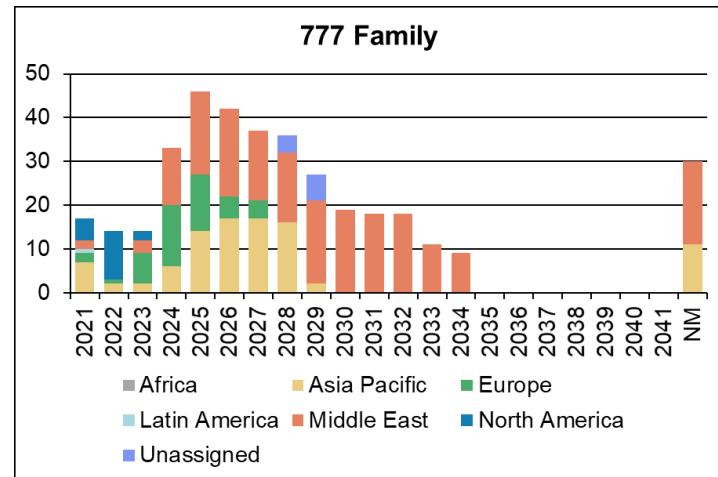
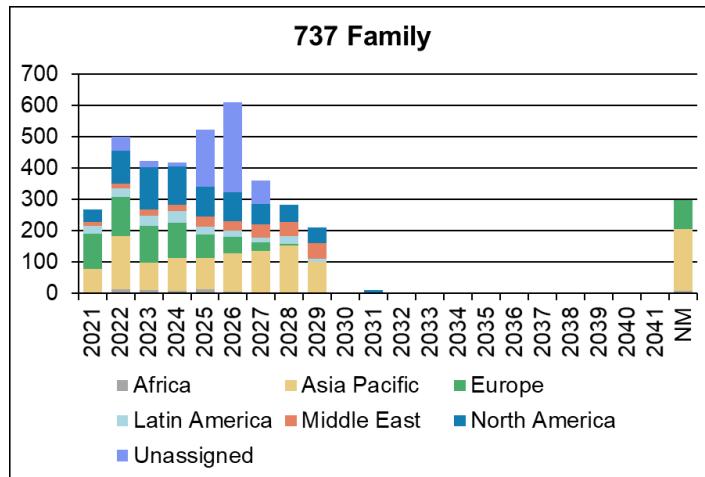
Commercial Aerospace: The Number of In Storage Aircraft Grew Significantly Post-COVID, now on Track towards Normalization



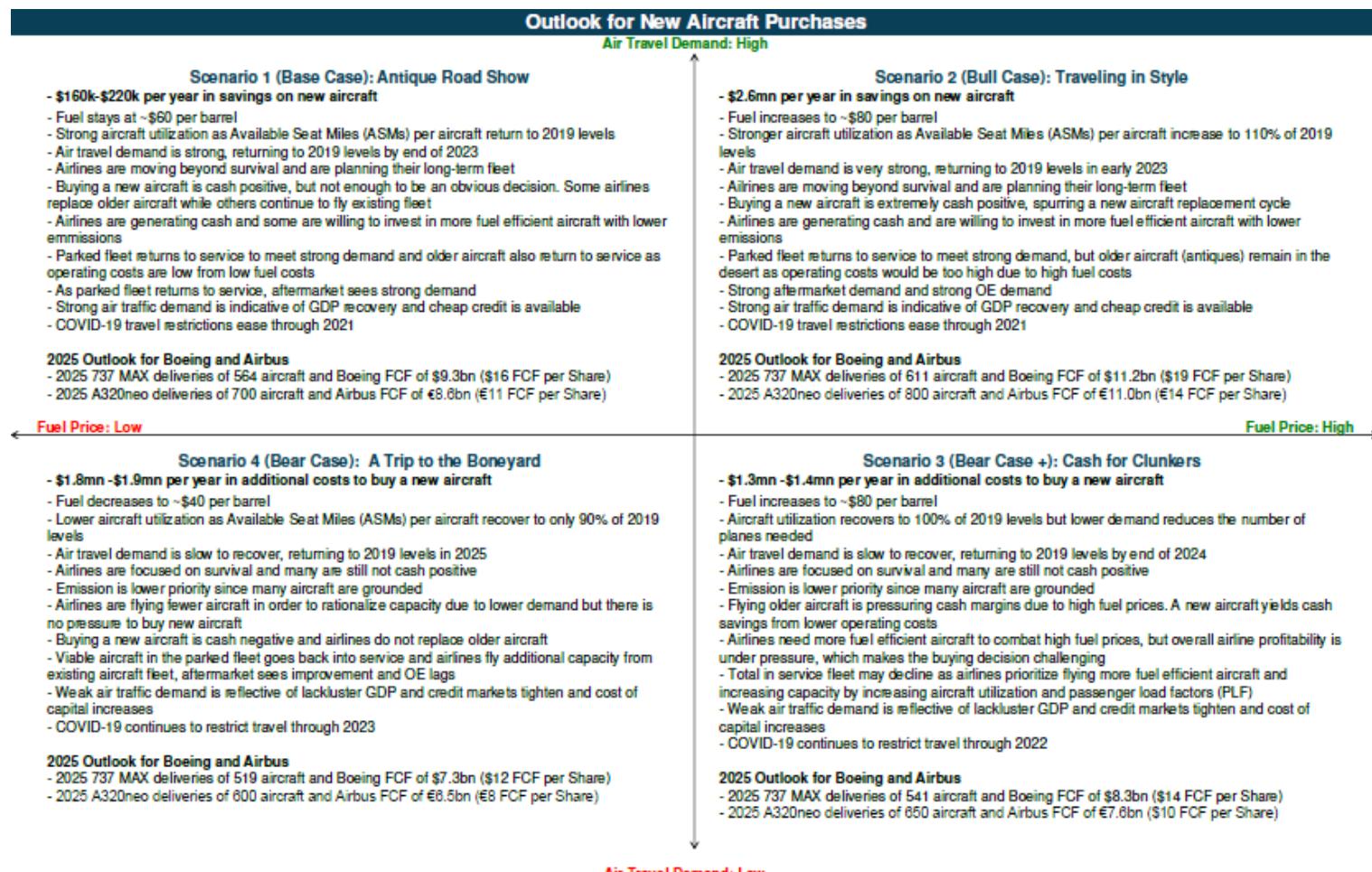
Commercial Aerospace: Average Aircraft Retirement Age of 22.9 years, Accelerating over Past 10 years



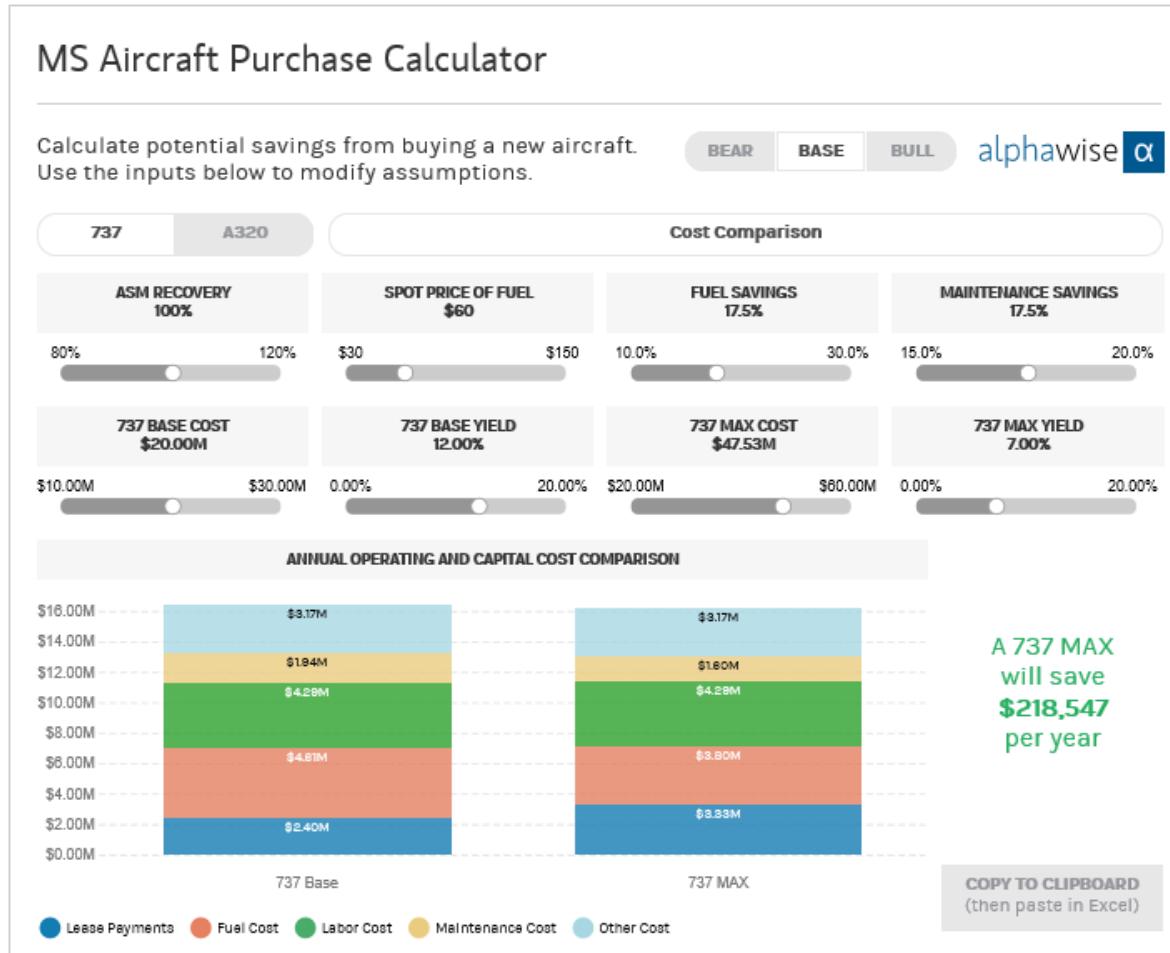
Commercial Aerospace: Boeing Order Book



Outlook for New Aircraft Purchases

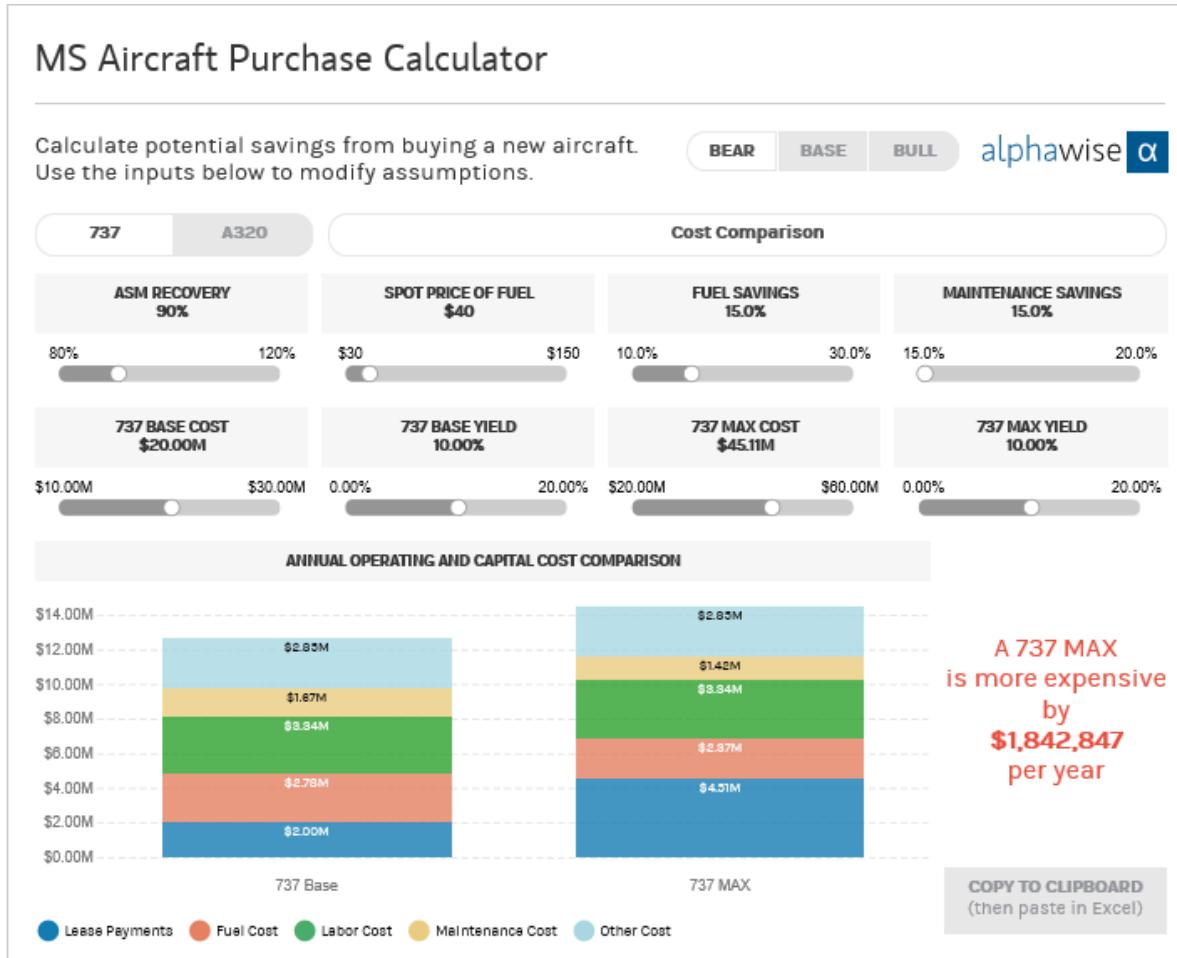


737: Base Scenario



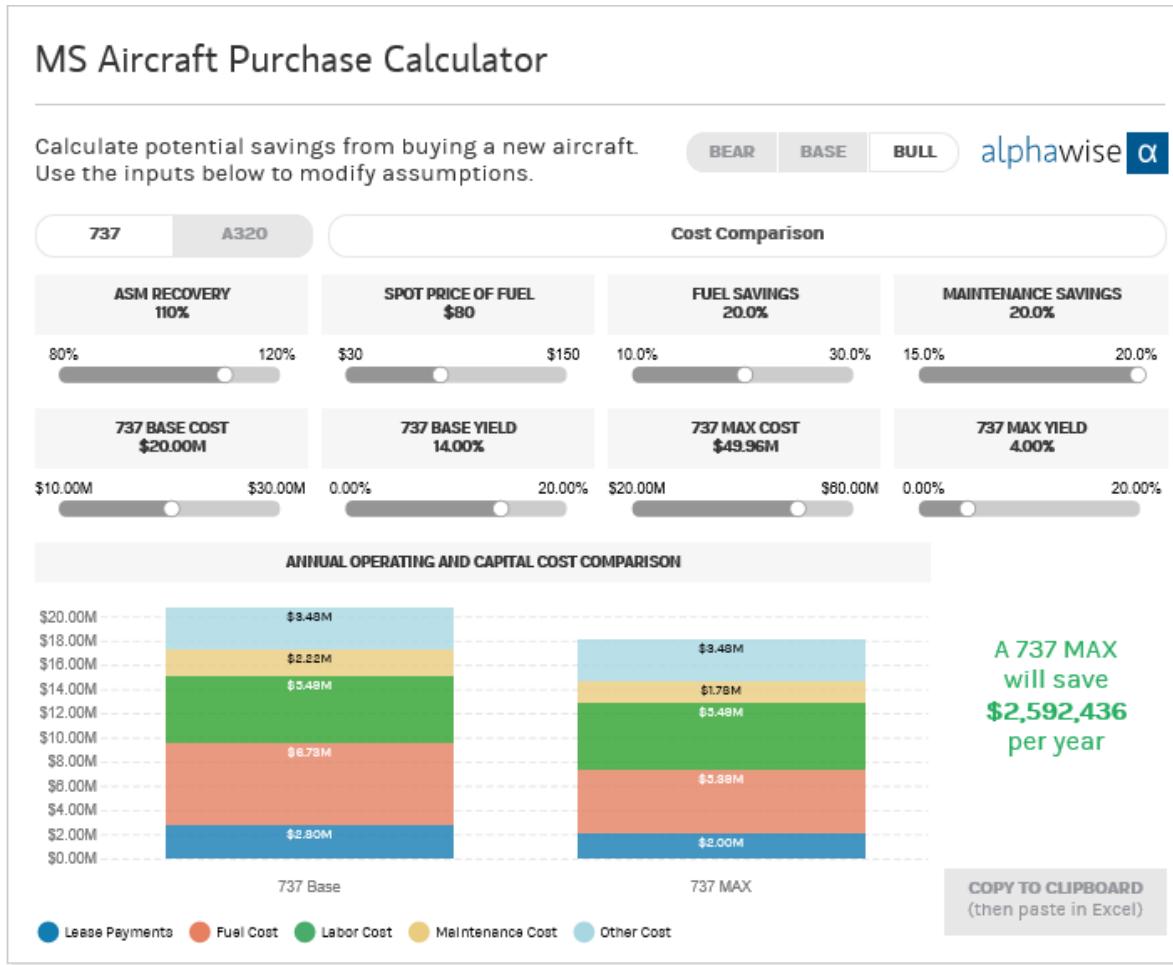
Source: Morgan Stanley Research

737: Bear Scenario



Source: Morgan Stanley Research

737: Bull Scenario



Source: Morgan Stanley Research

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Government Services



Source: U.S. Department of Defense

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Services Occupy a Distinct Segment of the Government Contractor Landscape

“Primes”

Directly contract with end-customer to build major systems that are typically hardware-oriented



“Subs”

Supply the “Primes” with hardware sub-systems and components or directly contract with end-customers in focused areas



“Services”

Provide services and solutions to end-customers that are wide-ranging and at times act as third-party integrators



The Group Has Wide-Ranging Capabilities but Is Becoming Increasingly Focused on Software-Based Solutions

 Leidos	 Booz Allen	 PAE	 CACI EVER VIGILANT	 SAIC		 Parsons	 ManTech International Corporation
Cyber Operations	Consulting	Business Process Solutions	Business Systems & BPS	Enterprise IT	Analytics and Data Services	Cyber and Intelligence	Full-Spectrum Cyber
Digital Modernization	Analytics	Counter-Threat Solutions	C4ISR & Cyber	Software	Applied Research	Space and Geospatial	Secure Mission and Enterprise IT
Integrated Systems	Digital Solutions	Infrastructure and Logistics	Engineering Services	Cyber	Cloud and Application Services	Missile Defense and C5ISR	Advanced Data Analytics
Mission Operations	Engineering	Intelligence Solutions	Enterprise IT	Advanced Analytics and Solutions	Consulting Services	Connected Communities	Software and Systems Development
Mission Software Systems	Cybersecurity	International Logistics and Stabilization	Mission Support	Engineering Integration and Logistics	Cybersecurity Services		Intelligent Systems Engineering
Enabling Technologies		Readiness and Sustainment		Training and Mission Solutions	Enterprise Managed Services		Intelligence Mission Support
					Integrated Solutions		Mission Operations

Contracting for Government Services Attracts a Wide Range of Industry Participants

Defense Contractors



BAE SYSTEMS



GENERAL DYNAMICS



Commercial IT & Technology Consulting

accenture

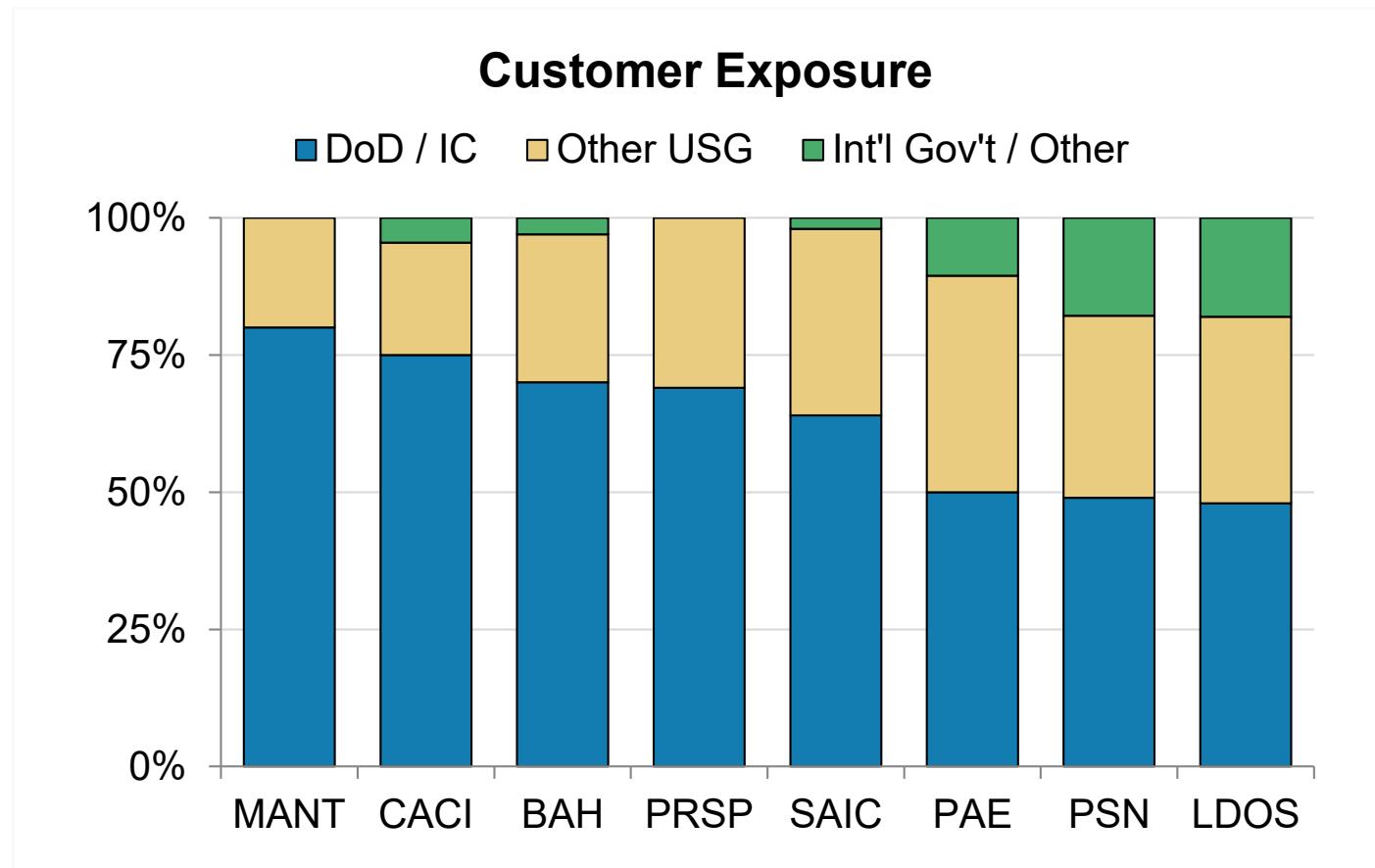


Deloitte.

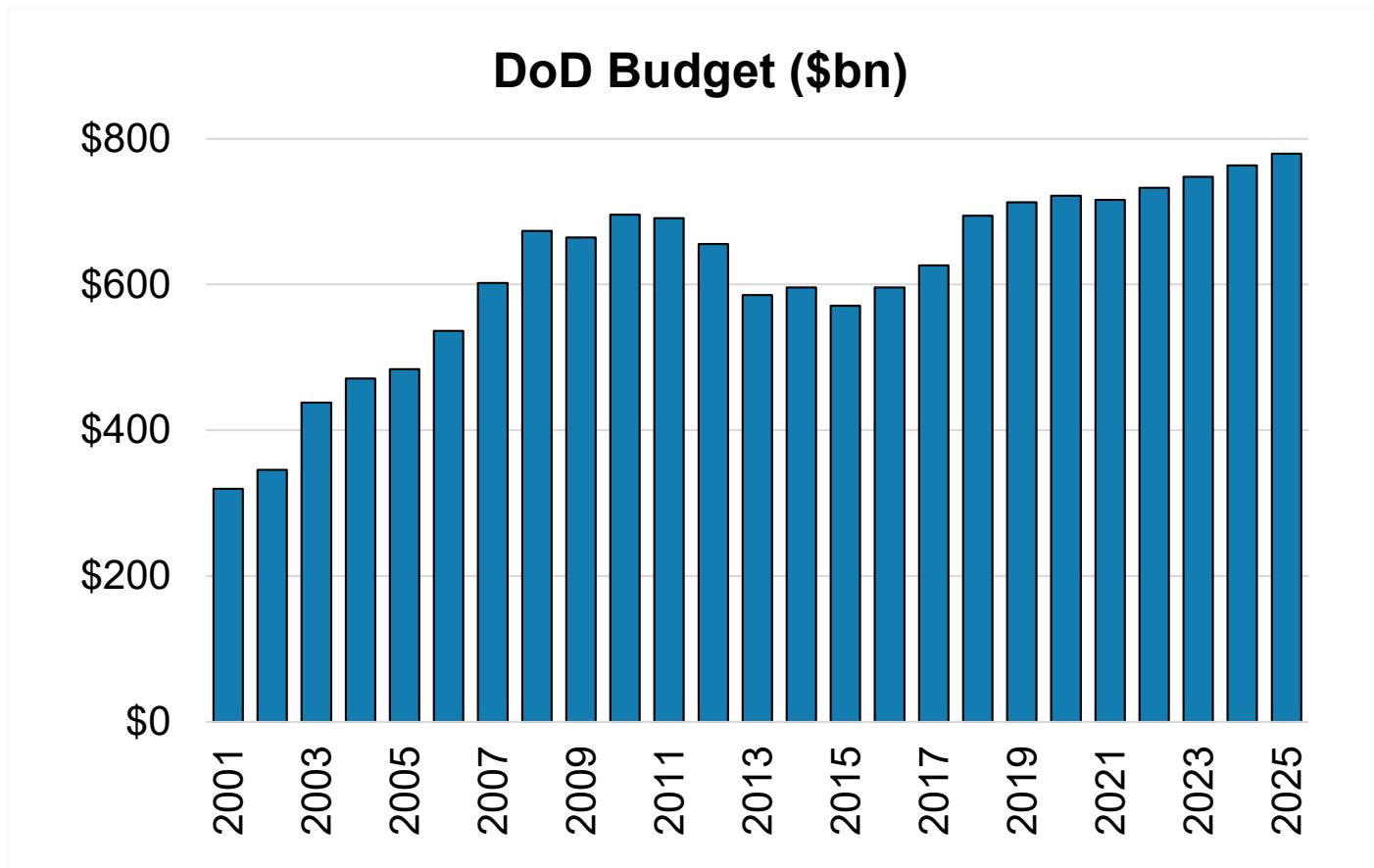


CGI

The DoD Is the Largest Consumer of Services With DHS, HHS, and DoS Also Notable



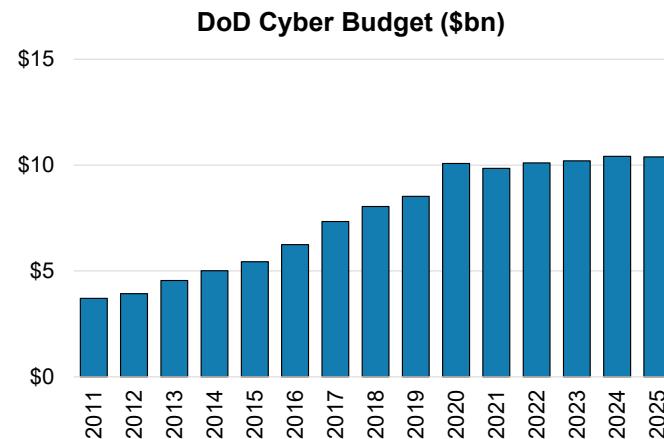
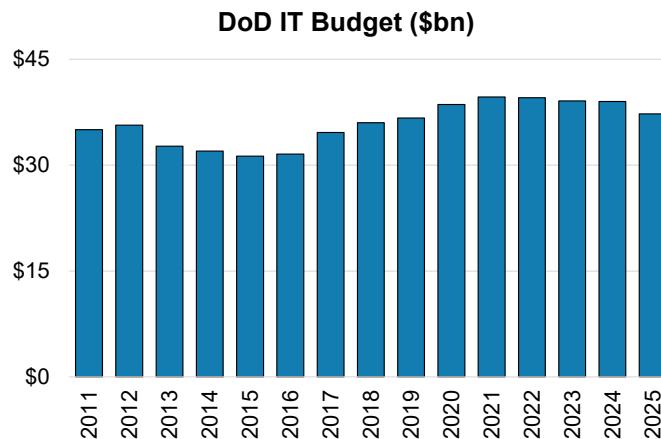
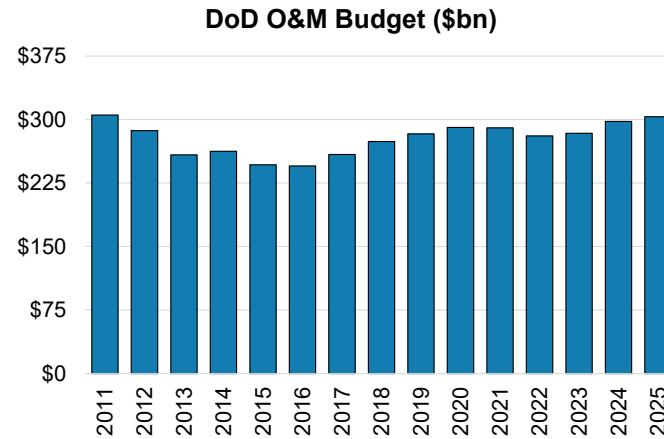
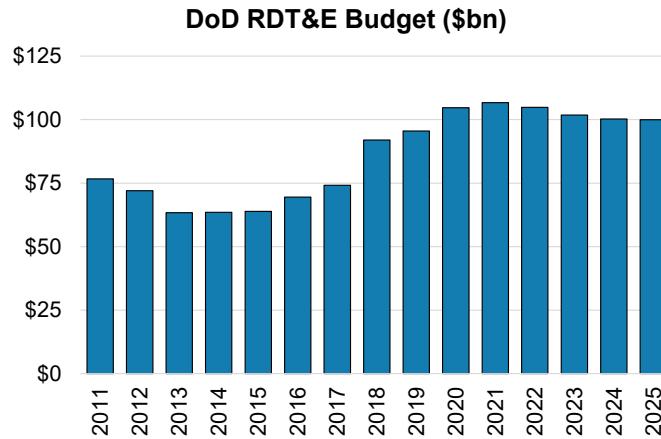
The DoD Budget Appears To Be Supportive of Industry Growth for the Near- to Medium-Term



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Positioning Within the DoD Budget Will Become Increasingly Important As Growth Moderates

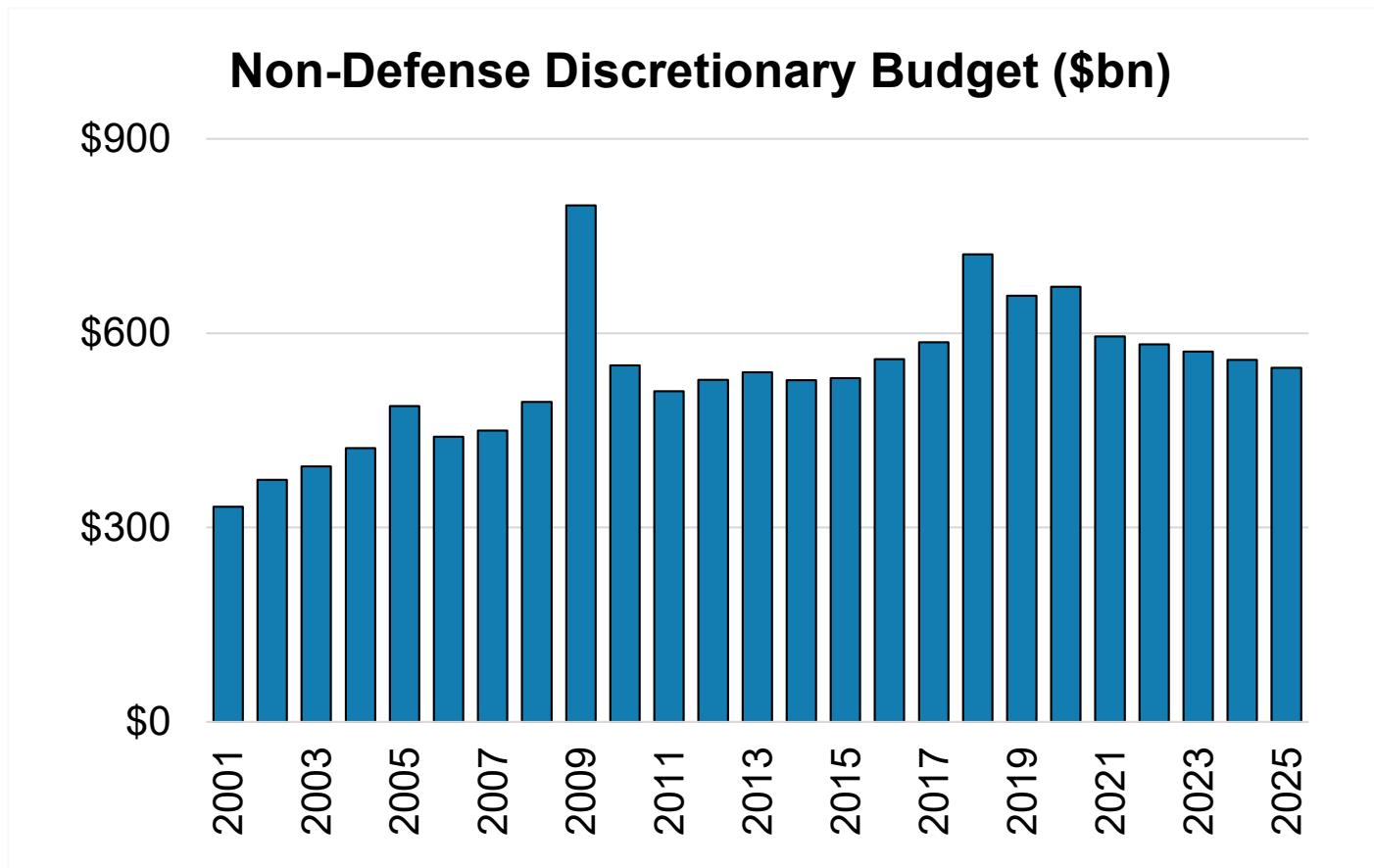


Source: USG, Morgan Stanley Research.

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The Biden Administration Is Expected To Reset the Trajectory of Non-Defense Discretionary Budgets

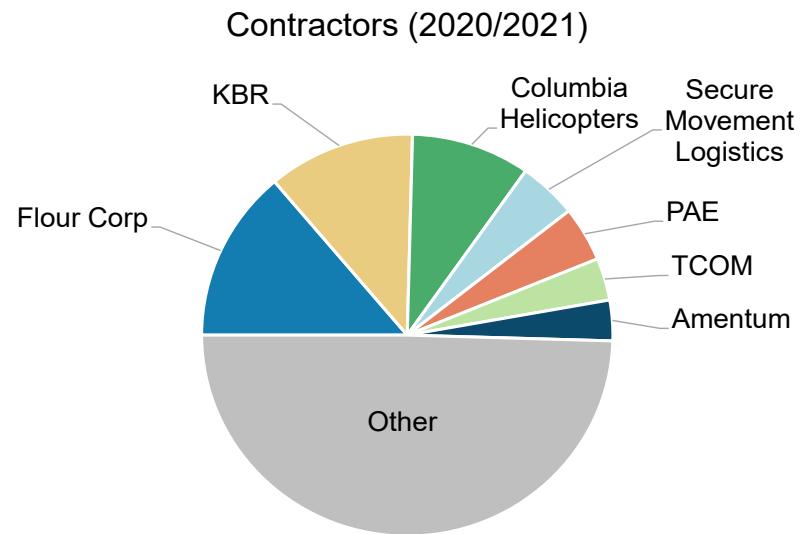
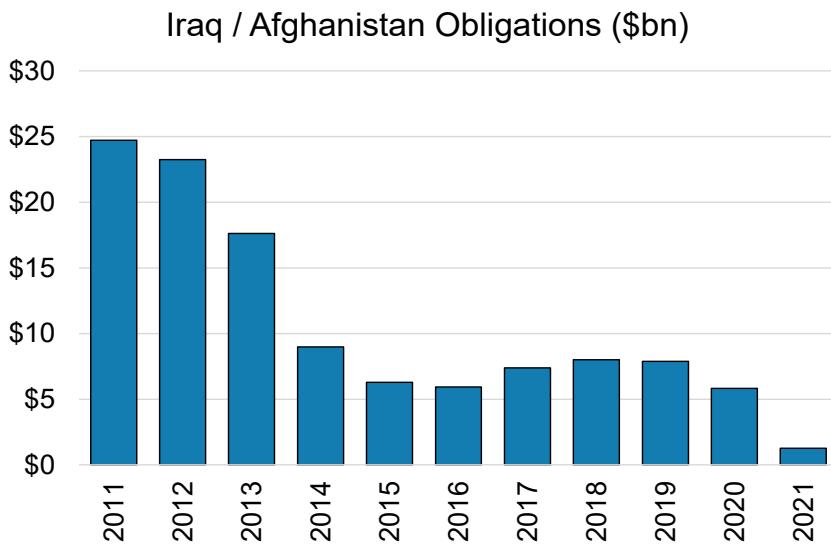


Source: USG, Morgan Stanley Research.

