

September 17, 2019 04:01 AM GMT

Space | North America

SpaceX, Starlink and Tesla: Moving into Orbit?

SpaceX is accelerating plans to deploy and commercialize satellite broadband with significant implications for capital demands, valuation... and potential strategic implications for Tesla. We believe the near-term timeline for Starlink will impact investor sentiment across the broader space economy.

Please save the date for the 2nd Annual Morgan Stanley Space Summit held in NYC on December 10th, 2019: The summit will bring together experts from Morgan Stanley Research, private and public firms, space investors, and other space experts. No response is necessary at this point. An invitation will follow in the coming months. *Please contact your Morgan Stanley representative with any questions.*

We see SpaceX as effectively 3 companies in 1: Launch, Starlink and Mars/deep space exploration. While there are clearly synergies between the 3 businesses... we have long noted the different end market drivers, economic profiles and capital needs that could present different risk/rewards and opportunities.

Starlink accelerating deployment of LEO constellation. According to [Ars Technica](#), citing an August 30th filing with the FCC, Starlink is requesting approval to triple the number of orbital planes for its LEO constellation to 72 from 24, which is aimed to improve service area coverage and economic payback. Additionally, [Spacenews](#) reported just last week that SpaceX President and COO Gwynne Shotwell announced at a September 10th Satellite conference in Paris the company's target to launch 24 Starlink missions in 2020. We have modelled for 30 total SpaceX launches in 2020, including 15 Starlink launches. We believe a launch frequency of 2 per month is materially above market expectations for 2020.

Relationship with the dominant reusable launch provider is a powerful competitive advantage. Our discussions with industry experts, including competitors in satellite broadband, suggest that SpaceX's industry leading launch costs provide a competitive/economic advantage to the initial deployment of LEO satellite constellations.

Starlink deployment requires many billions of capital... development acceleration may naturally drive increased relevance to a broader set of investors. This past May, according to Spacenews, SpaceX CEO Elon Musk stated that Starlink would have consistent partial coverage with 400 satellites and would be 'economically viable' with 1,000 satellites. According to an August 9th Washington Post [article](#): "SpaceX has said completing their Starlink network may cost over \$10 billion, though Musk says it could bring in \$30 to \$50 billion per year once operational."

MORGAN STANLEY & CO. LLC

Adam Jonas, CFA
EQUITY ANALYSTArmintas Sinkevicius, CFA, CPA
EQUITY ANALYSTRajeev Lalwani, CFA
EQUITY ANALYSTGeorge M Dailey
RESEARCH ASSOCIATEBilly Kovanis
RESEARCH ASSOCIATE

Autos & Shared Mobility

North America
IndustryView

Cautious

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.

We believe investors may be underappreciating the strategic relationship and synergy potential between SpaceX and Tesla. Our base case valuation of SpaceX is \$52bn+. This assumes that expanding access to the internet drives broadband penetration from 50% to 75% of the global population, with SpaceX able to capture ~10% of the incremental broadband subscribers. The risk reward remains wide, with a \$5bn+ Bear Case (assuming that SpaceX remains exclusively a satellite launch business) and \$120bn+ Bull Case (assuming that the satellite internet business is able to take greater share of the incremental broadband subscribers).

For more of our thoughts on SpaceX, Starlink and the relationship/relevance to Tesla please refer to the following reports:

- [Space: Investment Implications of the Final Frontier \(12 Oct 2017\)](#)
- [Space: Could 2019 Be the Year for Space? \(28 Nov 2018\)](#)
- [Space: Starlink Launch is A Milestone for the Global Space Economy \(23 May 2019\)](#)
- [Space: SpaceX Valuation Reportedly Reaches \\$30.5bn: Why This Matters \(19 Dec 2018\)](#)
- [Tesla Motors Inc.: Industrial Logic of Tesla and SpaceX \(27 Apr 2018\)](#)
- [Tesla Inc: Tesla and SpaceX: A Compelling Relationship \(5 Dec 2017\)](#)

