Trends + 5 Key Forces Reshaping the U.S. Dental Market

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.
PRESENTERS

Marko Vujicic, Ph.D., Chief Economist & Vice President, ADA Health Institute

Steve Beuchaw, MBA, Executive Director, Morgan Stanley Research

This webinar includes data provided by the ADA Health Institute.

Disclaimer: Marko Vujicic, Ph.D, is not a member of Morgan Stanley's Research Department. Unless otherwise indicated, his views are his own and may differ from the views of the Morgan Stanley Research Department and from the views of others within Morgan Stanley.
Morgan Stanley

Five Key Forces Reshaping Dentistry

1. The value agenda

2. Increased consumerism

3. Shifting dental care use patterns

4. Increased collaboration

5. Practice consolidation
Figure 6: National Dental Expenditures per Capita by Source of Financing (in constant 2015 dollars)

Dental spending growth moderating

Annual growth rates

Dental Services Expenditures vs. US Nominal GDP growth %

Source: Company Data, Morgan Stanley Research, AlphaWise
Reimbursement declines pressuring dentists

Average percent increase/decrease in dental reimbursement rates over last 12 months vs. next 12 months

-2.9% -3.3% -2.7% -4.7% -4.9% -6.7% -8.7%
Past 12 months
Next 12 months

Likelihood of joining a group practice, DSO, GPO in next 12 mos (Solo practitioners only)

- Extremely likely
  - 2017 survey: 9%
  - 2018 survey: 72%

- Very likely
  - 2017 survey: 0%
  - 2018 survey: 53%

- Somewhat likely
  - 2017 survey: 10%
  - 2018 survey: 34%

- Not very likely
  - 2017 survey: 3%
  - 2018 survey: 18%

- Not at all likely
**Figure 1:** Dentist Earnings, GDP Per Capita, Mean U.S. Household Income, 1981 to 2016 (2016 dollars)

Source: ADA Health Policy Institute; Bureau of Economic Analysis; U.S. Census Bureau, Current Population Survey. **Note:** Dentist net income data are based on the ADA Health Policy Institute annual *Survey of Dental Practice* with years 2000-2016 weighted to adjust for nonresponse bias. Shaded areas denote recession years according to National Bureau of Economic Research. GDP is deflated using the GDP deflator. Dentist earnings and U.S. household income are deflated using the All-Item CPI. All values are in constant 2016 dollars.
Large dental establishments with >500 employees have grown at a 12% CAGR from 2002-2015, while small establishments have been more stagnant.

Source: Align Technology data, Morgan Stanley Research, U.S. Census Bureau, Statistics of U.S. Businesses
How Big are Dental Service Organizations?

BY GENDER

11% FEMALE DENTISTS
7% MALE DENTISTS

BY AGE

OF U.S. DENTISTS were affiliated with dental service organizations (DSOs) in 2016. In 2015, it was 7.4%.
In 2017, younger dentists are attaining ownership at a decreased rate compared to 2005.
Figure 4: Average Wait Time for General Practitioner Dentist Appointment

Source: ADA Health Policy Institute annual Survey of Dental Practice. Note: Indicates the average wait time in days for an appointment with a general practitioner dentist. Weighted to adjust for nonresponse bias.
Dental product pricing is pressuring the practice

Dental Distributor vs. Manufacturer Pricing Growth

Average delta ~1.5%/yr

Percieved net price change for consumables

Weighted avg = 4%
Weighted avg = 6%

Source: Company Data, Morgan Stanley Research, AlphaWise
Pricing is getting more focus

Most Important Attribute of Dental Suppliers When Considering Purchases

- **Quality**: 64% in 2017, 53% in 2018
- **Price**: 19% in 2017, 22% in 2018
- **Compatibility with equipment**: 9% in 2017, 7% in 2018
- **Delivery time**: 3% in 2017, 6% in 2018
- **Breadth of selection**: 3% in 2017, 9% in 2018
- **Relationship with sales representative**: 1% in 2017, 1% in 2018
- **Contracts**: 1% in 2017, 1% in 2018

Private label consumables purchasing mix

- **Past 12 months**: Weighted avg = 41%
- **Next 12 months**: Weighted avg = 44%

Source: Company Data, Morgan Stanley Research, AlphaWise
Both Consumables and Equipment Growth Have Been Soft Lately

