

## Goodwill Hurting

Shobhit Gupta  
+1 212 412 2056  
shobhit.gupta@barclays.com  
BCI, US

James K Martin  
+1 212 412 2345  
james.k.martin@barclays.com  
BCI, US

Bradford Elliott, CFA  
+1 212 526 6704  
bradford.elliott@barclays.com  
BCI, US

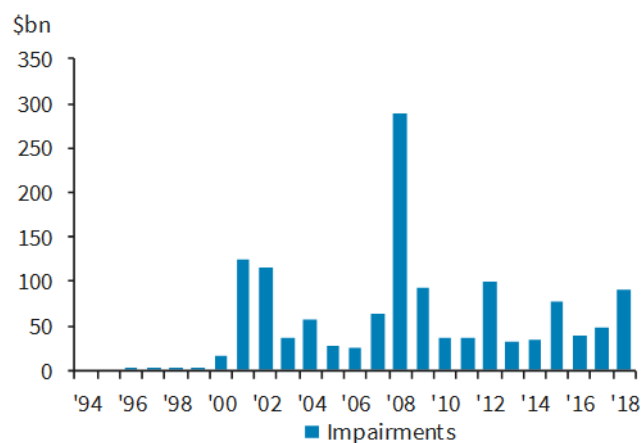
As companies reported annual results at the beginning of 2019, several large US corporations that pursued leveraged M&A transactions in recent years took goodwill impairment charges. GE, CVS, and Kraft Heinz alone took impairments totaling \$35bn, contributing to a 2018 goodwill impairment total of \$82bn for US non-financials (Figure 1). Total goodwill for these companies also happens to be at an all-time high both in absolute terms (at nearly \$3.5trn) and relative to the amount of total assets (Figure 2).

Goodwill and goodwill impairments are usually not cause for concern for credit investors, perhaps outside of cases where impairments can negatively affect financial tests such as debt to total capital ratio requirements used for revolvers. However, we find that goodwill impairments can permanently re-price issuer spreads meaningfully wider and that companies that take impairments see reduced earnings growth in subsequent years, on average. Identifying potential impairment candidates ahead of time is key to avoiding this spread underperformance, and we find that two to three years after M&A is when large impairments typically occur. With 2016 having been a record M&A year, this should increase the focus on impairments today. Certain sectors, such as healthcare, technology, and manufacturers, have seen goodwill increase more than others, and if these sectors come under pressure, from either unexpected margin compression or a broader economic downturn, the large amount of goodwill for certain issuers could be a signal of future underperformance.

### What Is Goodwill?

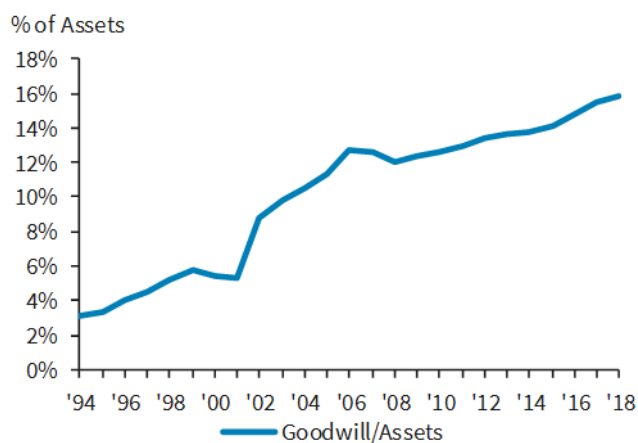
Goodwill is an intangible asset created as a result of an acquisition, defined as the difference between the purchase consideration and the fair values of all the tangible and intangible assets and liabilities when one company acquires another. In other words, it is an accounting plug on the asset side of the ledger for the amount paid for a business above and beyond what the business is worth on paper. Typically, the reason to pay a price above the book value of assets is related to the company's proprietary operations, brands, trademarks, licenses, and/or strong relationships with its customers. While extremely important to the success of the business, these are typically hard to quantify and, unlike other intangible assets, have indefinite useful lives. Goodwill is typically a positive value except in rare distressed instances where the acquisition price that is paid is less than the fair value of the assets of the purchased entity.

FIGURE 1  
Goodwill Impairments for US Non-Financials



Source: Compustat, Barclays Research

FIGURE 2  
Goodwill as a Percent of Assets for US Non-Financials



Source: Compustat, Barclays Research

### What Is an Impairment?

Just like any other asset, goodwill can incur an impairment if its fair value falls below its carrying value (the amount paid for the acquired asset less the net book value of that asset).

Since 2001, GAAP requires goodwill to be tested for impairment at least annually, or if certain events trigger an impairment test (see appendix for more detail). Because goodwill is not considered an identifiable intangible asset, there is some vagueness to measuring its fair value, which is based on assumptions of the value that market participants would give the asset or business unit. Typically, valuation models are used that account for future cash flows or apply similar asset multiples observed in the market, but there is a lack of conformity in methods. The subjectivity embedded in the fair value calculation creates layers of ambiguity, hindering investors' ability to forecast the amount or timing of goodwill impairments and, in turn, sometimes leading to multi-billion dollar surprises.