Hypothetical DCF Valuation Range

Exhibit 1: Hypothetical DCF-Based Valuation Range for SpaceX

BEAR CASE		DCF VALUATION		BULL CASE	
Satellite Launch					
Terminal Value	10,748	Terminal Value	3,522	Terminal Value	3,522
NPV of Terminal Value	1,200	NPV of Terminal Value	393	NPV of Terminal Value	393
NPV of Cash Flows	2,353	NPV of Cash Flows	667	NPV of Cash Flows	667
NPV of Satellite Launch	\$3,553	NPV of Satellite Launch	\$1,060	NPV of Satellite Launch	\$1,060
Satellite Internet					
Terminal Value		Terminal Value	233,745	Terminal Value	495,247
NPV of Terminal Value		NPV of Terminal Value	26,104	NPV of Terminal Value	55,308
NPV of Cash Flows		NPV of Cash Flows	36,397	NPV of Cash Flows	75,633
Less: Investment		Less: Investment	(12,500)	Less: Investment	(12,500)
NPV of Satellite Internet		NPV of Satellite Internet	\$50,001	NPV of Satellite Internet	\$118,441
Add: Cash	1,675	Add: Cash	1,675	Add: Cash	1,675
NPV	\$5,228	NPV	\$52,736	NPV	\$121,176
DCF Assumptions:					
% WACC	10.0%	% WACC	10.0%	% WACC	10.0%
% Terminal Growth Rate	1.5%	% Terminal Growth Rate	3.0%	% Terminal Growth Rate	3.0%

Source: Morgan Stanley Research, Wall Street Journal, CNBC. For Satellite Launch, 18 in 2019 (~2017) +1 / Month in 2020 @ < \$60M / Launch in 2018 -5% CAGR, with 25 bps of Annual Margin Expansion from 0.5% in 2017e to 6.0%+ in 2040. For Satellite Internet, Incremental Revenue Opportunity for Broadband x 50% x 35% for Satellite + Autonomous Cars, Aviation Connectivity, Connected Aircraft, and Maritime x 33% for SpaceX with SATS / VSAT Adjusted EBITDA Margins in 2021 + 1.5% of Annual Margin Expansion Through 2024 + 70% Incremental Adjusted EBITDA Margins Thereafter.