Source: Morgan Stanley Research, U.S. Census Bureau, Statistics of U.S. Businesses
Dentists searching for alternative supply

Amazon products purchased

- Basic consumables: Past 12 months - 72%, Next 12 months - 84%
- Small equipment: Past 12 months - 40%, Next 12 months - 28%
- Orthodontic supplies: Past 12 months - 32%, Next 12 months - 28%
- Digital technology (imaging, scanners, etc.): Past 12 months - 24%, Next 12 months - 32%
- Blocks: Past 12 months - 0%, Next 12 months - 0%
- Treatment centers: Past 12 months - 0%, Next 12 months - 4%
- Other: Past 12 months - 20%, Next 12 months - 16%

Share of Suppliers - 2018 Survey (All Practitioners)

- Henry Schein: Past 12 months - 29%, Next 12 months - 32%
- Patterson: Past 12 months - 10%, Next 12 months - 11%
- Benco: Past 12 months - 7%, Next 12 months - 9%
- Darby: Past 12 months - 6%, Next 12 months - 7%
- Amazon: Past 12 months - 7%, Next 12 months - 8%
- Pearson: Past 12 months - 3%, Next 12 months - 2%
- Burkhardt: Past 12 months - 2%, Next 12 months - 2%
- Midwest: Past 12 months - 1%, Next 12 months - 1%
- Atlanta Dental: Past 12 months - 1%
- Other suppliers: Past 12 months - 29%, Next 12 months - 31%

Source: Company Data, Morgan Stanley Research, AlphaWise
Note: AMZN is covered by Brian Nowak
Digital technology spend as a % of total budget

- Past 12 months
- Next 12 months

Weighted avg = 14%
Weighted avg = 12%

Source: Company Data, Morgan Stanley Research, AlphaWise
Marko Vujicic, PhD, Chief Economist & Vice President, ADA Health Policy Institute

Dmitry Edelchik, MBA, Marketing Executive, Dental Manufacturing Sector

Steve Beuchaw, MBA, Executive Director, Morgan Stanley | Research

Justin Ishbia, JD, Managing Partner, Shore Capital Partners

Chris Salierno, DDS, Dentist and Chief Editor of Dental Economics

Disclaimer: Marko Vujicic, Dmitry Edelchik, Justin Ishbia, and Chris Salierno are not members of Morgan Stanley’s Research Department. Unless otherwise indicated, their views are their own and may differ from the views of the Morgan Stanley Research Department and from the views of others within Morgan Stanley.
Disclosures and Risks
Valuation Methodology and Risks

Agilent (A, Overweight) Our $83 price target for Agilent is based on a 3.6% FCF yield on our '19 FCF estimate. Our view is based upon 6.6% organic growth in '18. Given the runway we see on margin expansion and FCF growth, Agilent shares are increasingly attractive and are a compelling play on cyclical momentum. Our PT reflects a premium multiple given the company's strong balance sheet/net cash position and strong free cash flow growth. Key value drivers include organic operating margin expansion of ~70bps/year in 2018/2019 and the Oligo plant in Colorado relieving capacity constraints in nucleic acid solutions. Risks to our price target on the upside include a recovery in Academic end markets, operating leverage proves more than anticipated, and clinical penetration is better than expected. Risks to the downside include margin expansion weighed down by lower top line growth and industrial/energy end-market strength slows faster than anticipated.

Illumina Inc. (ILMN, Underweight) Our $180 price target is based on a 2.9% FCF yield on our '19 estimate. Our view is based on uptake of NGS for clinical applications remaining concentrated in academic and not community hospitals through 2019, as refinements for ease of use with new software and sample preparation systems are ongoing. Regulatory approvals and guideline inclusion are anticipated but do not emerge in 2018. Research market growth remains limited and competition emerges through the medium term. Key value drivers include 1) Physician group support for clinical guideline evolution and broader adoption of NGS systems, including publications from expert consortia and clinical trial groups; 2) FDA and insurer support, including regulatory approvals of standardized tests and positive reimbursement policies; 3) Expanding interest in research to support and tailor genomically guided therapies; and 4) Rapid innovation on sample preparation and software to support adoption by users in smaller clinics and hospitals. Risks to our price target include clinical trial and guideline timelines, hospital and government budget constraints, and new competition.