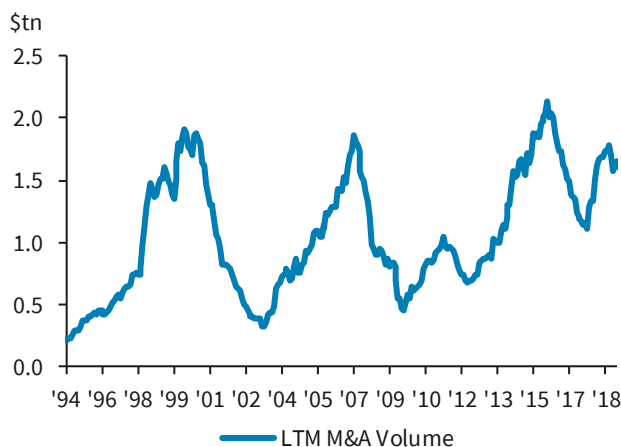
### Goodwill Has Increased since 2000; Why?

Goodwill has also gone up as a percent of assets since the late 1990s, in part because of a continuing shift to a services-focused economy that relies more on intangible assets. Separately, the post-2000 era has been characterized by an uptick in M&A activity, which is necessary for goodwill to increase given the mechanics of how the asset is created (Figure 3). If more of the total value of what an acquirer is purchasing is intellectual property, proprietary technology, and customer data, the goodwill portion of an acquisition is more likely to be high relative to the total assets being acquired.

Moreover, because of US GAAP reporting requirements, intangible investments such as IP are for the most part not capitalized and therefore not recognized as assets on the balance sheet prior to acquisition; they are expensed on the income statement. Therefore, it is difficult to capture exactly how much companies are investing in these intangibles until said company is acquired. Since the value of the intangible investments are considered when assessing the firm's value, when the company is acquired, all previous intangible investments are "captured" subjectively in the recognition of goodwill. Because the shift toward a more service-focused economy is a natural progression for the developed world, the rise in goodwill is not inherently a cause for concern, in our view.

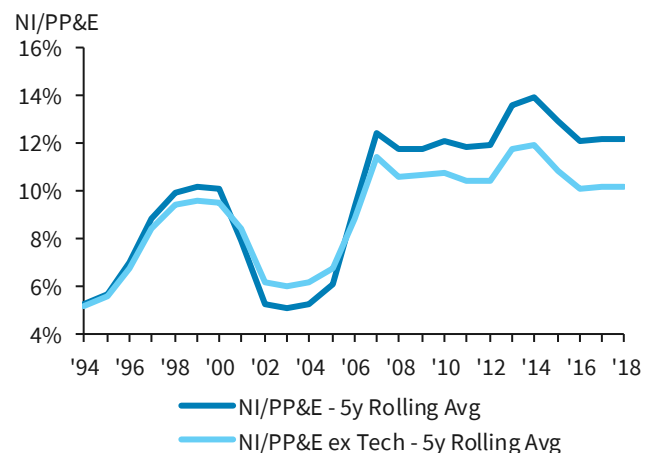
Figure 4 shows net income as a percent of property, plant, and equipment (PP&E), illustrating the amount of profits companies have derived from physical assets over the past few decades. Indeed, US companies have become more productive in relation to physical assets,

FIGURE 3  
M&A Volume – Rolling LTM



Source: Factset, Barclays Research

FIGURE 4  
US Non-Financials Are Generating More Net Income Relative to PP&E



Source: Compustat, Barclays Research

highlighting the shift to a service-based economy. While it can be argued that technology firms have driven the increase in income relative to PP&E, we see a similar trend even after excluding the tech sector. However, as companies rely less on physical assets to run their businesses, this could lead to less downside protection for credit investors. Companies' licenses, brands, trademarks, etc. are inherently illiquid, and the value of these assets could deteriorate at a much faster pace in a downside scenario compared with physical assets. While the liquidation value of a company's assets is less of a concern for investment grade issuers, the subjectivity of valuation for these intangible investments almost certainly increases the volatility of their fair value. In the event of a downturn, this could increase the likelihood of an impairment charge.

### *Why Have Impairments Happened?*

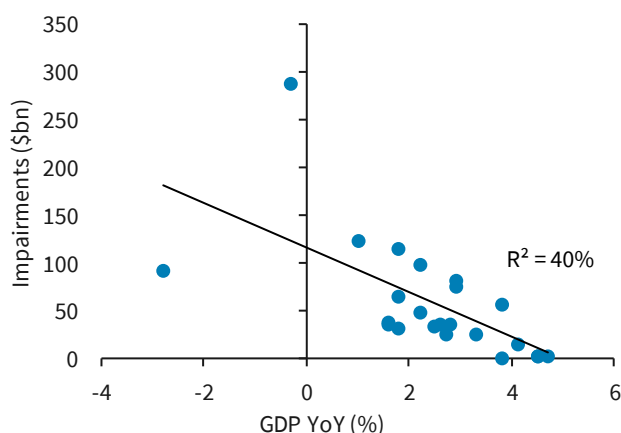
Because impairments to goodwill are based on the expected future cash flow generation of a business unit, brand, trademark, etc., an impairment is taken when expected cash flows have decreased materially. Broadly speaking, significant reversals of earnings expectations happen concurrently with economic downturns, so it is no surprise that the years with the most impairments occur in times of economic stress (Figure 5). In our analysis of the top 15 impairment charges of the past 20 years, common reasons for taking write-downs include significant changes in the sales forecast for a particular product or service. Impairments do not anticipate broader economic downturns, but instead are part of the reaction to a weakening outlook for the sector or business area of the acquired asset.