Exhibit 2: Satellite Launch

Satellite Launch	2011	2012	2013	2014	2015	2016	2017	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e	2031e	2032e	2033e	2034e	2035e	2036e	2037e	2038e	2039e	2040e
Launches	0	2	3	6	7	8	18	22	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210	222	234	246	258	
% Y/Y							22.2%	-18.2%	66.7%	40.0%	28.6%	22.2%	18.2%	15.4%	13.3%	11.8%	10.5%	9.5%	8.7%	8.0%	7.4%	6.9%	6.5%	6.1%	5.7%	5.4%	5.1%	4.9%	4.7%	
Launches		78	81	92	86	85	90	114	90	120	140	154	165	173	180	202	224	245	265	286	306	325	344	363	382	400	418	435	453	
% Market Share		0.0%	2.6%	3.7%	6.5%	8.1%	9.4%	20.0%	19.3%	20.0%	25.0%	30.0%	35.0%	40.0%	45.0%	50.0%	50.5%	51.0%	51.5%	52.0%	52.5%	53.0%	53.5%	54.0%	54.5%	55.0%	55.5%	56.0%	56.5%	
Avg. Revenue per Launch					135	90	61	56	53	50	48	45	43	41	39	37	35	33	32	30	28	27	26	24	23	22	21	20	19	
% Y/Y					-33.3%	-32.0%	-9.3%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%	-5.0%		
Satellite Launch (\$MM)																														
Revenue	175	400	700	1,000	945	720	1,102	1,221	949	1,503	1,999	2,441	2,834	3,182	3,488	3,756	3,988	4,187	4,356	4,498	4,615	4,709	4,783	4,837	4,873	4,894	4,901	4,894	4,877	4,848
% Y/Y					-23.8%	53.0%	10.8%	-22.3%	58.3%	33.0%	22.1%	16.1%	12.3%	9.6%	7.7%	6.2%	5.0%	4.0%	3.3%	2.6%	2.0%	1.6%	1.1%	0.8%	0.4%	0.1%	-0.1%	-0.4%	-0.6%	
Operating Profit	1	2	4	5	(250)	2	6	9	9	19	30	43	57	72	87	103	120	136	152	169	185	200	215	230	244	257	270	281	293	
% Margin	0.5%	0.5%	0.5%	0.5%	-26.5%	0.3%	0.5%	0.8%	1.0%	1.3%	1.5%	1.8%	2.0%	2.3%	2.5%	2.8%	3.0%	3.3%	3.5%	3.8%	4.0%	4.3%	4.5%	4.8%	5.0%	5.3%	5.5%	5.8%	6.0%	
% Tax Rate	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	35.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%	
NPAT	1	2	3	4	(188)	2	4	7	7	15	24	34	45	57	69	82	95	108	120	133	146	158	170	181	192	203	213	222	231	
% Y/Y					-138.7%	102.1%	3.6%	97.9%	59.6%	42.5%	32.7%	26.3%	21.8%	18.4%	15.8%	13.8%	12.1%	10.6%	9.4%	8.4%	7.5%	6.7%	6.1%	5.5%	4.9%	4.4%	4.0%	3.6%		

Source: Morgan Stanley Research, Wall Street Journal, Space Flight Now, Federal Aviation Administration, CNBC.

Disclosure Section

The information and opinions in Morgan Stanley Research were prepared by Morgan Stanley & Co. LLC, and/or Morgan Stanley C.T.V.M. S.A., and/or Morgan Stanley Mexico, Casa de Bolsa, S.A. de C.V., and/or Morgan Stanley Canada Limited. As used in this disclosure section, "Morgan Stanley" includes Morgan Stanley & Co. LLC, Morgan Stanley C.T.V.M. S.A., Morgan Stanley Mexico, Casa de Bolsa, S.A. de C.V., Morgan Stanley Canada Limited and their affiliates as necessary.

For important disclosures, stock price charts and equity rating histories regarding companies that are the subject of this report, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures, or contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY, 10036 USA.

For valuation methodology and risks associated with any recommendation, rating or price target referenced in this research 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.

Analyst Certification

The following analysts hereby certify that their views about the companies and their securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: Adam Jonas, CFA.

Unless otherwise stated, the individuals listed on the cover page of this report are research analysts.

Global Research Conflict Management Policy

Morgan Stanley Research has been published in accordance with our conflict management policy, which is available at www.morganstanley.com/institutional/research/conflictpolicies. A Portuguese version of the policy can be found at www.morganstanley.com.br

Important US Regulatory Disclosures on Subject Companies

As of August 30, 2019, Morgan Stanley beneficially owned 1% or more of a class of common equity securities of the following companies covered in Morgan Stanley Research: American Axle & Manufacturing Holdings Inc, Asbury Automotive Group Inc, Carvana Co, Delphi Technologies PLC, Fiat Chrysler Automobiles NV, Group 1 Automotive, Inc, Sonic Automotive Inc, Tenneco Inc., Tesla Inc, Visteon Corporation.

Within the last 12 months, Morgan Stanley managed or co-managed a public offering (or 144A offering) of securities of Avis Budget Group Inc, Ford Motor Company, General Motors Company, Tesla Inc.

Within the last 12 months, Morgan Stanley has received compensation for investment banking services from Avis Budget Group Inc, Ferrari NV, Ford Motor Company, General Motors Company, Penske Automotive Group, Inc, Tesla Inc.