PerkinElmer (PKI, Overweight) Our $90 price target for Perkin is based on a 3.9% FCF yield on our '19 FCF estimate and implies a 21x '19e EPS multiple. Our outlook incorporates ~5.4% organic growth in '18 with ~100bps organic EBIT margin expansion after adjusting for FX headwinds and Euroimun tailwinds. Key value drivers include a more substantial cost rationalization opportunity relative to peers and higher leverage to structurally attractive spaces in diagnostics. Risks to price target include new product launches failing to gain traction, weaker industrial demand, FX headwinds greater than anticipated, or operating leverage less than expected.

Waters (WAT, Equal-weight) Our $200 price target for Waters is based on a 4.3% FCF yield on our '19E FCF estimate, based upon 5.1% organic growth in '18E with 50bps EBIT margin expansion, and implies a 21.2x '19e EPS multiple. WAT is the most direct beneficiary of the momentum in the pharma market in Tools, yet we see no course for the company to grow EPS faster than the large cap peer group. The company's optimized operations and focus on pharma are both the driver of the company's ROIC, and the reason the company is unlikely to be able to maintain its ROIC and multiple over time despite its superior product lineup and customer ties. Downside risks to our price target include: (i) Pharma end-markets decelerate on tough comps and fading replacement cycle; (ii) competitive position less defensible than expected and share loss increases; and (iii) operating leverage weaker than expected as cost programs fail to gain traction and pricing power moderates. Upside risks include: (i) Pharma end-markets accelerate from stronger R&D budgets; (ii) competitive position more defensible than expected; and (iii) operating leverage higher than expected on more robust cost programs and pricing power.

Thermo Fisher (TMO, Overweight) Our $230 price target for Thermo is based on a 4.2% FCF yield on our '19 FCF estimate. We see ~5% organic growth in '18 on the company's leverage to improving end markets, with ~40bps of EBIT margin expansion on efficiency gains and synergies from the FEIC/AFFX/PTHN acquisitions. Key value drivers include TMO capturing share in pharma with its product breadth, while the company's forecasts for synergies from the FEIC/AFFX/PTHN acquisitions are conservative. Risks to our price target include less than expected synergies, greater than expected FX headwinds, constrained government budgetary spending, or a global macro slowdown.

Qiagen (QGEN, Overweight) Our $37 price target for QIAGEN is based on our 2.7% target FCF yield on '19, implying 23x '19 EPS, above the current 20x multiple our FCF yield of 2.8% 25x P/E multiple on '19E EPS. Our valuation is based on Qiagen's innovative suite of products and heavy exposure to fast growth molecular diagnostics segment (~50% of revenues). While the competitive set is substantial, Qiagen is the larger player in key segments and management has called out five key growth drivers at various stages of maturity, that have grown at a +20% '11-'14 revenue CAGR and totaled 30% of revenues in '14. We estimate these would grow to ~50% of revenues by '18E, providing organic growth reacceleration in '17E-'18E as the drag from the US HPV business fades. Key risks to price target include competition, margin expansion diluted by elevated spend into sales & marketing infrastructure or R&D, M&A transactions, and a slowdown in academic and pharma end markets.

Mettler-Toledo (MDT, Equal-weight) Our $568 price target for Mettler Toledo implies a 3.5% FCF yield on our '19 FCF estimate and is supported by our DCF analysis, incorporating a 7.9% WACC and 1.0 beta. Our outlook incorporates ~5.7% organic growth in '18 with 100bps+ EBIT margin expansion and implies a multiple of 24x '19e EPS. Our target P/E is also within the range implied by our ROE-COE analysis. Upside risks to price target include a sustained macro recovery driving HSD industrial growth, continued MSD-HSD lab growth, and better than expected margin expansion on more robust cost programs. Downside risks include a slowdown in cyclical indicators, slower than expected margin expansion, and weak Lab/Food Retail growth.

Buker (BRKR, Equal-weight) Our $31 price target for Buker is based on a 3.1% FCF yield on our '19 FCF estimate. We believe Buker can generate ~90bps/year of organic margin expansion in '18-'19, and LSD organic revenue growth on momentum in Academic markets and deceleration in Applied markets. While we acknowledge that upside to our estimates is possible on better execution, a key driver of the company's premium multiple, potential upside is more likely in other names in our coverage universe. Risks to our price target include NIH funding increases not translating to revenue growth, execution missteps, and FX headwinds.
Align Technology (ALGN, Equal-weight) Our price target price for ALGN of $290 implies a 44x P/E on ’19E EPS, based on our 2.1% FCF yield on ’19. We see accelerating EPS growth through ’20E with a 16%-20E EPS CAGR in the ~35% range as the business reaps the benefits of its (1) agreement with SDC, (2) increased digital technology among dentists, and (3) international market penetration. Key risks to our price target for ALGN include discretionary consumer spending trends and competitive entries to the market.