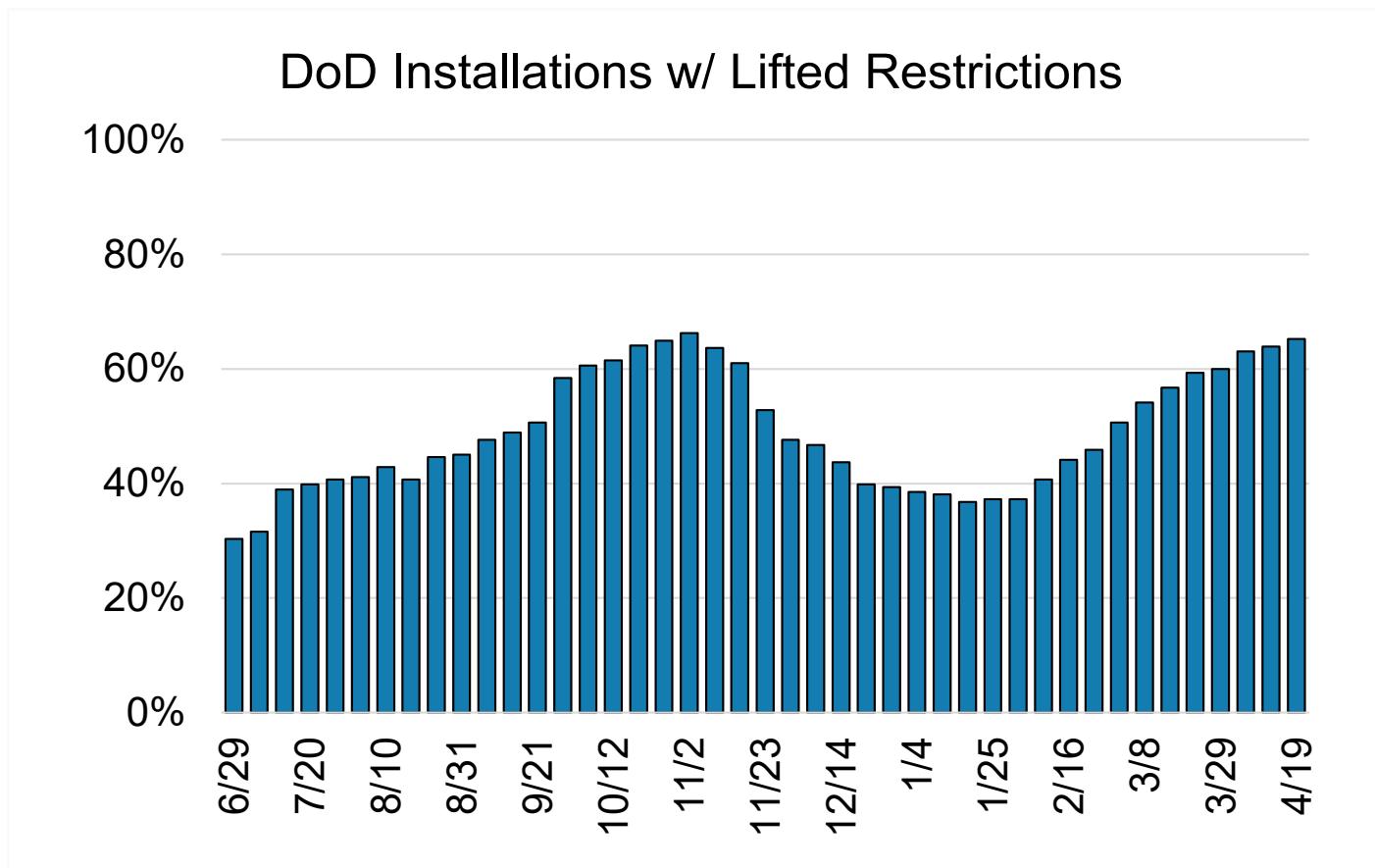
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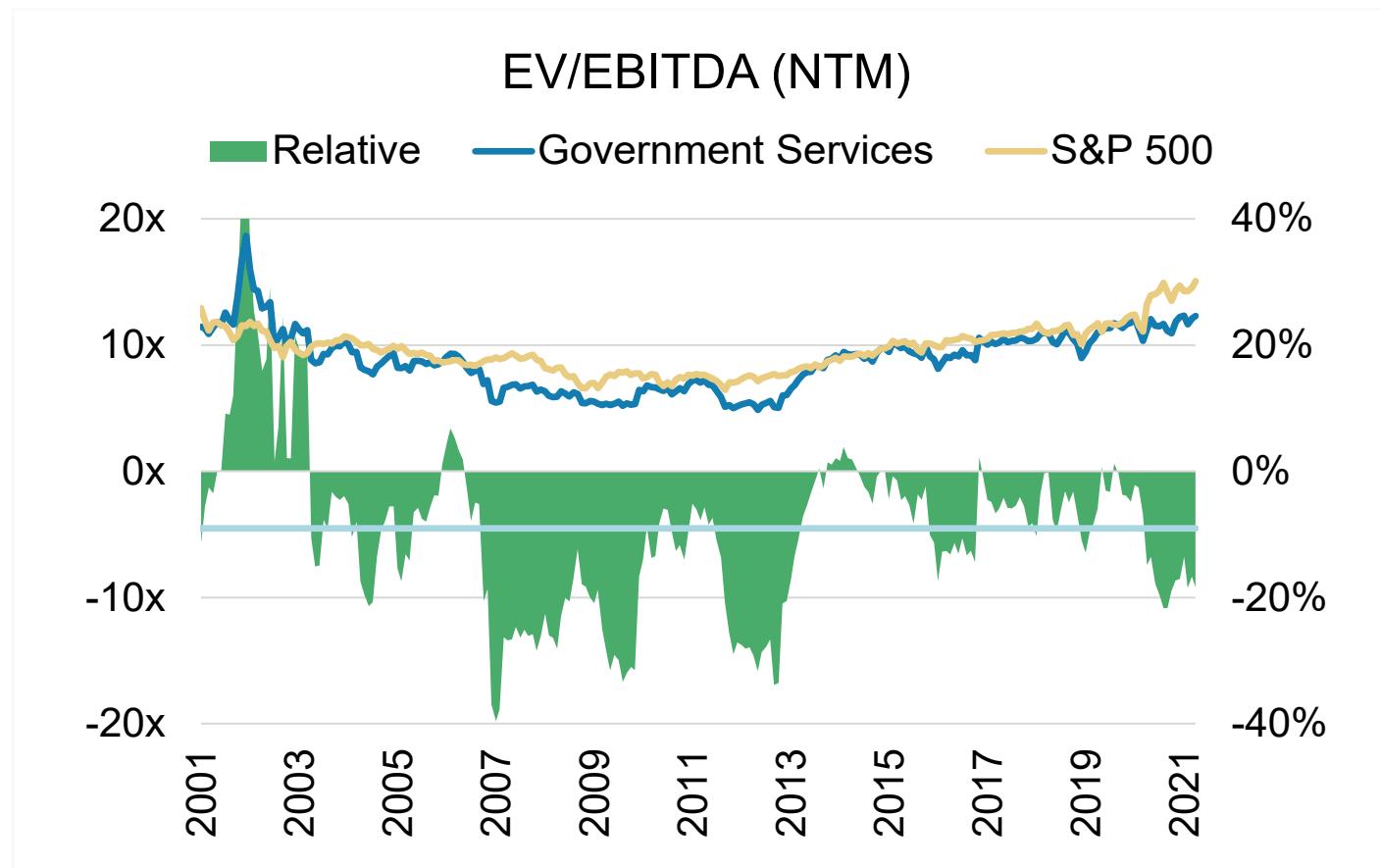
Impact From Wind Down of Remaining Operations in Iraq/Syria and Afghanistan Will Likely Be Limited



COVID-19 Has Challenged Operational Tempo at DoD Facilities but Is Improving



Relative Valuation for the Group Remains Below the Historical Average Discount of ~10%



What Are the Key Questions and Debates?

Will the new administration cut defense spending?

What investments will the DoD prioritize?

Is the slowdown in organic revenue growth temporary?

Will a withdrawal from Afghanistan impact earnings?

Can valuations improve from here?

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US Machinery



Source: Shutterstock

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May 2021

Agenda

1. When to Own Machinery Stocks?

2. How to Analyze Machinery Stocks

- Revenue
- Orders
- Replacement Cycles
- Cost Structure
- Capital Allocation
- Valuation

3. Deep Dive on End Markets

- Construction Equipment
- Ag Equipment
- Truck OEMs & Suppliers
- Aggregates
- Locomotives

4. Key Debates & Top Picks

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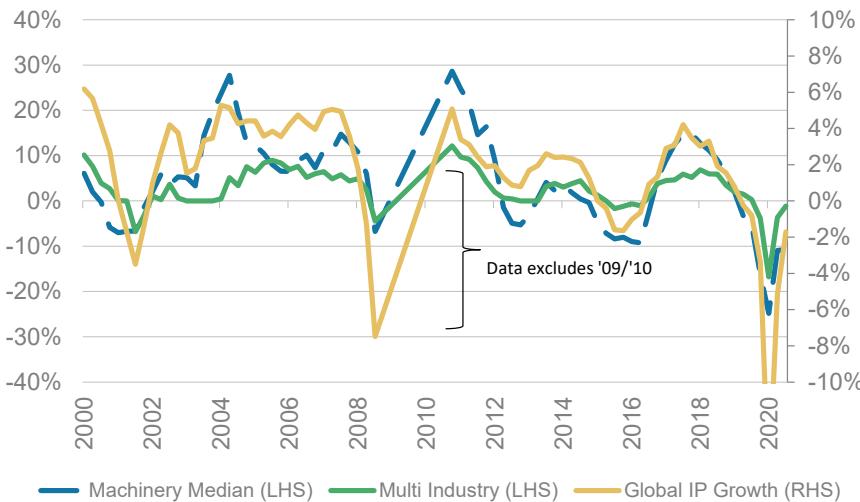
When to Own Machinery?

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Machinery stocks are “early” cycle

Organic Growth vs. Global IP Growth (ex-2009/2010)



	No Lag	1Q Lag	2Q Lag	3Q Lag	4Q Lag
AGCO	0.27	0.02	0.07	0.06	0.08
ALSN	0.78	0.59	0.42	0.37	0.06
CAT*	0.59	0.43	0.35	0.28	0.17
CMI	0.66	0.34	0.13	0.03	0.02
DE*	0.47	0.26	0.04	(0.04)	(0.08)
DCI	0.50	0.39	0.29	0.25	0.18
PCAR	0.50	0.25	0.07	(0.14)	(0.24)
TEX	0.74	0.59	0.47	0.43	0.35
TKR (Est Core)	0.71	0.35	0.15	(0.05)	(0.10)
OSK (Access)	0.54	0.32	0.16	0.05	(0.03)
CNHI	0.77	0.47	0.33	0.12	(0.03)
LECO	0.34	0.13	0.04	(0.01)	(0.07)
KMT	0.67	0.43	0.26	0.16	0.12
WAB	0.72	0.53	0.32	0.10	(0.10)
Median	0.63	0.37	0.21	0.08	(0.00)
Average	0.59	0.36	0.22	0.11	0.02

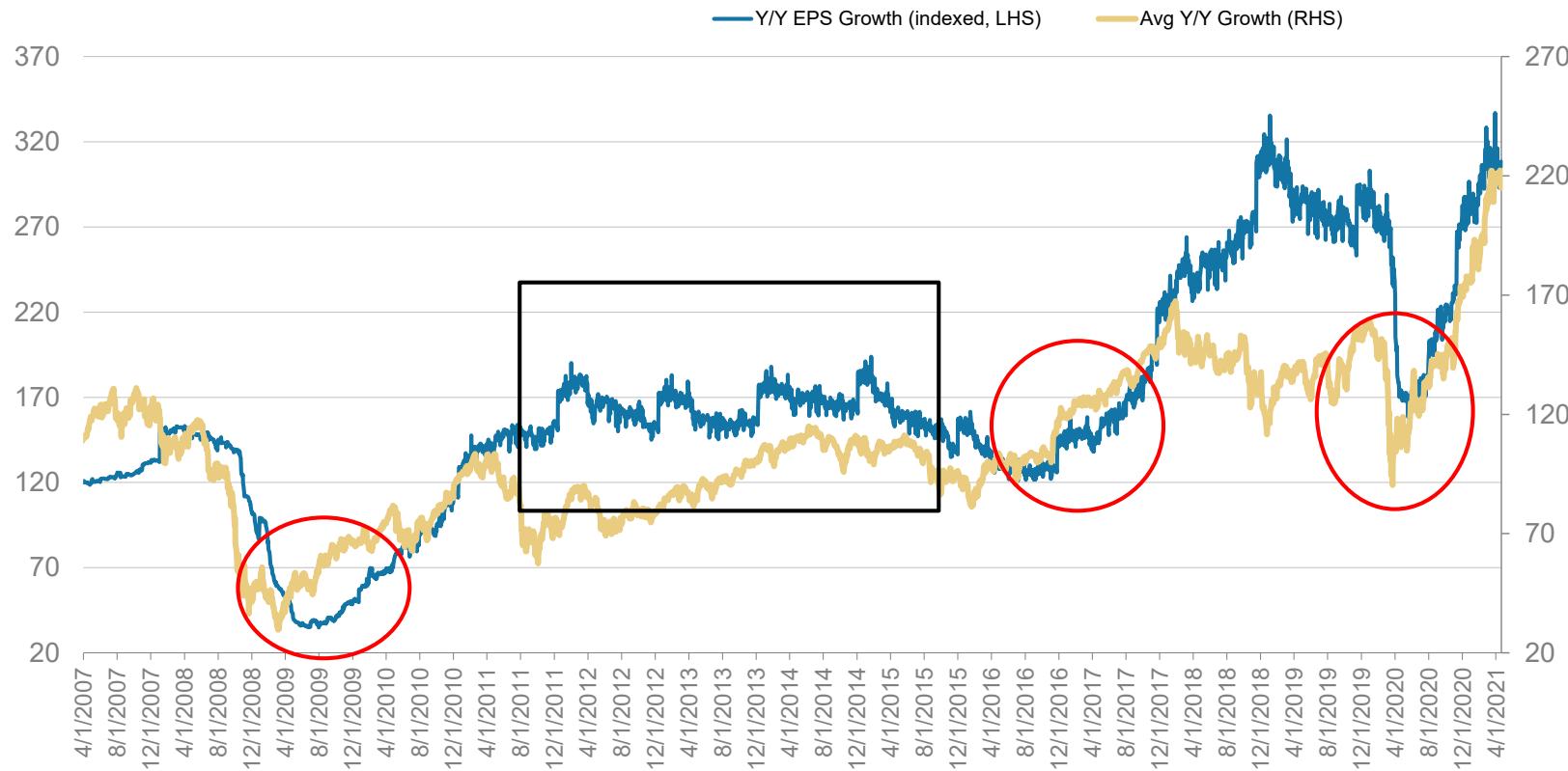
Source: Company Data, Morgan Stanley Research

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Machinery stocks inflect before EPS troughs

Price Performance vs. EPS Growth Revisions (indexed to 2007)



Source: Thomson Reuters, Company Data, Morgan Stanley Research

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EPS revisions have historically been the most reliable predictor of outperformance among Machinery Names

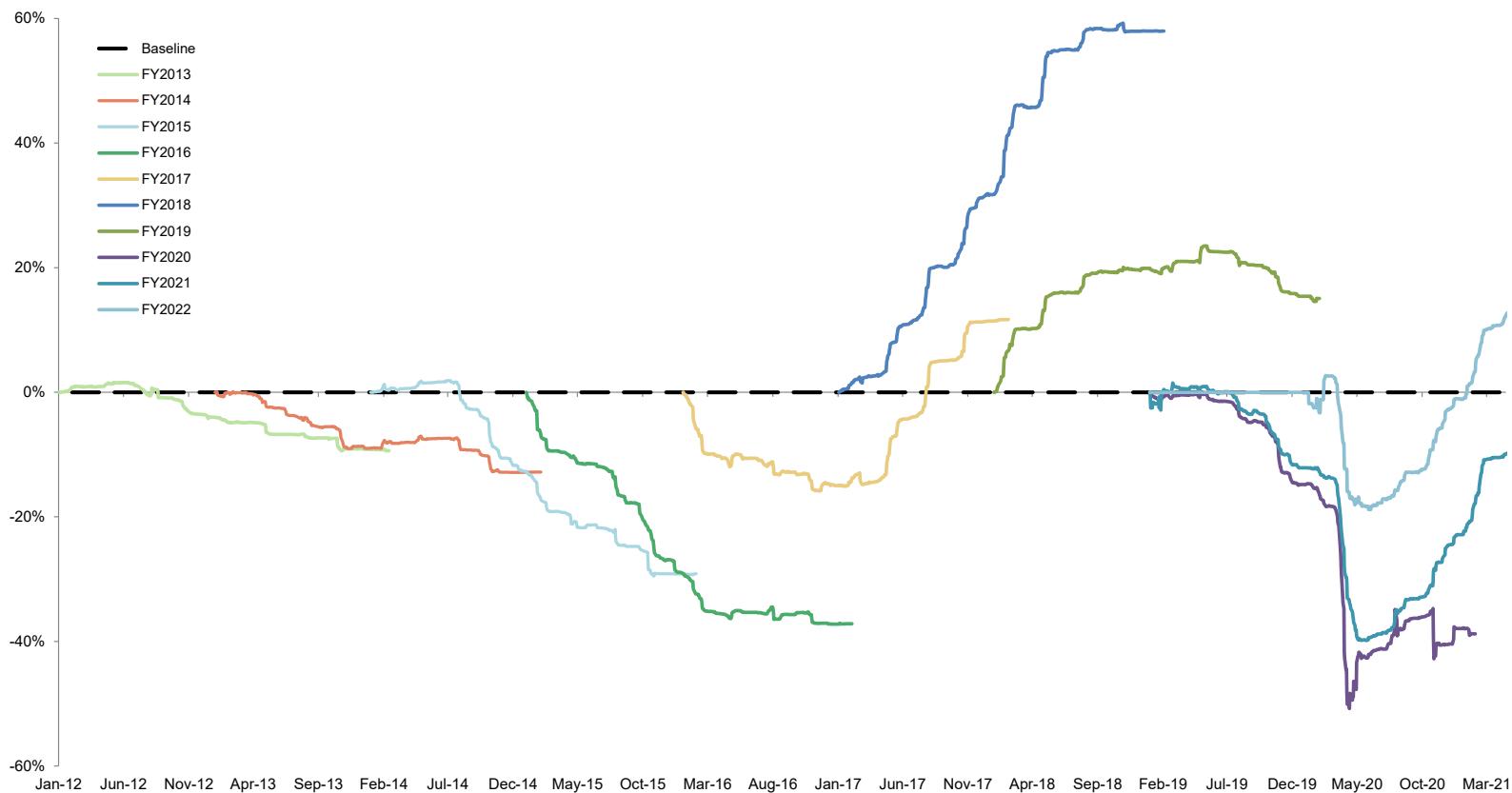
T1 - T3 Spread	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Median	Average	# of O/P years
EPS Revisions	15%	20%	-2%	25%	0%	3%	31%	11%	18%	35%	37%	17%	19%	64%	25%	13%	19%	22%	15
Relative	-14%	-12%	4%	12%	-8%	8%	-1%	10%	14%	7%	31%	-61%	11%	28%	-48%	13%	8%	-1%	10
FCF Yield	26%	21%	6%	24%	-18%	-11%	16%	14%	-22%	5%	8%	63%	-4%	14%	42%	-3%	7%	10%	10
Dividend Yield	-10%	-4%	9%	8%	-5%	-2%	10%	-7%	-10%	21%	3%	50%	8%	2%	4%	4%	4%	7%	11
Organic Growth	1%	-10%	8%	4%	8%	-21%	2%	-15%	9%	-30%	-30%	10%	7%	3%	9%	5%	3%	-3%	10
Share Repurchases*	8%	10%	-9%	-15%	-10%	17%	-4%	-16%	-34%	12%	22%	-82%	-1%	32%	3%	-28%	-6%	-7%	6

Factor	Type	Definition	Ranking
EPS Revisions	Sentiment	% change in current CY median EPS estimates	T1 = Stocks with the most positive EPS revisions
Relative	Valuation	Discount or premium vs. the S&P 500	T1 = Stocks with the highest discount entering the year
FCF Yield	Valuation	Trailing 12m Free Cash Flow / Market Cap as of the prior YE	T1 = Stocks with the highest FCF Yield entering the year
Dividend Yield	Capital Allocation	Trailing 12m dividend yield	T1 = Stocks with the highest dividend yield
Organic Growth	Growth	Organic growth during the prior calendar year	T1 = Stocks with the highest organic growth
Share Repurchases	Capital Allocation	Change in shares outstanding between current YE and prior YE	T1 = Stocks with the most shares repurchased during the current year

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FY21/FY22 EPS estimates stand ~(10%)/+13% below/above pre-COVID Levels



Source: Thomson Reuters, Company Data, Morgan Stanley Research

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How to Analyze Machinery Stocks

What type of Machinery stock?

Original Equipment Manufacturer (OEM)

- ✓ Makes and manufactures original equipment (tractors, excavators, trucks, locos, etc.)
- ✓ Generally 10-20% margins
- ✓ Ex. CAT, TEX, OSK, DE, AGCO, CNHI, PCAR, REVG, WAB

National Rental Chains (NRC)

- ✓ Ex. URI, HRI, AHT-LN, WSC
- ✓ Generally 40-50% margins
- ✓ Buy equipment from OEMs & rent to end user

Dealers

- ✓ Independent business owner
- ✓ Buys equipment from OEM + sells to end user
- ✓ Also sells AM parts + provides AM services
- ✓ Ex. FIT, TIH, RUSHA

Machinery Stocks break down into four basic categories...

Suppliers

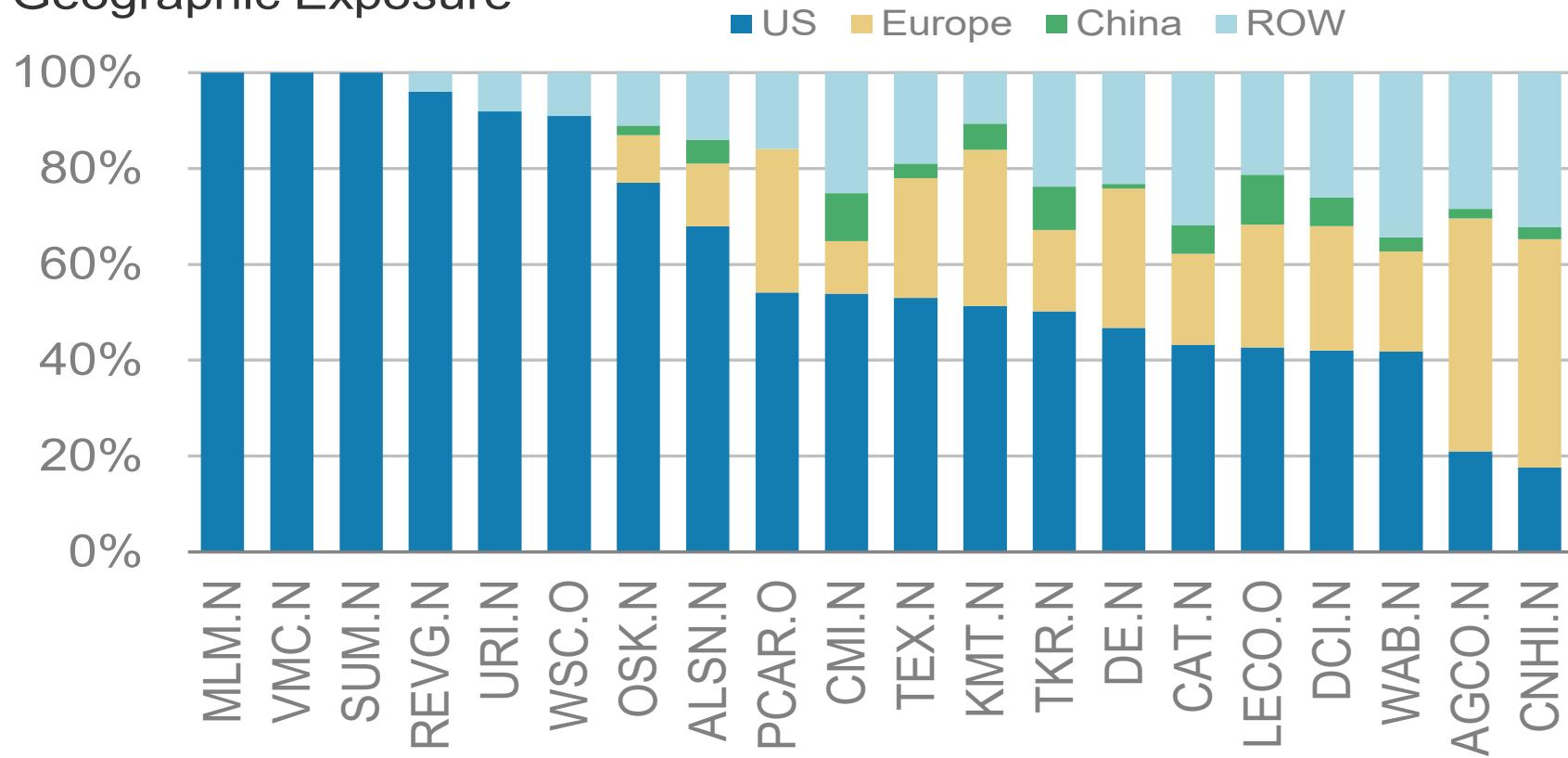
- ✓ Sell directly to OEMs
- ✓ Ex. ALSN, CMI, TKR, DCI, KMT, LECO

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Machinery stocks are heavily weighted towards US & Europe

Geographic Exposure



What type of business model?

Dealer Model

- Ex. CAT, DE, AGCO, PCAR, CNHI, REVG
 - Dealer manages relationship with end user
 - Dealer provides AM services to end user
- However:
- Less AM revenue to OEM

Captive Finance Unit

- CAT, DE, PCAR, CNHI
- Pay attention to delinquencies + loss ratios
- Residual value of equipment matters more

Machinery business models

Direct to End User

- Sell directly to end user
- Mostly consolidated customer base
- OSK, TEX, CAT E&T, TKR, ALSN

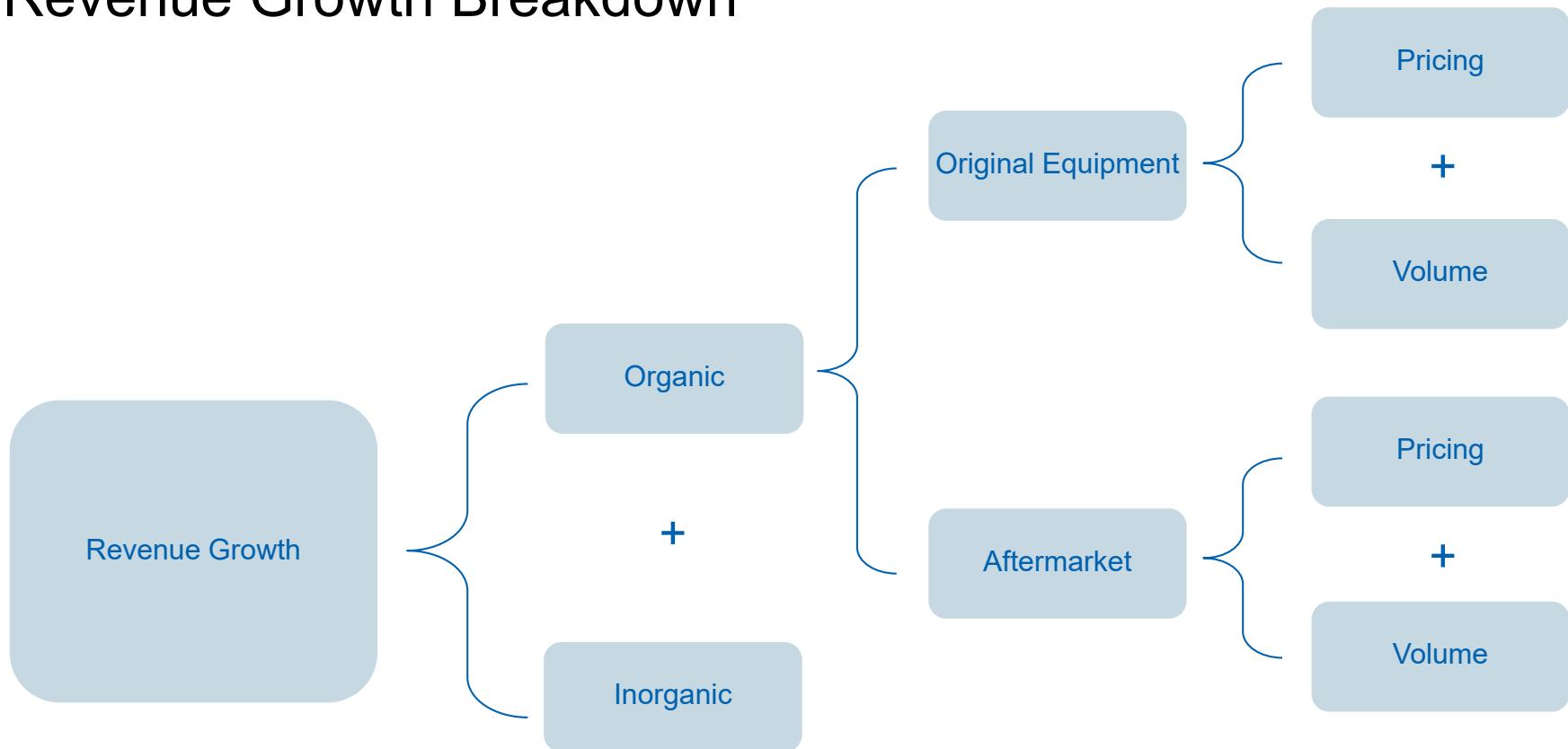
Distribution network

- CMI
- 5-8% margins
- Less cyclical
- Opportunity to push more product and manage relationships across regions
- More consistent service

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Revenue Growth Breakdown

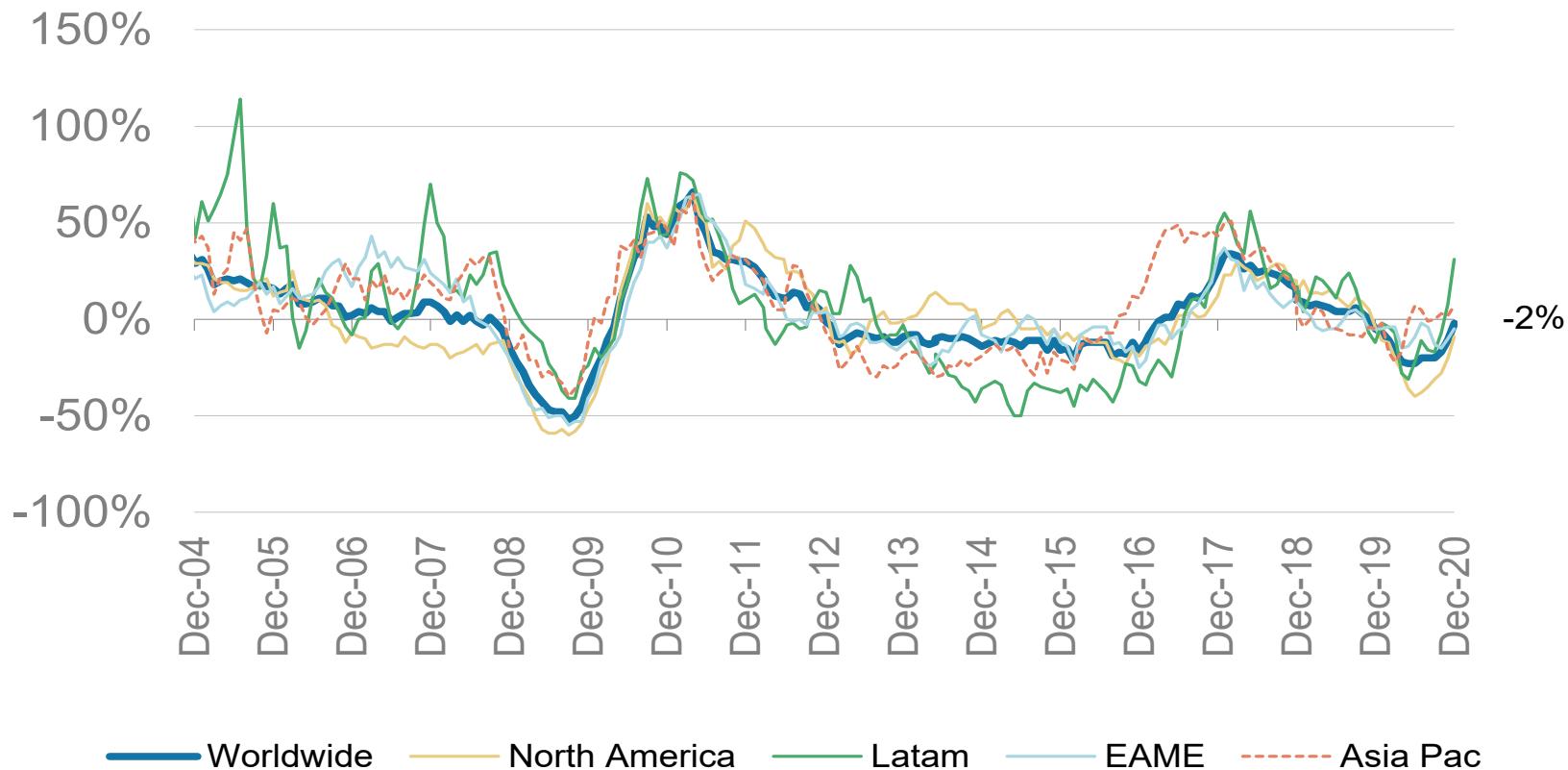


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Retail Statistics are backwards looking, but help identify where we are in cycle

CAT Machine 3-mo Rolling Retail Sales



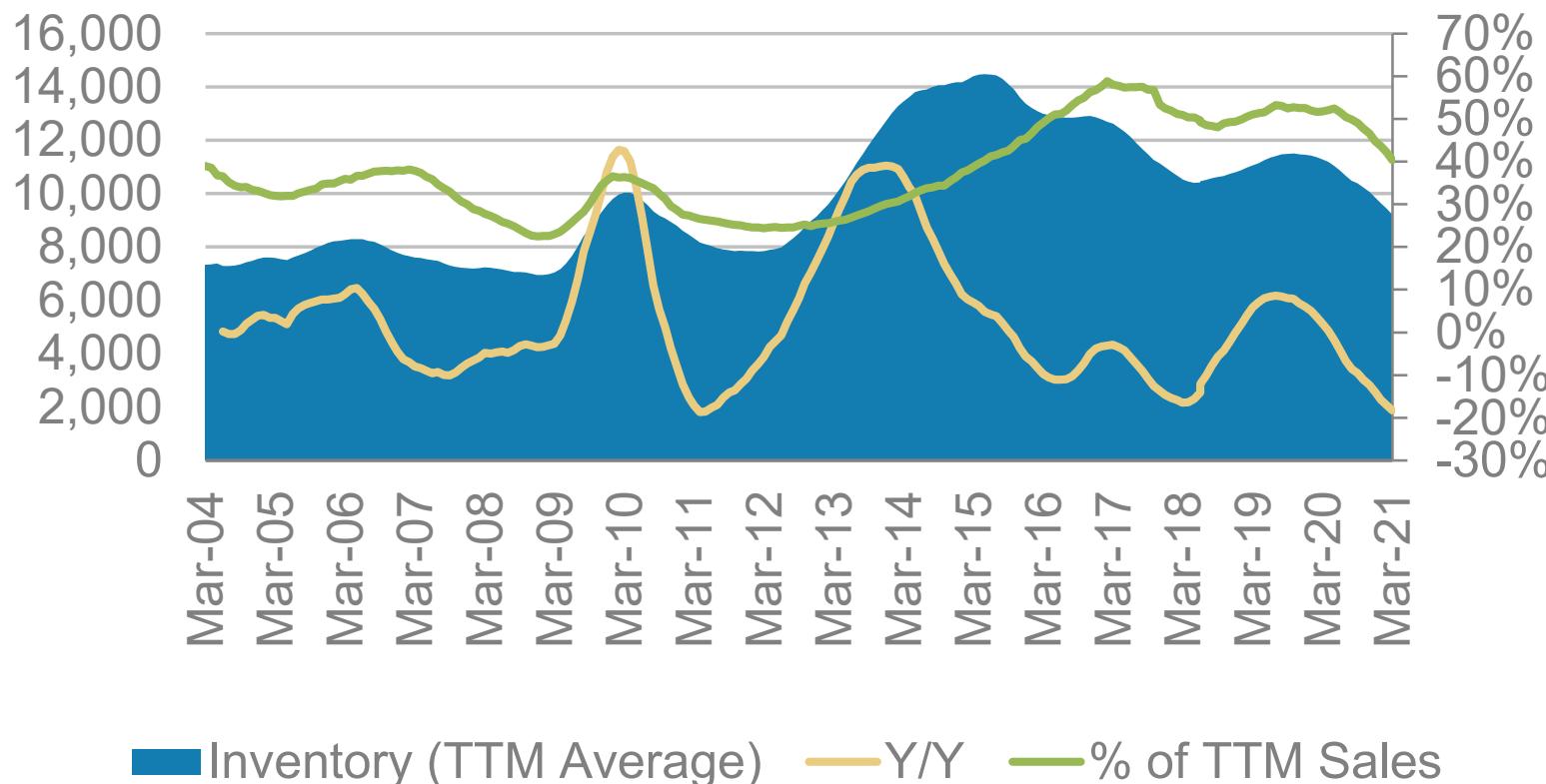
Source: Company data, Morgan Stanley Research. Note: Following 4Q20, CAT will be reporting retail sales on a quarterly basis.