In the next 3 months, Morgan Stanley expects to receive or intends to seek compensation for investment banking services from American Axle & Manufacturing Holdings Inc, Aptiv Plc, Avis Budget Group Inc, BorgWarner Inc., Carvana Co, Delphi Technologies PLC, Ferrari NV, Fiat Chrysler Automobiles NV, Ford Motor Company, Garrett Motion Inc, General Motors Company, Goodyear Tire & Rubber Company, Group 1 Automotive, Inc, Harley-Davidson Inc, Lear Corporation, Magna International Inc., Tenneco Inc., Tesla Inc, Visteon Corporation.

Within the last 12 months, Morgan Stanley has received compensation for products and services other than investment banking services from American Axle & Manufacturing Holdings Inc, Aptiv Plc, Avis Budget Group Inc, BorgWarner Inc., Ferrari NV, Fiat Chrysler Automobiles NV, Ford Motor Company, General Motors Company, Goodyear Tire & Rubber Company, Harley-Davidson Inc, Lear Corporation, Tenneco Inc., Visteon Corporation.

Within the last 12 months, Morgan Stanley has provided or is providing investment banking services to, or has an investment banking client relationship with, the following company: American Axle & Manufacturing Holdings Inc, Aptiv Plc, Avis Budget Group Inc, BorgWarner Inc., Carvana Co, Delphi Technologies PLC, Ferrari NV, Fiat Chrysler Automobiles NV, Ford Motor Company, Garrett Motion Inc, General Motors Company, Goodyear Tire & Rubber Company, Group 1 Automotive, Inc, Harley-Davidson Inc, Lear Corporation, Magna International Inc., Penske Automotive Group, Inc, Tenneco Inc., Tesla Inc, Visteon Corporation.

Within the last 12 months, Morgan Stanley has either provided or is providing non-investment banking, securities-related services to and/or in the past has entered into an agreement to provide services or has a client relationship with the following company: American Axle & Manufacturing Holdings Inc, Aptiv Plc, Avis Budget Group Inc, BorgWarner Inc., Ferrari NV, Fiat Chrysler Automobiles NV, Ford Motor Company, General Motors Company, Goodyear Tire & Rubber Company, Harley-Davidson Inc, Lear Corporation, Sonic Automotive Inc, Tenneco Inc., Tesla Inc, Visteon Corporation.

An employee, director or consultant of Morgan Stanley is a director of General Motors Company. This person is not a research analyst or a member of a research analyst's household.

Morgan Stanley & Co. LLC makes a market in the securities of American Axle & Manufacturing Holdings Inc, Aptiv Plc, Asbury Automotive Group Inc, AutoNation Inc., Avis Budget Group Inc, BorgWarner Inc., Carmax Inc, Delphi Technologies PLC, Ferrari NV, Fiat Chrysler Automobiles NV, Ford Motor Company, General Motors Company, Goodyear Tire & Rubber Company, Group 1 Automotive, Inc, Harley-Davidson Inc, Lear Corporation, Lithia Motors Inc., Magna International Inc., Penske Automotive Group, Inc, Sonic Automotive Inc, Tenneco Inc., Tesla Inc, Visteon Corporation.

The equity research analysts or strategists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality of research, investor client feedback, stock picking, competitive factors, firm revenues and overall investment banking revenues. Equity Research analysts' or strategists' compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

Morgan Stanley and its affiliates do business that relates to companies/instruments covered in Morgan Stanley Research, including market making, providing liquidity, fund management, commercial banking, extension of credit, investment services and investment banking. Morgan Stanley sells to and buys from customers the securities/instruments of companies covered in Morgan Stanley Research on a principal basis. Morgan Stanley may have a position in the debt of the Company or instruments discussed in this report. Morgan Stanley trades or may trade as principal in the debt securities (or in related derivatives) that are the subject of the debt research report.

Certain disclosures listed above are also for compliance with applicable regulations in non-US jurisdictions.