NanoString Technologies (NTSG, Equal-weight) Our price target of $12 is based on a blended valuation equally weighting (1) a long-term DCF analysis (WACC of 10.7% and a terminal growth rate of 3.0%) yielding $11 per share value and (2) a revenue-based multiples analysis generating a 4.0x ’19E EV/Sales multiple yielding a $12 per share value and balancing the execution risk associated with an emerging company with its superior growth profile. Our valuation is fueled by the differentiated features of both nCounter and Prosinga, which we believe will drive market penetration in their respective endmarkets. Downside risks include: (i) failure to gain commercial traction for Prosinga; (ii) competitor platforms or technologies outperform/outprice nCounter and critical expansion into the clinical market is not achieved; (iii) SPRINT is not as successful as anticipated; and (iv) sequestration in US. Upside risks include (i) rapid adoption of nCounter for diagnostic applications; (ii) accelerating use of nCounter for immunotherapy development; and (iii) recovering life sciences instrument spending trends.

Myriad Genetics (MYGN, Equal-weight) Our $35 price target reflects our DCF valuation utilizing our base case forecasts and a 7.5% WACC. We incorporate a 0% terminal growth rate. Underpinning our base case forecasts are expectations of weaker price and share trends over the next 2-3 years. By FY18E, we anticipate that other revenue streams may come online from pipeline projects and products reaching full commercialization, such as Vectra and Prolaris, albeit lower gross profit products. Risks to price target include that clinician “stickiness” and slower public database buildout lead to less significant market share loss and price drop for BRACAnalysis and myRisk; and greater penetration of breast, ovarian, and colorectal cancer asymptomatic markets; coding risk from 81432 adoption on myRisk; Genesight receives greater/less private insurance coverage.

Dentsply International Inc (XRAY, overweight) Our price target price for Dentsply is $65 and is based on a target 3.9% FCF yield on our ’19 estimates. On current FCF yield, XRAY offers a 4.4% yield on our ’18 estimate, above our coverage median, and we forecast a faster FCF CAGR from ’16-’18. Our optimism on dental end markets and the Dentsply-Sirona merger remain intact and we expect $120m in revenue synergies from the SIRO deal by year 3 and $100m in incremental operational efficiency synergies at the EBIT line. Risks to price target include the failure to realize our estimated synergies from the SIRO deal, weaker macro trends, growth spending larger than anticipated, and competitive threats in implants and orthodontics.

Natera (NTRA, over-weight) Our price target of $16 is based on base case ’19E revenues for its NIPS business multiplied by a composite 2.7x EV/18E revenue multiple based on the growth outlook across different end markets (1.0x-3.0x multiple range) and then adding an incremental $75m of implied equity value associated with the liquid biopsy program yielding a 2.4x EV/18E revenue multiple. Our valuation is in-line with comparable diagnostic companies considering the differentiating technology utilized by Natera while considering the commercial uncertainty around its diagnostic solutions.Key risks to our price target for NTRA include slower transition of Panorama to the average and low risk markets, steeper price declines for Panorama than forecasted, slower than anticipated roll-out of the cloud-based distribution model (Constellation), and the presentation of clinical trial data that does not support liquid biopsy tests for clinical use.

Danaher (DHR, overweight) Our $113 Price Target is based on a 4.4% FCFY on ’19e, which is above the 4% median of our mid-large cap Tools/Dental coverage given DHR's slower growth. This implies 23x our Base Case ’19e EPS, above the current 22x ’18e EPS multiple. Assuming modest acceleration driven predominately by Life Sciences, Diagnostics & Dental, we model ~4.4% organic growth in 2018e and 3.7% growth in 2019, with 100bps/yr of margin expansion over the same period.