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Retail Sales don't include aftermarket sales or swings in dealer inventories

U.S. + Canada 100+ HP Inventories



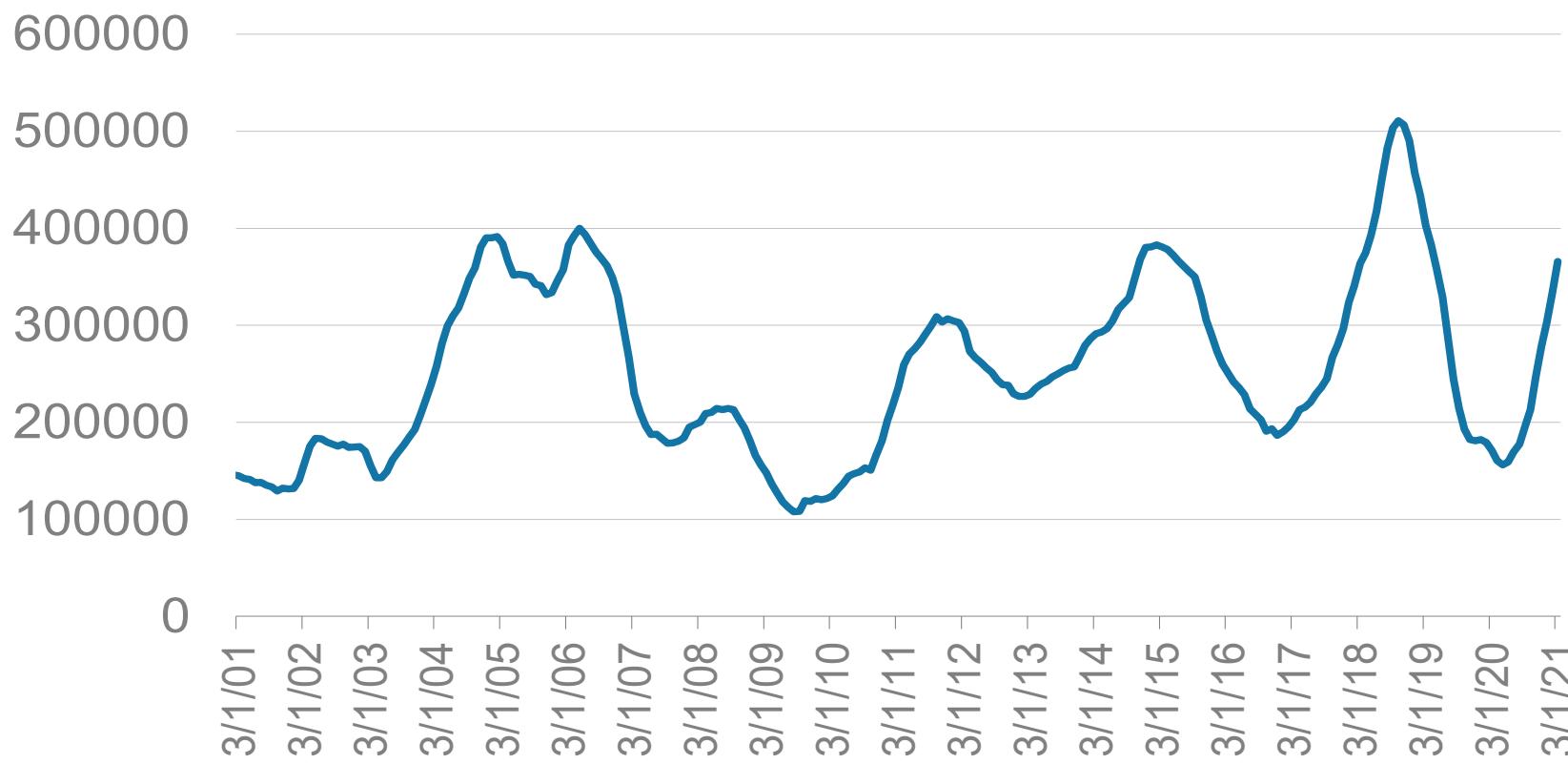
Source: Company Data, Morgan Stanley Research

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Orders are better leading indicator

TTM NA Class 8 Orders



Source: Company Data, ACT Research, Morgan Stanley Research

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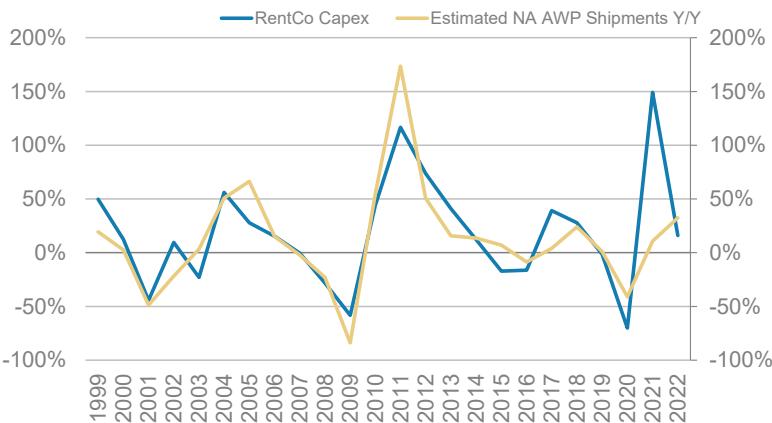
O+G, Mining + RentalCo Capex correlate with OEM revenue

Composite Capex Plans Index



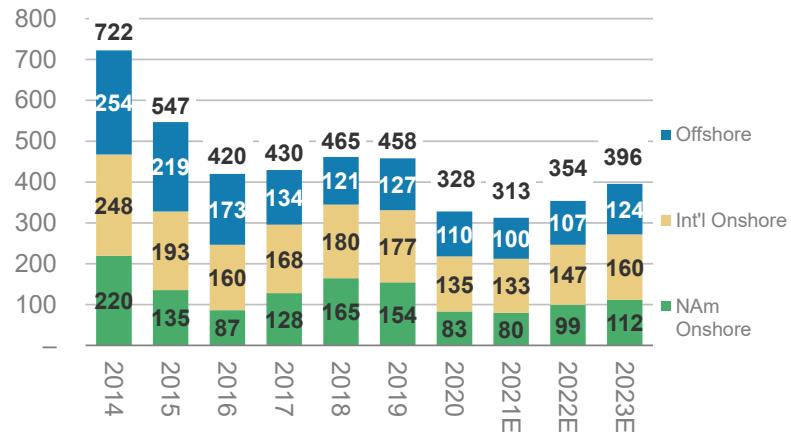
Source: Federal Reserve Banks of Richmond, Philadelphia, New York, Kansas City, Texas, Bureau of Economic Analysis, Morgan Stanley Research

RentCo Capex vs. NA AWP Shipments



Source: Thomson Reuters, Company Data, Morgan Stanley Research

Total Capex (\$B)



Mining Capex

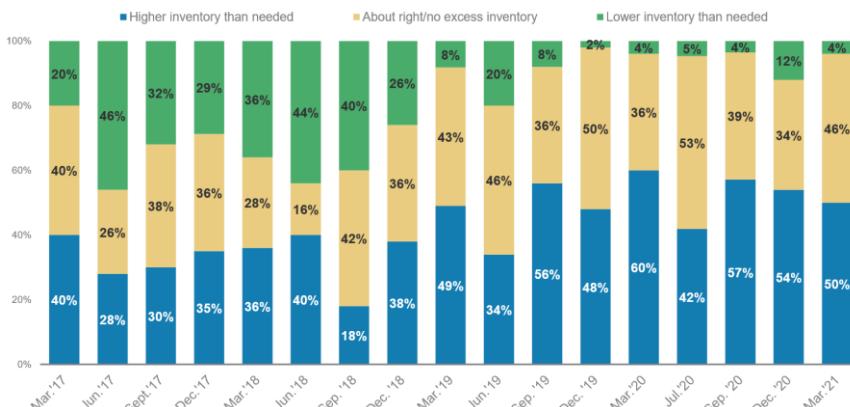


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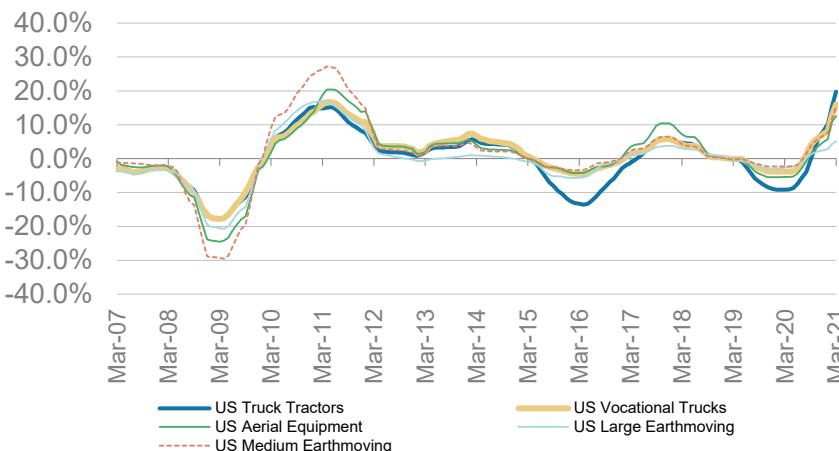
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Used Equipment Pricing/Inventory impacts New Equipment

Current Inventory Level: New CON Machinery



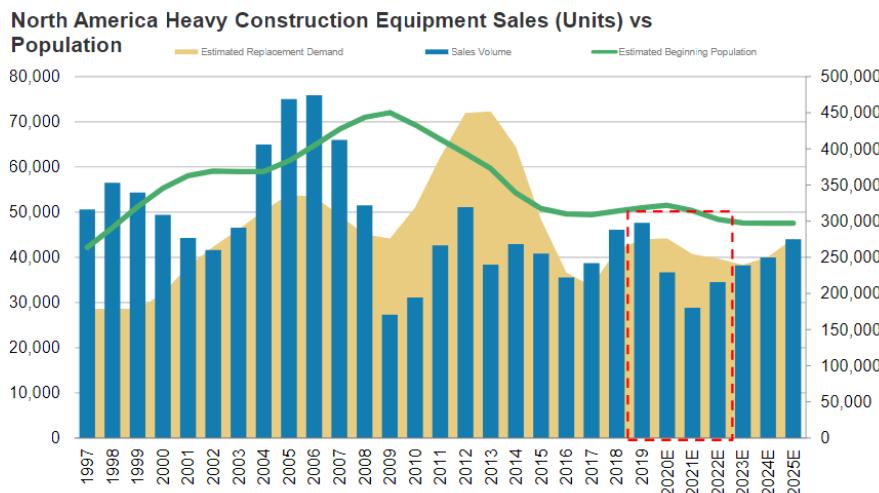
Used Equipment Prices (Y/Y)



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Understanding replacement cycle dynamics



Source: Company data, Off-Highway Research, Morgan Stanley Research

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Higher Aftermarket sales reduces cyclical nature of OEMs

Original Equipment (OE)

- ✓ Makes and manufactures original equipment (tractors, excavators, etc.)
- ✓ Generally 5-20% margins
- ✓ Ex. CAT, TEX, OSK, DE, AGCO, CNHI, PCAR, CMI, REVG

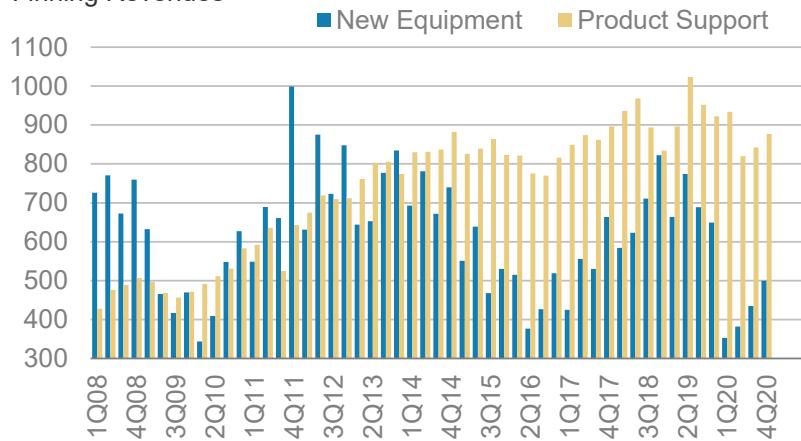
Aftermarket Services

- ✓ Generally offered by the dealer
- ✓ Generally 20+% margins

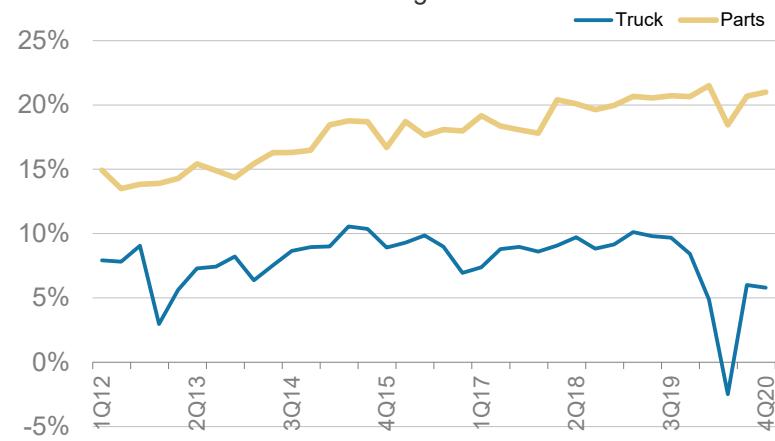
Aftermarket Parts (AM)

- ✓ Most OEMs also sell parts
- ✓ Some manufacture their own, others merely distribute
- ✓ Generally 15-35% margins

Funding Revenues



PCAR Truck vs Parts Pre-Tax Margins

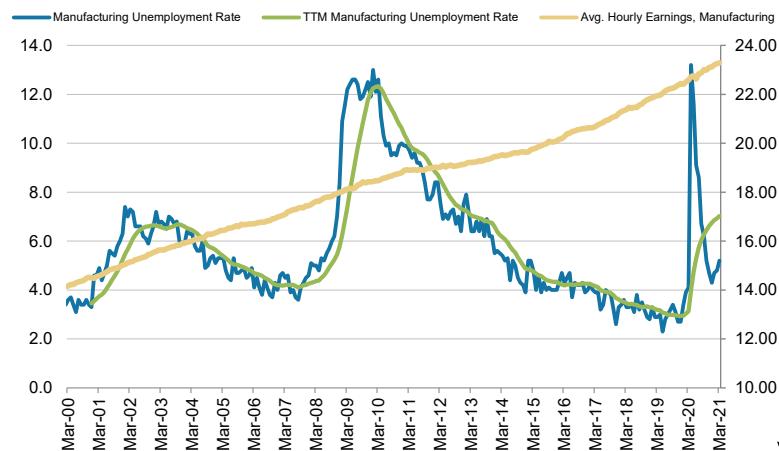


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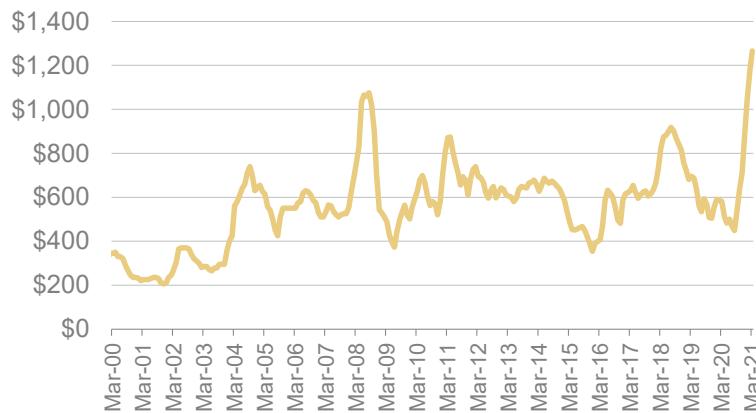
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Price/Cost Trends – input costs have retraced to record/near record levels

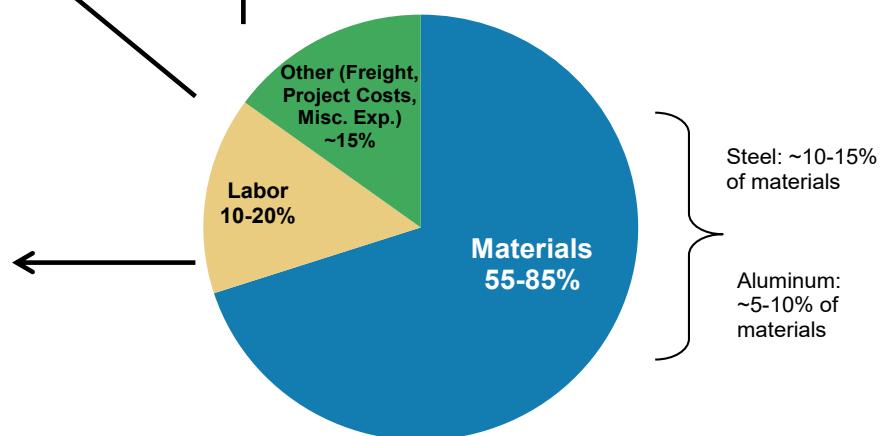
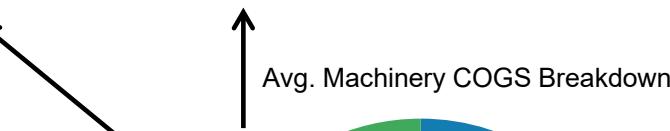
Labor Cost Trends



US HRC Prices (\$/ton)



DAT Linehaul Van Rates (Y/Y)



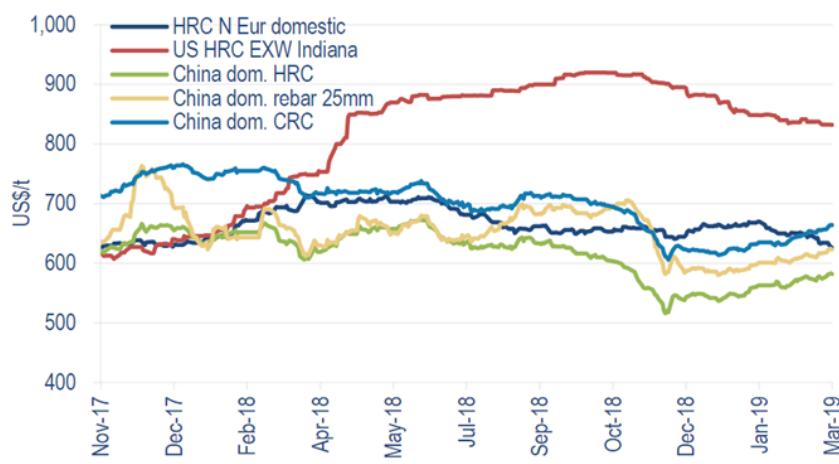
Source: BLS, Company Data, Morgan Stanley Research

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Price/Cost: We expect volatile margin performance in 2021

While steel inflation over the 2017/2018 cycle was largely isolated to the US...



...more recent inflation has been more broad-based, with ongoing Y/Y growth across Europe, China and the US.

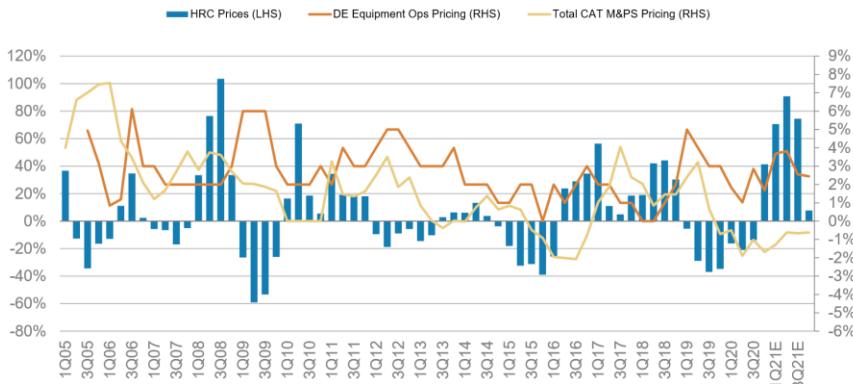


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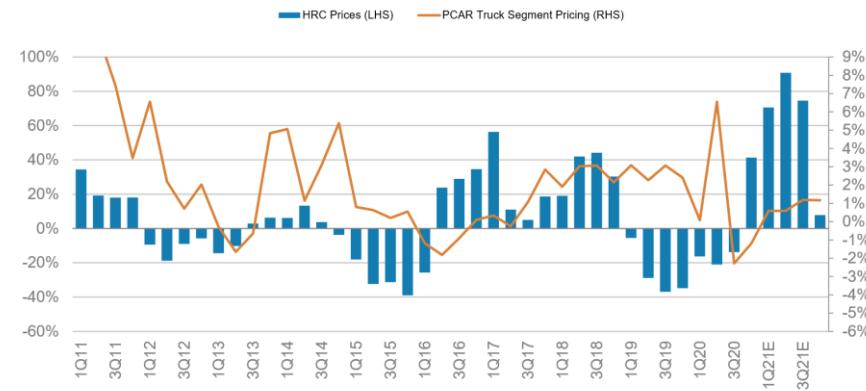
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Price/Cost: We expect volatile margin performance in 2021

Ag (DE) pricing has historically remained more stable through the cycle, including in periods around/following steel inflation - and while Construction pricing has shown a greater correlation with steel prices, it remains dependent on the strength of the end market.



Similarly, Truck (PCAR) pricing has successfully recaptured steel inflation, although this capture has largely coincided with underlying strength in the CI8 truck market as well.



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Focus on Incremental/Decremental Margins

$$\text{Incremental Margin} = \frac{\text{Change in Adj. Op Income}}{\text{Change in Sales}}$$

- Generally 20-25% incrementals are considered good for mid cycle
- Focus on accelerations/decelerations
- Volatility can be caused by:
 - Stage of recovery
 - FX Revenue Tailwinds/Headwinds can dampen/expand
 - Labor + Material inflation
 - Cost cutting programs (SG&A, R&D, Procurement Initiatives, Restructuring)
 - Best practice → make adjustments

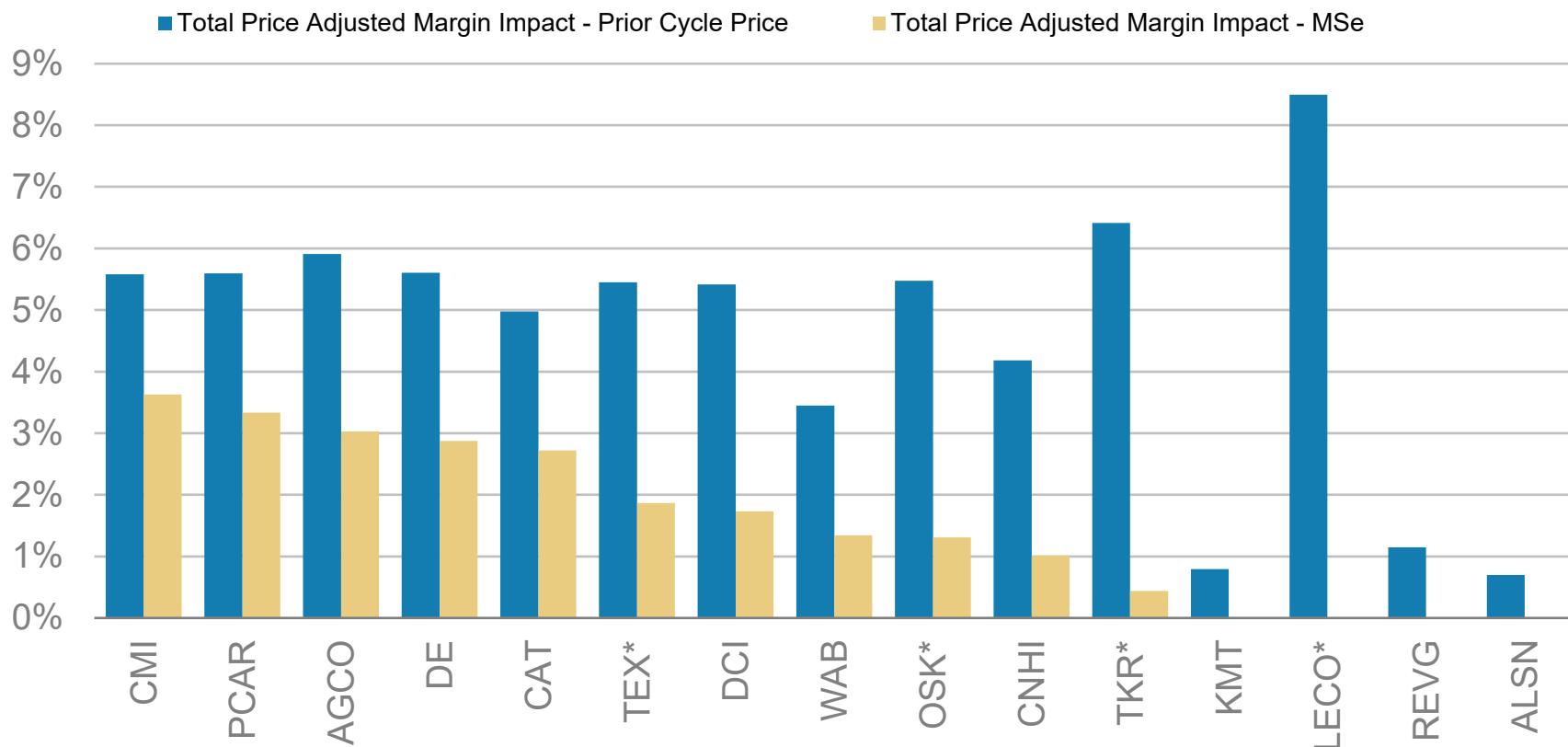
Incremental Operating Margin	1Q20	2Q20	3Q20	4Q20	2020	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22	4Q22	2022
Caterpillar	29%	32%	32%	24%	30%	18%	32%	21%	24%	25%	25%	25%	25%	25%	25%
CNH Industrial	38%	76%	17%	30%	82%	36%	90%	22%	-4%	56%	27%	28%	28%	28%	28%
Deere & Company	0%	17%	-14%	-418%	-6%	50%	32%	21%	15%	28%	30%	31%	30%	27%	31%
Terex Corp.	37%	20%	21%	5%	21%	2055%	24%	27%	31%	28%	23%	25%	19%	20%	23%
United Rentals	-25%	39%	28%	47%	46%	34%	29%	39%	61%	50%	41%	48%	52%	49%	48%
AGCO Corporation	8%	24%	15%	18%	-1%	13%	29%	13%	14%	77%	181%	14%	61%	-32%	19%
Cummins Inc	20%	22%	11%	70%	16%	33%	19%	19%	8%	19%	34%	34%	31%	30%	33%
Oshkosh Corp	47%	22%	16%	19%	20%	4%	582%	11%	15%	11%	10%	18%	23%	24%	19%
PACCAR Inc	24%	17%	18%	25%	19%	19%	16%	15%	22%	17%	20%	17%	16%	14%	17%
Rev Group Inc.	4%	41%	30%	-28%	22%	64%	41%	18%	12%	25%	-2%	33%	57%	33%	32%
WillScot Corporation	58%	-125%	35%	35%	39%	30%	19%	25%	77%	29%	64%	65%	66%	69%	66%
Westinghouse Air Brake Technologies Corp	21%	12%	17%	9%	6%	42%	32%	39%	36%	34%	33%	33%	33%	33%	33%
Allison Transmission Holdings Inc	71%	53%	66%	10%	52%	82%	44%	42%	11%	26%	33%	37%	26%	15%	32%
Timken	42%	14%	7%	13%	20%	15%	16%	22%	30%	20%	26%	26%	26%	26%	26%
Donaldson Company	35%	1%	19%	20%	18%	4%	37%	26%	20%	27%	15%	24%	29%	27%	23%
Lincoln Electric	20%	24%	12%	18%	20%	50%	23%	24%	37%	28%	25%	25%	24%	23%	24%
Kennametal	87%	69%	23%	27%	42%	11%	2%	251%	11%	35%	33%	27%	41%	40%	35%
Average	30%	21%	21%	-4%	26%	150%	63%	37%	31%	36%	30%	35%	27%	30%	30%
Median	29%	22%	18%	19%	20%	33%	29%	22%	20%	28%	27%	27%	29%	27%	28%

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We see CMI, PCAR, AGCO & DE as seeing the largest Y/Y margin headwinds from steel/aluminum prices

Estimated Steel/Aluminum Margin Impact



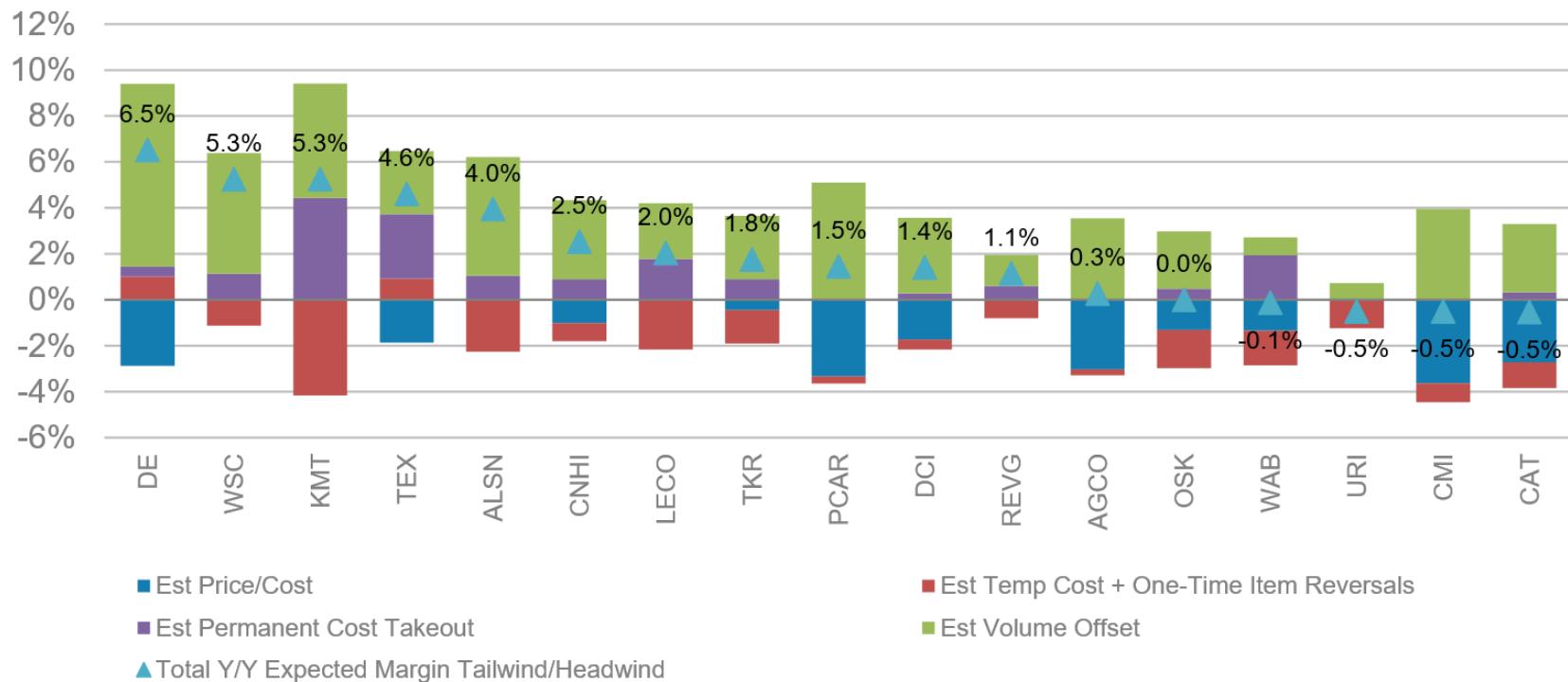
Source: Company Data, Morgan Stanley Research. *Denotes companies that have either put through a surcharge or outsized mid-year price increase to offset input cost inflation.

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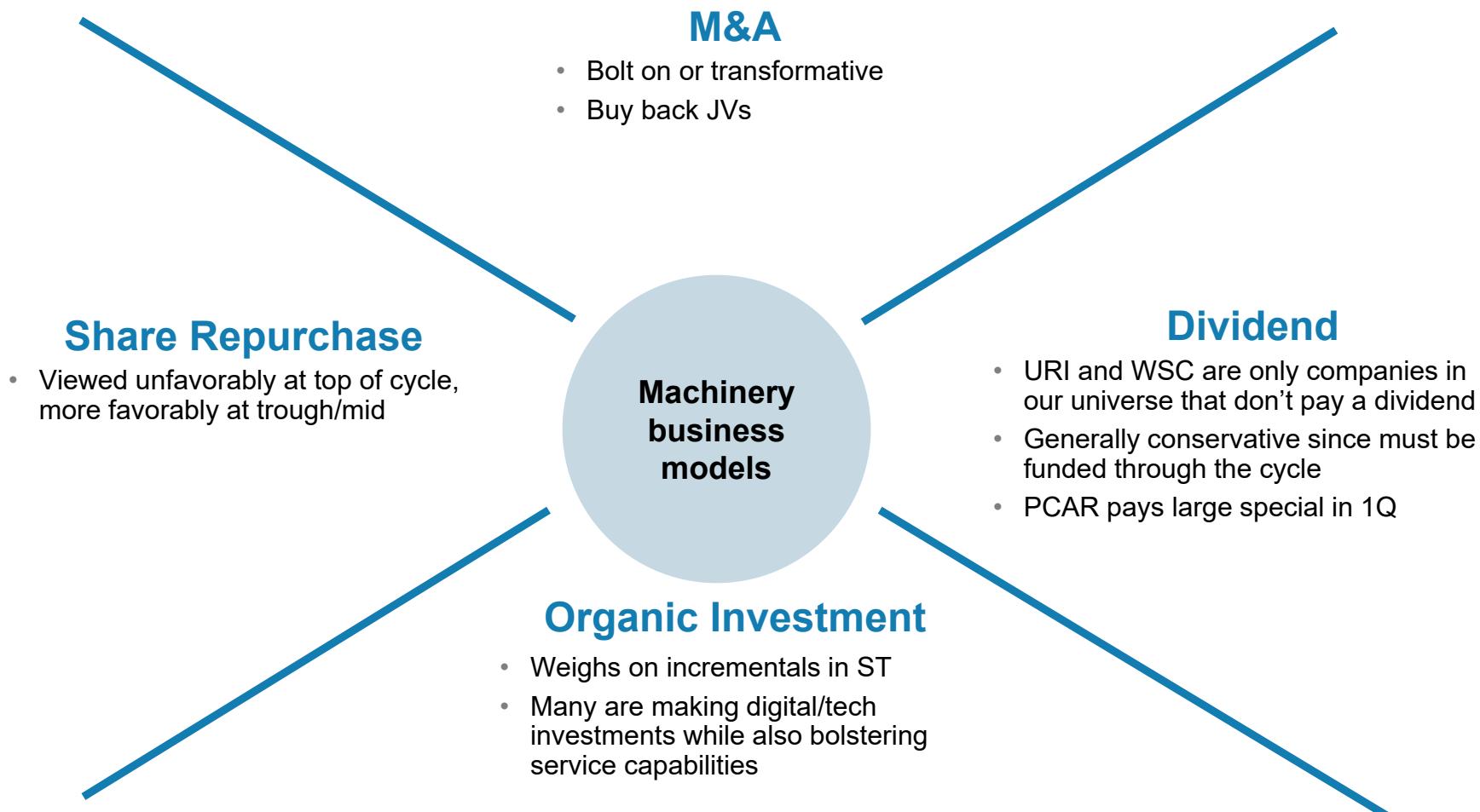
More broadly, we see URI, CMI and CAT as facing the largest degree of Y/Y margin headwinds

Estimated Margin Tailwind/Headwind



Source: Company Data, Morgan Stanley Research. Consensus & estimates as of March 2021.

How to spend cash?



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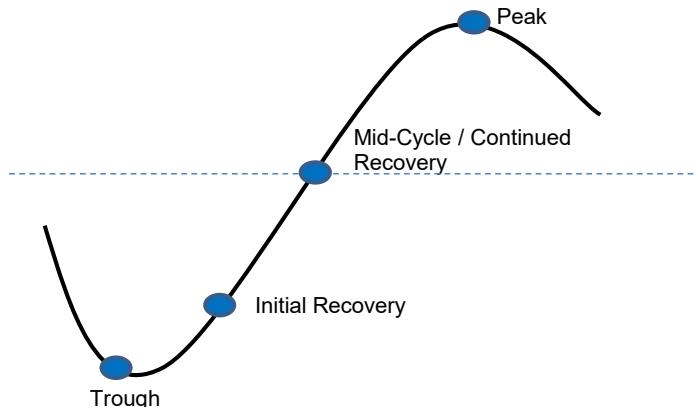
Valuation

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How do we value Machinery stocks?

When valuing Machinery stocks, we ascribe to a cyclical valuation framework based on where we are in the cycle. As we approach mid-cycle levels, we believe investors should focus on a NTM P/E or NTM EV/EBITDA given the additional clarity on revenue growth, price cost pressures, and the impact of restructuring when looking at a shorter term horizon. We use Peak & Trough EPS as secondary, "gut-check" methodology, acknowledging that our peak and trough estimates generally require many assumptions and we tend not to know when peak/trough occurs until it has passed. That said, as names in the sector begin to approach peak levels, we believe investors will should consider 'normalized' earnings numbers (i.e. 10-15 year average revenues on an updated cost-structure). We think using "normalized" valuation levels for construction stocks is still 1-2 years away as upwards EPS revisions continue to challenge peak earnings estimates. At peak and trough, we also consider P/Sales or EV/Sales as a secondary methodology.

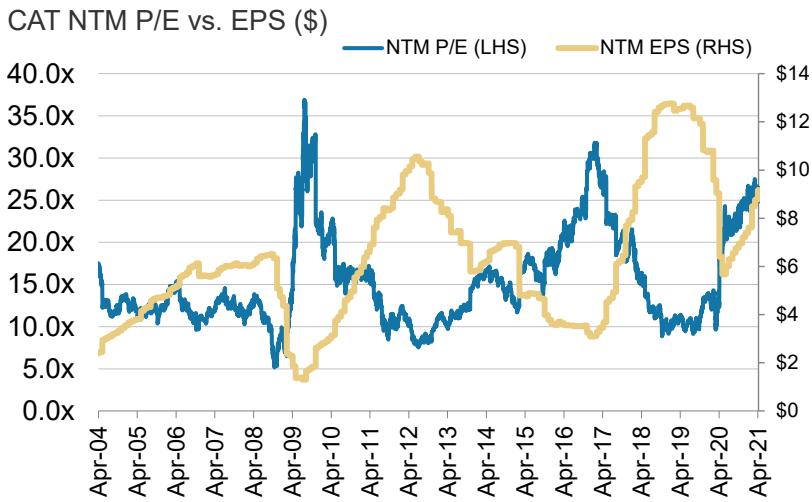
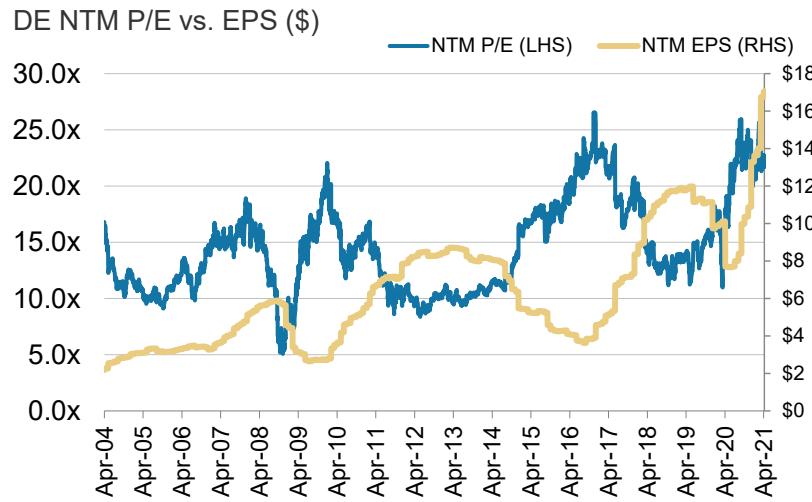


Point in Cycle	Valuation Methodology	Qualitative Commentary
Peak	Normalized EPS / EBITDA Price/LTM Sales	<ul style="list-style-type: none"> - What's the downside risk? - Macro-Economic Health - Potential Restructuring
Mid-Cycle / Continued Recovery	NTM EPS / EBITDA	<ul style="list-style-type: none"> - Strength of Upcycle - Degree of Volume Leverage & Price/Cost Impacts - Testing "Peak Earnings" hypothesis
Initial Recovery	NTM EPS/EBITDA Peak EPS / EBITDA	<ul style="list-style-type: none"> - Potential Strength of Upcycle - Impact from Restructuring - What Can This Be Worth in a Best Case Scenario?
Trough	Normalized EPS / EBITDA Price/LTM Sales Sum of the Parts	<ul style="list-style-type: none"> - Impact from Restructuring - Strategic Alternatives - How to Assess Value under Depressed Conditions

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Valuation “Peaks” when Sales/EPS trough



Source: Thomson Reuters, ACT, Company data, Morgan Stanley Research

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In periods of multiple compression, identifying upside to EPS revisions is key

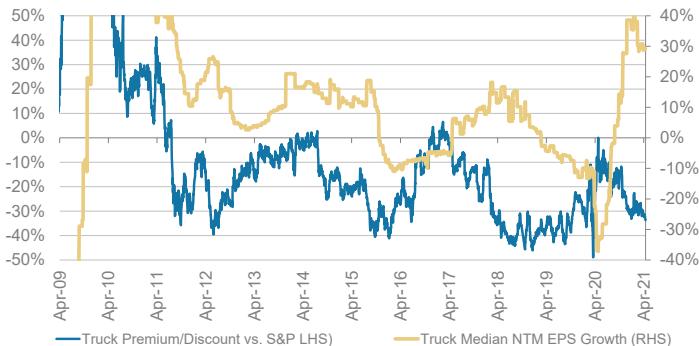
Ag multiples are currently trading at an -11% discount to the market multiple vs the 5 year median of a -12% discount.

Y/Y EPS Change vs Premium/Discount to S&P multiple (Ag)



Truck multiples are trading at a -34% discount to the market multiple vs. the 5 year median of a -25% discount.

Y/Y EPS Change vs Premium/Discount to S&P multiple (Truck)



Source: Company data, Thomson Reuters, Morgan Stanley Research. As of 4.21.2021.

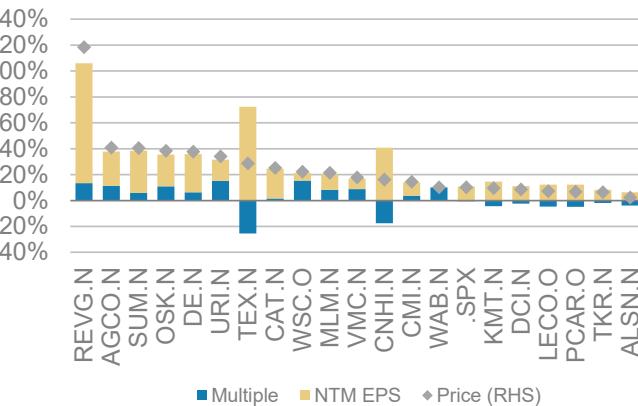
Construction multiples (ex URI which we value on EBITDA) are currently trading at a -7% discount to the market multiple vs. the 5-year median of -17%.

Y/Y EPS Change vs Premium/Discount to S&P multiple (Construction)



YTD, Machinery stocks are up ~25%, with positive NTM EPS revisions of 2% complemented by multiple expansion of 2%.