STOCK RATINGS

Morgan Stanley uses a relative rating system using terms such as Overweight, Equal-weight, Not-Rated or Underweight (see definitions below). Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold and sell. Investors should carefully read the definitions of all ratings used in Morgan Stanley Research. In addition, since Morgan Stanley Research contains more complete information concerning the analyst's views, investors should carefully read Morgan Stanley Research, in its entirety, and not infer the contents from the rating alone. In any case, ratings (or research) should not be used or relied upon as investment advice. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations.

Global Stock Ratings Distribution

(as of August 31, 2019)

The Stock Ratings described below apply to Morgan Stanley's Fundamental Equity Research and do not apply to Debt Research produced by the Firm.

For disclosure purposes only (in accordance with NASD and NYSE requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight, Not-Rated and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below). To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Not-Rated to hold and Underweight to sell recommendations, respectively.

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	1126	36%	290	43%	26%	522	37%
Equal-weight/Hold	1432	46%	306	46%	21%	661	47%
Not-Rated/Hold	1	0%	0	0%	0%	1	0%
Underweight/Sell	568	18%	74	11%	13%	231	16%
TOTAL	3,127		670			1415	

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.

Analyst Stock Ratings

Overweight (O). The stock's total return is expected to exceed 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.

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.

Important Disclosures for Morgan Stanley Smith Barney LLC Customers

Important disclosures regarding the relationship between the companies that are the subject of Morgan Stanley Research and Morgan Stanley Smith Barney LLC or Morgan Stanley or any of their affiliates, are available on the Morgan Stanley Wealth Management disclosure website at www.morganstanley.com/online/researchdisclosures. For Morgan Stanley specific disclosures, you may refer to www.morganstanley.com/researchdisclosures.

Each Morgan Stanley Equity Research report is reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval is conducted by the same person who reviews the Equity Research report on behalf of Morgan Stanley. This could create a conflict of interest.

Other Important Disclosures

Morgan Stanley & Co. International PLC and its affiliates have a significant financial interest in the debt securities of Aptiv Plc, Avis Budget Group Inc, BorgWarner Inc., Fiat Chrysler Automobiles NV, Ford Motor Company, General Motors Company, Goodyear Tire & Rubber Company, Tesla Inc. Morgan Stanley Research policy is to update research reports as and when the Research Analyst and Research Management deem appropriate, based on developments with the issuer, the sector, or the market that may have a material impact on the research views or opinions stated therein. In addition, certain Research publications are intended to be updated on a regular periodic basis (weekly/monthly/quarterly/annual) and will ordinarily be updated with that frequency, unless the Research Analyst and Research Management determine that a different publication schedule is appropriate based on current conditions. Morgan Stanley is not acting as a municipal advisor and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of Section 975 of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

Morgan Stanley produces an equity research product called a "Tactical Idea." Views contained in a "Tactical Idea" on a particular stock may be contrary to the recommendations or views expressed in research on the same stock. This may be the result of differing time horizons, methodologies, market events, or other factors. For all research available on a particular stock, please contact your sales representative or go to Matrix at <http://www.morganstanley.com/matrix>.

Morgan Stanley Research is provided to our clients through our proprietary research portal on Matrix and also distributed electronically by Morgan Stanley to clients. Certain, but not all, Morgan Stanley Research products are also made available to clients through third-party vendors or redistributed to clients through alternate electronic means as a convenience. For access to all available Morgan Stanley Research, please contact your sales representative or go to Matrix at <http://www.morganstanley.com/matrix>.

Any access and/or use of Morgan Stanley Research is subject to Morgan Stanley's Terms of Use (<http://www.morganstanley.com/terms.html>). By accessing and/or using Morgan Stanley Research, you are indicating that you have read and agree to be bound by our Terms of Use (<http://www.morganstanley.com/terms.html>). In addition you consent to Morgan Stanley processing your personal data and using cookies in accordance with

our Privacy Policy and our Global Cookies Policy (http://www.morganstanley.com/privacy_pledge.html), including for the purposes of setting your preferences and to collect readership data so that we can deliver better and more personalized service and products to you. To find out more information about how Morgan Stanley processes personal data, how we use cookies and how to reject cookies see our Privacy Policy and our Global Cookies Policy (http://www.morganstanley.com/privacy_pledge.html).