Because companies have been required to test for goodwill impairments at least annually since 2001, most firms test for impairment as a part of their annual reporting requirements. Indeed, we find that more than half of all impairment charges are taken in 4Q, with only one-quarter of impairments occurring in 1Q and 2Q (Figure 6).

### *Looking Back on Impairments Past*

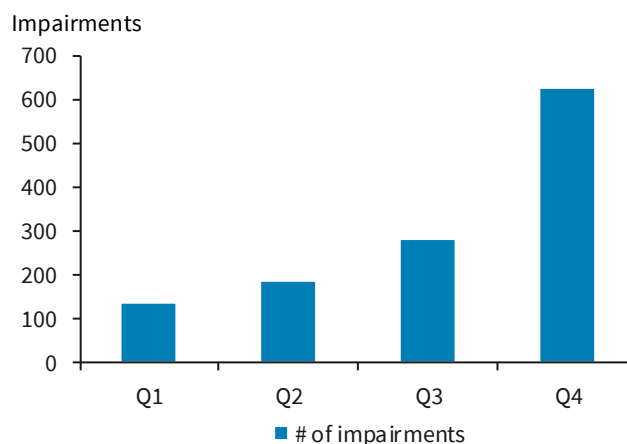
While it is clear that goodwill impairments happen during times of economic stress, companies also take charges outside of recession periods. For instance, in 2018, companies took \$82bn of impairments (Figure 7 shows the top 10 impairment charges in 2018). While specifics vary among this cohort, in general, the companies are characterized by either low margins or high fixed costs and, in turn, have the potential to realize sudden decreases in profitability. The two companies that took the largest impairments, General Electric and

**FIGURE 5**  
Goodwill Impairments Are Concurrent with Economic Downturns, Lower Growth



Source: Bloomberg, Compustat, Barclays Research

**FIGURE 6**  
Most Goodwill Impairment Charges Are Taken in 4Q

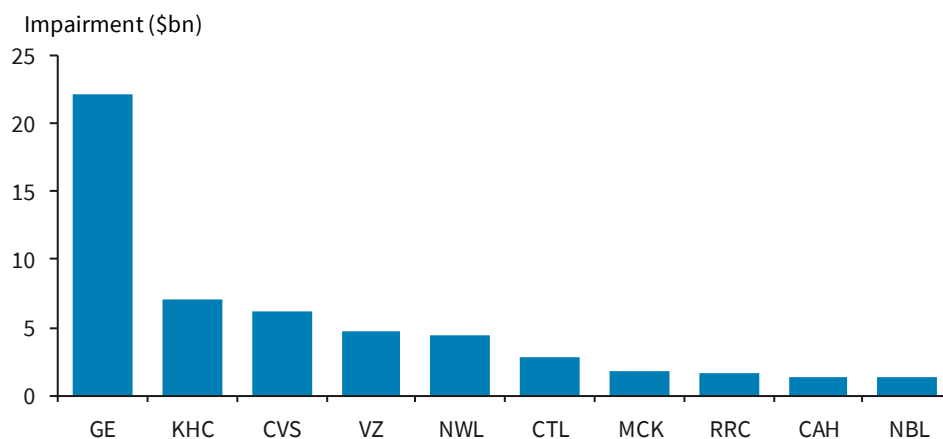


Note: Excludes companies with less than \$1bn in assets.

Source: Compustat, Barclays Research

Kraft Heinz, fit this description. GE took an impairment to its capital-intensive power business, writing down almost the entirety of the segment's goodwill, mostly related to the 2015 acquisition of Alstom's thermal and renewable power businesses. Kraft Heinz impaired \$15.4bn of intangibles primarily related to lower-margin consumer products, Kraft and Oscar Mayer, of which \$7.1bn was goodwill. Interestingly, both impairments were related to blockbuster 2015 combinations as the companies attempted to reignite growth inorganically.

FIGURE 7  
2018 Largest Goodwill Impairment Charges



Source: Compustat, Barclays Research

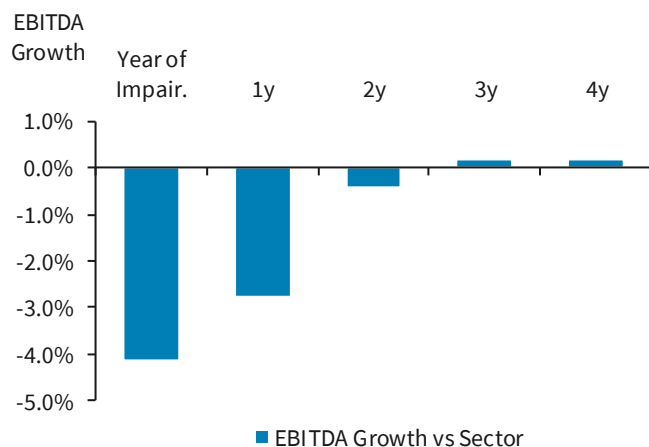
To get a sense of the length of time between acquisition and impairment, we analyzed some of the largest impairments over the past two decades. Figure 8 lists the largest impairments tied to specific acquisitions mentioned in company filings, and we find that impairment charges were taken 2-3 years after the transactions, on average. While we recognize that this is a limited sample set, the preponderance of M&A activity in 2015-16 implies that companies that participated in large-scale acquisitions during that period could be susceptible to impairments in the coming years.