Machinery Price Appreciation YTD



Construction Equipment (incl. O&G and Mining)

Agriculture Equipment

Truck OE Equipment & Suppliers

Aggregates

Locomotives

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Construction Equipment

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Construction Equipment & Market Primer: Who sells what?

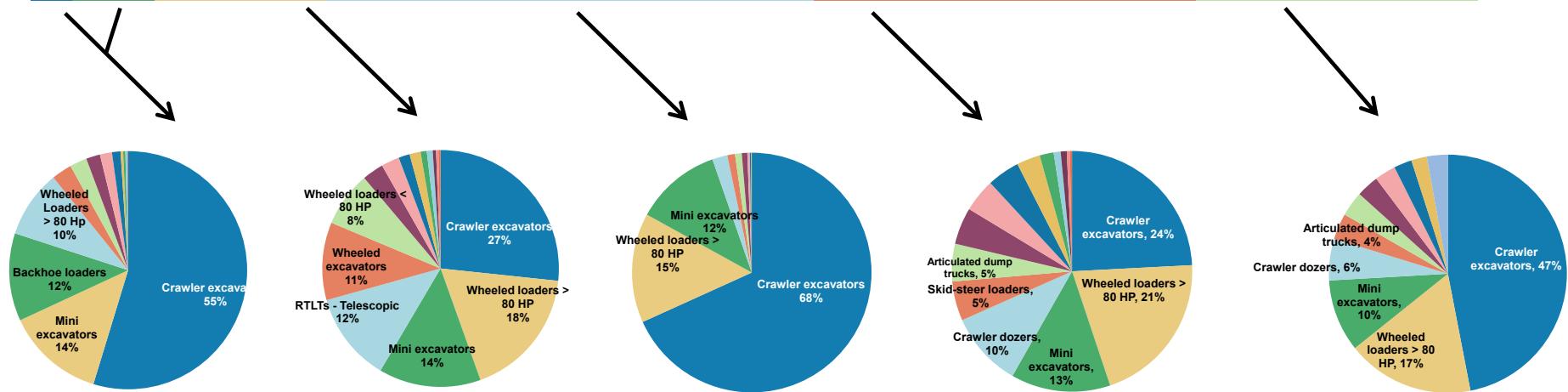
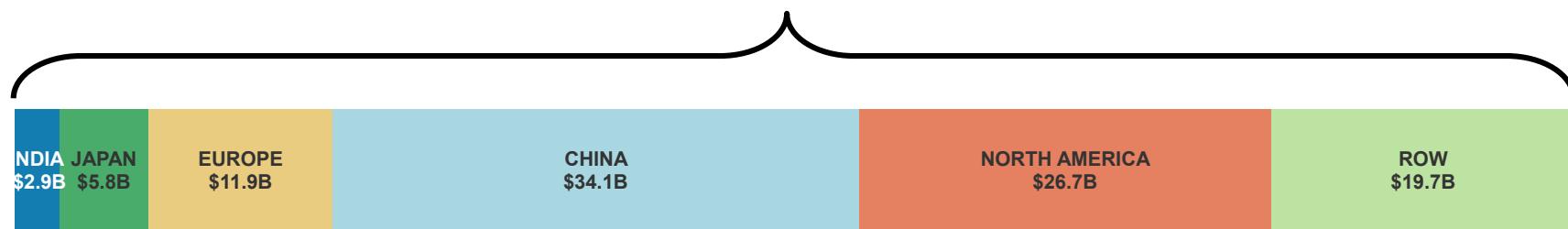
		CAT	DE	CNH	TEX	OSK	MTW	Komatsu	Hitachi	Kubota	Sumitomo	Volvo	Liebherr	Altec
	Light Construction Equipment	Mini Excavators	✓	✓	✓			✓	✓	✓		✓		
		Wheel Loaders	✓	✓	✓			✓		✓		✓		
		Skid Steers	✓	✓	✓			✓		✓		✓		
		Backhoe Loaders	✓	✓	✓			✓		✓		✓		
		Aerial Lifts				✓	✓			✓		✓		✓
	Heavy Construction Equipment	Excavators	✓	✓	✓			✓	✓			✓	✓	
		Wheel Loaders	✓	✓	✓			✓	✓			✓	✓	
		Backhoe Loaders	✓	✓	✓			✓				✓		
		Motor Graders	✓	✓	✓			✓				✓		
		Off-Highway Trucks	✓	✓	✓			✓				✓		
	Cranes	Boom Trucks						✓			✓		✓	✓
		Mobile Telescopic				✓		✓			✓		✓	✓
		Lattice Boom						✓			✓		✓	
		Tower				✓		✓					✓	

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Crawler Excavators are most important in every market

Construction Equipment was a \$101B market in 2020
(excludes ~\$35B cranes + ~\$10B aerials)

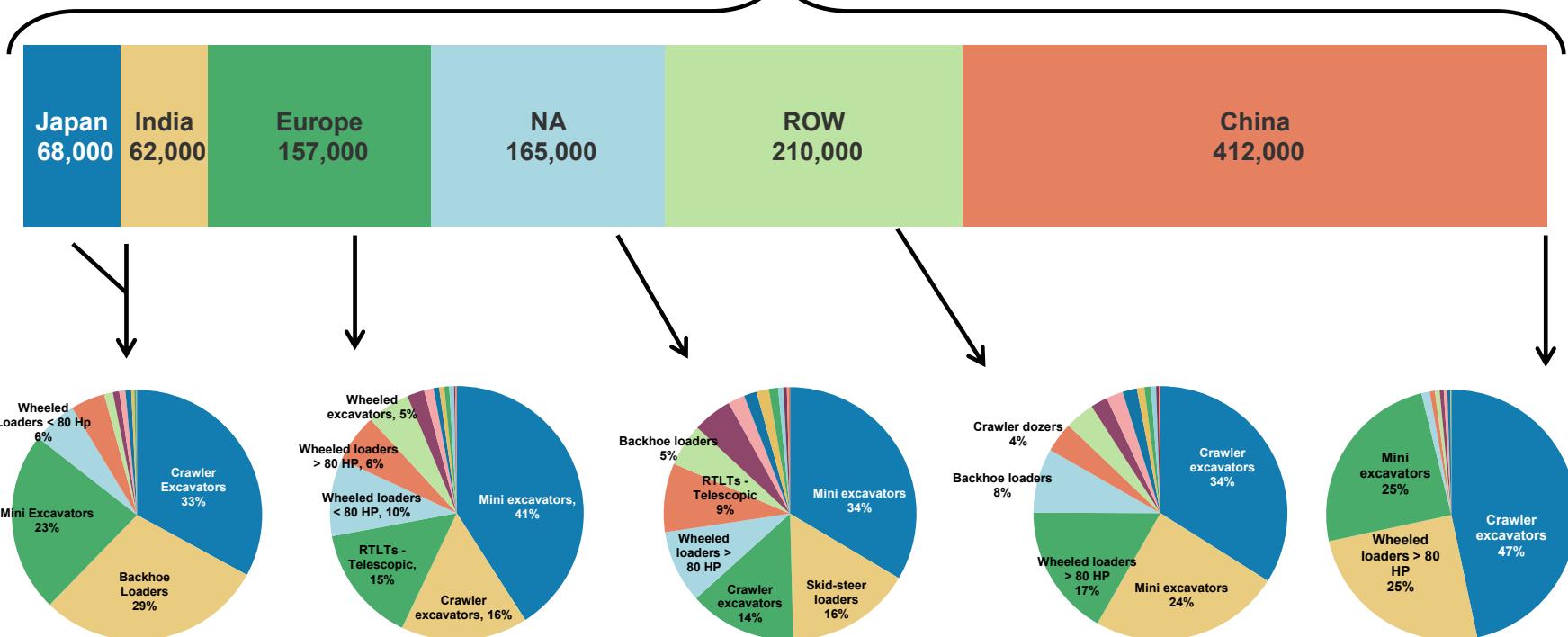


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China is largest market by units

1.1m unit market in 2020
(excludes cranes + aerials)



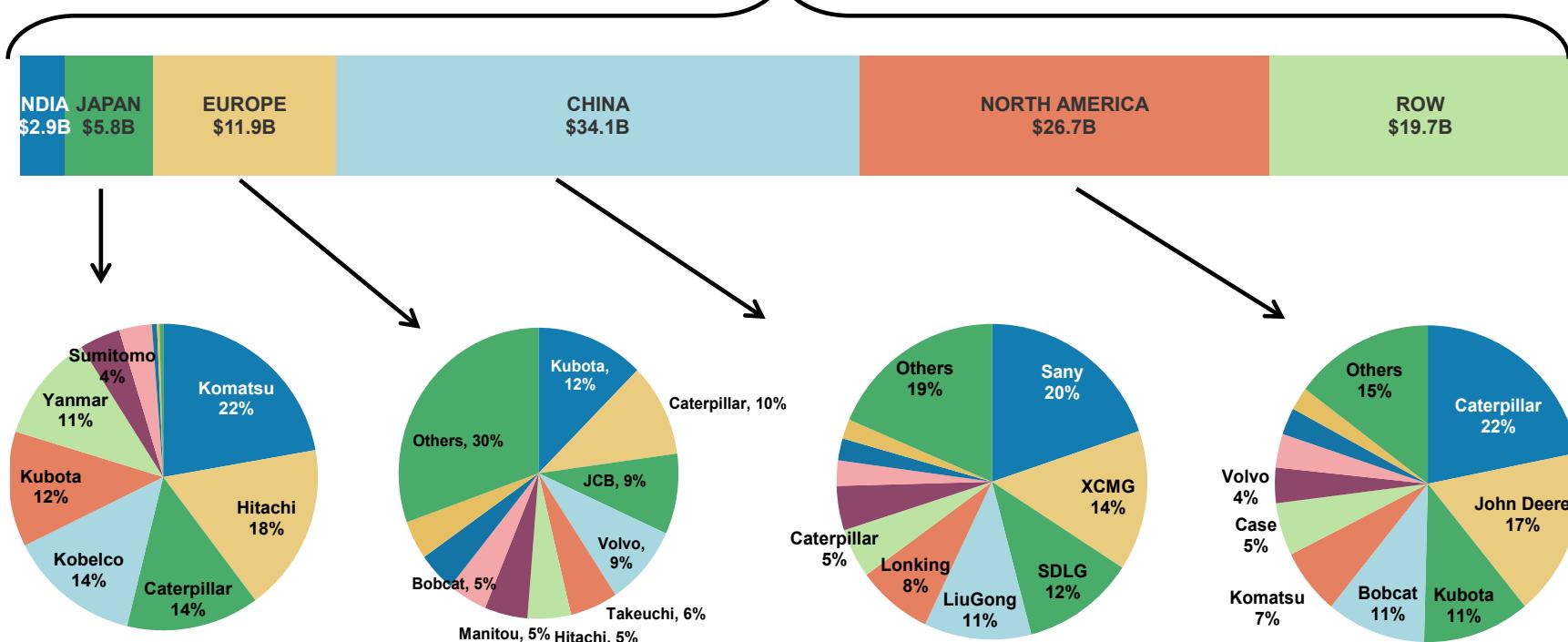
Source: Off-Highway, Morgan Stanley Research

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North America is the most consolidated market

\$101B market in 2020
(excludes ~\$35B cranes + ~\$10B aerials)



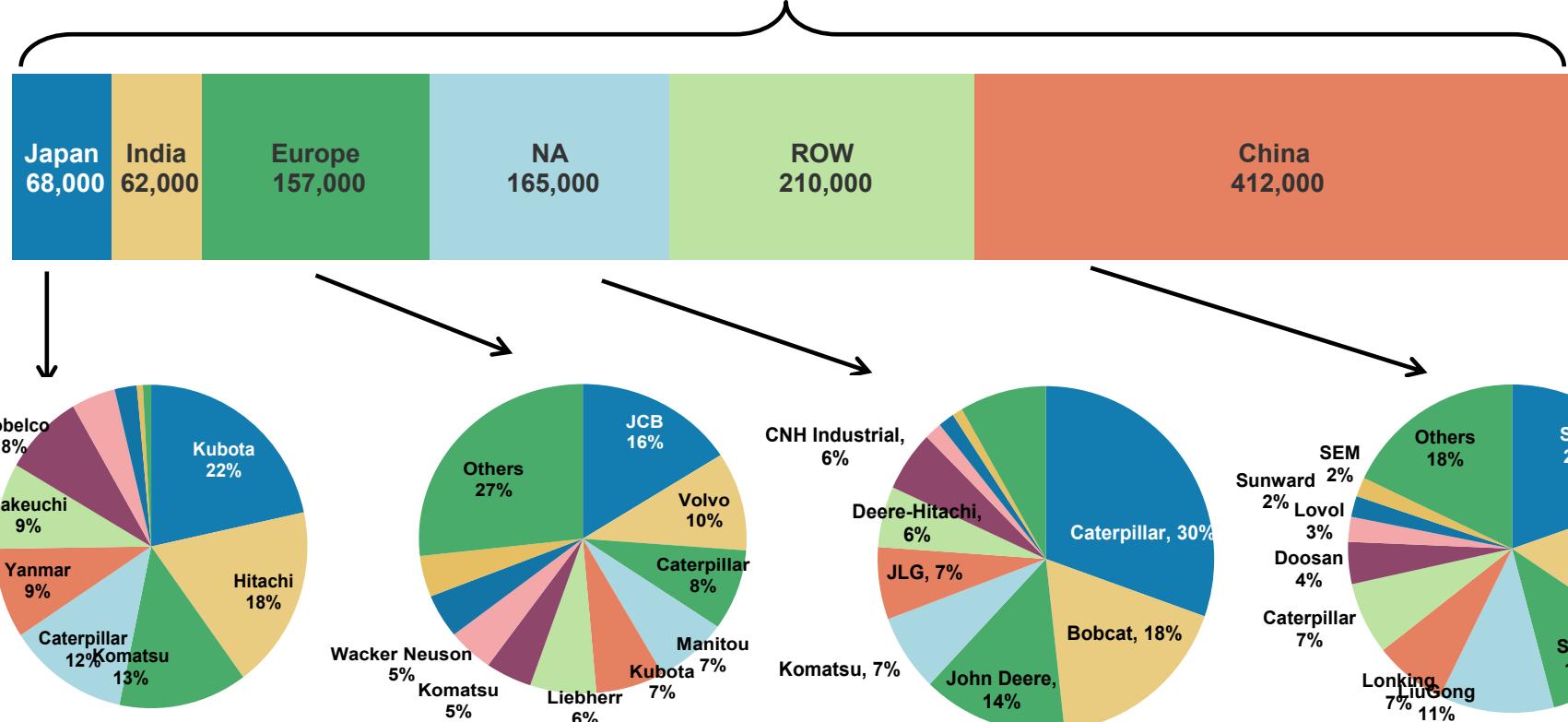
Source: Off-Highway, Morgan Stanley Research

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Looking at unit share can be misleading

1.1m unit market in 2020
(excludes cranes + aerials)



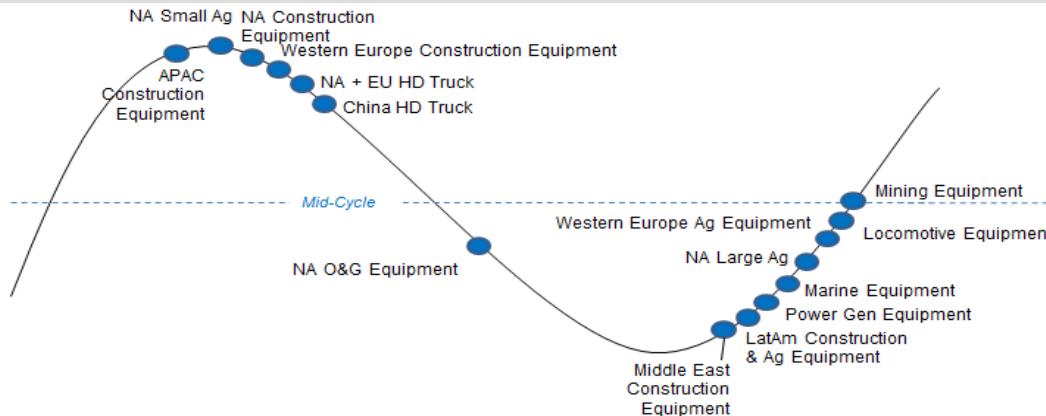
Source: Off-Highway, Morgan Stanley Research

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Where are we in the Construction Equipment Cycle?

2020 marked a year of universal weakness across both Heavy and Light construction equipment albeit with higher Resi spending trends driving relative resiliency in Light equipment. After incorporating our updated Non-Resi forecast and fleet growth assumptions, we expect heavy CE verticals to remain weak in '21 after a significant fall in '20.



Construction Equipment Sales Growth	2015	2016	2017	2018	2019	2020E	2021E	2022E
North America	-1%	-7%	11%	16%	2%	-14%	-8%	20%
<i>Light</i>	3%	0%	12%	13%	1%	-5%	5%	20%
<i>Heavy</i>	-5%	-13%	9%	19%	3%	-23%	-21%	20%
EAME	-2%	-2%	12%	10%	3%	-22%	-3%	17%
<i>Light</i>	-1%	5%	12%	11%	2%	-20%	5%	20%
<i>Heavy</i>	-2%	-9%	11%	9%	4%	-25%	-11%	15%
LatAm	-33%	-27%	13%	9%	6%	-12%	-22%	-25%
APAC/ROW	-19%	6%	41%	25%	-4%	-1%	-12%	-4%
Weighted Average	-8%	-5%	17%	16%	1%	-13%	-9%	10%

Source: Company data, EDA, Off-Highway Research, Morgan Stanley Research

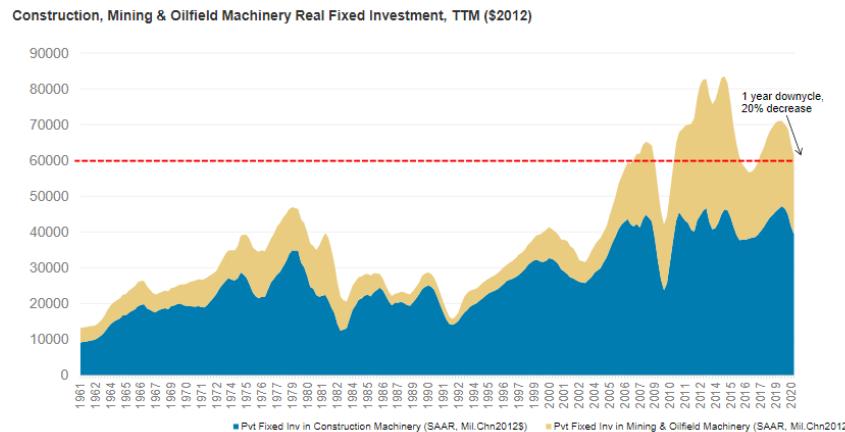
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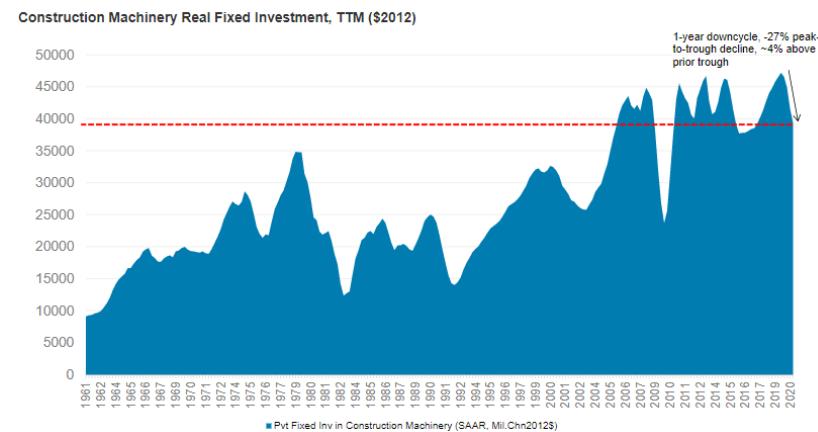
A typical NA construction equipment upcycle rises 70-80% and a downcycle falls 35-40%

A "typical" construction equipment revenue up-cycle lasts ~4 years (50 months) and features an increase in revenue of 70-80%, excluding inflation, from trough to peak. A typical revenue downturn on average lasts 10 quarters and features a 35-40% decline in revenue from peak (ex-inflation) to trough. Construction Machinery stocks generally inflect ~2-3 quarters before revenues do, largely because investors value Construction Equipment stocks on next-12-month's (NTM) earnings. On average, it pays to own Construction Equipment stocks for the final 3 quarters of the down-cycle, through the trough and recovery until 2-3 quarters before peak (~75% of the up-cycle).

Construction, Mining & Oilfield Machinery Real Fixed Investment, TTM



Construction Machinery Real Fixed Investment, TTM

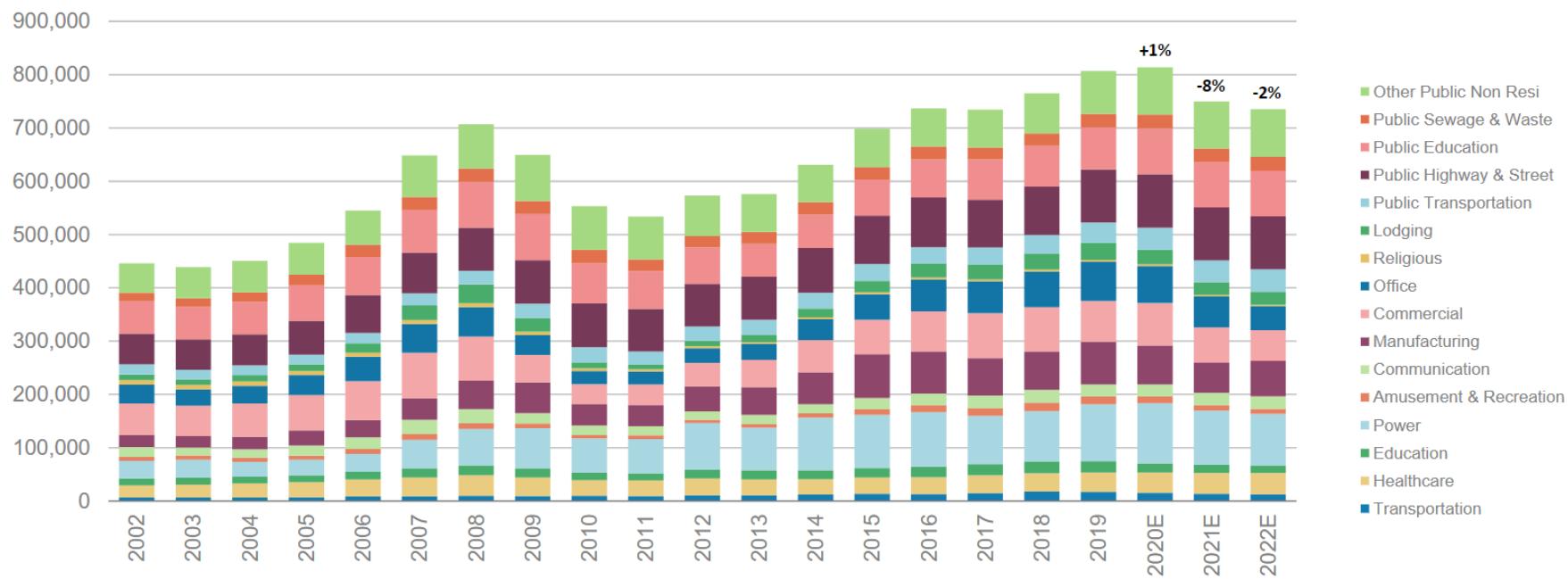


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We continue to forecast Y/Y declines in Non-Resi spending of 8% in 2021 and 2% Y/Y in 2022.

Total Non Resi Spending

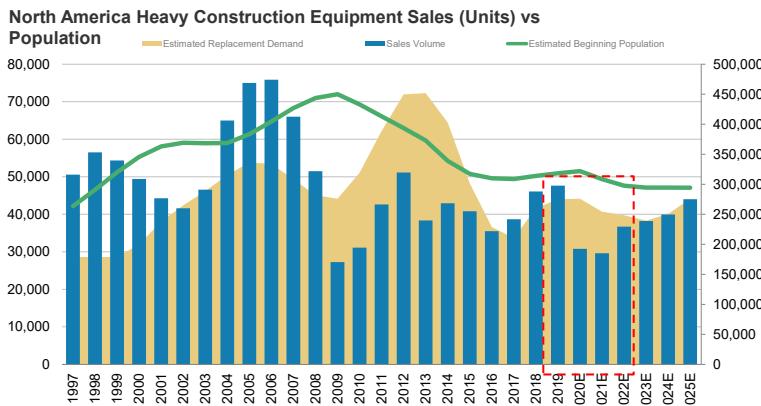


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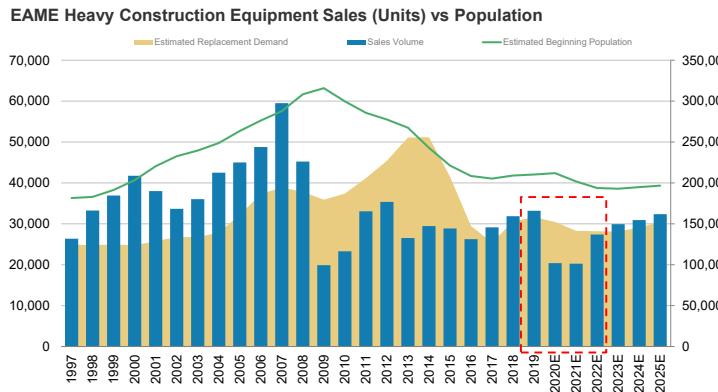
Industrials Spring Training Teach-In

Fundamentals drive fleet growth, but replacement drives Y/Y sales

We see 2020 NA heavy CE sales as only slightly above GFC lows, down -35% Y/Y and additional declines in '21...

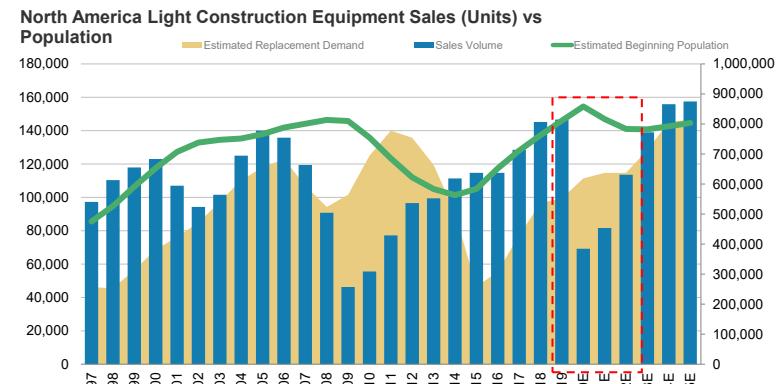


EAME heavy CE sales are expected to retest GFC lows before recovering in 2022

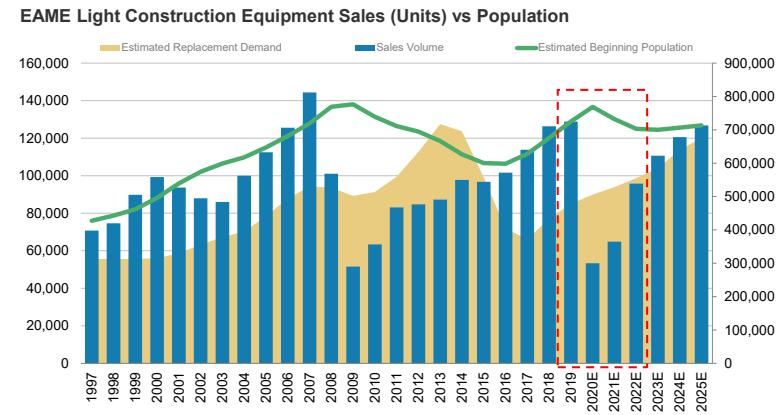


Source: Company data, Off-Highway Research, Morgan Stanley Research

...and while light CE sales should remain more insulated given the level of cycle over cycle adoption, we see sales down -54% in 2020.



We see 2020 and 2021 re-testing GFC lows for EAME light equipment as well.



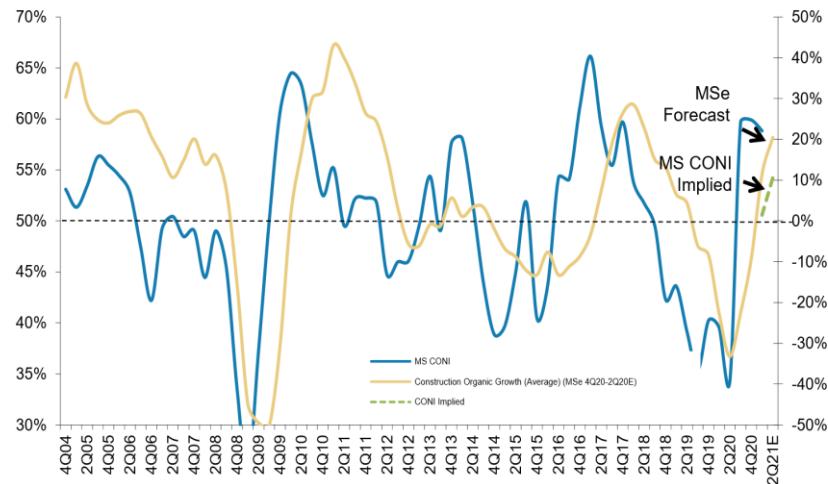
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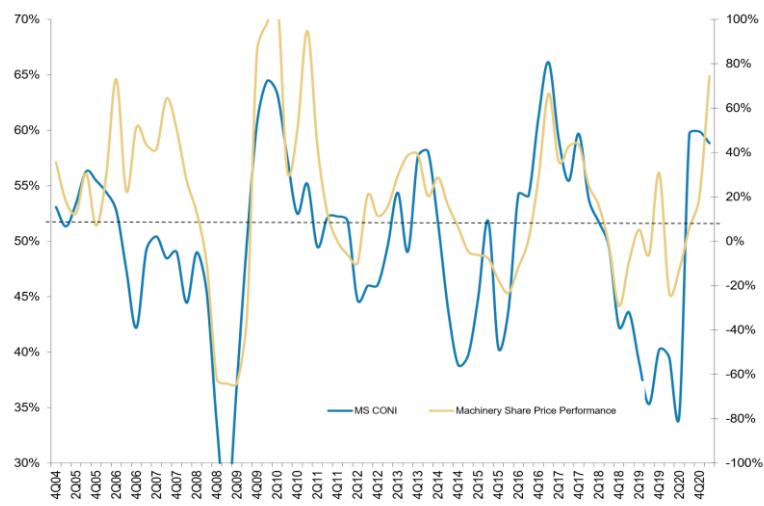
MS CONI – Historically Strong Correlation with Share Price and Organic Growth

MS CONI is our preferred leading indicator of sector growth. It has an 80% correlation with share price (co-incident) and a 90% correlation with organic growth (6 month lag).

Our Indicator Index, MS CONI, points to 2Q20/3Q20 organic growth of ~-24%/-24% vs. 1Q21/2Q22 organic growth of ~1%/+11% vs. MSe of ~+11%/+20%.



Despite the divergence seen in '19/'20, machinery share price performance has moved with the recent improvement in our index.

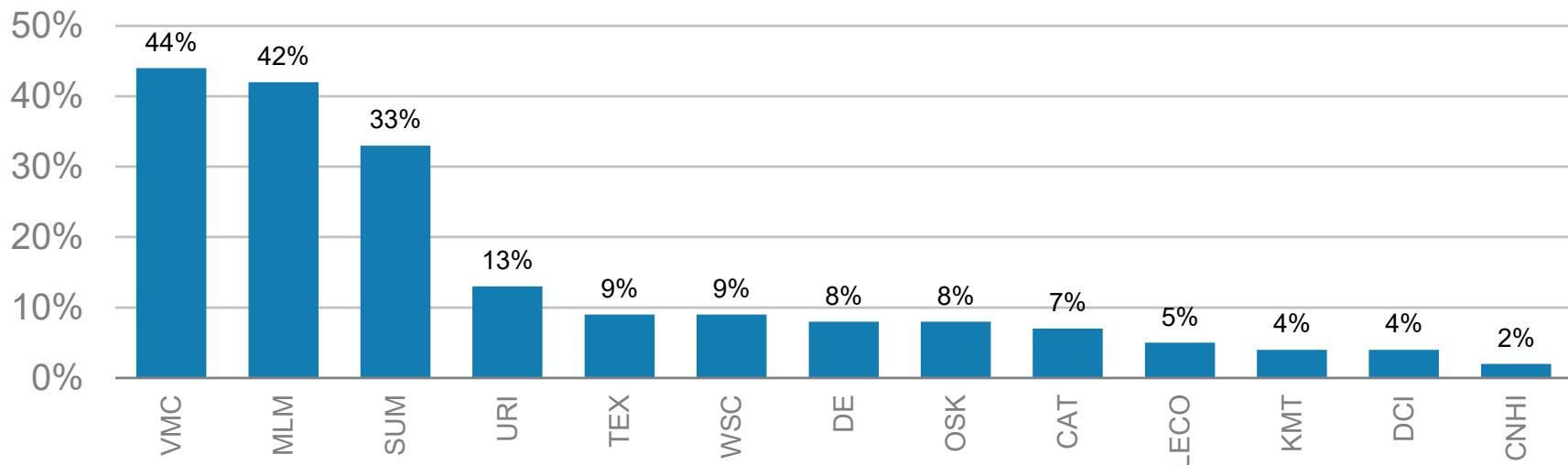


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Aggregates stocks are most levered to NA Infrastructure Construction

MSe US Infra Exposure (as % of Total Revenue)



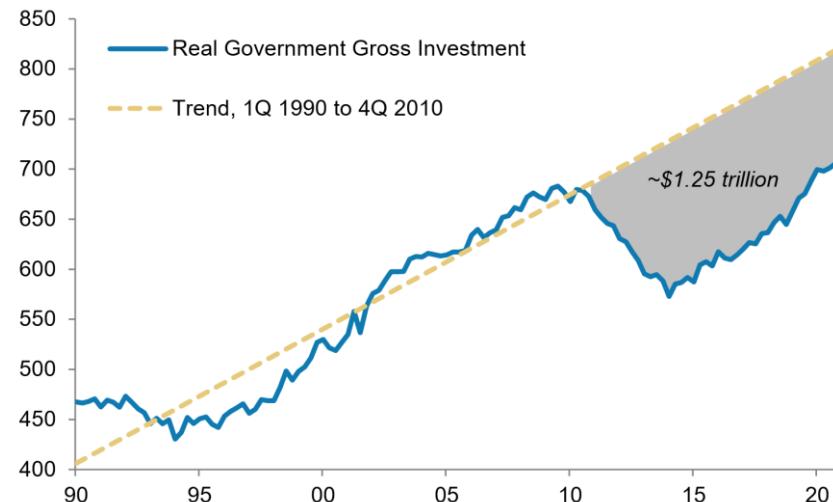
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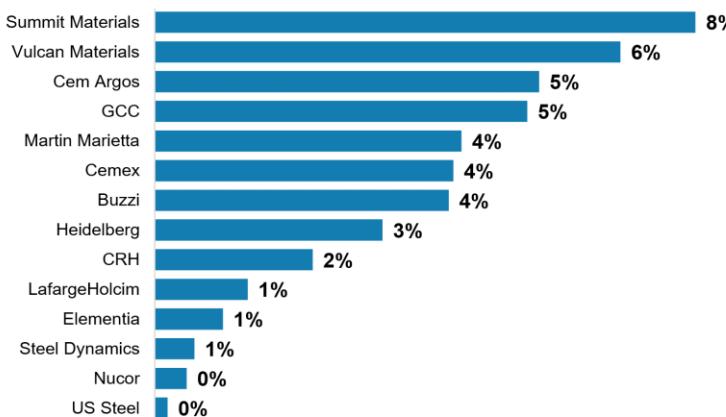
Infrastructure spending has been below trend since '10. Our AlphaWise analysis identified ~\$3T in repair work

Real Government Gross Investment

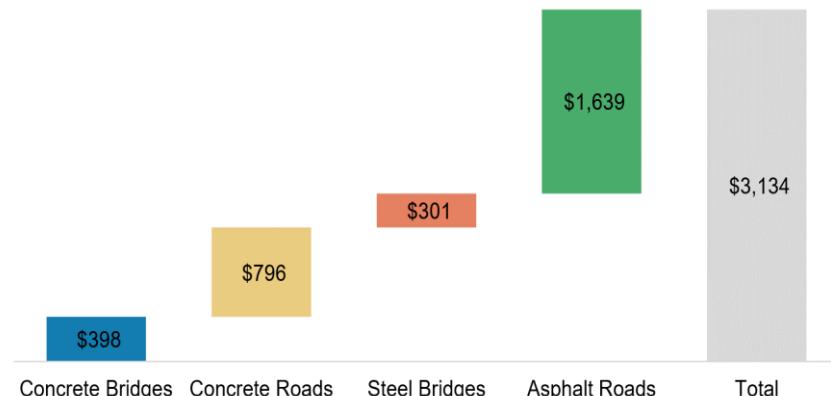
Bil. Chn. 2009\$



Yearly Revenue Impact associated to Bridge & Highway Repair works
(Base 2025e)



US Infrastructure: Estimated Investment needed to repair highways and bridges in unsatisfactory conditions (US\$ billion)



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Surface transportation spending needs to be reauthorized for Biden's plan to be incremental to historical spending

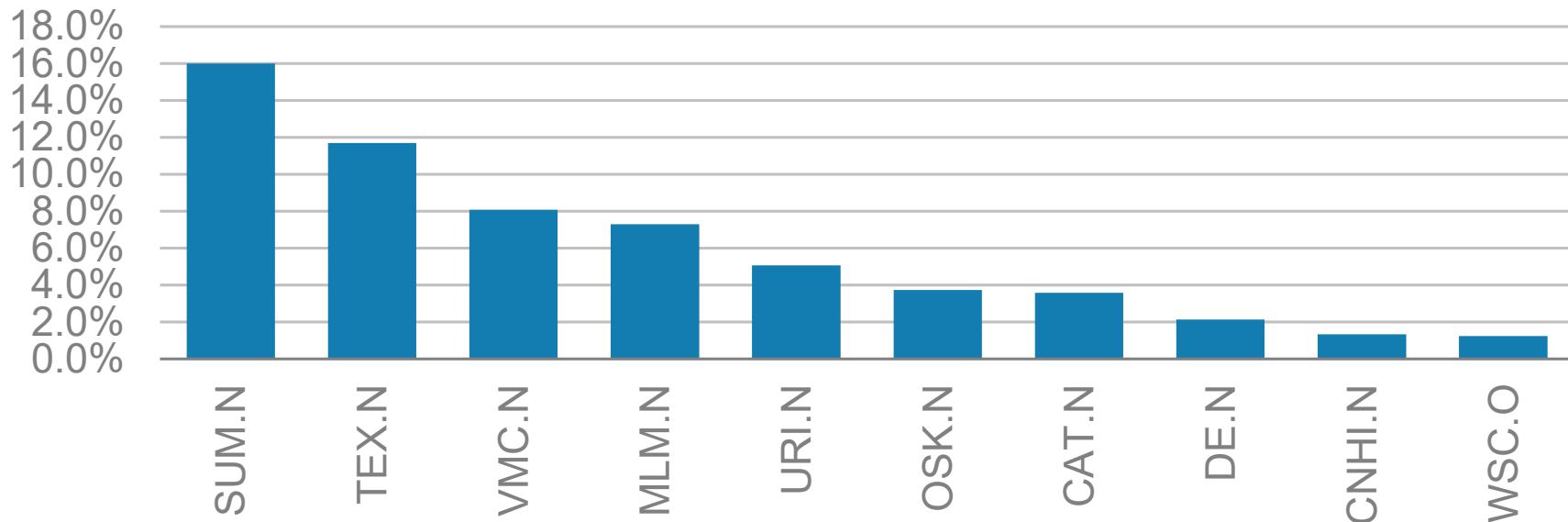
Program	FAST ACT 5-Year Funding '16-20	CBO Baseline '21-25	America's Transportation Infrastructure Act	INVEST ACT 5-Year Funding '21-25	Moving Forward 5-Year Funding '21-25	MS Prior Base Case	MS Prior Bull Case	American Jobs Plan ('Build Back Better') (8Y) (billions)
	(billions)	(billions)	(billions)	(billions)	(billions)			
Federal Highway Administration	226	237	287	319	319			115
Federal Transit Administration	61	84 (70 ex-CARES)	84	105	105			85
Federal Motor Carrier & National Highway Traffic Safety Administration	8	9	9	10	10			20
Federal Railroad Administration	10	14	14	60	55			80
Other Misc Surface Programs*								95
Total Surface Transportation	306	330	394	494	489			395
Annual Surface Transportation Spend	61	66	79	99	98			49
<i>Average Annual Increase vs. FAST Act*</i>		<i>8%</i>	<i>29%</i>	<i>61%</i>	<i>60%</i>			<i>-19%</i>
Non Surface Transportation Infrastructure Spend (Air, Water, Clean Energy & Communications)**		125			271			684
EV Market Investments								174
Supply Chain & Manufacturing Spend								300
Other								697
Total Size of Infra Package	306	455	394	494	760			2,250