If you do not agree to our Terms of Use and/or if you do not wish to provide your consent to Morgan Stanley processing your personal data or using cookies please do not access our research.

Morgan Stanley Research does not provide individually tailored investment advice. Morgan Stanley Research has been prepared without regard to the circumstances and objectives of those who receive it. Morgan Stanley recommends that investors independently evaluate particular investments and strategies, and encourages investors to seek the advice of a financial adviser. The appropriateness of an investment or strategy will depend on an investor's circumstances and objectives. The securities, instruments, or strategies discussed in Morgan Stanley Research may not be suitable for all investors, and certain investors may not be eligible to purchase or participate in some or all of them. Morgan Stanley Research is not an offer to buy or sell or the solicitation of an offer to buy or sell any security/instrument or to participate in any particular trading strategy. The value of and income from your investments may vary because of changes in interest rates, foreign exchange rates, default rates, prepayment rates, securities/instruments prices, market indexes, operational or financial conditions of companies or other factors. There may be time limitations on the exercise of options or other rights in securities/instruments transactions. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. If provided, and unless otherwise stated, the closing price on the cover page is that of the primary exchange for the subject company's securities/instruments.

The fixed income research analysts, strategists or economists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality, accuracy and value of research, firm profitability or revenues (which include fixed income trading and capital markets profitability or revenues), client feedback and competitive factors. Fixed Income Research analysts', strategists' or economists' compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

The "Important US Regulatory Disclosures on Subject Companies" section in Morgan Stanley Research lists all companies mentioned where Morgan Stanley owns 1% or more of a class of common equity securities of the companies. For all other companies mentioned in Morgan Stanley Research, Morgan Stanley may have an investment of less than 1% in securities/instruments or derivatives of securities/instruments of companies and may trade them in ways different from those discussed in Morgan Stanley Research. Employees of Morgan Stanley not involved in the preparation of Morgan Stanley Research may have investments in securities/instruments or derivatives of securities/instruments of companies mentioned and may trade them in ways different from those discussed in Morgan Stanley Research. Derivatives may be issued by Morgan Stanley or associated persons.

With the exception of information regarding Morgan Stanley, Morgan Stanley Research is based on public information. Morgan Stanley makes every effort to use reliable, comprehensive information, but we make no representation that it is accurate or complete. We have no obligation to tell you when opinions or information in Morgan Stanley Research change apart from when we intend to discontinue equity research coverage of a subject company. Facts and views presented in Morgan Stanley Research have not been reviewed by, and may not reflect information known to, professionals in other Morgan Stanley business areas, including investment banking personnel.

Morgan Stanley Research personnel may participate in company events such as site visits and are generally prohibited from accepting payment by the company of associated expenses unless pre-approved by authorized members of Research management.

Morgan Stanley may make investment decisions that are inconsistent with the recommendations or views in this report.

To our readers based in Taiwan or trading in Taiwan securities/instruments: Information on securities/instruments that trade in Taiwan is distributed by Morgan Stanley Taiwan Limited ("MSTL"). Such information is for your reference only. The reader should independently evaluate the investment risks and is solely responsible for their investment decisions. Morgan Stanley Research may not be distributed to the public media or quoted or used by the public media without the express written consent of Morgan Stanley. Any non-customer reader within the scope of Article 7-1 of the Taiwan Stock Exchange Recommendation Regulations accessing and/or receiving Morgan Stanley Research is not permitted to provide Morgan Stanley Research to any third party (including but not limited to related parties, affiliated companies and any other third parties) or engage in any activities regarding Morgan Stanley Research which may create or give the appearance of creating a conflict of interest. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities/instruments. MSTL may not execute transactions for clients in these securities/instruments.