FIGURE 8  
Top 15 Goodwill Impairments Associated with Specific Acquisitions

| Company                | Impairment (\$bn) | Acquisition Date | Impairment Date | Years      |
|------------------------|-------------------|------------------|-----------------|------------|
| Viavi Solutions Inc.   | 50.1              | Feb-01           | Sep-01          | 0.6        |
| Time Warner Inc.       | 44.7              | Jan-00           | Dec-02          | 3.0        |
| Sprint Corp            | 29.7              | Aug-05           | Dec-07          | 2.4        |
| ConocoPhillips         | 25.4              | Mar-06           | Dec-08          | 2.8        |
| General Electric Co    | 22.1              | Nov-15           | Dec-18          | 3.2        |
| The Kraft Heinz Co     | 15.9              | Jul-15           | Dec-18          | 3.5        |
| HP Inc.                | 13.7              | Aug-08           | Jun-12          | 3.8        |
| Verisign Inc.          | 9.9               | Jun-00           | Jun-01          | 1.1        |
| Energy Future Holdings | 8.9               | Oct-07           | Dec-08          | 1.2        |
| Qwest Communications   | 8.5               | Jun-00           | Jun-02          | 2.0        |
| Virgin Media Inc.      | 8.1               | Jan-99           | Dec-01          | 3.0        |
| Symantec Corp          | 7.4               | Sep-05           | Dec-09          | 4.3        |
| Delta Air Lines Inc.   | 7.3               | Jun-07           | Mar-08          | 0.8        |
| Microsoft Corp         | 6.2               | Aug-07           | Jun-12          | 4.9        |
| Freeport-McMoRan Inc.  | 6.0               | Mar-07           | Dec-08          | 1.8        |
| <b>Average</b>         |                   |                  |                 | <b>2.5</b> |

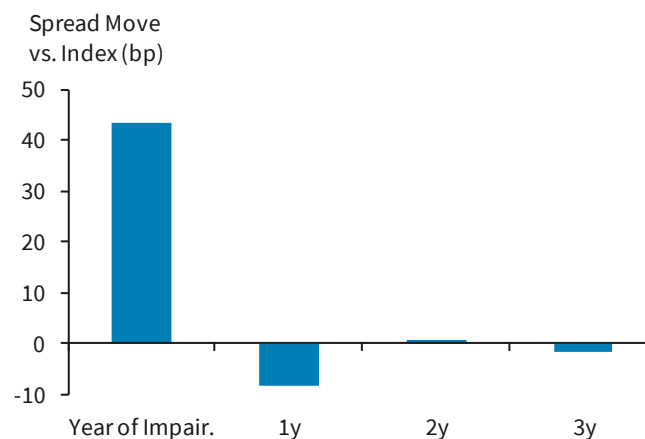
Source: Company filings, Compustat, Barclays Research

FIGURE 9  
EBITDA Growth versus Sector after Impairment Charges



Note: Companies with at least \$1bn in assets.  
Source: Compustat, Barclays Research

FIGURE 10  
Spread Performance of Companies with the Largest Impairment Charges



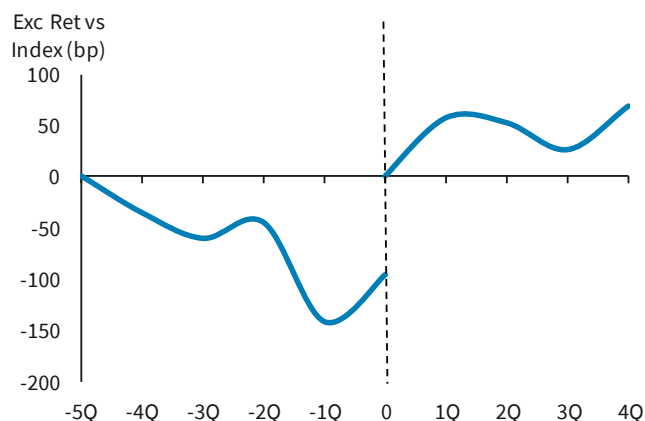
Note: Companies with goodwill impairments of at least \$1bn  
Source: Compustat, Barclays Research

### Credit Market Implications

Since companies that take goodwill impairments tend to be in sectors facing headwinds, it is no surprise that their EBITDA growth lags the rest of the market; however, they also lag their respective sectors. In the year that impairment charges are taken and the subsequent year, these companies tend to underperform their peers, with EBITDA growth significantly behind the sector average (Figure 9). That underperformance tends to wear off in a few years, after which the companies perform in line with the sector. The underperformance is particularly notable given that the economic trends leading to impairment are usually not company specific and tend to affect other companies in the sector as well.