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We estimate that SUM, TEX, and VMC would see the highest EPS lift in '22/23 from a \$1.5T/10Y infra package

FY22-FY23 Total EPS Uplift Total EPS Uplift from \$1.5T/10Y Package



Key Construction End Markets

Oil and Gas

Mining

Infrastructure

Rental

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US Machinery End Market Exposures

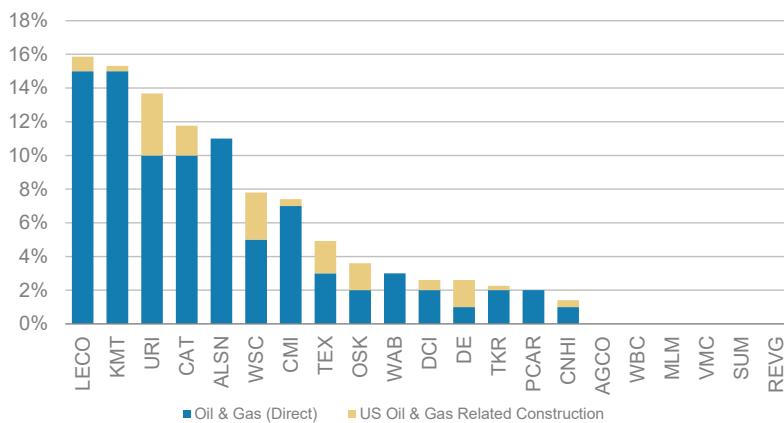
	CAT	TEX	URI	AGCO	DE	OSK	CNHI	WSC	TKR	CMI	ALSN	WBC	PCAR	WAB	DCI	KMT	LECO	MLM	VMC	SUM	REVG	Median	
Resi Construction	3%	17%	5%	0%	4%	13%	1%	8%	0%	0%	0%	0%	0%	0%	0%	2%	1%	0%	22%	20%	33%	0%	1%
Non-Resi Construction	30%	46%	48%	0%	27%	25%	9%	35%	6%	8%	0%	0%	0%	0%	0%	18%	6%	18%	78%	80%	67%	0%	18%
US Non-Resi Construction	22%	24%	46%	0%	20%	20%	5%	35%	3%	5%	0%	0%	0%	0%	0%	8%	4%	11%	78%	80%	67%	0%	8%
US Non-Resi Construction (General, non-Infrastructure)	14%	12%	30%	0%	9%	11%	3%	26%	2%	2%	0%	0%	0%	0%	0%	4%	2%	5%	36%	35%	33%	0%	4%
US Infrastructure (Incl in total Non-Resi)	8%	9%	13%	0%	8%	8%	1%	6%	1%	3%	0%	0%	0%	0%	0%	4%	2%	5%	42%	44%	33%	0%	4%
US Oil & Gas Related Construction	2%	2%	4%	0%	2%	2%	0%	3%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Europe Non-Resi Construction	8%	15%	0%	0%	11%	8%	2%	0%	1%	0%	3%	0%	0%	0%	0%	4%	2%	3%	0%	0%	0%	0%	0%
Mining & Quarry	20%	6%	0%	0%	0%	0%	0%	0%	13%	4%	3%	0%	0%	0%	3%	11%	6%	5%	0%	0%	0%	0%	0%
Agriculture	5%	0%	0%	100%	68%	0%	43%	1%	8%	0%	0%	0%	0%	0%	0%	12%	0%	3%	0%	0%	0%	0%	0%
Industrial	11%	15%	34%	0%	0%	0%	0%	36%	22%	9%	0%	0%	0%	0%	0%	21%	46%	33%	0%	0%	0%	0%	0%
Oil & Gas (Direct)	10%	3%	10%	0%	1%	2%	1%	5%	2%	7%	11%	0%	2%	3%	2%	15%	15%	0%	0%	0%	0%	0%	2%
Electric Power	8%	7%	3%	0%	0%	0%	0%	2%	0%	9%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Aerospace & Defense	0%	0%	0%	0%	0%	20%	0%	0%	7%	0%	6%	0%	0%	0%	0%	3%	8%	0%	0%	0%	0%	0%	0%
Transportation/Truck	13%	0%	0%	0%	0%	21%	46%	0%	22%	63%	63%	100%	98%	91%	20%	18%	17%	0%	0%	0%	100%	18%	
Other	0%	6%	0%	0%	0%	19%	0%	13%	20%	1%	18%	0%	0%	3%	7%	0%	9%	0%	0%	0%	0%	0%	0%
Total Exposure to NA Infrastructure, Europe Non-Resi, O&G & Mining	46%	33%	23%	0%	20%	18%	4%	11%	17%	14%	16%	0%	2%	6%	21%	25%	28%	42%	44%	33%	0%	18%	
Total Auto Exposure	0%	0%	0%	0%	0%	0%	0%	0%	13%	9%	0%	5%	0%	0%	0%	0%	10%	0%	0%	0%	0%	0%	0%
Total Industrial Exposure	11%	15%	34%	0%	0%	0%	0%	36%	22%	9%	0%	0%	0%	0%	0%	21%	46%	33%	0%	0%	0%	0%	0%
Total Consumer Exposure	0%	0%	0%	0%	7%	0%	0%	0%	0%	9%	0%	5%	0%	0%	0%	0%	22%	20%	33%	29%	0%	0%	0%
Structurally/Cyclically Challenged Thru '21	64%	60%	69%	0%	28%	47%	10%	52%	35%	22%	20%	0%	2%	6%	41%	50%	49%	78%	80%	67%	0%	41%	

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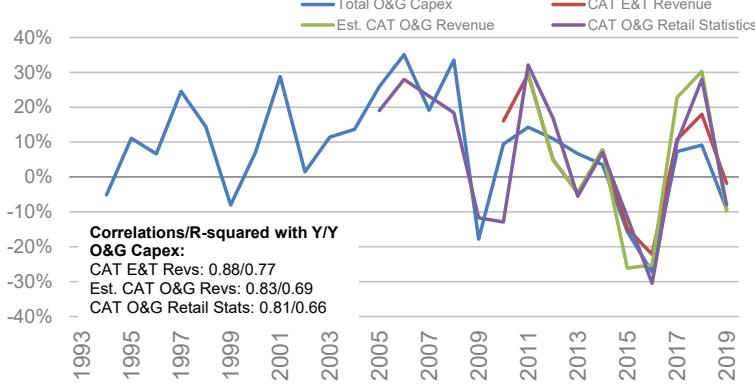
Industrials Spring Training Teach-In

O&G Capex: LECO + KMT are most exposed, URI + CAT are the most common ways to play it

Machinery Oil & Gas Exposure

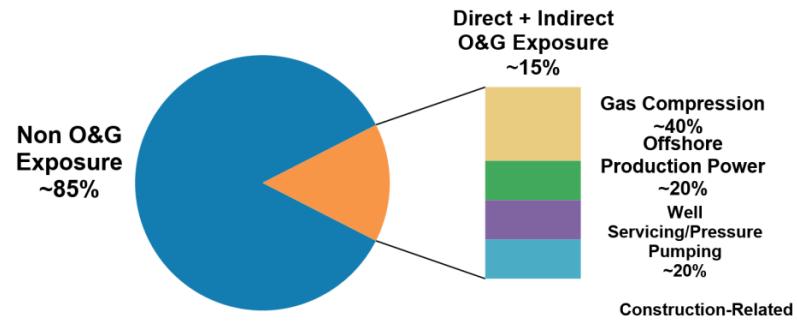


Y/Y Growth

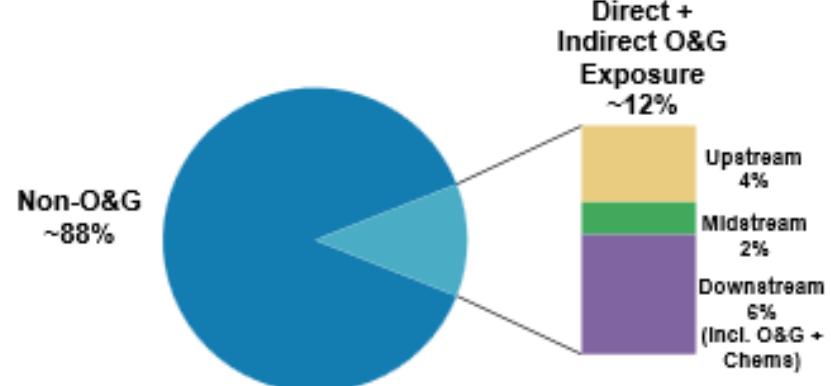


Source: Company data, Thomson Reuters, Morgan Stanley Research

Est. CAT O&G Exposure



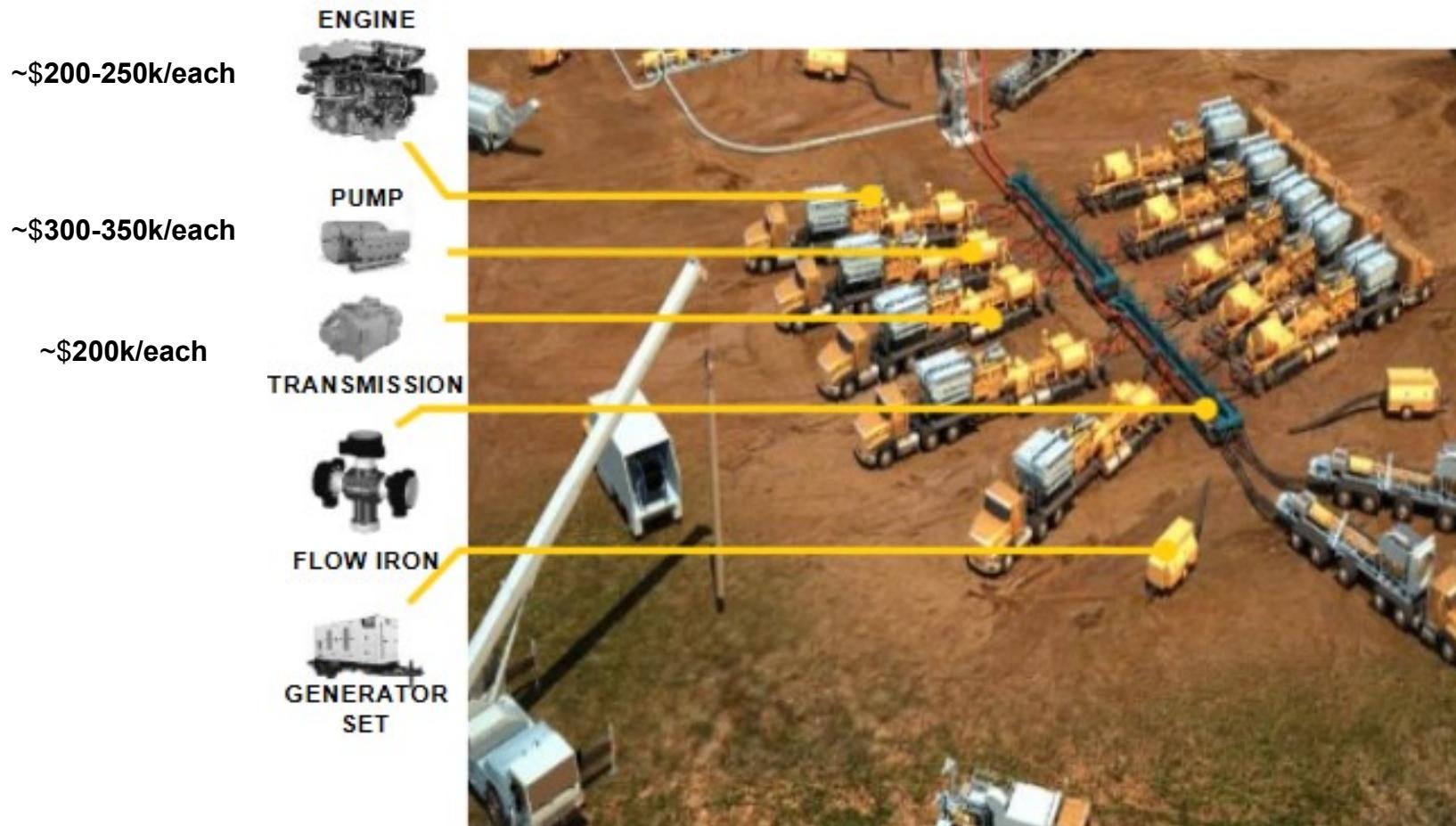
Est. URI O&G Exposure



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Typical Frac Pumping Unit has 40k HP provided by 16-20 2250-2500 HP engines

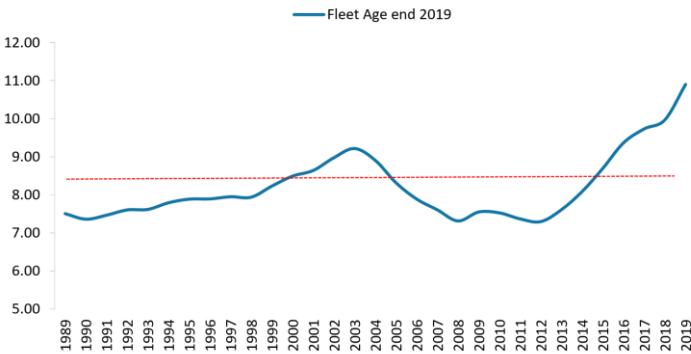


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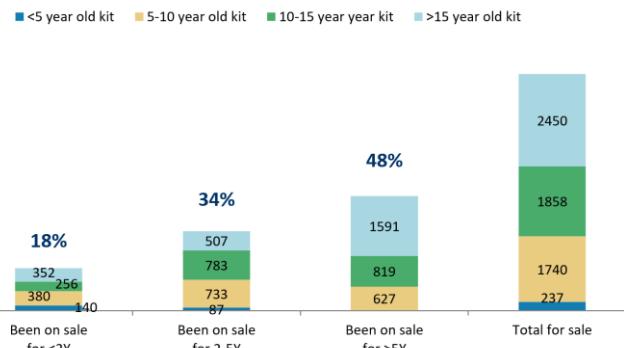
Industrials Spring Training Teach-In

Mining: Elevated Equipment Ages Supportive of A/M, OE Yet to Accelerate

The Mining Machinery fleet has reached an average age of 10Y old, the highest in 30 years

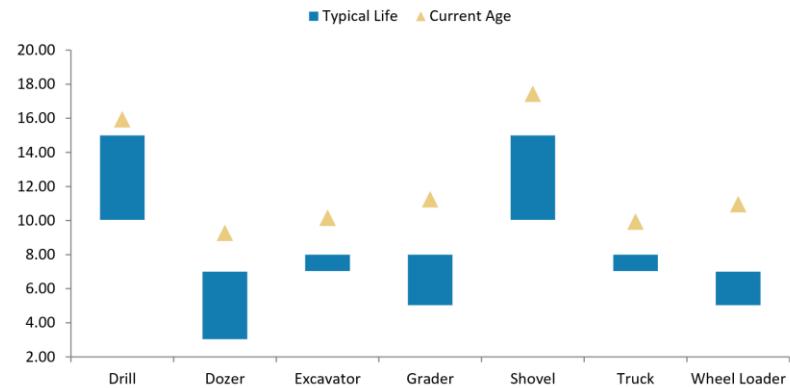


There are minimal levels of parked /idle kit that could return to active service – what's out there looks too old to be worth bringing back with >50% of idle kit >15Y old & having been on sale for >5Y

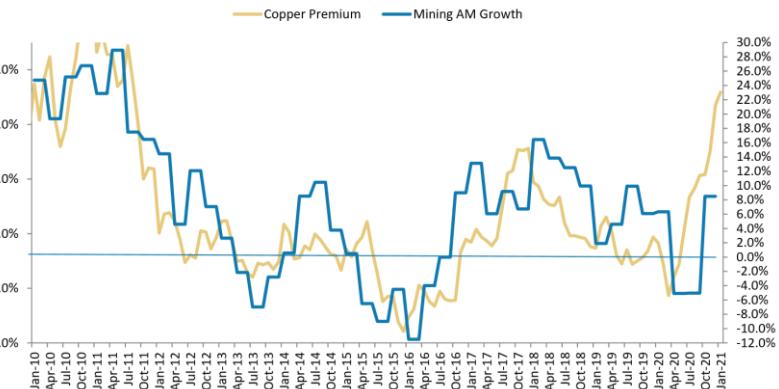


Source: Company data, Parker Bay, Morgan Stanley Research

Age profile varies by equipment type but all categories now have average ages above the top end of a normal range – this provides a 'need' for miners to replace / upgrade



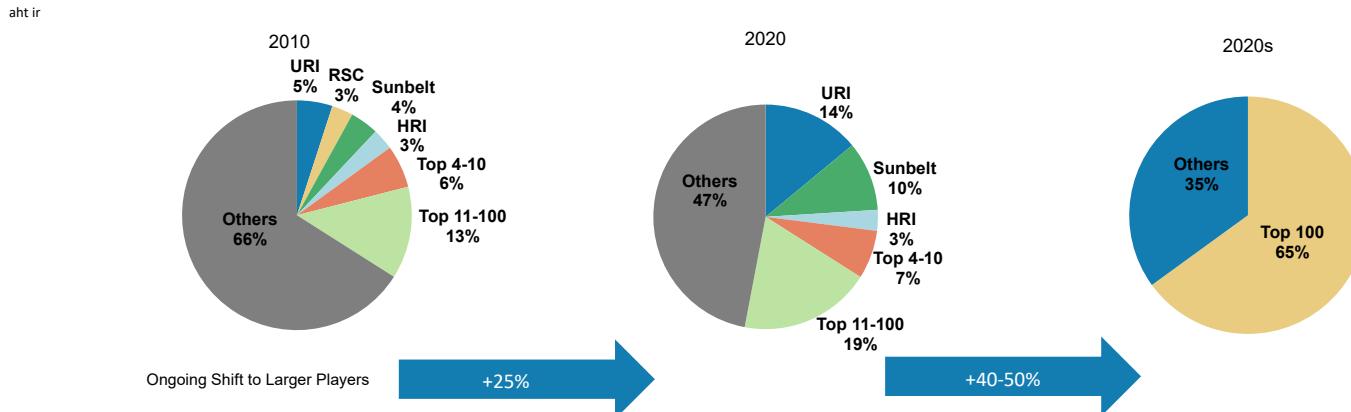
AM growth vs copper premium – indicates a clear recovery in high margin aftermarket orders in 2021



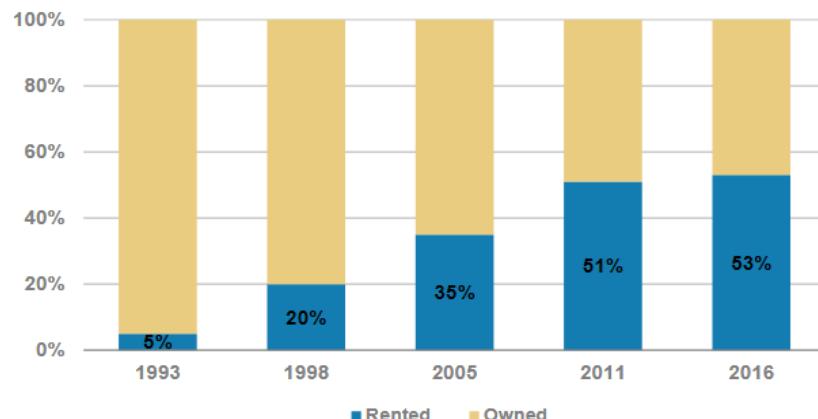
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Rental Equipment Market is consolidating

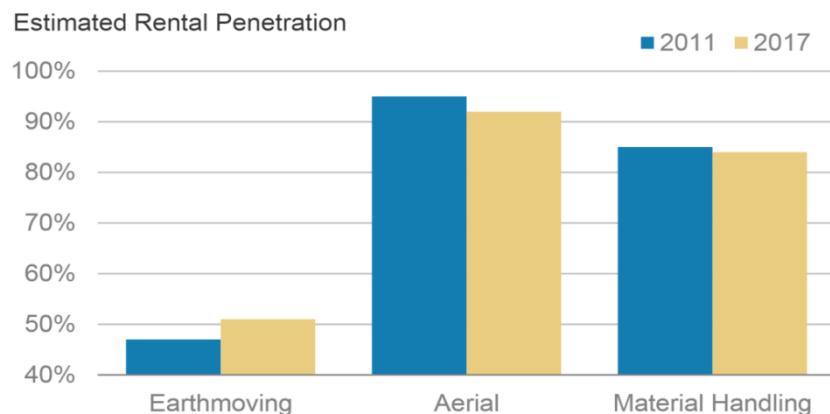


Rental share has increased for the past 25 years, even through 2011 (the last time 100% capital expensing was in place) – we expect capital expensing to have little effect on the secular trend towards renting vs. buying.



Source: Company data, Daniel Kaplan Associates, Morgan Stanley Research

URI has bolstered areas of its fleet (e.g. Earthmoving) which are still relatively underpenetrated from a Rent vs. Buy perspective vs aerial and material handling equipment.

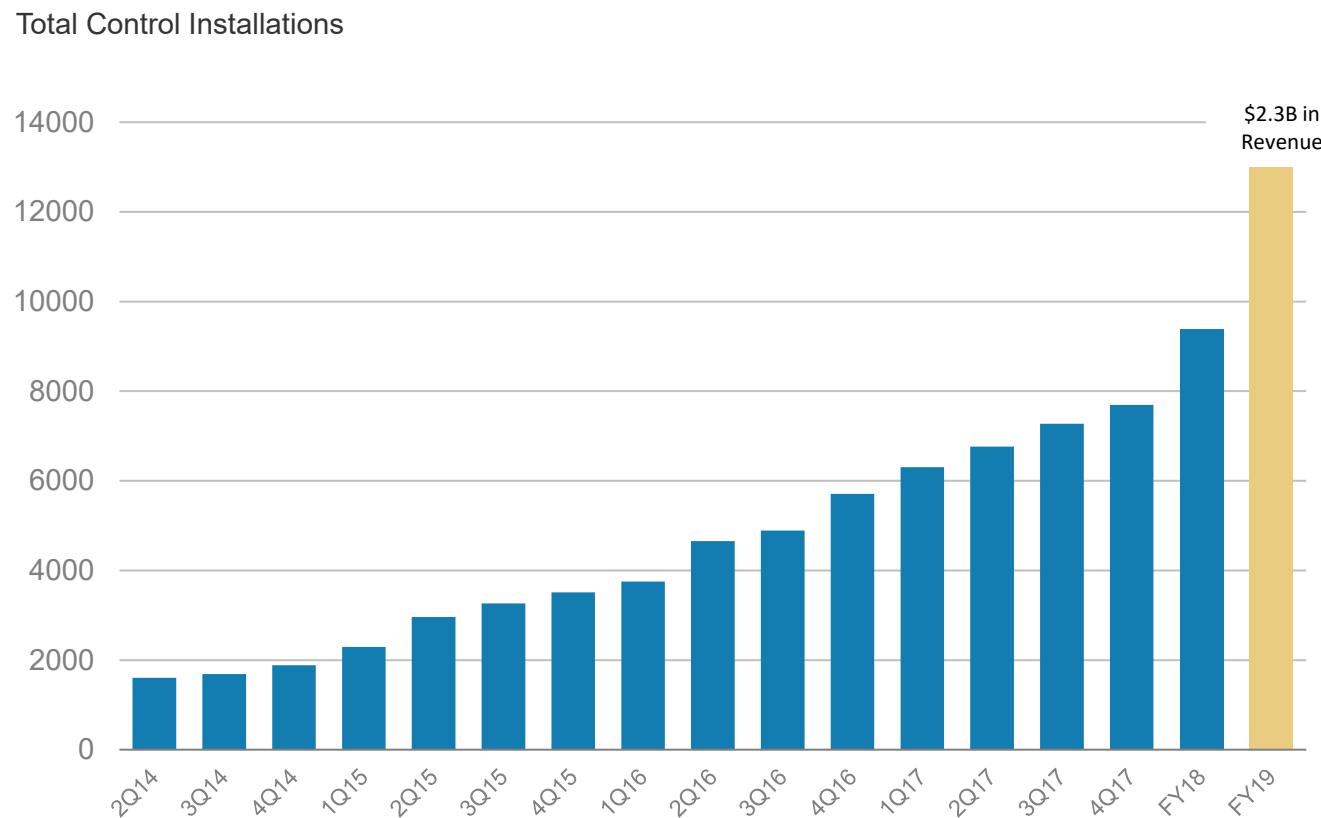


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Recently launched digital platforms encourage further share gains for rental chains

Installations of URI's Total Control accelerated meaningfully in 2019, and now account for ~\$2.3B in revenue.



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Agriculture Equipment

May 2021

Industrials Spring Training Teach-In

Ag Equipment & Market Primer: Equipment Types

Category	Product	Description	Key Players	Approx. Price
Tractors	Compact Utility Tractor	- Small tractor designed for landscaping and estate management - generally <40 HP	AGCO, CNH, Kubota, Claas, Mahindra, Deutz-Fahr	<\$20k
Tractors	Utility Tractor	- Common on livestock farms, not commonly used to grow crops - 45-140 HP	AGCO, CNH, Kubota, Claas, Mahindra, Deutz-Fahr	\$15-50k
Tractors	Row-Crop Tractor	- Designed for growing / cultivating row crops 140-360 HP	AGCO, CNH, Kubota, Claas, Deutz-Fahr	\$100-300k
Tractors	Four-Wheel-Drive Tractor	- Large, high horsepower tractors for the most demanding tasks on large farms - 360-560 HP	AGCO, CNH, Claas	\$225-400k
Harvesting	Combine	- Machine that cuts and threshes grain crops	AGCO, CNH, Claas, Deutz-Fahr	\$275-475k
Harvesting	Cotton Stripper	- Strips the entire plant of both open and unopened bolls - 190 HP	AGCO, CNH	\$175-200k
Harvesting	Cotton Picker	- Removes the seed cotton from the plant and builds bales - 373 HP or 530 HP	AGCO, CNH	\$400-700k
Harvesting	Sugarcane Harvester	- Cuts cane at the base of the stalk, strips the leaves, and chops it into consistent lengths	AGCO, CNH	\$350-450k

Category	Product	Description	Key Players	Approx. Price
Hay & Forage	Forage Harvester	- Harvests plants to make silage for livestock feed	AGCO, CNH, Claas	\$200-400k
Hay & Forage	Windrower	- Cuts hay and small grain crops, forms rows with the cut crop	AGCO, CNH, Claas	\$100-125k
Hay & Forage	Baler	- Compresses cut crop into compact bales for easy transport and storage	AGCO, CNH, Claas, Deutz-Fahr	\$15-40k
Hay & Forage	Mower	- Cuts and also allows for crimping and crushing of newly cut hay for faster drying	AGCO, CNH, Claas, Deutz-Fahr	up to \$40k
Crop Care	Planters and Seeders	- Includes planters, drills, air seeders	AGCO, CNH, Claas	up to \$200k
Crop Care	Tillage	- Includes plows, disks, rippers	AGCO, CNH, Claas, Deutz-Fahr	up to \$100k
Crop Care	Self-Propelled Sprayer	- Sprays pesticides, herbicides, fungicides for quality control	AGCO, CNH	\$150k-350k
Crop Care	Ag Management	- Electronics for nutrient and land management	AGCO, CNH, Claas	up to \$100k

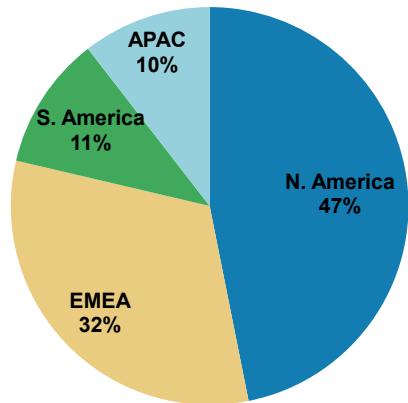
Source: Company data, Morgan Stanley Research

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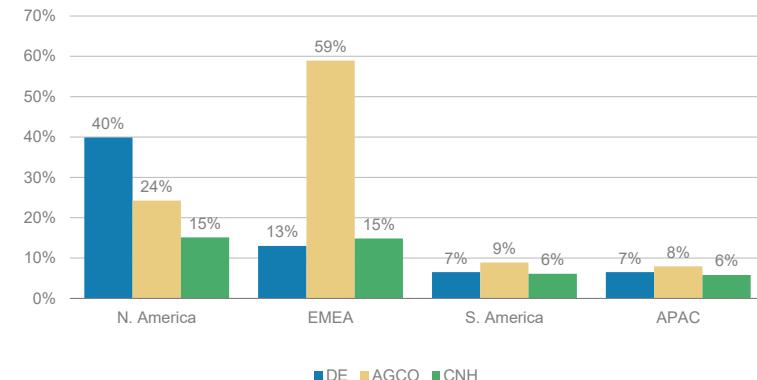
Regional Sales & OEM Exposures

Ag OEM Revenue Breakdown



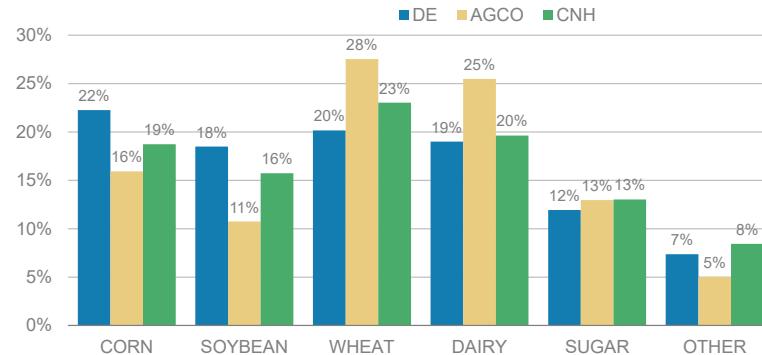
On a total revenue basis, AGCO over-indexes to Europe + South America, while DE is a purer play on North America.

Ag Exposure as % of Total Revenues



DE has the highest exposure to corn and soybeans, while AGCO has highest exposure to wheat, dairy and sugar.

Ag Exposure as % of Ag Revenues



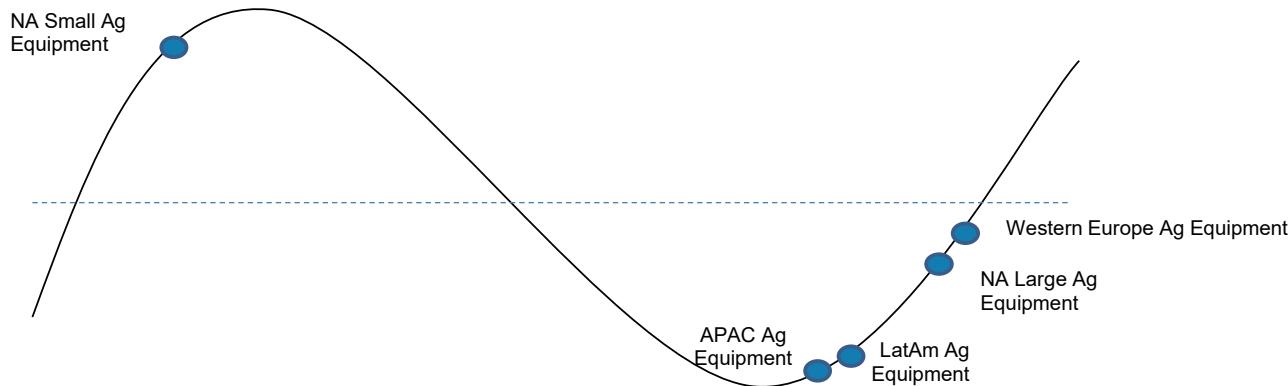
Source: VDMA, Company data, Morgan Stanley Research

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Industrials Spring Training Teach-In

Where are we in the Ag Equipment Cycle?

With the exception of North America Small Ag, most Ag Equipment Markets remain below mid-cycle, albeit with mid-cycle likely to be achieved by YE21. We see NA as having the strongest fundamental backdrop given strong corn + soybean prices and recent sustained strength in sentiment indicators such as the Purdue Ag Barometer Index.



Agricultural Equipment	2015	2016	2017	2018	2019	2020E	2021E	2022E
North America								
40-100 HP	-3%	-4%	3%	3%	0%	11%	8%	-3%
100+ HP	-26%	-23%	-8%	6%	3%	-1%	15%	4%
4WD	-39%	-26%	5%	13%	6%	1%	12%	5%
Combines	-33%	-26%	5%	16%	-1%	6%	16%	20%
Weighted Average	-30%	-23%	1%	11%	2%	5%	15%	8%
EU Tractors (>40 HP)	-2%	-7%	11%	-12%	8%	-5%	10%	-2%

Source: Company data, EDA, Off-Highway Research, Morgan Stanley Research.

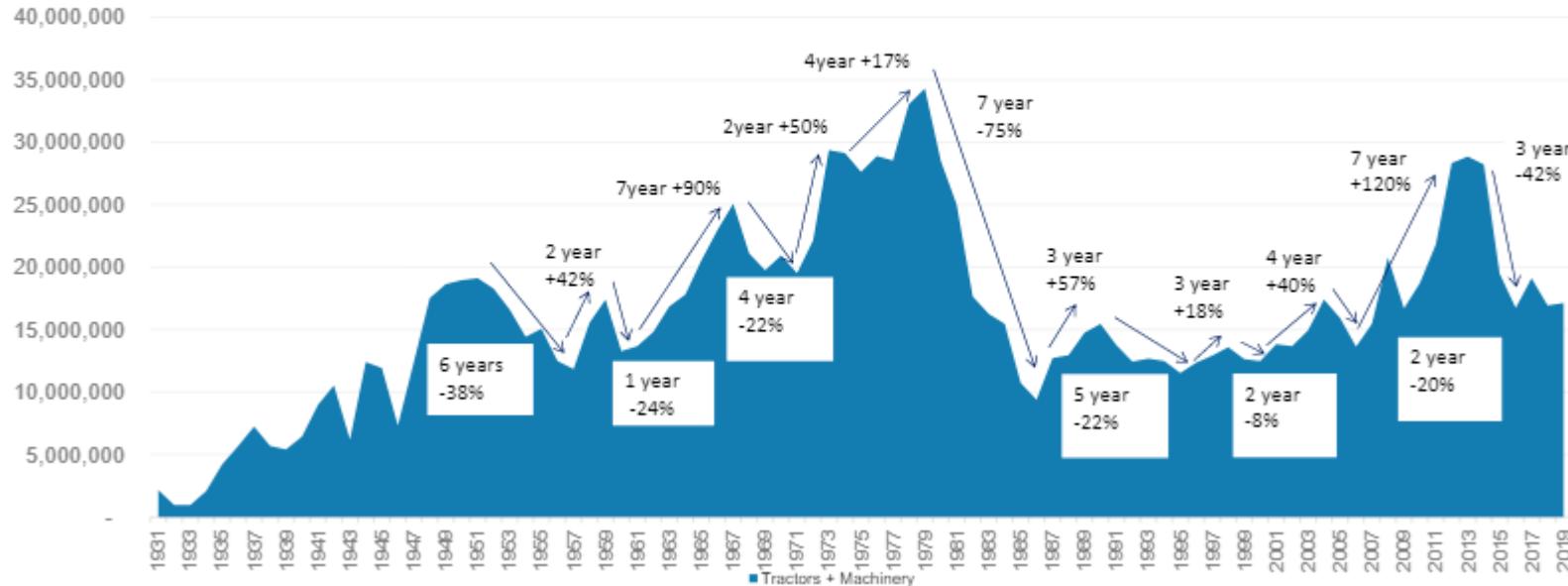
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The large ag equipment cycle is ~4 years up and 3-4 years down with average increases of 50% and declines of ~30%.

Real Farm Capex Spent on Tractors+ Machinery, which we view as a proxy for NA large ag equipment spend, suggests that the most recent '14 peak was 15% below the '79 peak in real terms. On average, the large ag equipment cycle is ~4 years up and 3-4 years down (~7 years peak to peak) with average increases of 50% and declines of ~30%.

Farm Capex Spent on Tractors + Machinery (2020 dollars, 000s)



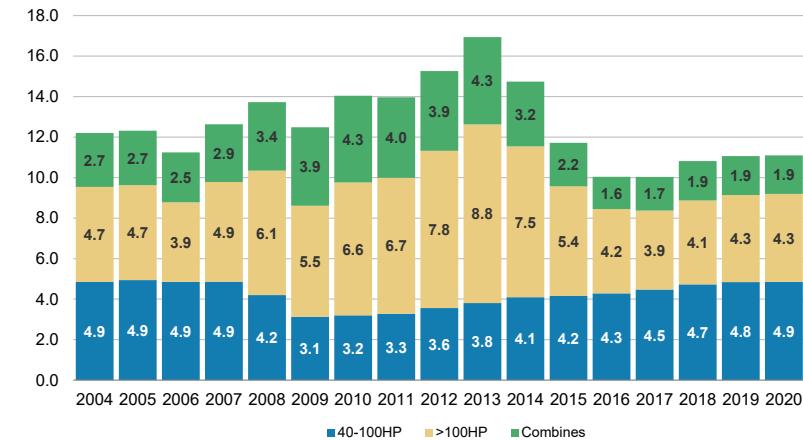
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A decline in Large Ag Equipment drove declines in NA demand

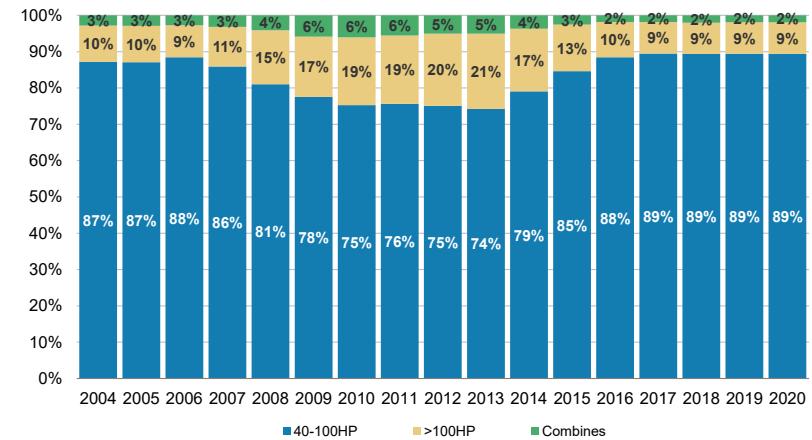
The slowdown in Ag Equipment spend has been driven by declines in large ag (combines and tractors >100 HP).