Patterson Companies (PDCO, under-weight) Our PT of $20 is based on a 6.6% FCF yield on our ’19 estimates. Dental business organic growth in the 0-2% range and Animal Health in the 3-5% range combine for 1.4%-normalized organic growth. Margins remain pressured by ongoing customer consolidation and e-commerce competition creating a price/mix headwind. Implied multiple contracts to 13x ’19 P/E from current P/E of 17x NTM EPS. Key risks to our price target include 1) Macroeconomic environment improves, impacting discretionary spend in both Dental and Companion Animal; 2) Dental utilization improves from healthcare coverage expansion; 3) Online competition fails to materialize; 4) Share loss on CEREC blocks is worse/greater than expected.

Henry Schein (HSIC, under-weight) Our PT of $65 is based on a 6.2% FCF yield on our CY19 estimates. We forecast Dental business organic growth in the 2-3% range, Animal Health in the 4-7% range and Medical in the 3-6% range which combine for 4-5% normalized organic growth. Margins remain pressured by ongoing customer consolidation and e-commerce competition creating a price/mix headwind. Implied multiple on CY19 compresses to 16x ’19e P/E from current P/E of 17x NTM EPS. Key risks include 1) Macroeconomic environment weakens, impacting discretionary spend in both Dental and Companion Animal; 2) Outpatient Medical and dental utilization slow from healthcare coverage pullback; 3) Online competition enters the market earlier than expected, creating a larger than expected headwind to price/mix.
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: Steve Beuchaw.

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.

Important US Regulatory Disclosures on Subject Companies

As of April 30, 2018, Morgan Stanley beneficially owned 1% or more of a class of common equity securities of the following companies covered in Morgan Stanley Research: Danaher, Illumina Inc., NanoString Technologies Inc, Qiagen NV, Thermo Fisher Scientific Inc.. Within the last 12 months, Morgan Stanley has received compensation for investment banking services from Thermo Fisher Scientific Inc.. In the next 3 months, Morgan Stanley expects to receive or intends to seek compensation for investment banking services from Agilent Technologies, Inc., Bruker Corp, Danaher, illumina Inc., Mettler-Toledo International Inc., Myriad Genetics Inc., NanoString Technologies Inc, Natera Inc, PerkinElmer Inc., Qiagen NV, Thermo Fisher Scientific Inc., Waters Corp.. Within the last 12 months, Morgan Stanley has received compensation for products and services other than investment banking services from Agilent Technologies, Inc., Danaher, illumina Inc., Qiagen NV, Thermo Fisher Scientific Inc.. 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: Agilent Technologies, Inc., Bruker Corp, Danaher, illumina Inc., Mettler-Toledo International Inc., Myriad Genetics Inc., NanoString Technologies Inc, Natera Inc, PerkinElmer Inc., Qiagen NV, Thermo Fisher Scientific Inc., Waters Corp.. 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: Agilent Technologies, Inc., Danaher, illumina Inc., Myriad Genetics Inc., Qiagen NV, Thermo Fisher Scientific Inc.. Morgan Stanley & Co. LLC makes a market in the securities of Agilent Technologies, Inc., Bruker Corp, Danaher, illumina Inc., Mettler-Toledo International Inc., Myriad Genetics Inc., Natera Inc, PerkinElmer Inc., Qiagen NV, Thermo Fisher Scientific Inc., Waters Corp..

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.
Morgan Stanley
Disclosure section (cont.)

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 April 30, 2018) 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.

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. Stock Price, Price Target and Rating History (See Rating Definitions)

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/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 Danaher, Thermo Fisher Scientific 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.; in Mexico by Morgan Stanley México, Casa de Bolsa, S.A. de C.V which is regulated by Comision 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 by Morgan Stanley Bank AG, Frankfurt am Main and Morgan Stanley Private Wealth Management Limited, Niederlassung Deutschland, 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 regulated by the Financial Services Board in South Africa. 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 to 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.
<table>
<thead>
<tr>
<th>Region</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Americas</td>
<td>1585 Broadway, New York, NY 10036-8293</td>
<td>+1 212 761 4000</td>
</tr>
<tr>
<td>Europe</td>
<td>20 Bank Street, Canary Wharf, London E14 4AD</td>
<td>+44 (0) 20 7425 8000</td>
</tr>
<tr>
<td>Japan</td>
<td>4-20-3 Ebisu, Shibuya-ku, Tokyo 150-6008</td>
<td>+81 (0) 3 5424 5000</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>1 Austin Road West, Kowloon, Hong Kong</td>
<td>+852 2848 5200</td>
</tr>
</tbody>
</table>