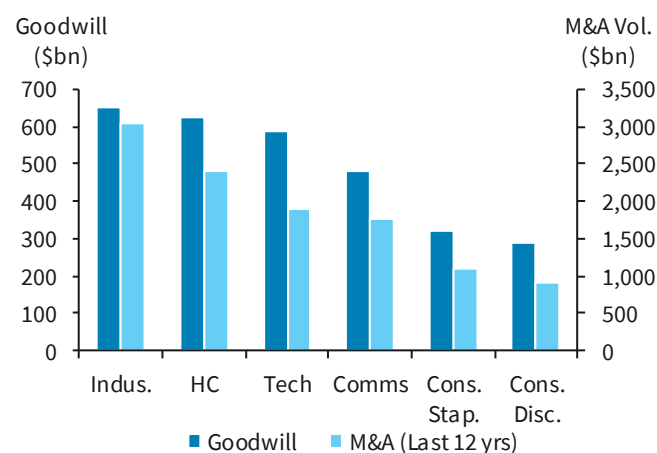
As a consequence of poor operating performance, the spreads of companies with impairment charges of more than \$1bn since 1998 have lagged the index. Most of the underperformance occurred in the year of the impairment, and the companies tended to perform in line with the index in subsequent years (Figure 10). This underperformance is expected given that credit investors likely react to an anticipated decline in business

FIGURE 11  
Quarterly Excess Returns around Goodwill Impairment Charges



Source: Compustat, Barclays Research

FIGURE 12  
Nominal Goodwill by Sector versus M&A Volume



Source: Bloomberg, Compustat, Barclays Research

performance even before an impairment charge is taken. Notably, the lack of a rebound in spreads for this cohort in subsequent years suggests that the credits remain off their tights versus the index for the intermediate term.

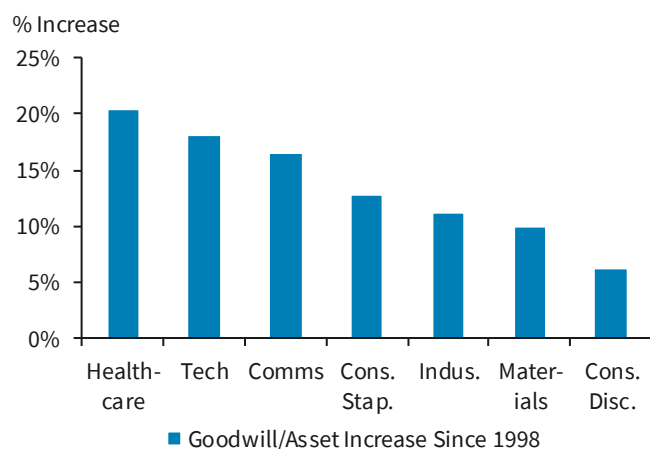
For some of the largest impairments, we took a more granular look at quarterly excess returns versus the index around the impairment dates. We found that these credits lagged the index by approximately 100bp in the five quarters leading up to impairment (Figure 11). After the impairment charges were taken, excess returns were positive relative to the index. Because spreads for these issuers had re-priced wider, the credits had higher carry post-impairment, so some outperformance in excess return terms is not altogether surprising.

## Sector Trends

The industrials sector has the largest nominal amount of goodwill on the balance sheet because of the prevalence of large, acquisitive companies. Not surprisingly, industrial companies have also engaged in the largest amount of M&A transactions over the past 12 years (Figures 12). Companies with the highest goodwill totals in the sector include large conglomerates such as GE; aerospace & defense companies such as United Technologies, Honeywell, and Raytheon; and railroad roll-ups such as Burlington Northern Santa Fe. These companies are in very mature sub-industries that have been characterized by consolidation throughout the past few decades and have therefore engaged in a significant amount of M&A transactions. The aerospace & defense industry, in particular, has seen massive consolidation as companies have looked to streamline supply chains and achieve greater economies of scale, using M&A to accomplish those goals. While industrials have the most amount of goodwill on the balance sheet, they also constitute the largest sector by assets. After taking into consideration the larger asset base for these companies, healthcare and technology have the largest amount of goodwill as determined by percent of assets.

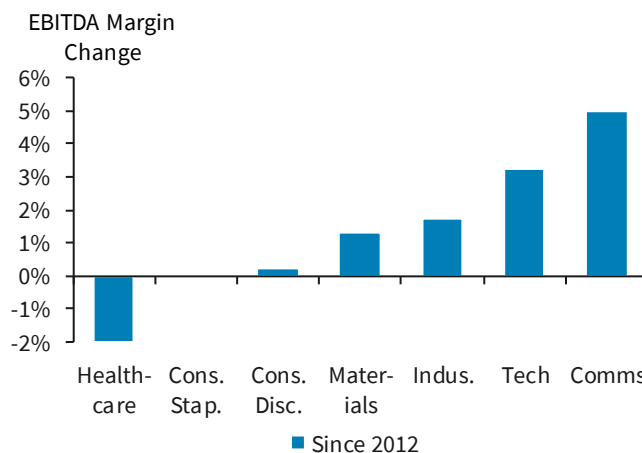
Goodwill as a percent of assets has increased the most in healthcare since 2000, mostly because of the growing reliance on intangible assets, notably patents and proprietary processes, as well as the acquisitive nature of large well-capitalized firms that have grown more reliant on focused innovative start-ups for their drug candidate pipelines. Over the past decade, pharmaceutical companies have increasingly shifted drug development from a mostly in-house operation to an “off-balance-sheet” research and development model. Instead of spending years (often up to a decade) trying to move candidates through various stages in the clinic, at a large opportunity cost for internal resources, they have grown to prefer allowing small biotechs to first identify promising candidates that have shown reasonable success in early phases of trial and then acquiring and incubating them through,

FIGURE 13  
Goodwill as a Percent of Total Assets Increase since 1998



Source: Compustat, Barclays Research

FIGURE 14  
EBITDA Margin Change by Sector since 2012



Source: Compustat, Barclays Research

hopefully, commercialization. Since the value of pre-revenue biotech companies is largely based on the expected future value of a portfolio of drugs still in development, acquisitions are often executed at prices significantly above the book value of assets.