US Tractor + Combine Sales Value (MS est)



"Large" Ag makes up only 10-25% of units but 60-80% of sales

US Ag Equipment Market Share by Units (MS est)



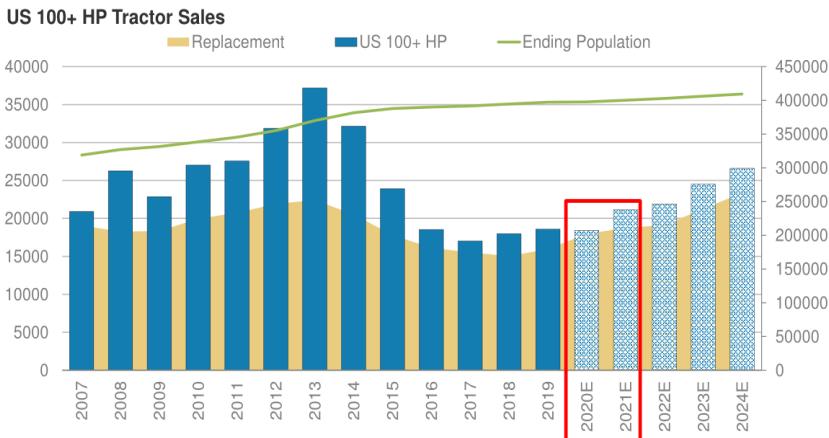
Source: USDA, AEM, Anfavea, Morgan Stanley Research

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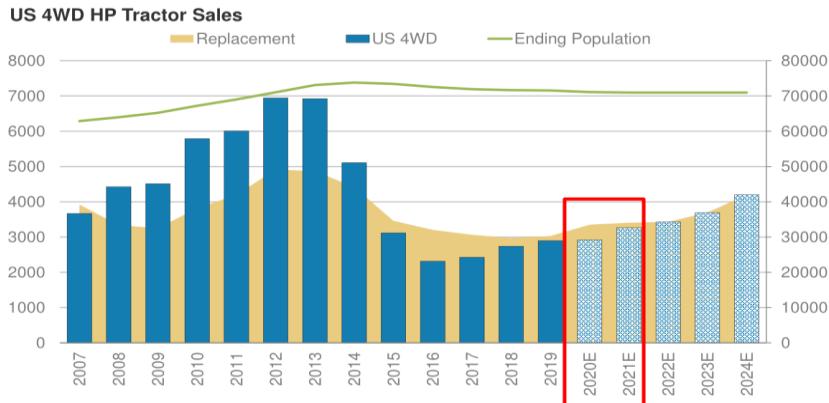
Industrials Spring Training Teach-In

NA and European Replacement Cycles Underway – Prefer North America

We see 100+ HP tractor sales up ~+15% Y/Y in 2021,

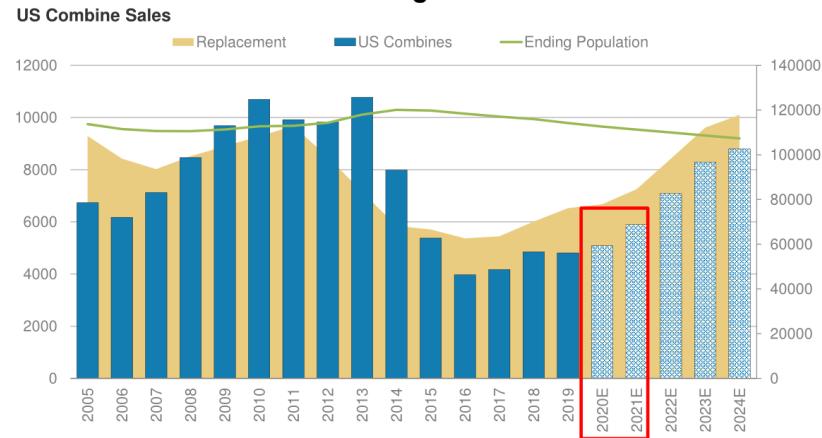


We see US 4WD tractors up +10% Y/Y in '21.

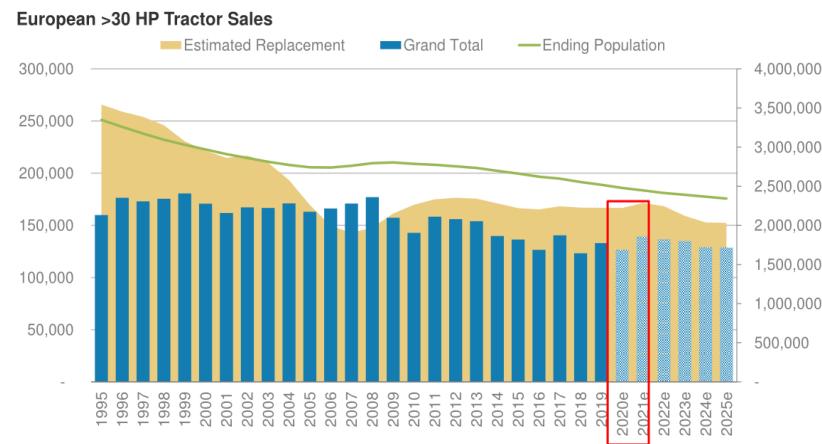


Source: Company data, Off Highway Research, AEM, BEA, Morgan Stanley Research

We expect US Combine sales to accelerate to +15-20% Y/Y through 2022.



In Europe, we estimate a ~10% Y/Y recovery in tractor sales in '21.



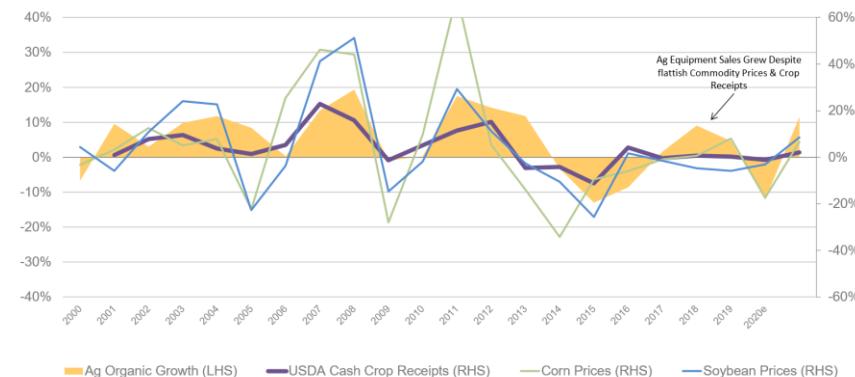
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Industrials Spring Training Teach-In

Ag Equipment demand is highly correlated with grain prices & US Farm Cash Receipts

Corn prices do have a 57%/63% correlation with Ag Equipment Organic growth (based on No Lag/1 year Lag), but we think USDA Cash Crop Receipts (65/73% correlation), Crop Production plus Gov't Aid (73% correlation) and Net Cash Crop Receipts (74% correlation) are better indicators of Ag Equipment Organic Growth.

Ag Equipment Organic Growth vs Y/Y Change in Grain Prices and Y/Y Cash Crop Receipts



	No Lag	1 Year Lag
Corn Prices	57%	63%
Soybean Prices	66%	51%
USDA Cash Crop Receipts	65%	73%
Corn, Soybean, Wheat, Cotton Cash Crop Receipts	60%	65%
Crop Cash Receipts Minus Crop Production Expenses	48%	74%
Crop Production + Gov't Aid	73%	54%

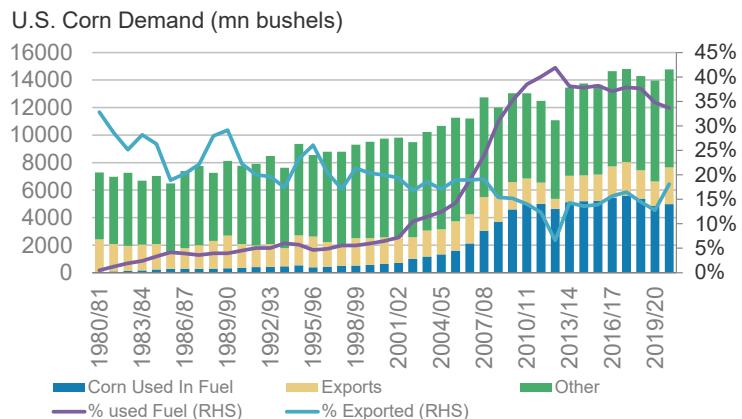
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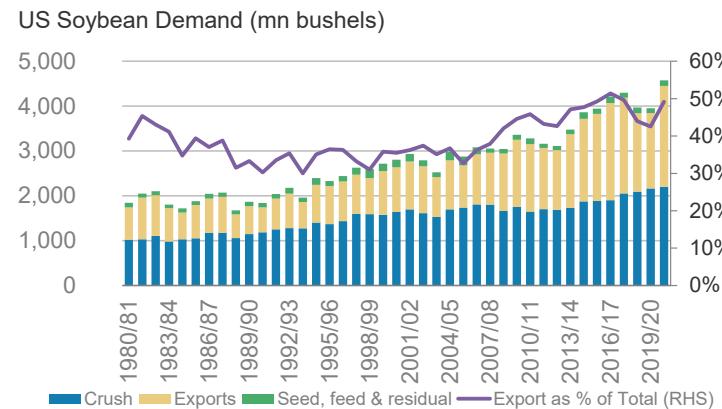
Biofuel represents ~35-40% of Corn Demand

Exports represent ~15% of US corn demand, and ~50% of US soy demand, according to the USDA. Biofuel / ethanol represents 35-40% of corn demand, and 25-30% of soybean oil demand.

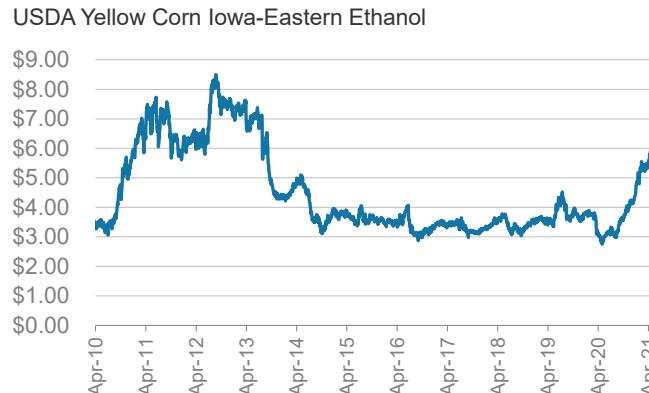
Corn used for ethanol accounts for ~30-40% of annual demand



Exports account for ~50% of US soybean demand



Iowa Eastern Ethanol prices are up ~25% YTD and ~100% Y/Y

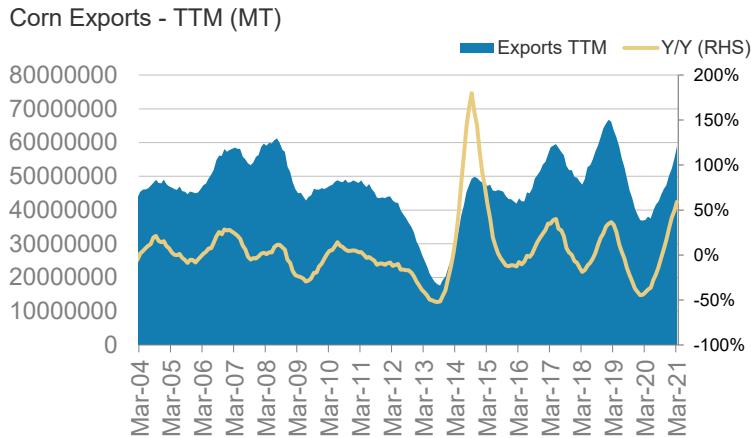


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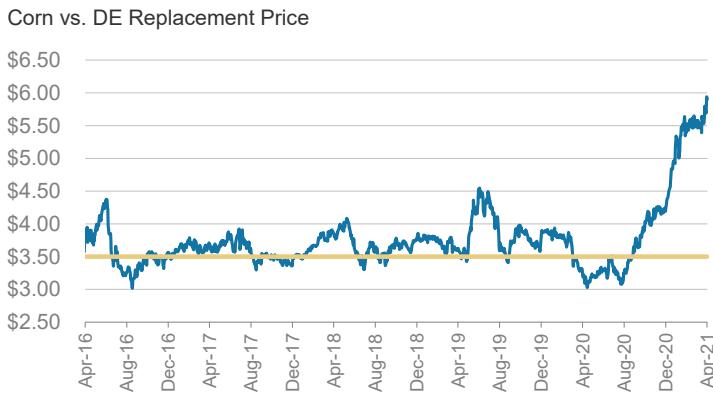
Industrials Spring Training Teach-In

Exports make up 15%/50% of US Corn/Soybean Demand

Corn exports are up ~60% on a TTM basis

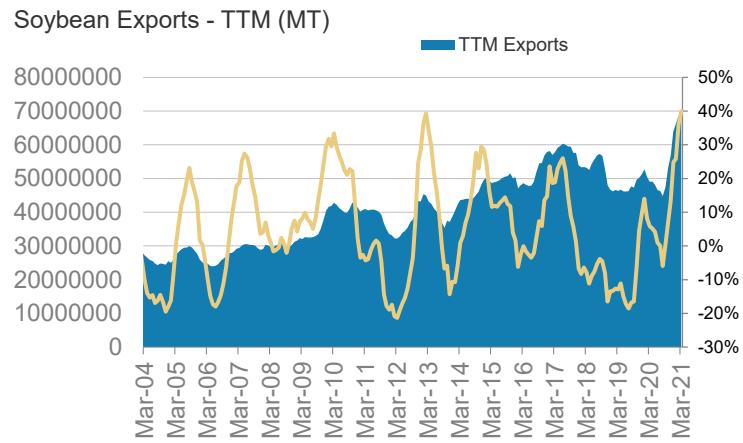


Corn prices are up 22% YTD and well above DE's \$3.50 'replacement' threshold

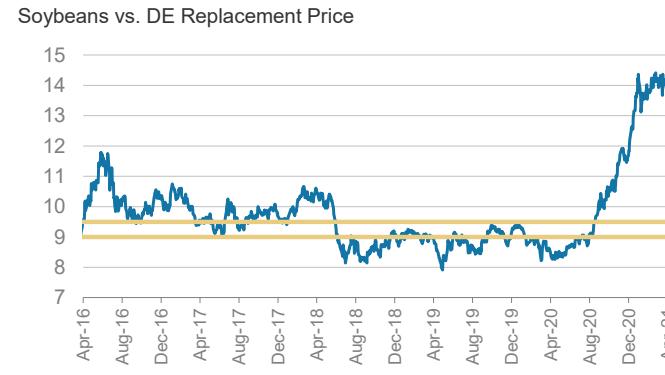


Source: Company data, USDA, Morgan Stanley Research.

Similarly, soybean exports are up ~40% on a TTM basis



Similarly, soybean prices up 8% YTD well above DE's \$9.00 - \$9.50 'replacement' window



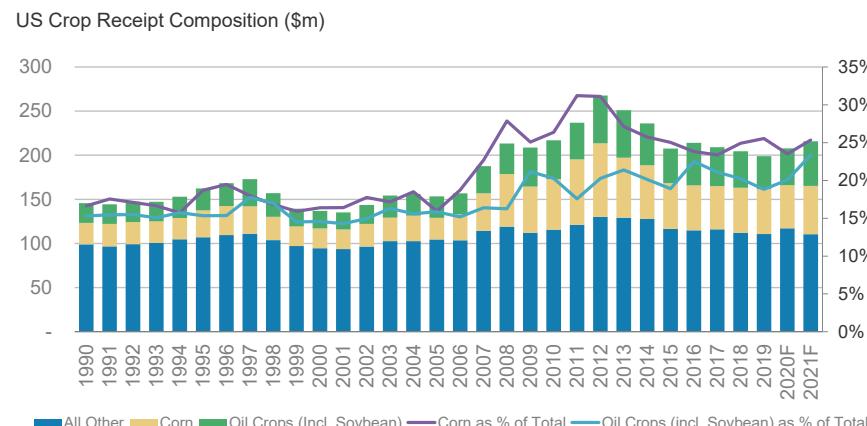
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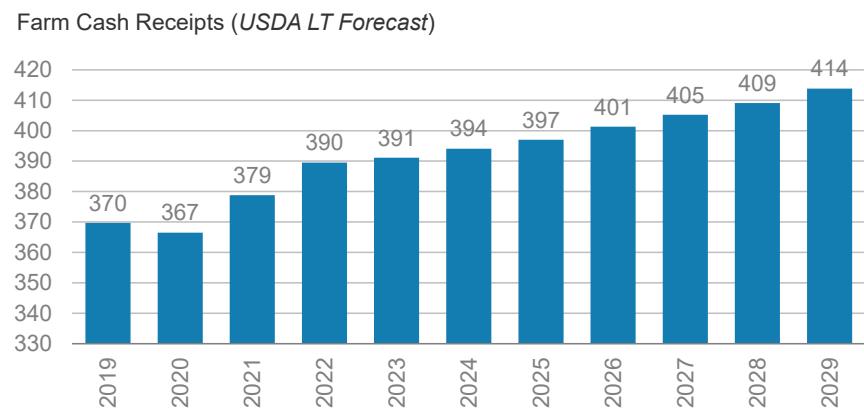
What is the Outlook for US Farm Cash Receipts?

After several consecutive years as a 'casualty' of the US-China trade conflict, the US corn and soybean complex (and subsequently, farmer sentiment) has benefitted from a sharp recovery in both demand and prices. Growing foreign purchases of both US corn and soybeans have driven prices to levels not seen since pre-2018 levels - with the US grains complex benefitting from China Phase I trade commitments (including its efforts to rebuild the hog herd) and growing demand from renewable diesel solutions. In 2021, the USDA sees crop cash receipts up ~4% Y/Y, supported by a +12% Y/Y increase in corn cash receipts. Longer term, the USDA forecasts ~1% growth p.a. through 2030.

Corn and Oil Crops (incl soybeans) account for ~20% of Crop Cash Receipts



The USDA calls for modest ~1% growth in cash receipts between '20 and '30.



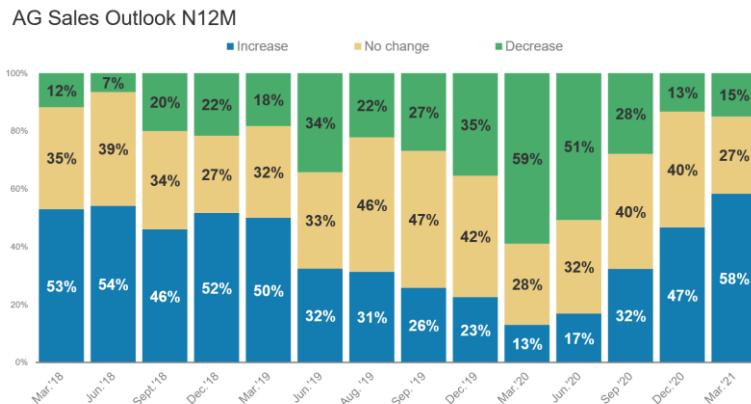
Source: Company data, USDA, Morgan Stanley Research. USDA LT Forecast as of February 2021.

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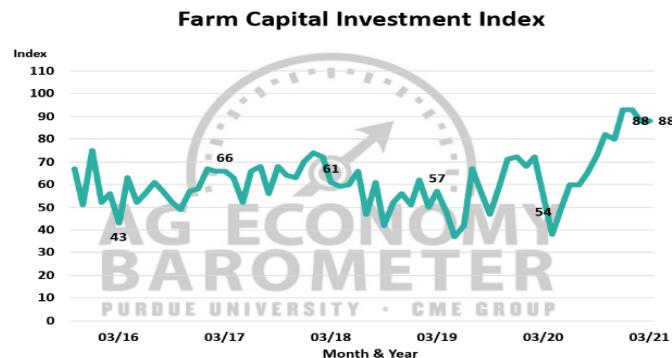
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Farmer Sentiment reflects purchases intentions

Forward sales sentiment reached the highest level in the history of our survey

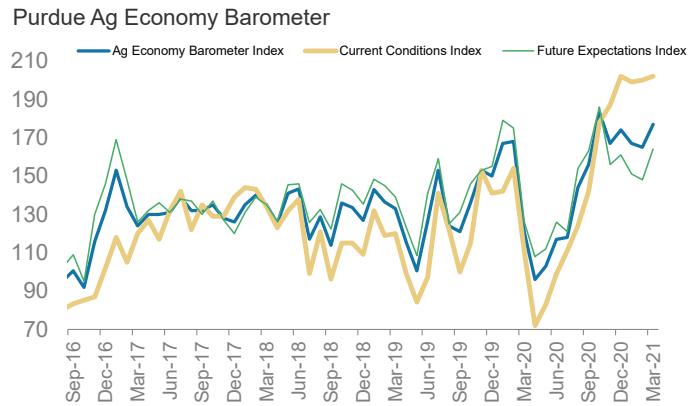


Encouragingly, stronger sentiment appears to be supporting equipment purchasing intentions



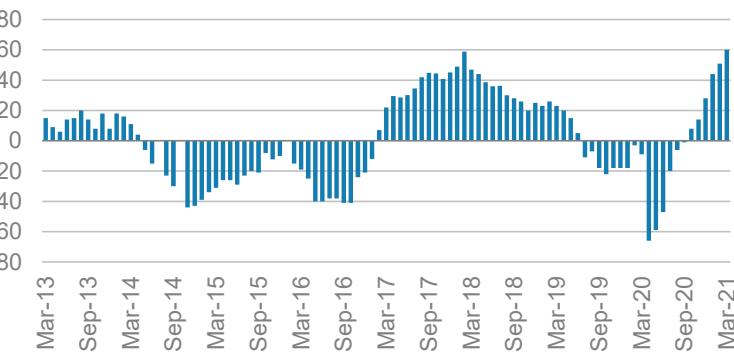
Source: CEMA, Purdue University Center for Commercial Agriculture, Morgan Stanley Research

Similarly, the Purdue Ag Barometer has retraced past prior highs.



In Europe, sentiment has followed a similar path

CEMA Business Climate Index



May 2021

Industrials Spring Training Teach-In

Truck OE Equipment & Suppliers

May 2021

Truck Equipment & Market Primer: Equipment Types

Medium-Duty (Class 5)		Medium-Duty (Class 6-7)			Heavy-Duty (Class 8)	
Type	On-Road	Transit	Medium-Duty On-road	Vocational	Traditional Day Cab / Sleeper & Vocational	
Uses	Small service trucks, City Delivery  	 	Beverage Truck, Single-Axle, Rack Truck, Large Walk-in, City Delivery  	Dump truck, Fire & Emergency, Refuse, Service, Sweeper, Towing   	 	
Brands	Ford, Freightliner (Daimler), International (Navistar), Kenworth (PCAR), Peterbilt (PCAR) <u>Local:</u> Freightliner (Daimler), Thomas Built (Daimler), International (Navistar), Bluebird, Collins (REVG) <u>Mass:</u> Van Hool, North American Bus Industries		Ford (Class 6), Freightliner (Daimler), International (NAV), Peterbilt (PCAR), Kenworth (PCAR), Hino (Toyota)	Kenworth (PCAR), Peterbilt (PCAR), Mack (Volvo), Volvo, Freightliner (Daimler), Autocar (Refuse)	Freightliner (Daimler), Kenworth (PCAR), International (NAV), Peterbilt (PCAR), Volvo, Mack (Volvo), Western Star (Daimler)	
ASP	\$50-\$70k	\$75k	\$70-\$100k	\$120-\$250k	\$100-\$160, \$200-\$400k Vocational	

Daimler

Freightliner

Western Star

Volvo (Mack & Volvo)

PCAR (Peterbilt & Kenworth)

Navistar (International)

Ford

Oshkosh

REV Group

Toyota (Hino)

- ✓
- ✓
- ✓
- ✓

✓	✓	✓
	✓	✓
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Source: ACT, DAT, Company Data, Morgan Stanley Research

May 2021

Industrials Spring Training Teach-In

Truck Equipment & Market Primer: Equipment Types

On-Highway				Natural Gas	Power / Industrial
Type	Light-Duty	Medium-Duty	Heavy-Duty		
HP	350 hp (light-duty), 300 - 600 hp (RV)	150 - 400 hp	300 - 600 hp		
Uses	Heavy-duty pick-up trucks and motor homes	City delivery, buses, medium vocational	Long haul and short haul trailers, heavy vocational	Natural gas engines are available for every class of truck	350 hp + Industrial generators, marine, oil & gas, mining, rail
					
Component-Only					
Cummins	✓	✓	✓		
Westport	✓	✓	✓	✓	✓
OEMs					
PACCAR		✓	✓		
Detroit Diesel (Daimler)		✓	✓		
Navistar		✓	✓		
Volvo		✓	✓		
Ford	✓	✓	✓	✓	✓
Hino (Toyota)		✓			
Caterpillar				✓	✓

Source: ACT, DAT, Company Data, Morgan Stanley Research

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Industrials Spring Training Teach-In

Truck Equipment & Market Primer: Equipment Types

Commercial Truck Components

Engine	Transmission	Fuel Systems	Fuel Tanks	Aftertreatment	Braking Systems	Aftermarket
						
	Includes manual, automatic manual (AMT), and automatic	Electronic fuel injection, high pressure injection, direct injection	High-pressure for natural gas (LNG & CNG), Diesel	Catalytic converter, Particulate Filter	Block brakes, anti-lock brake system (ABS), electronic (EBS)	

OEMs

PACCAR	✓	✓				
Navistar	✓					
Daimler	✓	✓				
Volvo	✓	✓				

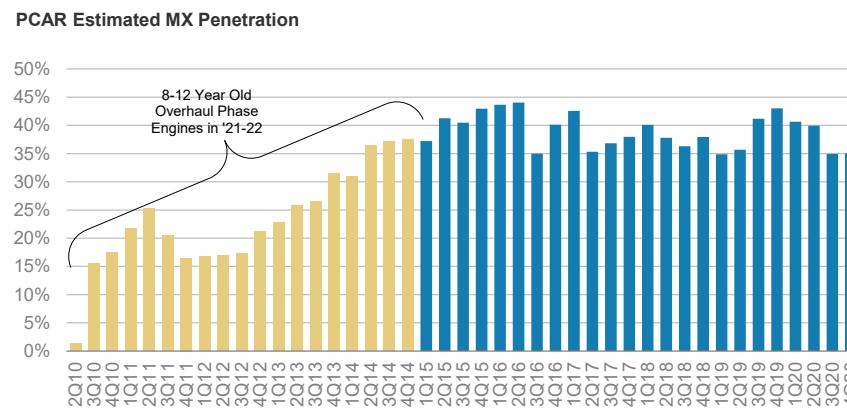
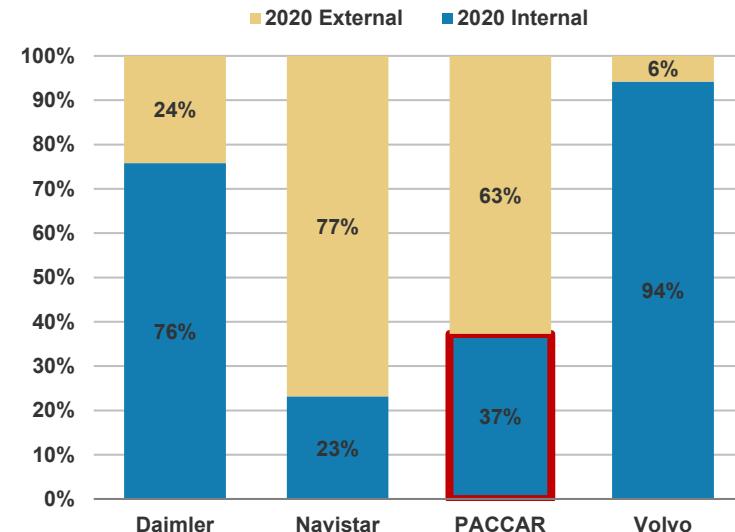
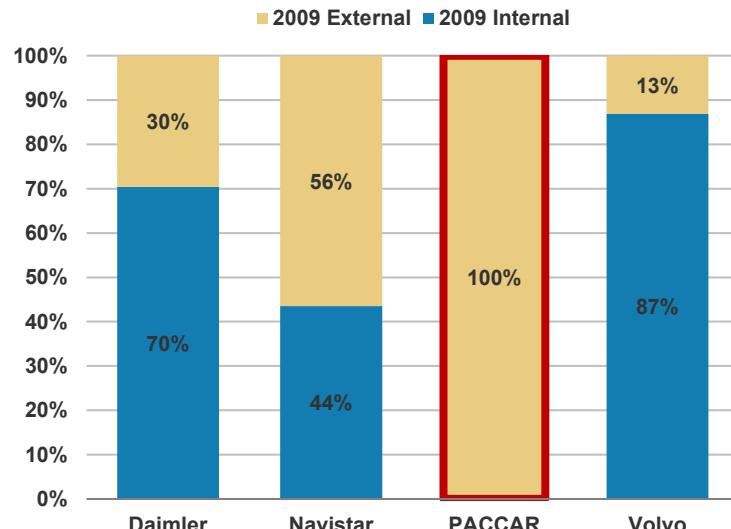
Suppliers

Cummins	✓	✓	✓		✓	
Allison		✓				
Wabash						✓
WABCO		✓				✓
Westport	✓		✓	✓		

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Industrials Spring Training Teach-In

Vertical Integration leads to more aftermarket parts sales



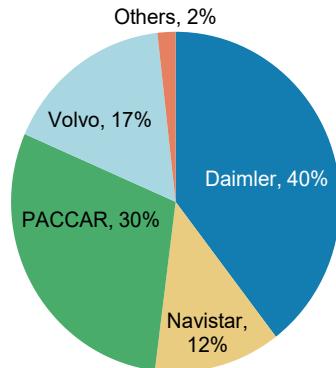
Source: ACT, DAT, Wards, Company Data, Morgan Stanley Research

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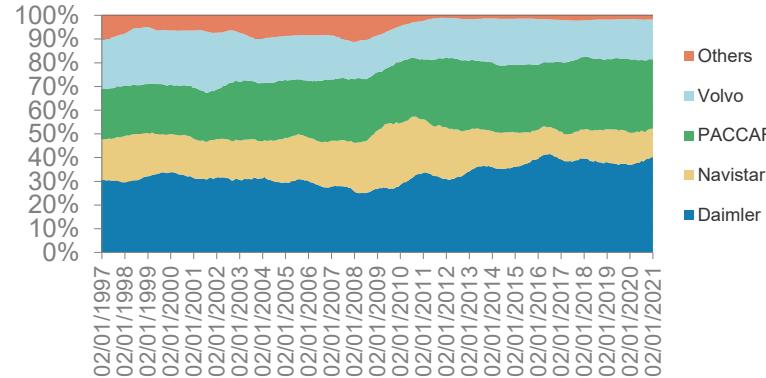
Industrials Spring Training Teach-In

NAFTA is most consolidated; Daimler is market leader

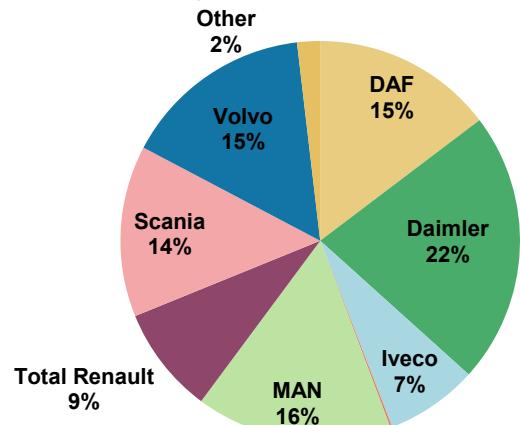
LTM NAFTA Class 8 Sales Share



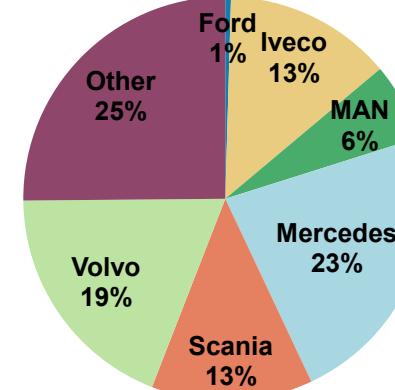
LTM NAFTA Class 8 Market Share - Sales



Est. W Europe Heavy Truck Market Share



Brazil Heavy Truck Market Share (>15T)



Source: ACT, ACEA, DAT, Company Data, Morgan Stanley Research

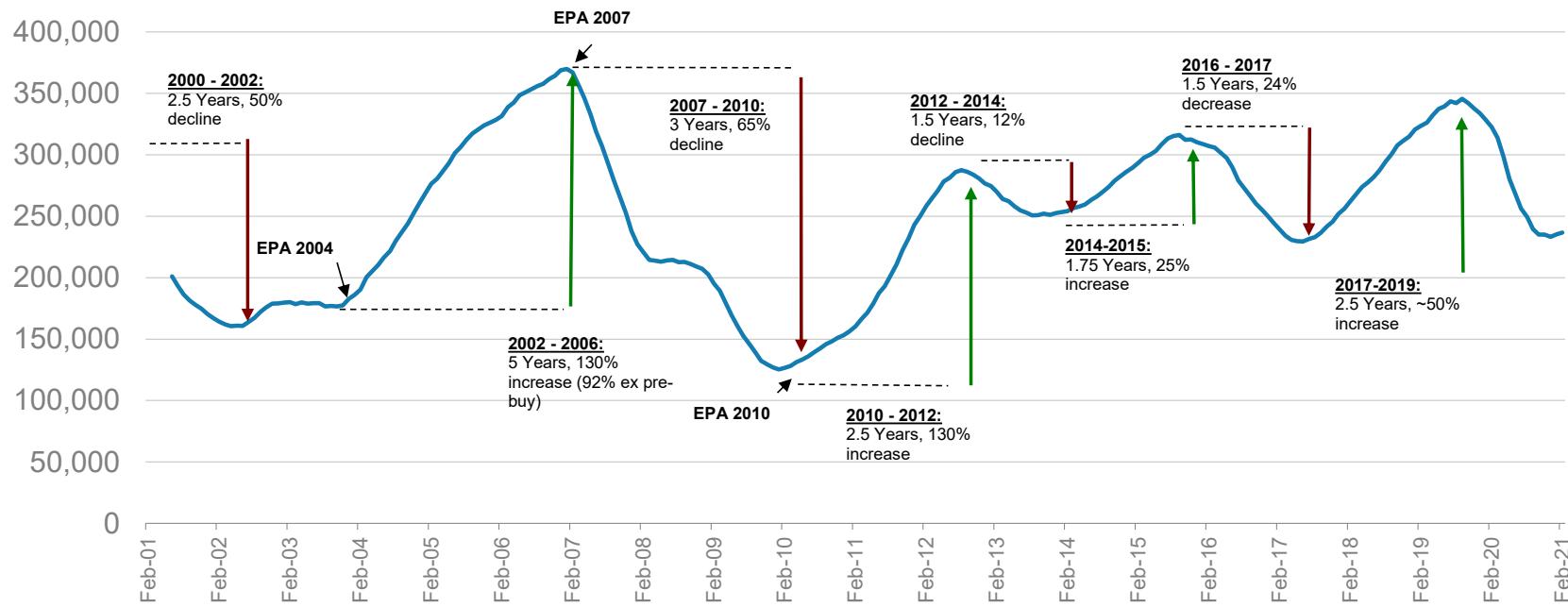
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Industrials Spring Training Teach-In

Truck cycles are generally 2-4 years up, 1-2 years down

Ex-EPA regulation incentives, Truck cycles are generally 2-4 years up, 1-2 years down, driven by large fleets who replace their trucks every 2 years to remain within warranty and reduce maintenance. The EPA 2007-driven pre-buy was the most notable anomaly over our data set, given the confluence of strong freight demand, robust trucker profitability and a more compelling payback argument vs. other emissions regulations.

NAFTA Class 8 Truck Sales (T12M)



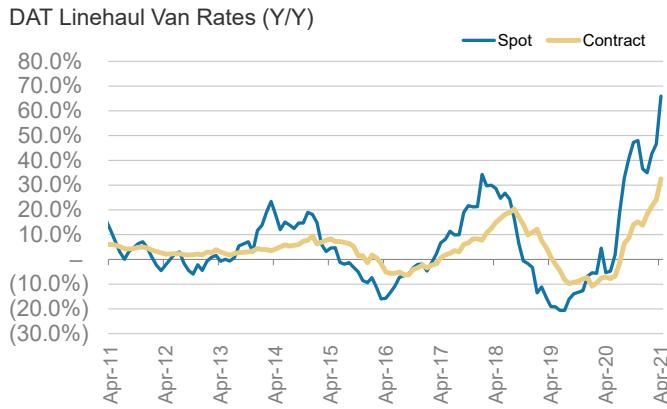
Source: ACT, AEM, Anfavea, Morgan Stanley Research

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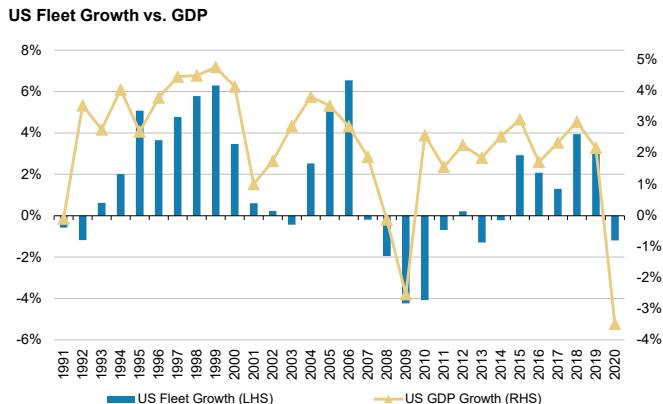
Industrials Spring Training Teach-In

NAFTA Class 8 Truck Orders & Sales correlate with DAT freight rates, Trucker EBITDA & Capex and MS TLFI; Fleet growth correlates with GDP

Historically, DAT Freight rates have correlated well with orders, suggesting some degree of supply indiscipline on the part of TLs.

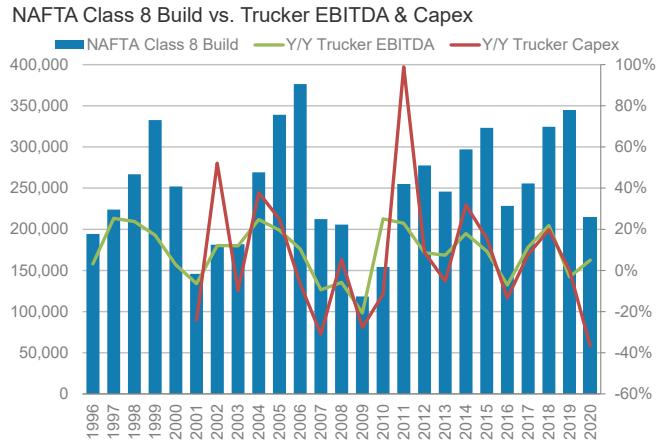


US Class 8 Fleet Growth correlates with GDP.

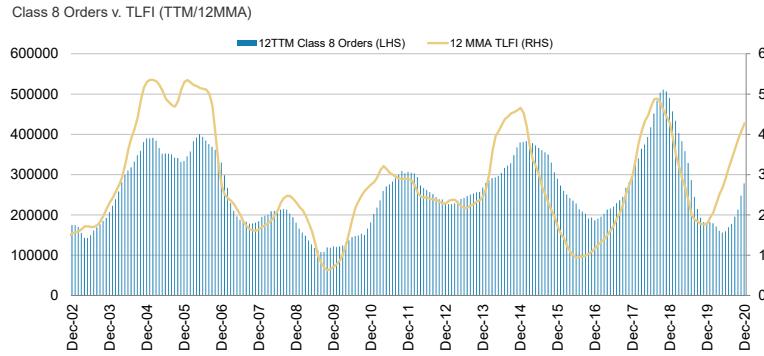


Source: ACT, DAT, Company Data, Morgan Stanley Research

Class 8 Retail Sales have shown a meaningful correlation with Trucker EBITDA and Capex.