Morgan Stanley is not incorporated under PRC law and the research in relation to this report is conducted outside the PRC. Morgan Stanley Research does not constitute an offer to sell or the solicitation of an offer to buy any securities in the PRC. PRC investors shall have the relevant qualifications to invest in such securities and shall be responsible for obtaining all relevant approvals, licenses, verifications and/or registrations from the relevant governmental authorities themselves. Neither this report nor any part of it is intended as, or shall constitute, provision of any consultancy or advisory service of securities investment as defined under PRC law. Such information is provided for your reference only.

Morgan Stanley Research is disseminated in Brazil by Morgan Stanley C.T.V.M. S.A. located at Av. Brigadeiro Faria Lima, 3600, 6th floor, São Paulo - SP, Brazil; and is regulated by the Comissão de Valores Mobiliários; in Mexico by Morgan Stanley México, Casa de Bolsa, S.A. de C.V. which is regulated by Comisión Nacional Bancaria y de Valores. Paseo de los Tamarindos 90, Torre 1, Col. Bosques de las Lomas Floor 29, 05120 Mexico City; in Japan by Morgan Stanley MUFG Securities Co., Ltd. and, for Commodities related research reports only, Morgan Stanley Capital Group Japan Co., Ltd; in Hong Kong by Morgan Stanley Asia Limited (which accepts responsibility for its contents) and by Morgan Stanley Asia International Limited, Hong Kong Branch; in Singapore by Morgan Stanley Asia (Singapore) Pte. (Registration number 199206298Z) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H), regulated by the Monetary Authority of Singapore (which accepts legal responsibility for its contents and should be contacted with respect to any matters arising from, or in connection with, Morgan Stanley Research) and by Morgan Stanley Asia International Limited, Singapore Branch (Registration number T11FC0207F); in Australia to "wholesale clients" within the meaning of the Australian Corporations Act by Morgan Stanley Australia Limited A.B.N. 67 003 734 576, holder of Australian financial services license No. 233742, which accepts responsibility for its contents; in Australia to "wholesale clients" and "retail clients" within the meaning of the Australian Corporations Act by Morgan Stanley Wealth Management Australia Pty Ltd (A.B.N. 19 009 145 555, holder of Australian financial services license No. 240813, which accepts responsibility for its contents; in Korea by Morgan Stanley & Co International plc, Seoul Branch; in India by Morgan Stanley India Company Private Limited; in Indonesia by PT. Morgan Stanley Sekuritas Indonesia; in Canada by Morgan Stanley Canada Limited, which has approved of and takes responsibility for its contents in Canada; in Germany and the European Economic Area where required by Morgan Stanley Europe S.E., regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin); in Spain by Morgan Stanley, S.V., S.A., a Morgan Stanley group company, which is supervised by the Spanish Securities Markets Commission (CNMV) and states that Morgan Stanley Research has been written and distributed in accordance with the rules of conduct applicable to financial research as established under Spanish regulations; in the US by Morgan Stanley & Co. LLC, which accepts responsibility for its contents. Morgan Stanley & Co. International plc, authorized by the Prudential Regulatory Authority and regulated by the Financial Conduct Authority and the Prudential Regulatory Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. RMB Morgan Stanley Proprietary Limited is a member of the JSE Limited and A2X (Pty) Ltd. RMB Morgan Stanley Proprietary Limited is a joint venture owned equally by Morgan Stanley International Holdings Inc. and RMB Investment Advisory (Proprietary) Limited, which is wholly owned by FirstRand Limited. The information in Morgan Stanley Research is being disseminated by Morgan Stanley Saudi Arabia, regulated by the Capital Market Authority in the Kingdom of Saudi Arabia, and is directed at Sophisticated investors only.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (DIFC Branch), regulated by the Dubai

Financial Services Authority (the DFSA), and is directed at Professional Clients only, as defined by the DFSA. The financial products or financial services to which this research relates will only be made available to a customer who we are satisfied meets the regulatory criteria to be a Professional Client. The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (QFC Branch), regulated by the Qatar Financial Centre Regulatory Authority (the QFCRA), and is directed at business customers and market counterparties only and is not intended for Retail Customers as defined by the QFCRA.