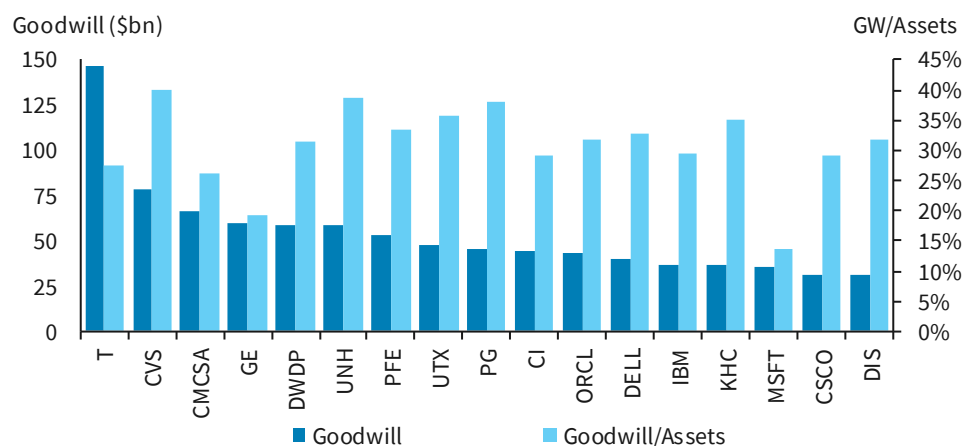
### *Margin Compression Combined with Increased Goodwill*

Since impairments occur as a result of material changes in the outlooks for business units or products, we view declining margins as a signal for sectors that are currently experiencing economic stress in one of their business segments. Moreover, we view sectors that have increased goodwill as a percentage of their asset base and have contemporaneously experienced margin compression as having the greatest potential for future impairments. While healthcare, technology, and communications have seen the largest increases in goodwill, technology and communications have expanded their EBITDA margins more than any other sectors (Figures 13 and 14). Conversely, healthcare has seen the largest EBITDA margin decline since 2012. Interestingly, healthcare companies were relatively unscathed in 2008-09, taking only around \$12bn of impairments during the crisis (less than 0.6% of total assets), near the lowest among all sectors.

### *Companies with Elevated Goodwill*

Figure 15 lists the investment grade companies with the largest amounts of goodwill on their balance sheets, and we include goodwill as a percent of assets to illustrate its relative magnitude. Although our economic outlook remains generally sanguine and we are not specifically negative on the listed names, these companies could have more downside if they impair a portion of their goodwill. Moreover, we believe it is noteworthy that the three largest impairments in 2018 were taken by companies on the list (GE, Kraft Heinz, and CVS).

FIGURE 15  
Companies with the Largest Amount of Goodwill



Source: Compustat, Barclays Research

## Appendix

### Impairments

GAAP requires goodwill to be tested for impairment at least annually, or if certain events trigger an impairment test. Examples of events that could trigger an impairment test include:

- External sources - Adverse legal actions (ie, lawsuits or changes in regulatory environment), a significant decline in share price, adverse changes in technology, interest rates volatility, and/or net assets higher than market capitalization.

- Internal sources – Asset is idle, physical damage of an asset, worse-than-expected performance, and/or accumulation of costs significantly above expectations.

If it is concluded that an impairment test must be completed, the company begins calculating the fair value of the asset to assess whether it is less than the carrying value. When evaluating whether fair value is less than the carrying amount, the company should assess relevant events such as macroeconomic conditions, limitations on accessing capital, currency fluctuations, financial performance, changes in strategy, or a sustained decrease in share price. After all of these factors are considered and fair value is calculated, if the assessment is lower than the carrying value, a one-time impairment charge is taken to reduce the value of the asset, as well as the income in that reporting period. It is important to note that a subsequent reversal of a previously recognized impairment loss is prohibited once the loss is recognized.

### **Country of Incorporation**

Please note that our analysis includes only non-financial companies that are incorporated in the United States.



**Analyst Certification**

We, Bradford Elliott, CFA, Shobhit Gupta and James K Martin, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

**Important Disclosures:**

Barclays Research is produced by the Investment Bank of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays").

All authors contributing to this research report are Research Analysts unless otherwise indicated. The publication date at the top of the report reflects the local time where the report was produced and may differ from the release date provided in GMT.

**Availability of Disclosures:**

For current important disclosures regarding any issuers which are the subject of this research report please refer to <https://publicresearch.barclays.com> or alternatively send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 13th Floor, New York, NY 10019 or call +1-212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and / or short position in such securities, other financial instruments and / or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the Investment Banking Department), the profitability and revenues of the Markets business and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not necessarily represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. Barclays Research Department produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations and trade ideas contained in one type of Barclays Research may differ from those contained in other types of Barclays Research, whether as a result of differing time horizons, methodologies, or otherwise.

In order to access Barclays Statement regarding Research Dissemination Policies and Procedures, please refer to <https://publicresearch.barcap.com/S/RD.htm>. In order to access Barclays Research Conflict Management Policy Statement, please refer to: <https://publicresearch.barcap.com/S/CM.htm>.