Historically we have witnessed a very strong relationship between our Freight team's TTM TLFI and TTM Class 8 orders - as such, we continue to view the team's indicator as a valuable predictor of retail sales.



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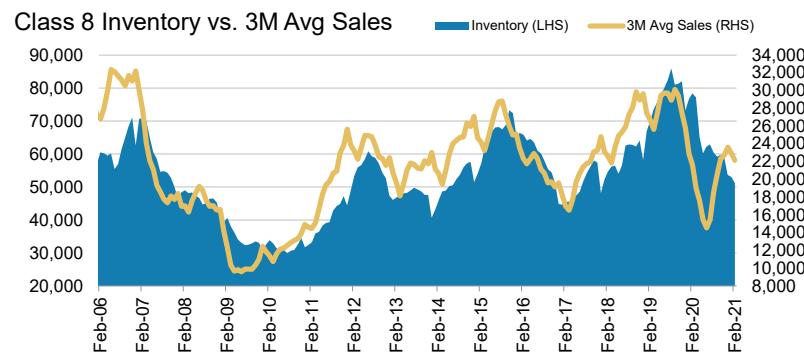
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NAFTA Class 8 used truck pricing is recovering

PCAR's FinCo margins have historically shown a meaningful correlation with used truck pricing.

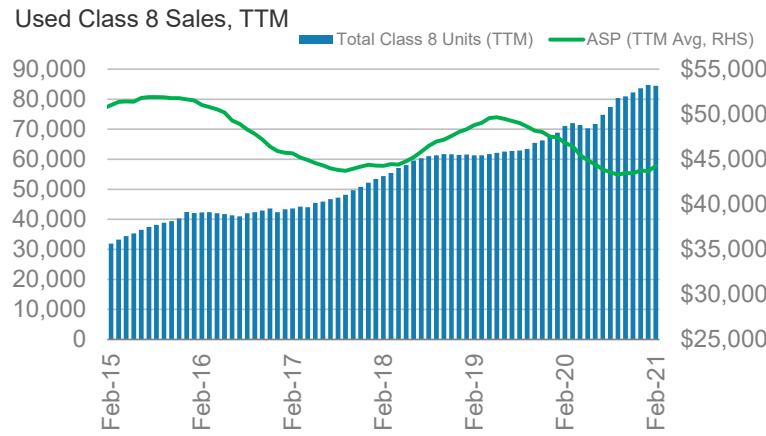


Inventories have normalized after surpassing prior peaks

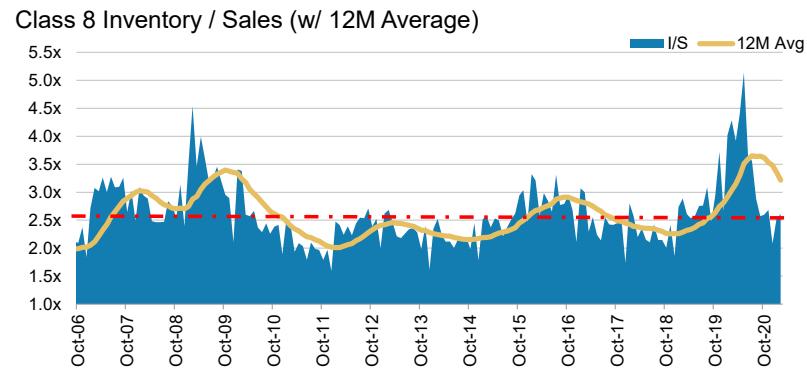


Source: ACT, Company Data, Morgan Stanley Research

Used Class 8 Sales have remained robust, with pricing recovering from trough.



As demand has remained strong, the Inventory to Sales ratio has improved to historical averages



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European Truck Market – Less Volatile than NAFTA

European registrations were somewhat more inconsistent vs. NA retail sales following the GFC, with the pace of registrations coming in well below prior peak levels (while NA retail sales achieved a level similar to pre-buy adj. prior peak in 2015). Our European Autos team broadly attributes this to somewhat poorer credit quality and lagging effects of European QE, which began to benefit owner operators to a more noticeable degree in 2016 and early 2017 (given the lack of larger, publicly traded fleets in the EU).

EU HD Registrations vs. NAFTA Class 8 Truck Sales (T12M)



Source: Global Insight, ACEA, ANFAVEA, CAAM, SIAM, JADA, AEB, Company Data, Morgan Stanley Research

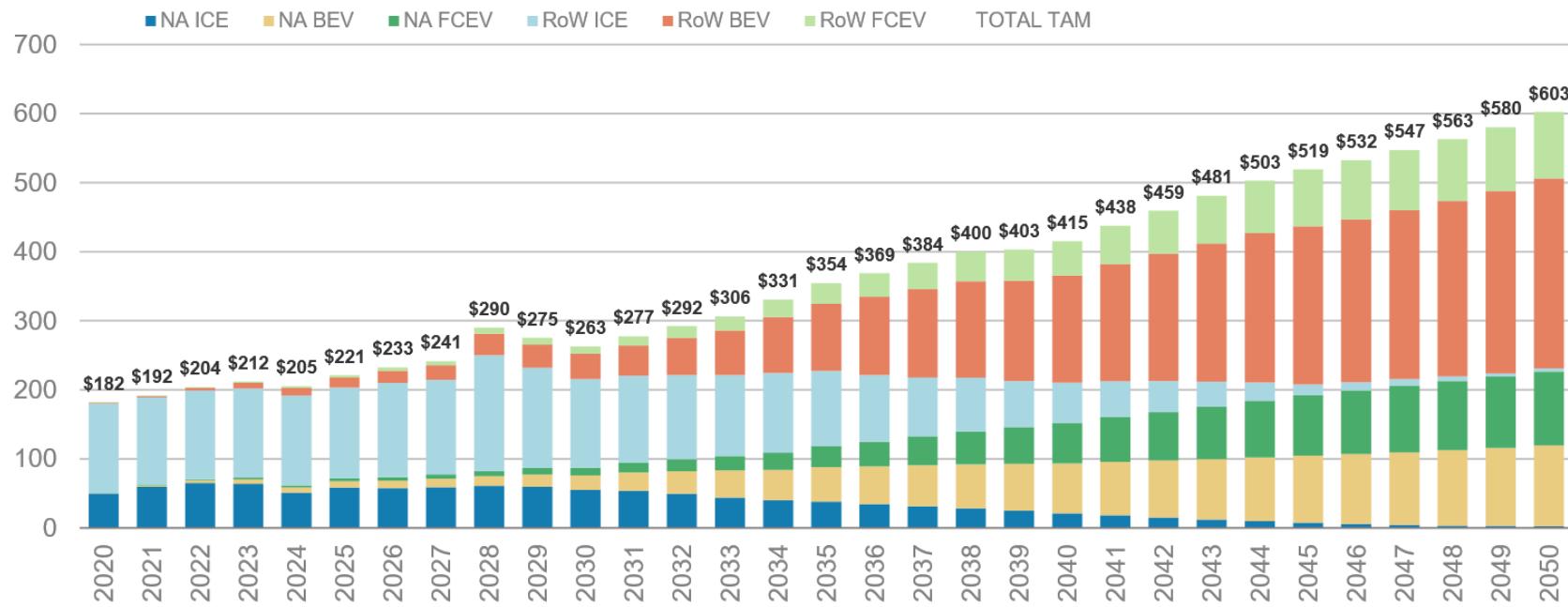
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Alternative powertrains threaten to disrupt the market

Truck OEMs and suppliers have acknowledged that EV technology is continuing to improve, with increasing degrees of market penetration as battery and fuel cell producers continue to perfect their technology. Our work implies that the total ZEV truck Total Addressable Market (TAM) will grow from <\$5B today to ~\$30B by 2025 and ~\$600B by 2050, resulting in a ~20% CAGR over the 2020-2050 time period.

Global Heavy & Medium Duty Truck TAM (\$B)



Source: Thomson Reuters, ACT, ACEA, CV World, Company data, Morgan Stanley Research

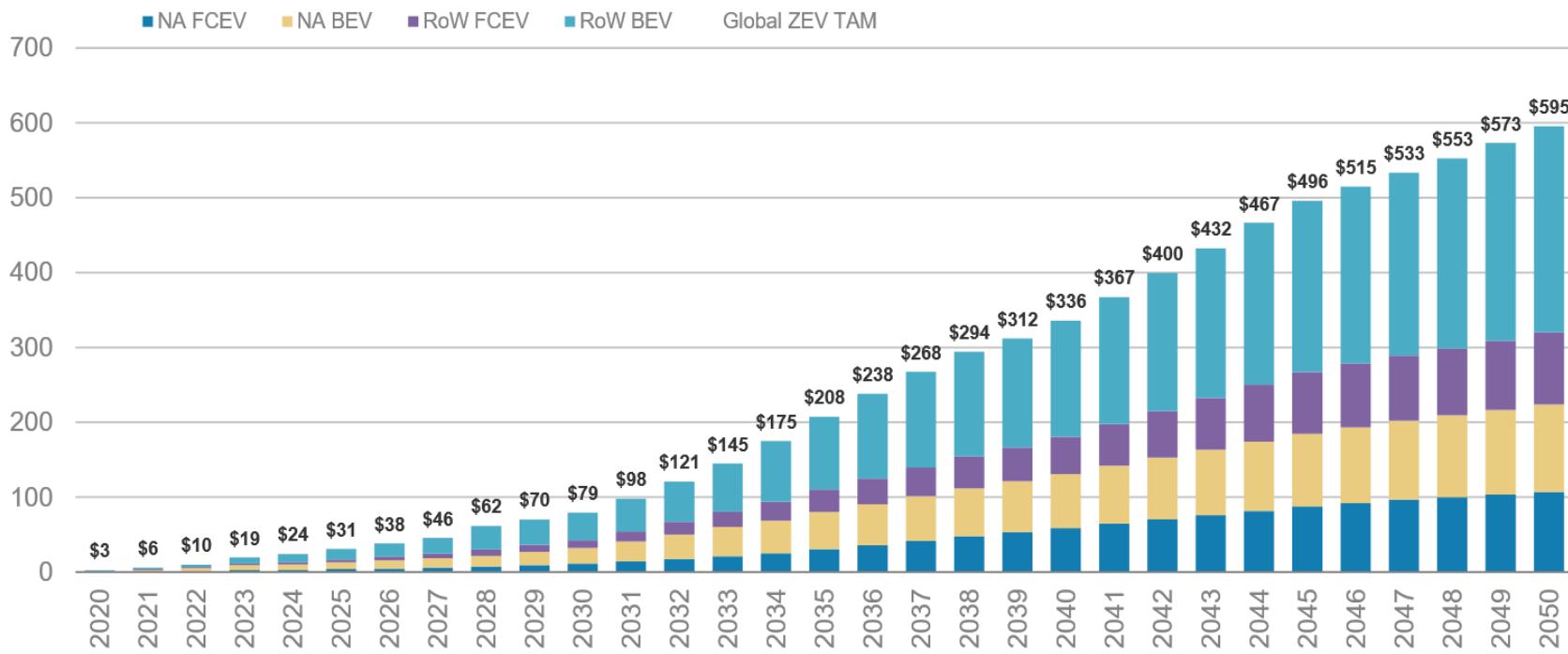
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Alternative Powertrains Threaten to Disrupt Market

Our 2050 estimates contemplate a Global BEV TAM of ~\$400B by 2050 (vs. <\$2B in 2020) and a Global FCEV TAM of ~\$200B (vs. <\$1B today), resulting in CAGRs of ~20%/19%, respectively. Within the mix of regions and powertrain technologies, we expect North America FCEV to show the highest 2020-2050 CAGR of ~40%, with market growth moving from <\$5M in 2020 to ~\$110B by 2050. Global ICE TAM is seen contracting from ~\$180B today to just ~\$8B by 2050, implying a CAGR of (10%).

Global Heavy & Medium Duty ZEV Truck TAM (\$B)



Source: Thomson Reuters, ACT, ACEA, CV World, Company data, Morgan Stanley Research

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Hydrogen carries several advantages vs. BEV

The two most promising Zero-Emissions technologies for trucks are BEVs (Battery Electric Vehicles) and FCEVs (Fuel Cell Electric Vehicles). FCEV technology development materially lags that of BEVs, but FCEVs are sometimes viewed as the "greener" technology since BEVs have ESG issues with respect to battery material sourcing and 'dirty' energy sources for electricity in certain areas. In FCEVs, hydrogen (from a tank) and oxygen (air intake) are combined to produce electricity and water. Hydrogen fuel cells are anticipated to provide superior range and quicker charging/refueling times than BEVs. As a result, industry experts largely believe that FCEV will be the most viable solution for long haul trucking while BEV will be better suited for short haul due to the expected ranges, weight/size of the batteries and charging times.

	Hydrogen-Electric	100% Battery Electric	Diesel
Primary Power Unit (PPI)	Hydrogen Fuel Cell	Battery	Diesel Engine
Refuel / Charge Time	10-15 minutes	Several Hours	10-15 minutes
Est. Range	500-750 miles (long-haul)	100-300 miles (medium/short haul)	500-750 miles
Refill Affect on Electrical Grid	Hydrogen stations act as buffer & balance grid	Recharge to be managed within grid load capacity	N/A
PPU Sustainability Profile	Hydrogen is the most abundant element on planet	Dependent on further advances in technology	Access to oil reserves can be costly and prices are highly volatile
Impact on Emissions	Zero emission vehicle	Zero emission vehicle	Heavy emission vehicle unlikely to adhere to future regulations on emissions standards
Est. Vehicle Weight	~22,000 - 24,000 lbs	~25,000 - 27,000 lbs	~17,000 - 19,000 lbs
Est. Hauling Capacity	~56,000 - 58,000 lbs	~53,000 - 55,000 lbs	~61,000 - 63,000 lbs

Source: ACT, ACEA, CV World, Company data, Morgan Stanley Research

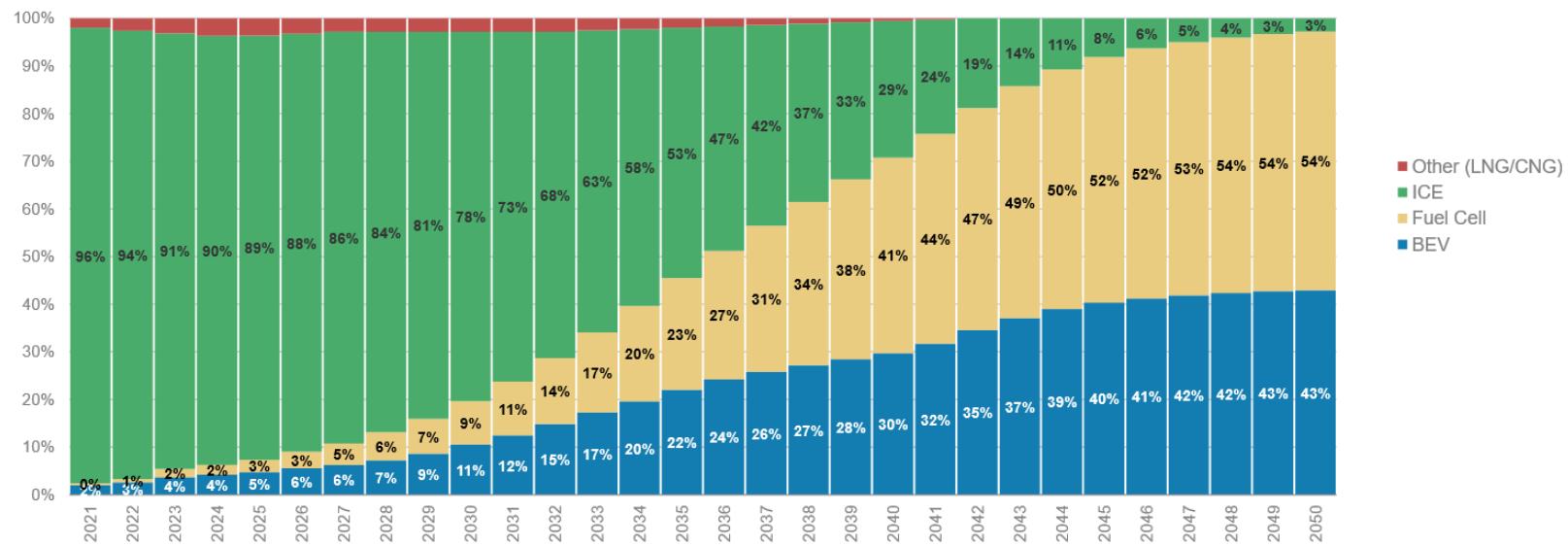
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Rate of Adoption in NA Class 8

We see a path to ~55%+ FCEV penetration of FCEV Class 8 Trucks by 2050. Our ~55% penetration rate assumes that nearly all long haul trucks and ~50% of medium-haul trucks convert to FCEV. We expect short haul to largely adopt BEV. We estimate that ~25% of the Class 8 Truck market is considered short-haul (<100 mile routes), ~35-40% are medium-haul (100-500 mile routes), and 35-40% are long-haul (>500 mile routes) based on responses from ARTI's 2019 Survey. The number of trucks servicing short-haul routes has increased over the past decade due to a focus on last mile delivery and more efficient routes, but we expect the adoption of autonomous driving over the coming decade to increase the number of long haul routes as driver hour restriction will no longer apply. Regional haul (medium-haul) tends to "cube out" of space vs. "max out" on weight, so BEV battery size vs. FCEV hydrogen storage/battery size and truck design will significantly impact adoption curves.

Total NA Class 8 Powertrain Penetration Rates (~275k trucks/year)



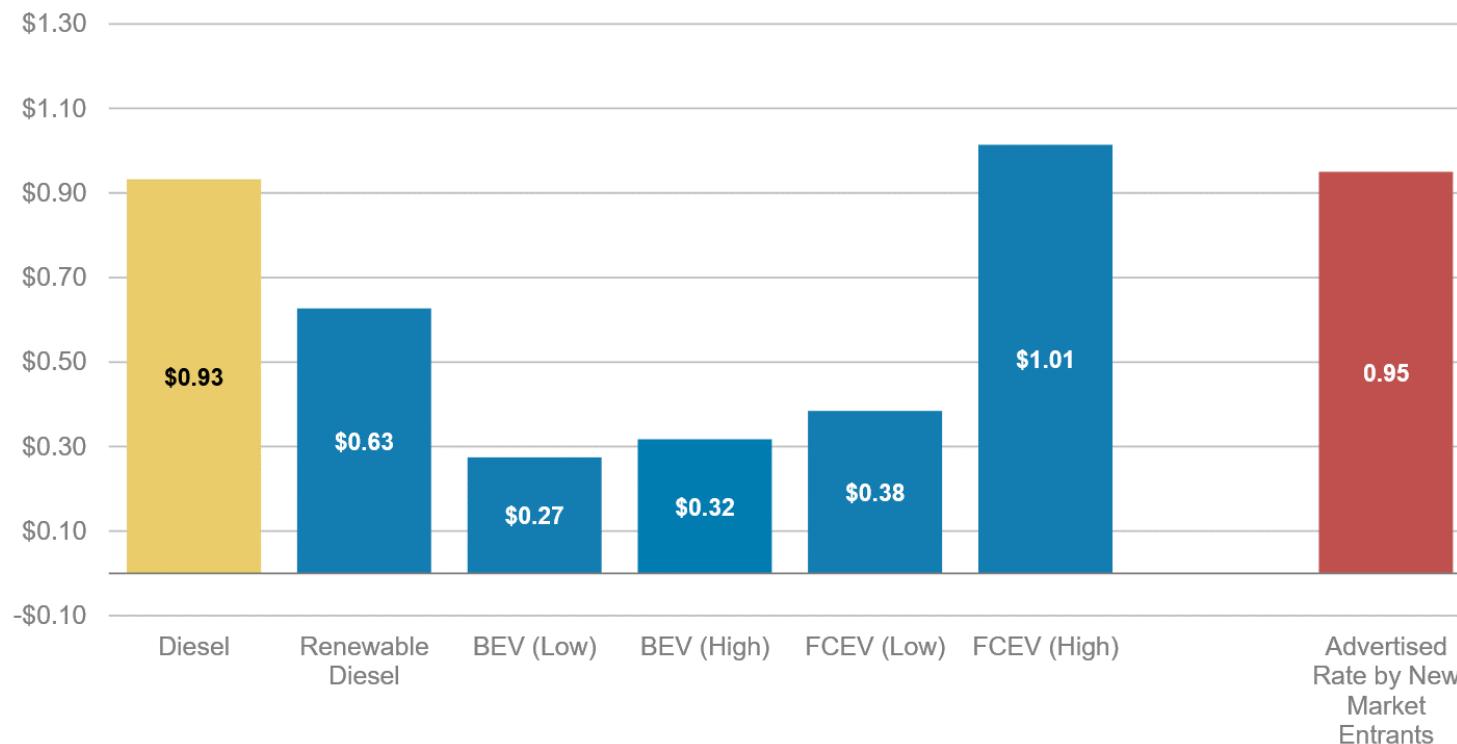
Source: ACT, Company Data, Morgan Stanley Research

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Breaking Down the Components of our Total Cost of Ownership Model

LCFS Credits and existing fuel subsidies for hydrogen/electricity have the potential to make FCEV and BEV trucks competitive with diesel on a total cost of ownership basis, although this does not address the additional challenges for technology adoption (e.g., charge time, infrastructure, service footprints, etc.).

Annual Cost Per Mile (Assuming 100k Miles/Year & LCFS Credits & Fuel Subsidies)



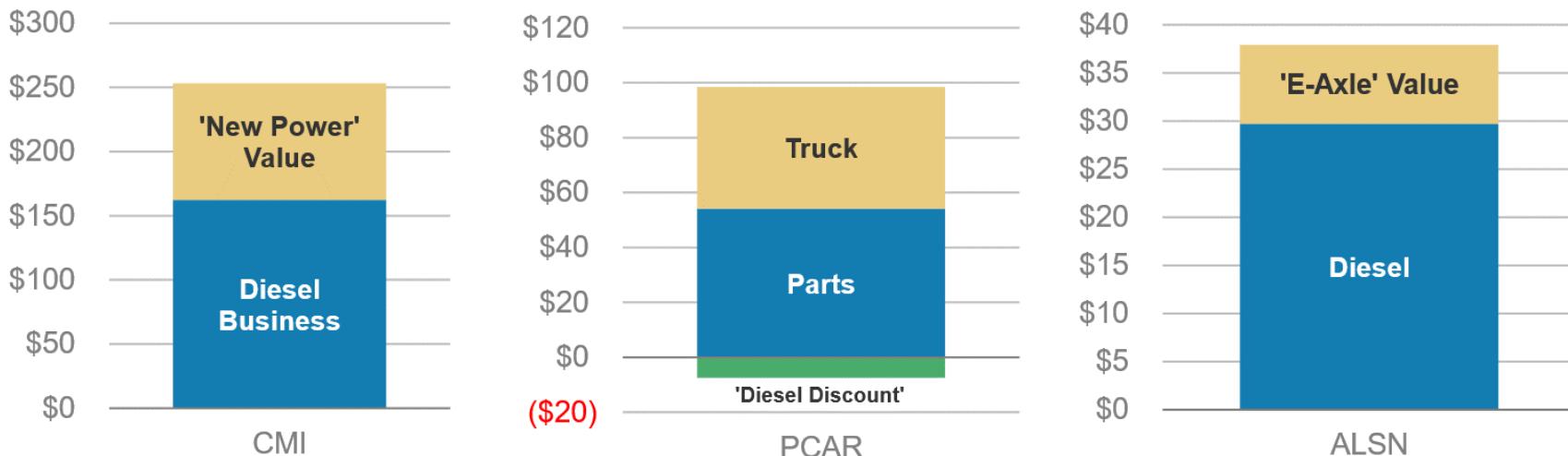
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Implied Valuations - Diesel vs. Alternative Powertrain

Utilizing our 2050 adoption curves and associated DCFs, we see the highest degree of risk to shares at ALSN, where investors are likely ascribing a value to the company's 'E-Axle' business where we see a greater degree of risk of commoditization and disruption from new market entrants. We think investors' valuation of CMI embeds a more reasonable valuation of the company's 'New Power' business, and here we are more bullish on the company's efforts to leverage its existing customer relationships and R&D scale to better address its competitive position should zero-emissions technologies see faster uptake. PCAR's valuation suggests modest upside to the shares from our long-term forecast, implying limited risk from zero-emissions technologies. Importantly, our DCFs incorporate a terminal value growth rate of zero in 2050, account for potential R&D and capex pressures over the ~2026-2030 period, and embed assumptions driving diesel revenues towards zero over time, and so we view long-term risk as appropriately calibrated.

Implied Valuations - 2050 DCFs



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Full Adoption Forecast Table

North America Retail Sales	2020	2025	2030	2035	2040	2050
Total HD Sales	233,232	294,700	302,071	316,195	319,649	337,666
NA Class 8 Penetration - ICE	99%	89%	78%	53%	29%	3%
NA Class 8 Penetration - BEV	0%	5%	11%	22%	30%	43%
NA Class 8 Penetration - FCEV	0%	3%	9%	23%	41%	54%
Total MD ICE Sales	233,499	270,700	276,948	297,863	310,759	344,444
NA Class 5-7 Penetration - ICE	96%	75%	53%	20%	5%	0%
NA Class 5-7 Penetration - BEV	1%	14%	33%	62%	74%	75%
NA Class 5-7 Penetration - FCEV	0%	3%	7%	13%	18%	25%
Total Bus Sales	33,986	58,202	40,382	14,927	7,488	8,969
NA Bus ICE Penetration	90%	72%	51%	20%	10%	0%
NA Bus BEV Penetration	3%	16%	35%	64%	76%	86%
NA Bus FCEV Penetration	0%	2%	4%	7%	9%	12%
EU Retail Sales	2020	2025	2030	2035	2040	2050
Total HD Sales	239,688	327,572	298,474	341,568	350,183	390,529
EU Heavy Duty Penetration - ICE	97%	85%	73%	51%	25%	0%
EU Heavy Duty Penetration - BEV	1%	7%	16%	32%	51%	70%
EU Heavy Duty Penetration - FCEV	0%	3%	7%	15%	22%	30%
Total MD ICE Sales	62,988	82,338	85,267	89,027	95,938	105,055
EU Medium Duty Penetration - ICE	95%	75%	55%	15%	0%	0%
EU Medium Duty Penetration - BEV	1%	15%	35%	75%	90%	90%
EU Medium Duty Penetration - FCEV	0%	1%	3%	5%	7%	10%
Total Bus Sales	33,770	43,100	41,260	44,767	48,007	53,733
EU Bus ICE Penetration	83%	61%	44%	8%	0%	0%
EU Bus BEV Penetration	9%	23%	40%	80%	94%	95%
EU Bus FCEV Penetration	0%	1%	2%	3%	4%	5%
APAC Retail Sales	2020	2025	2030	2035	2040	2050
Total 15T+ Sales	1,308,465	1,143,344	1,272,378	1,438,985	1,340,463	1,478,851
APAC 15T+ Penetration - ICE	98%	88%	76%	54%	29%	2%
APAC 15T+ Penetration - BEV	1%	6%	15%	31%	50%	69%
APAC 15T+ Penetration - FCEV	1%	2%	6%	14%	21%	29%
Total 6-15T ICE Sales	322,628	356,222	332,684	382,322	361,279	393,482
APAC 6-15T Penetration - ICE	97%	78%	57%	17%	4%	2%
APAC 6-15T Penetration - BEV	1%	14%	34%	74%	89%	89%
APAC 6-15T Penetration - FCEV	0%	1%	2%	4%	7%	9%

Source: ACT, ACEA, CV World, Company data, Morgan Stanley Research

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Aggregates

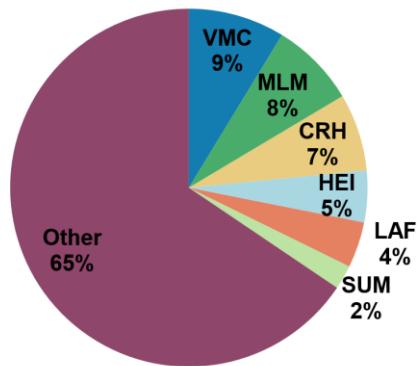
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Aggregates volumes over-index to infrastructure, and the market remains highly fragmented

Aggregates are naturally occurring mineral deposits that have been processed into crushed stone, sand, and gravel. They are primarily used in construction applications like road and building foundations, but are also used for railroad ballast, erosion control, filtration, and solutions for snow and ice control. They are critical to the production of cement, ready mix concrete and asphalt paving mixes (which are referred to as "downstream" products) since aggregates make up 90-95% of asphalt and 70-80% of concrete. The main end markets for aggregates are public construction/infrastructure (~65% of volumes), Private Non-Residential Construction (~20% of volumes) and residential construction (~15% of volumes). Exposures for Aggregates companies like VMC, MLM, and SUM skew slightly higher toward residential (20-25%) and non-residential construction (30-35%) vs. public construction/infrastructure (45-50%) due to downstream exposure.

US Aggregates Market Share



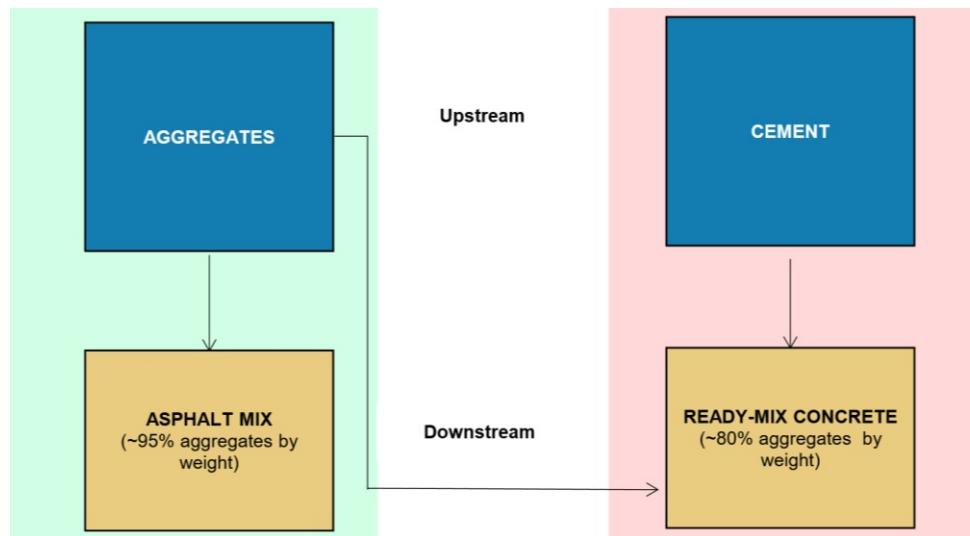
Aggregate End Market Exposure



Application	Aggregates Intensity
Highway	38k tons per mile of 4 lane highway
House	400 tons per house
School or Hospital	15k tons per building

Aggregates 101: Upstream vs. Downstream

Aggregates are attractive product lines due to high barriers to entry, logistical moats, low energy intensity in the production process and limited substitute products. Generally speaking, downstream exposure has higher fixed costs (esp energy costs) and sees more volatile margins.



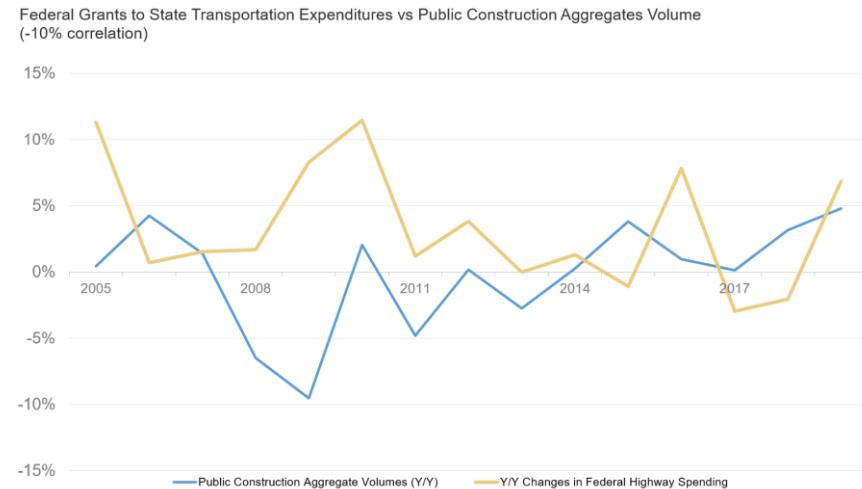
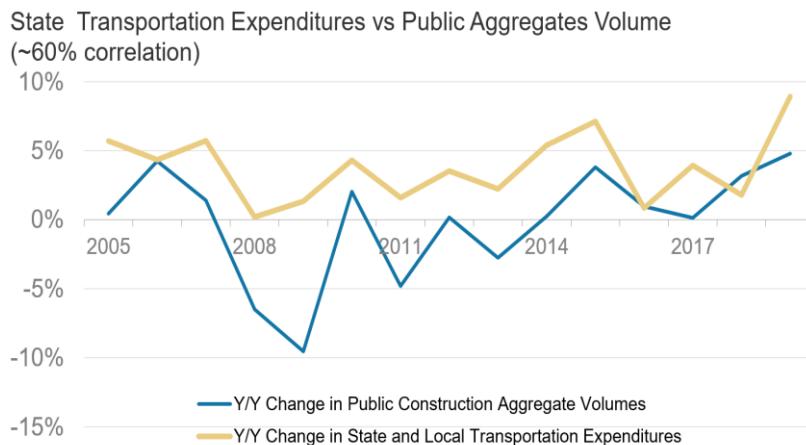
	US Market Size (units)	US Market Size (\$)	ASP	Flexible Production	Pricing Power depends on Volume?	Transportation Radius	Barriers to Entry
Aggregates	2.4B tons	\$27B	\$11 per ton	✓	No	35 miles	✓
Cement	96M tons	\$12B	\$125 per ton	X	Yes	150-200 miles	✓
Asphalt Mix	400M tons	\$21B	\$50 per ton	✓	No		X
Ready Mix	350M cubic yards	\$41B	\$120 per cu. yd	✓	Yes	90 mins	X

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Aggregates volumes are correlated with state transportation expenditures

Annual changes in aggregates volume is highly correlated with total state transportation expenditures (~60%), but not highly correlated with Federal Transportation Expenditures (-10%). This is partially because increases in federal spending can offset more declines at the state and local level. Also, though increases in federal grants often require some form of state match, the CBO estimates that states often offset the impact of increases in federal grants by reducing their own outlays by about one-third.



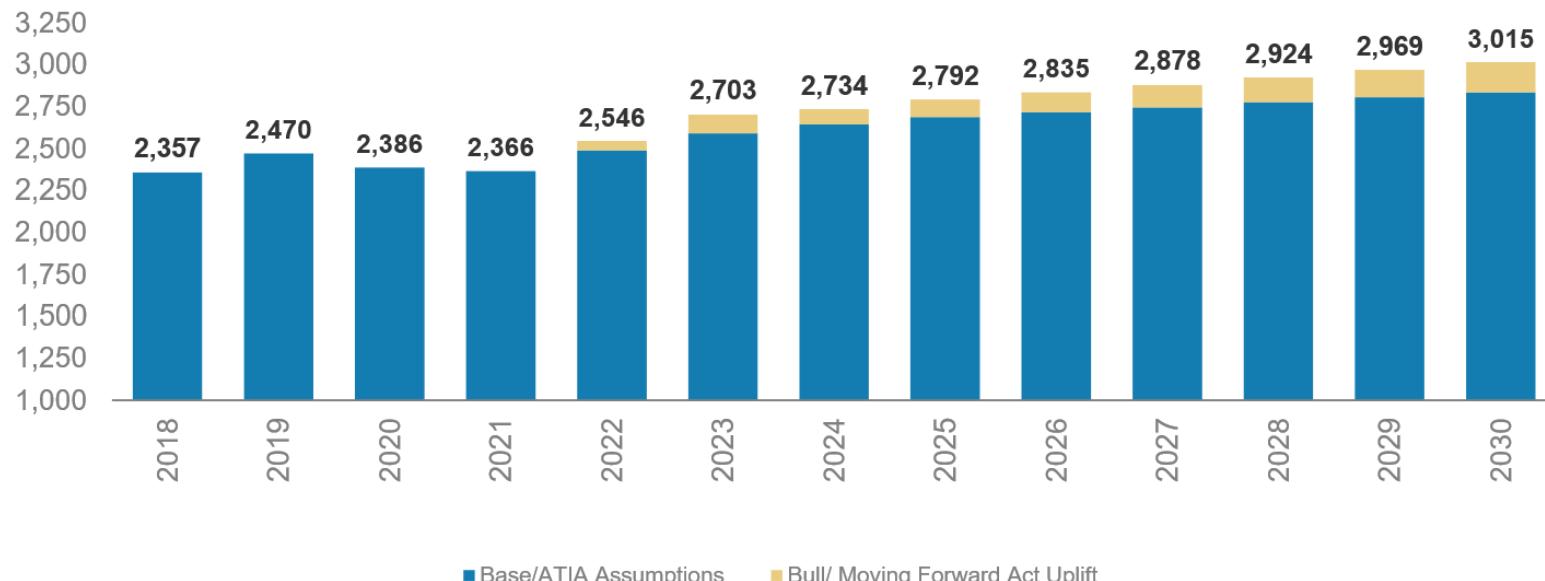
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We estimate that the \$3T of repair work identified in our AlphaWise analysis would require ~4Y of volumes

We estimate that a total of ~9 billion metric tons of aggregates are needed to fully address the \$3.0 trillion of road and bridge repairs identified in our Alphawise analysis. This is the equivalent of ~4 years worth of aggregate demand (which averages ~2.3 metric tons per year). However, any infrastructure proposal will only address a fraction of this demand. We estimate a \$1.5 trillion/10-year infrastructure package with ~\$640 billion focused on surface infrastructure would result in an additional 1.1 billion metric tons of aggregates demand between 2022 and 2030 vs our current forecasts (~4.5% lift to total aggregates demand in 2022-30).