As required by the Capital Markets Board of Turkey, investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided exclusively to persons based on their risk and income preferences by the authorized firms. Comments and recommendations stated here are general in nature. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations.

The trademarks and service marks contained in Morgan Stanley Research are the property of their respective owners. Third-party data providers make no warranties or representations relating to the accuracy, completeness, or timeliness of the data they provide and shall not have liability for any damages relating to such data. The Global Industry Classification Standard (GICS) was developed by and is the exclusive property of MSCI and S&P.

Morgan Stanley Research, or any portion thereof may not be reprinted, sold or redistributed without the written consent of Morgan Stanley.

Indicators and trackers referenced in Morgan Stanley Research may not be used as, or treated as, a benchmark under Regulation EU 2016/1011, or any other similar framework.

INDUSTRY COVERAGE: Autos & Shared Mobility

COMPANY (TICKER)	RATING (AS OF)	PRICE* (09/16/2019)
Adam Jonas, CFA		
Avis Budget Group Inc (CAR.O)	U (06/26/2018)	\$29.50
Ferrari NV (RACE.N)	O (05/09/2019)	\$150.96
Fiat Chrysler Automobiles NV (FCHAM)	O (02/24/2016)	€12.58
Fiat Chrysler Automobiles NV (FCAU.N)	O (02/24/2016)	\$13.77
Ford Motor Company (F.N)	O (08/06/2019)	\$9.30
General Motors Company (GMN)	O (04/09/2018)	\$37.21
Harley-Davidson Inc (HOG.N)	O (05/06/2013)	\$36.14
Hertz Global Holdings Inc (HTZ.N)	U (09/14/2017)	\$14.82
Tesla Inc (TSLA.O)	E (05/15/2017)	\$242.81
Armintas Sinkevicius, CFA, CPA		
Adient PLC (ADNT.N)	U (07/31/2018)	\$24.70
American Axle & Manufacturing Holdings Inc (AXL.N)	O (03/22/2018)	\$8.64
Aptiv Plc (APT.V.N)	U (12/05/2017)	\$89.59
Asbury Automotive Group Inc (ABG.N)	E (07/10/2018)	\$99.10
AutoNation Inc. (AN.N)	U (07/10/2018)	\$50.53
BorgWarner Inc. (BWA.N)	O (03/22/2018)	\$39.49
Carmax Inc (KMX.N)	O (07/10/2018)	\$84.26
Carvana Co (CVNA.N)	U (01/14/2019)	\$81.53
Delphi Technologies PLC (DLPH.N)	E (10/15/2018)	\$16.83
Garrett Motion Inc (GTX.N)	U (09/09/2019)	\$12.28
Goodyear Tire & Rubber Company (GT.O)	E (08/13/2018)	\$13.70
Group 1 Automotive, Inc (GPI.N)	O (05/06/2019)	\$86.70
Lear Corporation (LEA.N)	O (07/31/2018)	\$124.03
Lithia Motors Inc. (LAD.N)	O (07/10/2018)	\$129.47
Magna International Inc. (MGAN)	U (03/22/2018)	\$53.83
Penske Automotive Group, Inc (PAG.N)	O (07/10/2018)	\$46.85
Sonic Automotive Inc (SAH.N)	U (07/10/2018)	\$30.00
Tenneco Inc. (TEN.N)	E (08/14/2019)	\$14.09
Visteon Corporation (VC.O)	U (03/22/2018)	\$80.51

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

* Historical prices are not split adjusted.