All pricing information is indicative only. Prices are sourced from Refinitiv as of the last available closing price at the time of production of the research report, unless another time and source is indicated.

**Types of investment recommendations produced by Barclays FICC Research:**

In addition to any ratings assigned under Barclays' formal rating systems, this publication may contain investment recommendations in the form of trade ideas, thematic screens, scorecards or portfolio recommendations that have been produced by analysts in FICC Research. Any such investment recommendations produced by non-Credit Research teams shall remain open until they are subsequently amended, rebalanced or closed in a future research report. Any such investment recommendations produced by the Credit Research teams are valid at current market conditions and may not be otherwise relied upon.

**Disclosure of other investment recommendations produced by Barclays FICC Research:**

Barclays FICC Research may have published other investment recommendations in respect of the same securities/instruments recommended in this research report during the preceding 12 months. To view all investment recommendations published by Barclays FICC Research in the preceding 12 months please refer to <https://live.barcap.com/go/research/Recommendations>.

**Legal entities involved in producing Barclays Research:**

Barclays Bank PLC (Barclays, UK)  
Barclays Capital Inc. (BCI, US)  
Barclays Bank Ireland PLC, Frankfurt Branch (BBI, Frankfurt)  
Barclays Bank Ireland PLC, Paris Branch (BBI, Paris)  
Barclays Bank Ireland PLC, Milan Branch (BBI, Milan)  
Barclays Securities Japan Limited (BSJL, Japan)  
Barclays Bank PLC, Hong Kong branch (Barclays Bank, Hong Kong)  
Barclays Capital Canada Inc. (BCCI, Canada)  
Barclays Bank Mexico, S.A. (BBMX, Mexico)  
Barclays Securities (India) Private Limited (BSIPL, India)  
Barclays Bank PLC, India branch (Barclays Bank, India)  
Barclays Bank PLC, Singapore branch (Barclays Bank, Singapore)

**Disclaimer**

This publication has been produced by Barclays Research Department in the Investment Bank of Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). It has been prepared for institutional investors only and not for retail investors. It has been distributed by one or more Barclays affiliated legal entities listed below. It is provided to our clients for information purposes only, and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data included in this

publication. To the extent that this publication states on the front page that it is intended for institutional investors and is not subject to all of the independence and disclosure standards applicable to debt research reports prepared for retail investors under U.S. FINRA Rule 2242, it is an "institutional debt research report" and distribution to retail investors is strictly prohibited. Barclays also distributes such institutional debt research reports to various issuers, media, regulatory and academic organisations for their own internal informational news gathering, regulatory or academic purposes and not for the purpose of making investment decisions regarding any debt securities. Media organisations are prohibited from re-publishing any opinion or recommendation concerning a debt issuer or debt security contained in any Barclays institutional debt research report. Any such recipients that do not want to continue receiving Barclays institutional debt research reports should contact [debtresearch@barclays.com](mailto:debtresearch@barclays.com). Barclays will not treat unauthorized recipients of this report as its clients and accepts no liability for use by them of the contents which may not be suitable for their personal use. Prices shown are indicative and Barclays is not offering to buy or sell or soliciting offers to buy or sell any financial instrument.

Without limiting any of the foregoing and to the extent permitted by law, in no event shall Barclays, nor any affiliate, nor any of their respective officers, directors, partners, or employees have any liability for (a) any special, punitive, indirect, or consequential damages; or (b) any lost profits, lost revenue, loss of anticipated savings or loss of opportunity or other financial loss, even if notified of the possibility of such damages, arising from any use of this publication or its contents.

Other than disclosures relating to Barclays, the information contained in this publication has been obtained from sources that Barclays Research believes to be reliable, but Barclays does not represent or warrant that it is accurate or complete. Barclays is not responsible for, and makes no warranties whatsoever as to, the information or opinions contained in any written, electronic, audio or video presentations of third parties that are accessible via a direct hyperlink in this publication or via a hyperlink to a third-party web site ('Third-Party Content'). Any such Third-Party Content has not been adopted or endorsed by Barclays, does not represent the views or opinions of Barclays, and is not incorporated by reference into this publication. Third-Party Content is provided for information purposes only and Barclays has not independently verified its accuracy or completeness.

The views in this publication are solely and exclusively those of the authoring analyst(s) and are subject to change, and Barclays Research has no obligation to update its opinions or the information in this publication. Unless otherwise disclosed herein, the analysts who authored this report have not received any compensation from the subject companies in the past 12 months. If this publication contains recommendations, they are general recommendations that were prepared independently of any other interests, including those of Barclays and/or its affiliates, and/or the subject companies. This publication does not contain personal investment recommendations or investment advice or take into account the individual financial circumstances or investment objectives of the clients who receive it. The securities and other investments discussed herein may not be suitable for all investors. Barclays is not a fiduciary to any recipient of this publication. Investors must independently evaluate the merits and risks of the investments discussed herein, consult any independent advisors they believe necessary, and exercise independent judgment with regard to any investment decision. The value of and income from any investment may fluctuate from day to day as a result of changes in relevant economic markets (including changes in market liquidity). The information herein is not intended to predict actual results, which may differ substantially from those reflected. Past performance is not necessarily indicative of future results. The information provided does not constitute a financial benchmark and should not be used as a submission or contribution of input data for the purposes of determining a financial benchmark.