Crushed Stone, Sand & Gravel Volumes (mm metric tons)



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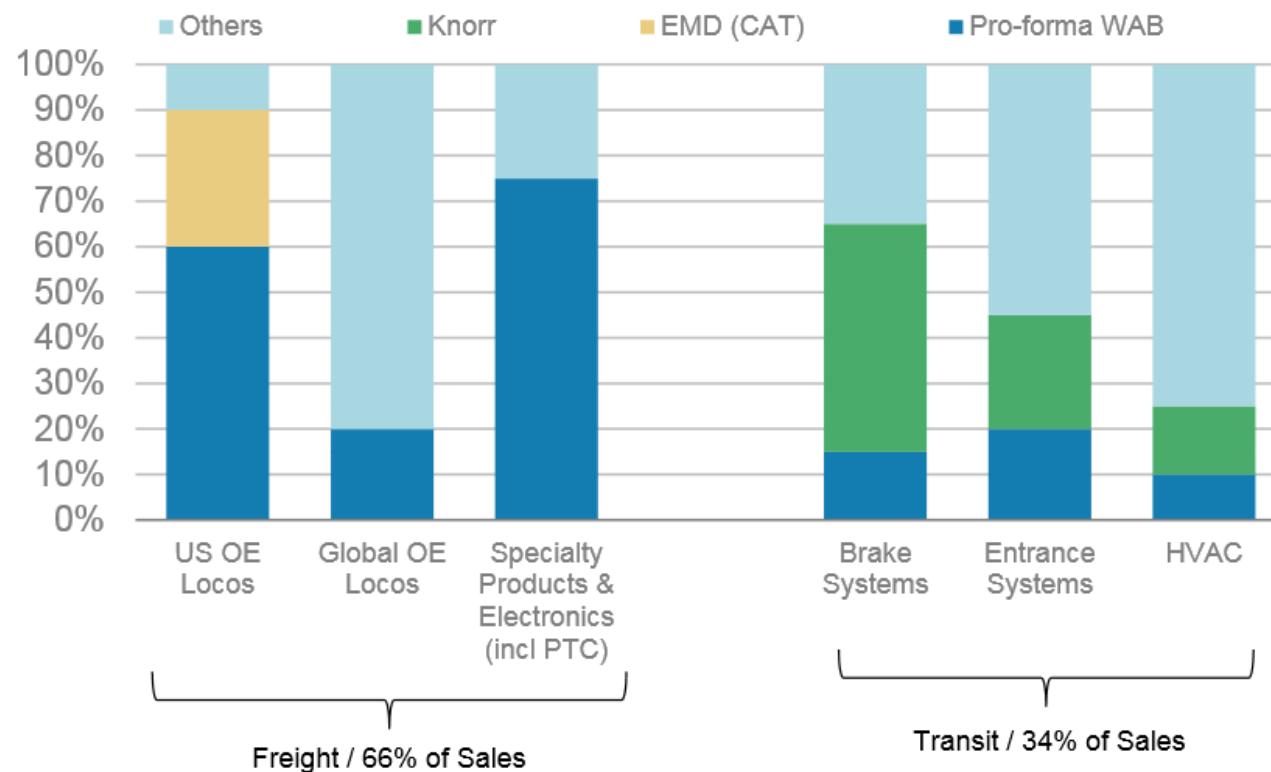
Locomotives

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WAB & CAT have duopoly in US Locomotives

Estimated Global Market Share

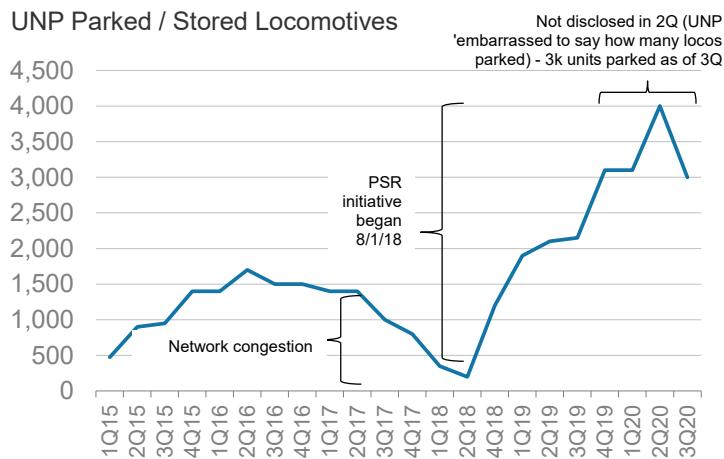


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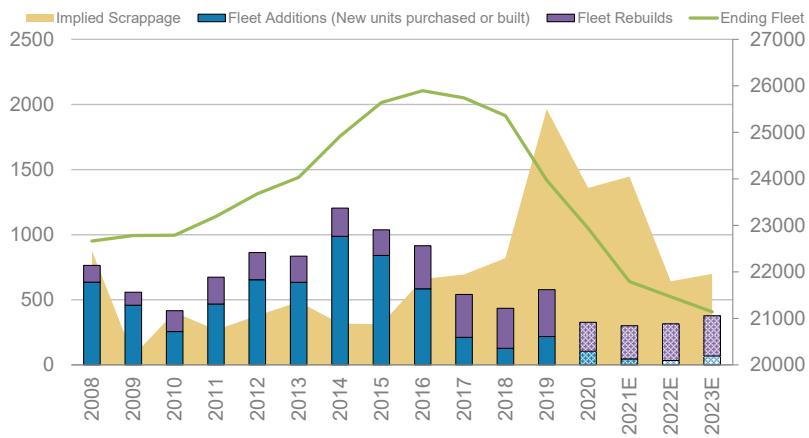
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Precision Scheduled Railroading (PSR) has reduced the active locomotive fleet

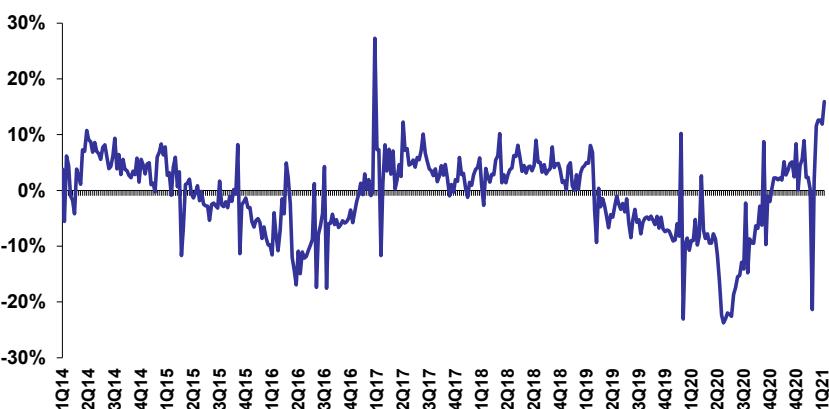
UNP Parked / Stored Locomotives



US Locomotive Fleet



Class 1 Rail Traffic Y/Y



Class 1 Rail Capex



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Key Debates and Top Picks

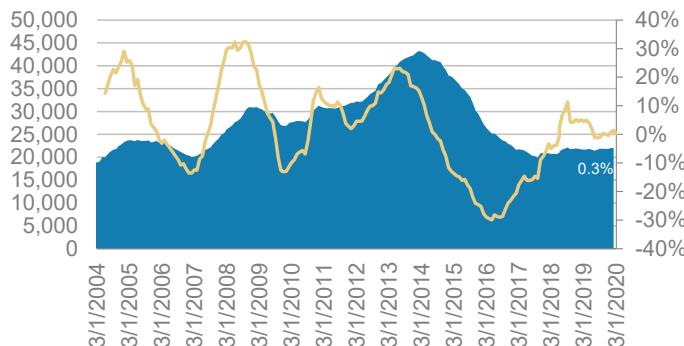
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Top Picks: Deere & Company (DE) – OW

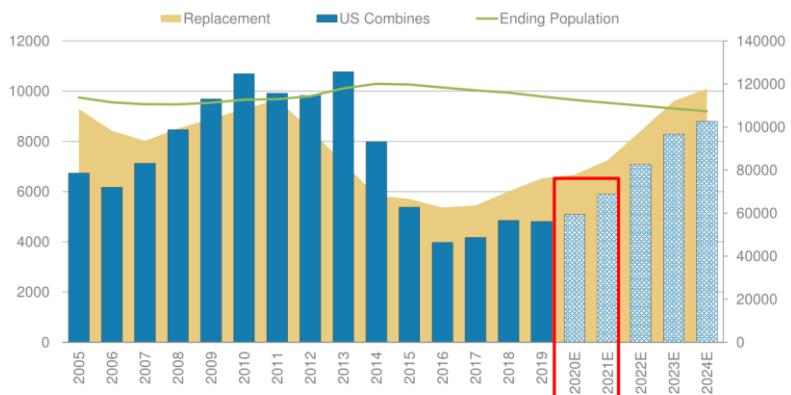
NA is still well-below mid-cycle.

U.S + Canada 100+ HP Registrations (TTM)



We expect US Combine sales to accelerate to +15-20% Y/Y through 2022.

US Combine Sales



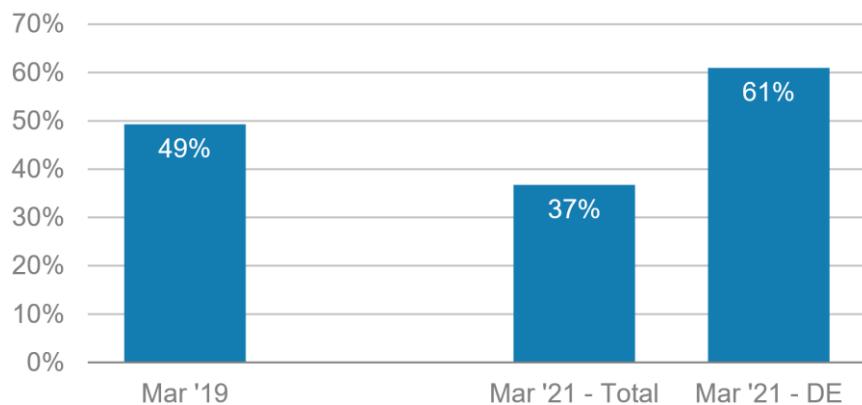
We see 100+ HP tractor up ~15%/5% Y/Y in 2021

US 100+ HP Tractor Sales



DE has continued to outperform its peer set in terms of Precision Ag

Weighted Avg Precision Ag Penetration

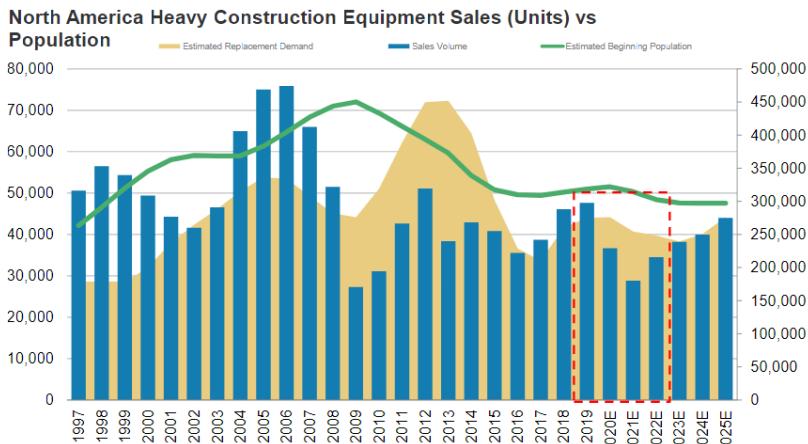


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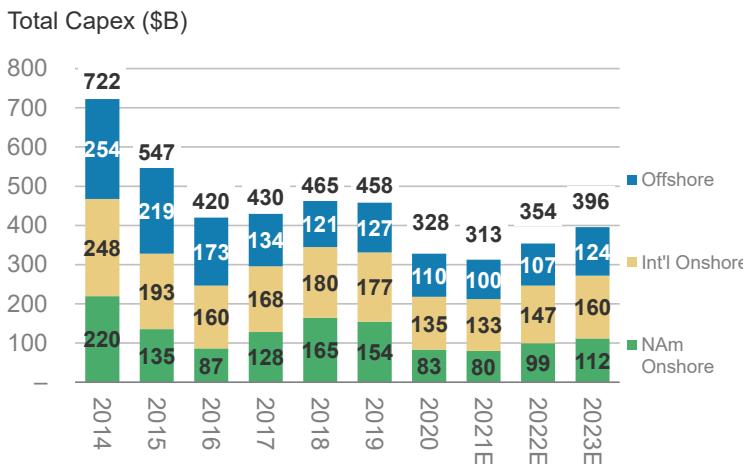
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Top Picks: Caterpillar (CAT) - UW

Based on our updated US Non-Resi assumptions, we see ~20% Y/Y industry-level construction equipment declines in 2021.

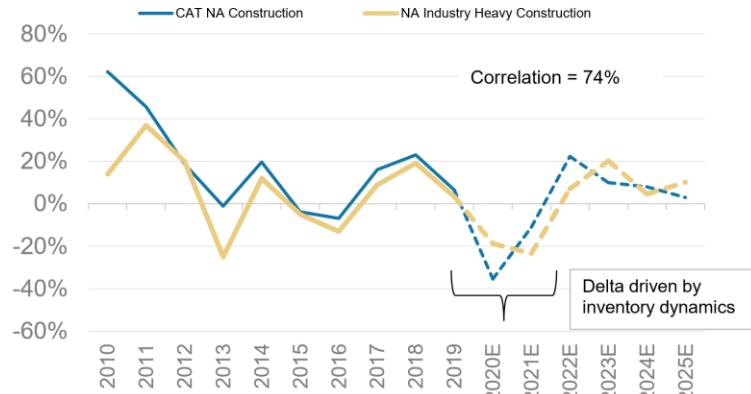


Our OFS team sees another year of declines in O+G capex



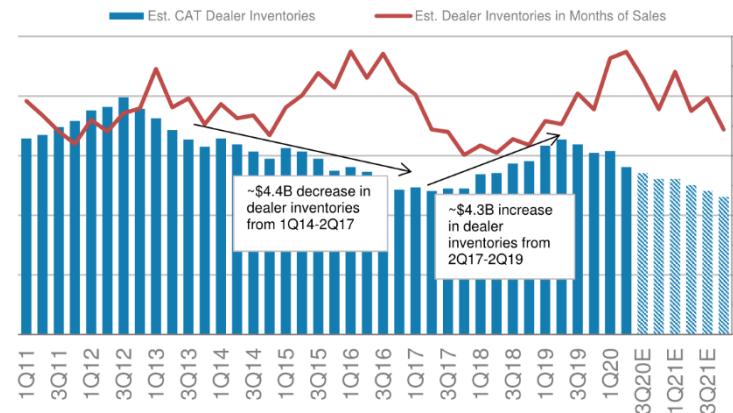
CAT's NA Construction sales have historically correlated ~75% with industry sales.

CAT NA Construction vs. Industry Sales



Destocking will exacerbate retail sales declines.

Est. CAT Dealer Inventories*



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US Machinery Ratings and EPS Estimates

Morgan Stanley Valuation Comps Machinery										
04/28/2021 Ticker	MS Rating	Current Price	Price Target	Upside %	Mkt Cap (\$mil.)	3 Yr. Beta	MS EPS Est. (CY) 2021E	MS EPS Est. (CY) 2022E	MS EPS vs. Cons (CY) 2021E	MS EPS vs. Cons (CY) 2022E
Construction Equipment										
CAT	UW	\$232.30	168	-28%	\$126,674	1.01	\$7.11	\$8.72	-15%	-19%
URI	UW	\$324.85	246	-24%	\$23,496	1.80	\$18.55	\$21.26	-1%	-2%
WSC.O	OW	\$30.08	32	6%	\$6,818	1.88	\$0.91	\$1.18	12%	6%
TEX	EW	\$48.65	47	-3%	\$3,392	1.34	\$2.44	\$3.31	6%	-3%
OSK	OW	\$128.35	122	-5%	\$8,777	1.27	\$5.90	\$8.21	-6%	2%
Avg/Sum ^e				-11%		1.46			-4%	-6%
Agriculture Equipment										
DE	OW	\$379.80	410	8%	\$119,044	1.21	\$17.03	\$19.63	5%	5%
AGCO.K	OW	\$156.16	155	-1%	\$11,758	1.36	\$7.33	\$8.30	0%	-1%
CNHI.K	++	\$15.63	++	++	\$21,379	1.31	\$0.91	\$1.16	16%	16%
Avg/Sum ^e				4%		1.29			7%	7%
Trucks and Suppliers										
PCAR.O	EW	\$90.68	103	14%	\$31,478	1.01	\$6.06	\$7.25	5%	5%
CMI	EW	\$255.38	260	2%	\$37,425	1.00	\$15.29	\$18.37	8%	10%
ALSN.K	EW	\$42.96	37	-14%	\$4,774	1.14	\$3.89	\$4.92	-4%	-3%
REVG.K	EW	\$18.38	19	3%	\$1,186	1.37	\$1.08	\$1.45	8%	12%
Avg/Sum ^e				1%		1.13			4%	6%
Rail Equipment										
WAB	OW	\$85.55	95	11%	\$16,199	1.50	\$4.31	\$5.24	4%	10%
Machinery Suppliers										
TKR	EW	\$86.80	87	0%	\$6,594	1.47	\$4.89	\$5.68	-2%	1%
LECO.O	EW	\$130.27	132	1%	\$7,772	1.03	\$5.16	\$6.08	-2%	1%
KMT	EW	\$41.44	38	-8%	\$3,462	1.47	\$1.09	\$1.32	-3%	-28%
DCI	OW	\$62.14	73	17%	\$7,837	1.13	\$2.49	\$2.87	5%	5%
Avg/Sum ^e				3%		1.28			0%	-5%
Aggregates										
MLM.N	OW	\$355.17	372	5%	\$22,148	1.23	\$11.54	\$12.86	2%	0%
VMC.N	EW	\$179.04	173	-3%	\$23,752	1.13	\$5.06	\$5.99	0%	1%
SUM.N	EW	\$28.42	31	9%	\$3,314	1.95	\$1.21	\$1.32	13%	2%
Machinery Average										
Avg/Sum ^e				-1%		1.30			2%	1%

Please see VMR disclaimer

Source: Thomson Reuters, Morgan Stanley Research. Note that all data is on a calendar year basis. *CAT, DE, and PCAR EBITDA are for Equipment Operations only. Estimates as of 4.28.2021.

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US Machinery Trading Comps

Machinery Valuation Metrics (Consensus & Morgan Stanley Estimates)										
04/28/2021	Cons. P / E Ratio*		MS P / E Ratio*		MS P / Sales Ratio		MS EV / EBITDA Ratio*		MS Net Debt (Cash) / EBITDA	
Ticker	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
Construction Equipment										
CAT	27.8x	21.5x	32.7x	26.6x	2.9x	2.7x	17.4x	15.4x	0.3x	0.2x
URI	17.3x	15.0x	17.5x	15.3x	2.7x	2.5x	8.1x	7.5x	2.0x	1.6x
WSC.O	37.2x	27.1x	33.2x	25.6x	3.8x	3.6x	13.6x	12.1x	2.6x	2.2x
TEX	21.1x	14.2x	19.9x	14.7x	0.9x	0.8x	12.2x	9.8x	NM	0.0x
OSK	20.3x	15.9x	21.7x	15.6x	1.2x	1.1x	13.8x	10.9x	0.0x	-0.3x
Avg	21.7x	16.6x	23.0x	18.1x	1.9x	1.8x	12.9x	10.9x	0.8x	0.4x
Agriculture Equipment										
DE	23.4x	20.3x	22.3x	19.3x	2.9x	2.8x	15.9x	14.6x	0.0x	-0.3x
AGCO.K	21.2x	18.7x	21.3x	18.8x	1.1x	1.1x	11.7x	10.7x	0.0x	-0.4x
CNHI.K	19.8x	15.7x	-	-	-	-	-	-	0.4x	0.0x
Avg	21.5x	18.2x	21.8x	19.1x	2.0x	1.9x	13.8x	12.6x	0.1x	-0.2x
Trucks and Suppliers										
PCAR.O	15.7x	13.2x	15.0x	12.5x	1.4x	1.2x	10.7x	8.9x	-1.7x	-1.2x
CMI	18.0x	15.3x	16.7x	13.9x	1.6x	1.5x	10.8x	9.5x	0.1x	0.3x
ALSN.K	10.6x	8.5x	11.1x	8.7x	2.0x	1.8x	8.5x	7.6x	0.6x	0.5x
REVG.K	18.4x	14.3x	17.0x	12.7x	0.5x	0.5x	11.9x	9.9x	1.9x	0.8x
Avg	15.7x	12.8x	14.9x	12.0x	1.4x	1.2x	10.5x	9.0x	0.2x	0.1x
Rail Equipment										
WAB	20.7x	18.0x	19.9x	16.3x	2.1x	1.9x	13.8x	12.2x	2.2x	1.7x
Machinery Suppliers										
TKR	17.4x	15.4x	17.8x	15.3x	1.7x	1.6x	8.9x	8.1x	1.4x	1.0x
LECO.O	24.9x	21.7x	25.2x	21.4x	2.6x	2.4x	17.0x	15.4x	1.1x	0.9x
KMT	37.0x	22.6x	38.0x	31.4x	1.1x	1.0x	13.3x	13.9x	2.1x	1.2x
DCI	26.3x	22.6x	25.0x	21.6x	2.7x	2.5x	15.8x	14.3x	0.7x	0.5x
Avg	26.4x	20.6x	26.5x	22.4x	2.0x	1.9x	13.7x	12.9x	1.3x	0.9x
Aggregates										
MLM.N	31.5x	27.6x	30.8x	27.6x	4.5x	4.1x	17.2x	15.6x	2.2x	1.7x
VMC.N	35.4x	30.2x	35.4x	29.9x	4.7x	4.4x	18.7x	16.7x	1.2x	0.7x
SUM.N	26.5x	21.9x	23.5x	21.5x	1.4x	1.3x	9.8x	9.2x	2.6x	2.1x
Machinery Average										
Avg	22.8x		22.8x	19.1x	2.1x	1.9x	13.1x	11.7x	1.0x	0.6x

Source: Thomson Reuters, Morgan Stanley Research. Note that all data is on a calendar year basis. *CAT, DE, and PCAR EV/EBITDA are for Equipment Operations only. Estimates as of 4.28.2021.

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(as of April 30, 2021)

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STOCK RATING CATEGORY	COVERAGE UNIVERSE		INVESTMENT BANKING CLIENTS (IBC)			OTHER MATERIAL INVESTMENT SERVICES CLIENTS (MISC)	
	COUNT	% OF TOTAL	COUNT	% OF TOTAL IBC	% OF RATING CATEGORY	COUNT	% OF TOTAL OTHER MISC
Overweight/Buy	1517	44%	413	47%	27%	670	44%
Equal-weight/Hold	1418	41%	373	42%	26%	649	42%
Not-Rated/Hold	4	0%	2	0%	50%	4	0%
Underweight/Sell	529	15%	95	11%	18%	210	14%
TOTAL	3,468		883			1533	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Not-Rated (NR). Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

Analyst Industry Views

Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index or MSCI sub-regional index or MSCI AC Asia Pacific ex Japan Index.

Disclosure Section (Cont.)

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May 2021

Industrials Spring Training Teach-In

Disclosure Section (Cont.)

INDUSTRY COVERAGE: Machinery & Construction

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Courtney Yakavonis, CFA		
AGCO Corp (AGCO.N)	O (12/15/2020)	\$152.55
Allison Transmission Holdings Inc (ALSN.N)	E (07/17/2019)	\$42.63
Caterpillar Inc. (CAT.N)	U (04/27/2020)	\$233.41
CNH Industrial NV (CNHI.N)	++	\$15.10
Cummins Inc. (CMN.L)	E (03/02/2018)	\$255.61
Deere & Co. (DE.N)	O (03/02/2018)	\$379.58
Martin Marietta Materials, Inc. (MLMN)	O (12/18/2020)	\$373.43
Oshkosh Corp. (OSKN)	O (03/17/2020)	\$127.43
PACCAR Inc (PCAR.O)	E (12/15/2020)	\$90.06
REV Group Inc. (REVGN)	E (12/15/2020)	\$18.44
Summit Materials Inc (SUMN)	E (12/18/2020)	\$30.59
Terex Corp. (TEXN)	E (03/02/2018)	\$50.76
Timken Co (TKRN)	E (06/10/2019)	\$88.00
United Rentals Inc. (URBN)	U (12/15/2020)	\$329.95
Vulcan Materials Company (VMC.N)	E (12/18/2020)	\$189.21
Westinghouse Air Brake Technologies Corp (WAB.N)	O (03/17/2020)	\$81.31
WillScot Corporation (WSC.O)	O (07/21/2020)	\$28.53
Dillon G Cumming		
Donaldson Company, Inc. (DCI.N)	O (06/26/2020)	\$63.81
Kennametal Inc. (KMT.N)	E (06/26/2020)	\$41.30
Lincoln Electric Holdings Inc (LECO.O)	E (06/26/2020)	\$131.82

Stock Ratings are subject to change. Please see latest research for each company.

* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Metals & Mining

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Carlos De Alba		
Alcoa Corp (AA.N)	O (03/23/2021)	\$39.07
Freeport-McMoRan Inc (FCX.N)	E (03/23/2021)	\$39.22
Largo Resources Ltd (LGO.TO)	O (04/18/2021)	C\$21.11
MP Materials Corp (MP.N)	O (03/01/2021)	\$32.14
Tekk Resources Limited (TECK.N)	O (11/07/2019)	\$22.42
Ioannis Masvoulas, CFA		
First Quantum Minerals Ltd (FM.TO)	O (06/08/2020)	C\$29.09

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Autos & Shared Mobility

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Adam Jonas, CFA		
Adient PLC (ADNT.N)	U (03/17/2021)	\$45.71
American Axle & Manufacturing Holdings Inc (AXL.N)	U (03/24/2021)	\$9.37
Apivit Plc (APTV.N)	O (03/30/2020)	\$139.74
Aebury Automotive Group Inc (ABG.N)	O (12/07/2020)	\$205.43
AutoNation Inc. (AN.N)	U (07/10/2018)	\$105.16
BorgWarner Inc. (BWA.N)	U (11/09/2020)	\$48.50
Carmax Inc (KMX.N)	O (07/10/2018)	\$137.41
Carvana Co (CVNA.N)	O (02/26/2021)	\$289.23
Ferrari NV (RACE.N)	O (05/09/2019)	\$202.98
Fisker Inc (FSRN)	O (02/11/2021)	\$11.98
Ford Motor Company (F.N)	U (01/29/2021)	\$11.41
Garrett Motion Inc (GTx.O)		
General Motors Company (GM.N)	O (04/09/2018)	\$55.34
Group 1 Automotive, Inc (GPI.N)	O (05/06/2019)	\$189.70
Lear Corporation (LEAN)	O (11/09/2020)	\$182.85
Lithia Motors Inc. (LAD.N)	U (02/09/2021)	\$390.04
Lordsdown Motors (RIDE.O)	U (02/11/2021)	\$8.84
Magna International Inc. (MGAN)	E (04/13/2021)	\$92.81
Penske Automotive Group, Inc (PAG.N)	O (07/10/2018)	\$90.51
Quantumscape Corp (QS.N)	O (02/11/2021)	\$34.71
Romeo Power, Inc. (RMD.N)	U (02/11/2021)	\$8.40
Sonic Automotive Inc (SAH.N)	E (11/14/2019)	\$53.11
Tenneco Inc. (TEN.N)	U (03/30/2020)	\$10.30
Tesla Inc (TSLA.O)	O (11/18/2020)	\$673.60
Visteon Corporation (VC.O)	U (03/22/2018)	\$118.65

Billy Kovanis

Avis Budget Group Inc (CAR.O)	E (03/15/2021)	\$83.35
Harley-Davidson Inc (HOG.N)	U (04/22/2021)	\$47.89
Polaris Inc. (PII.N)	O (01/19/2021)	\$142.28

Victoria A Greer

Goodyear Tire & Rubber Company (GT.O)	E (04/16/2021)	\$18.28
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* Historical prices are not split adjusted.

Disclosure Section (Cont.)

INDUSTRY COVERAGE: Freight Transportation

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Ravi Shanker		
ArcBest Corp (ARCB.O)	O (12/10/2020)	\$79.26
C.H. Robinson Worldwide Inc. (CHRW.O)	U (06/09/2013)	\$99.30
Canadian National Railway Co. (CNR.TO)	++	C\$133.70
Canadian Pacific Railway Ltd. (CP.TO)	++	C\$461.76
CSX Corporation (CSX.O)	U (12/10/2020)	\$101.65
Echo Global Logistics Inc (ECHO.O)	E (03/05/2019)	\$33.75
Expeditors International of Washington I (EXPD.O)	E (02/25/2015)	\$113.82
FedEx Corporation (FDX.N)	E (06/20/2013)	\$304.28
Heartland Express Inc (HTL.D.O)	U (05/06/2011)	\$19.12
Hub Group Inc (HUBG.O)	E (02/13/2018)	\$68.63
J.B. Hunt Transport Services Inc. (JBHT.O)	E (05/06/2011)	\$176.57
Kansas City Southern (KSU.N)	++	\$294.14
Knight-Swift Transportation Holdings Inc (KNX.N)	O (12/13/2017)	\$48.50
Landstar System Inc (LSTR.O)	U (02/23/2016)	\$178.59
Norfolk Southern Corp. (NSC.N)	U (06/03/2016)	\$287.68
Old Dominion Freight Line Inc (ODFL.O)	O (03/23/2020)	\$264.75
Saiia, Inc. (SAIA.O)	U (02/23/2016)	\$235.89
Schneider National Inc. (SNDR.N)	O (05/01/2017)	\$25.33
TFI International Inc (TFI.L.N)	O (06/10/2020)	\$87.28
Union Pacific Corp. (UNP.N)	E (03/23/2020)	\$225.67
United Parcel Service (UPS.N)	U (02/23/2016)	\$214.31
US Xpress Enterprises Inc (USX.N)	O (07/09/2018)	\$10.62
Warner Enterprises (WERN.O)	O (02/23/2016)	\$47.52
XPO Logistics, Inc. (XPO.N)	E (02/19/2019)	\$141.52

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Paper & Packaging

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Neel Kumar, CFA		
AptarGroup Inc. (ATR.N)	E (02/26/2020)	\$155.02
Avery Dennison Corp. (AVYN)	E (12/17/2019)	\$214.70
Ball Corporation (BLL.N)	O (01/16/2019)	\$93.65
Berry Global Group Inc (BERY.N)	E (01/16/2019)	\$65.85
Crown Holdings, Inc. (CCKN)	O (12/15/2020)	\$110.08
Graphic Packaging Holding Co. (GPKN)	E (05/03/2021)	\$18.91
International Paper Co (IP.N)	U (06/15/2020)	\$80.38
Packaging Corp Of America (PKG.N)	E (06/15/2020)	\$151.88
Sealed Air Corporation (SEEN.N)	E (01/16/2019)	\$54.92
Westrock Co (WRK.N)	E (06/15/2020)	\$57.83

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Multi-Industry

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Joshua C Pokrzewinski		
3MCo. (MMN)	E (08/20/2018)	\$199.38
Advanced Drainage Systems Inc (WMS.N)	E (02/11/2021)	\$109.52
Allegion PLC (ALLEN)	E (08/20/2018)	\$137.41
Ametek Inc. (AMEN)	O (12/18/2018)	\$136.03
Carrier Global Corporation (CARR.N)	O (03/28/2021)	\$43.13
Cognex Corp (CGNX.O)	U (03/23/2020)	\$80.83
Colfax Corp (CFXN)	E (08/20/2018)	\$42.99
Dover (DOV.N)	E (11/23/2020)	\$151.54
Eaton Corporation PLC (ETN.N)	O (03/03/2021)	\$144.67
Emerson Electric Co (EMR.N)	E (03/23/2020)	\$91.11
Fastenal Co. (FAST.O)	E (12/18/2018)	\$53.29
Flowserve Corp (FLS.N)	E (05/22/2020)	\$41.92
Fortive Corp (FTV.N)	E (02/17/2021)	\$71.84
Gates Industrial Corporation plc (GTES.N)	E (12/18/2018)	\$17.32
General Electric Co. (GEN)	++	\$13.12
Hayward Holdings Inc (HAYW.N)	E (04/06/2021)	\$19.39
Heitos Technologies Inc (HITO.O)	E (05/29/2020)	\$73.60
Honeywell International Inc (HON.N)	E (03/23/2020)	\$225.43
Hubbell Inc. (HUBB.N)	E (12/18/2018)	\$195.49
Illinois Tool Works (ITW.N)	U (07/13/2020)	\$235.98
Ingersoll Rand INC (IR.N)	O (11/09/2018)	\$49.21
Johnson Controls International Plc (JCI.N)	O (03/28/2021)	\$83.64
Lennox International Inc (LII.N)	U (08/20/2018)	\$341.33
Parker-Hannifin Corp (PH.N)	O (04/29/2020)	\$13.76
Pentair plc (PNR.N)	E (12/03/2020)	\$66.40
Rockwell Automation (ROKN)	O (11/23/2020)	\$262.80
Stanley Black & Decker (SWK.N)	O (08/20/2018)	\$210.72
Trane Technologies PLC (TT.N)	O (08/20/2018)	\$174.72
W.W. Grainger Inc. (GWG.N)	E (12/11/2019)	\$456.34
Watsco Inc. (WSO.N)	E (12/18/2018)	\$297.15

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INDUSTRY COVERAGE: Aerospace

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Kristine T Liwag		
Boeing Co. (BA.N)	O (01/29/2021)	\$233.63
Raytheon Technologies Corp (RTX.N)	O (08/07/2020)	\$83.94
Spirit AeroSystems Holdings Inc (SPRN.N)	O (03/01/2021)	\$45.52
TransDigm Group Inc. (TDG.N)	O (09/07/2020)	\$596.66

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Disclosure Section (Cont.)

INDUSTRY COVERAGE: Chemicals

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Angel Castillo		
Huntsman Corp (HUN.N)	O (09/29/2020)	\$30.89
Olin Corp. (OLN.N)	E (03/03/2021)	\$45.62
PQ Group Holdings Inc (PQG.N)	E (05/04/2021)	\$14.54
Trinseo S.A. (TSEN)		\$65.32
Westlake Chemical Corp (WLKN)	E (01/09/2018)	\$97.91
Lisa H De Neve		
International Flavors & Fragrances (IFF.N)	O (04/11/2021)	\$145.50
Neel Kumar, CFA		
Element Solutions Inc (ESLN)	E (01/30/2017)	\$22.38
Vincent Andrews		
Air Products and Chemicals Inc. (APD.N)	O (02/09/2020)	\$290.27
Albermarle Corporation (ALB.N)	U (02/26/2018)	\$162.11
Avent Corporation (AVNT.N)	E (12/14/2020)	\$51.62
Aetna Coating Systems Ltd (AXTAN)	E (12/09/2015)	\$33.07
Celanese Corp. (CE.N)	E (10/08/2012)	\$165.15
CF Industries (CF.N)	E (05/25/2016)	\$49.62
Chemours Co (CC.N)	E (01/30/2018)	\$31.53
Corteva Inc. (CTVAN)	O (12/14/2020)	\$49.79
Diversey Holdings, Ltd. (DSEY.O)	O (04/19/2021)	\$17.38
Dow Inc. (DOW.N)	E (12/01/2019)	\$66.22
DuPont DuPont Nemours Inc. (DD.N)		\$79.50
Eastman Chemical Co (EMN.N)	O (01/17/2019)	\$121.15
Ecolab Inc. (ECLN)	E (08/15/2017)	\$228.99
FMC Corporation (FMC.N)	E (05/20/2019)	\$119.04
Intrepid Potash (IPLN)	U (10/03/2013)	\$35.62
Israel Chemicals Ltd. (ICLN)	E (11/03/2014)	\$6.77
Linde PLC (LIN.N)	O (02/09/2020)	\$283.00
LyondellBasell Industries N.V. (LYBN)	O (12/01/2019)	\$109.31
Mosaic Company (MOS.N)	E (03/16/2016)	\$34.33
Nutrien Ltd (NTRN)	E (12/11/2018)	\$58.35
PPG Industries Inc. (PPG.N)	E (11/01/2019)	\$178.75
RPM International Inc. (RPMN)	E (12/14/2020)	\$97.77
Sherwin-Williams Co. (SHW.N)	O (03/19/2014)	\$283.50
Tronox Holdings Plc-Class A (TROX.N)	E (01/03/2018)	\$22.59
Venator Materials PLC (VNTR.N)	E (01/30/2018)	\$5.13

Stock Ratings are subject to change. Please see latest research for each company.

* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Defense

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Kristine T Liwag		
General Dynamics Corp. (GD.N)	U (09/07/2020)	\$191.99
L3Harris Technologies Inc (LHX.N)	O (09/07/2020)	\$216.40
Lockheed Martin Corp (LMT.N)	O (09/07/2020)	\$387.48
MDA Ltd (MDAT.O)	E (04/27/2021)	CS15.37
Northrop Grumman Corp. (NOC.N)	O (09/07/2020)	\$368.12
Textron Inc. (TXT.N)	E (09/07/2020)	\$65.50

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INDUSTRY COVERAGE: Aerospace & Defense

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Adam Jonas, CFA		
Virgin Galactic Holdings Inc (SPCE.N)	E (02/01/2021)	\$20.80

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* Historical prices are not split adjusted.

INDUSTRY COVERAGE: Government Services & Technology

COMPANY (TICKER)	RATING (AS OF)	PRICE* (05/04/2021)
Matthew Sharpe		
Booz Allen Hamilton Holding Corporation (BAH.N)	O (06/03/2019)	\$85.61
CACI International Inc. (CACT.N)	E (06/03/2019)	\$263.44
Leidos Holdings Inc (LDOS.N)	E (06/03/2019)	\$104.80
ManTech International Corp. (MANT.O)	E (06/03/2019)	\$86.10
PAE Inc (PAEO)	O (12/27/2020)	\$8.96
Perspecta Inc. (PRSP.N)	E (02/25/2020)	\$29.32
Science Applications International Corp (SAIC.N)	O (06/03/2019)	\$90.68

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Industrials Spring Training Teach-In

Disclosure Section (Cont.)

INDUSTRY COVERAGE: Airlines

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Ravi Shanker		
Alaska Air Group Inc (ALKN)	O (04/06/2021)	\$66.56
Allegiant Travel (ALGT.O)	O (09/07/2020)	\$230.36
American Airlines Group Inc (AAL.O)	U (04/06/2021)	\$21.42
Delta Airlines, Inc. (DAL.N)	O (09/07/2020)	\$44.66
Fronter Group Holdings Inc (ULCC.O)	O (04/26/2021)	\$20.12
JetBlue Airways Corp. (JBLU.O)	O (09/07/2020)	\$19.05
Southwest Airlines Co. (LUVN)	O (09/07/2020)	\$60.82
Sun Country Airlines Holdings Inc (SNCY.O)	E (04/12/2021)	\$38.86
United Airlines Holdings, Inc. (UAL.O)	E (04/06/2021)	\$52.80

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INDUSTRY COVERAGE: Latin America Metals & Mining

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Carlos De Alba		
CAP S.A. (CAP.SN)	E (03/23/2021)	CH\$14,188.00
Compania de Minas Buenaventura S.A. (BVN.N)	U (11/15/2020)	\$9.77
CSN Mineracao (CMN3.SA)	O (03/25/2021)	R\$10.12
Grupo Mexico S.A.B. de C.V. (GMEXICO.B.MX)	E (03/23/2021)	M\$89.75
Industrias Penoles S.A.B. de C.V. (PEOLESM.MX)	E (12/09/2020)	M\$275.36
Mnera Frisco, S.A.B. de C.V. (MFRISCO.MX)	U (05/03/2011)	M\$4.27
Nexa Resources SA (NEXAN)	O (01/01/2021)	\$9.92
Southern Copper Corp. (SCCO.N)	U (08/03/2020)	\$69.64
Vale (VALE.N)	O (03/03/2020)	\$20.38

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INDUSTRY COVERAGE: Latin America Steel

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Carlos De Alba		
CSN (CSNA3.SA)	O (03/25/2021)	R\$48.14
Gerdau S.A. (GGBR4.SA)	O (12/14/2020)	R\$32.65
Grupo Simec S.A.B. de C.V. (SIMECB.MX)	E (08/20/2017)	M\$102.10
Industrias CH, S.A.B. de C.V. (ICHBMK)	E (03/11/2021)	M\$139.30
Temium S.A. (TXN)	O (03/15/2020)	\$40.25
Usiminas (USIM5.SA)	E (04/02/2020)	R\$21.92

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INDUSTRY COVERAGE: Steel

COMPANY(TICKER)	RATING(AS OF)	PRICE* (05/04/2021)
Carlos De Alba		
Nucor Corp (NUE.N)	E (12/08/2020)	\$89.66
Steel Dynamics Inc (STLD.O)	O (12/08/2020)	\$59.41
US Steel (XN)	E (12/08/2020)	\$26.63

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