**United Kingdom:** This document is being distributed (1) only by or with the approval of an authorised person (Barclays Bank PLC) or (2) to, and is directed at (a) persons in the United Kingdom having professional experience in matters relating to investments and who fall within the definition of "investment professionals" in Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "Order"); or (b) high net worth companies, unincorporated associations and partnerships and trustees of high value trusts as described in Article 49(2) of the Order; or (c) other persons to whom it may otherwise lawfully be communicated (all such persons being "Relevant Persons"). Any investment or investment activity to which this communication relates is only available to and will only be engaged in with Relevant Persons. Any other persons who receive this communication should not rely on or act upon it. Barclays Bank PLC is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority and is a member of the London Stock Exchange.

**European Economic Area:** This material is being distributed to any "Authorised User" located in a Restricted EEA Country by Barclays Bank Ireland PLC. The Restricted EEA Countries are Finland, Austria, Luxembourg, Portugal, Liechtenstein, Iceland, Slovenia, Malta, Lithuania, Slovakia, Hungary, Romania and Bulgaria. For any other "Authorised User" located in a country of the European Economic Area, this material is being distributed by Barclays Bank PLC. Barclays Bank Ireland PLC is a bank authorised by the Central Bank of Ireland whose registered office is at 1 Molesworth Street, Dublin 2, Ireland. Barclays Bank PLC is not registered in France with the Autorité des marchés financiers or the Autorité de contrôle prudentiel.

**Americas:** The Investment Bank of Barclays Bank PLC undertakes U.S. securities business in the name of its wholly owned subsidiary Barclays Capital Inc., a FINRA and SIPC member. Barclays Capital Inc., a U.S. registered broker/dealer, is distributing this material in the United States and, in connection therewith, accepts responsibility for its contents. Any U.S. person wishing to effect a transaction in any security discussed herein should do so only by contacting a representative of Barclays Capital Inc. in the U.S. at 745 Seventh Avenue, New York, New York 10019.

Non-U.S. persons should contact and execute transactions through a Barclays Bank PLC branch or affiliate in their home jurisdiction unless local regulations permit otherwise.

This material is distributed in Canada by Barclays Capital Canada Inc., a registered investment dealer, a Dealer Member of IIROC ([www.iiroc.ca](http://www.iiroc.ca)), and a Member of the Canadian Investor Protection Fund (CIPF).

This material is distributed in Mexico by Barclays Bank Mexico, S.A.

**Japan:** This material is being distributed to institutional investors in Japan by Barclays Securities Japan Limited. Barclays Securities Japan Limited is a joint-stock company incorporated in Japan with registered office of 6-10-1 Roppongi, Minato-ku, Tokyo 106-6131, Japan. It is a subsidiary of Barclays Bank PLC and a registered financial instruments firm regulated by the Financial Services Agency of Japan. Registered Number: Kanto Zaimukyokuchō (kinsho) No. 143.

**Asia Pacific (excluding Japan):** Barclays Bank PLC, Hong Kong Branch is distributing this material in Hong Kong as an authorised institution regulated by the Hong Kong Monetary Authority. Registered Office: 41/F, Cheung Kong Center, 2 Queen's Road Central, Hong Kong.

All Indian securities-related research and other equity research produced by Barclays' Investment Bank are distributed in India by Barclays Securities (India) Private Limited (BSIPL). BSIPL is a company incorporated under the Companies Act, 1956 having CIN U67120MH2006PTC161063. BSIPL is registered and regulated by the Securities and Exchange Board of India (SEBI) as a Research Analyst: INH000001519; Portfolio Manager INP000002585; Stock Broker/Trading and Clearing Member: National Stock Exchange of India Limited (NSE) Capital Market INB231292732, NSE Futures & Options INF231292732, NSE Currency derivatives INE231450334, Bombay Stock Exchange Limited (BSE) Capital Market INB011292738, BSE Futures & Options INF011292738; Depository Participant (DP) with the National Securities & Depositories Limited (NSDL): DP ID: IN-DP-NSDL-299-2008; Investment Adviser: INA000000391. The registered office of BSIPL is at 208, Ceejay House, Shivsagar Estate, Dr. A. Besant Road, Worli, Mumbai – 400 018, India. Telephone No: +91 2267196000. Fax number: +91 22 67196100. Any other reports produced by Barclays' Investment Bank are distributed in India by Barclays Bank PLC, India Branch, an

associate of BSIPL in India that is registered with Reserve Bank of India (RBI) as a Banking Company under the provisions of The Banking Regulation Act, 1949 (Regn No BOM43) and registered with SEBI as Merchant Banker (Regn No INM000002129) and also as Banker to the Issue (Regn No INBI00000950). Barclays Investments and Loans (India) Limited, registered with RBI as Non Banking Financial Company (Regn No RBI CoR-07-00258), and Barclays Wealth Trustees (India) Private Limited, registered with Registrar of Companies (CIN U93000MH2008PTC188438), are associates of BSIPL in India that are not authorised to distribute any reports produced by Barclays' Investment Bank.

This material is distributed in Singapore by the Singapore branch of Barclays Bank PLC, a bank licensed in Singapore by the Monetary Authority of Singapore. For matters in connection with this material, recipients in Singapore may contact the Singapore branch of Barclays Bank PLC, whose registered address is 10 Marina Boulevard, #23-01 Marina Bay Financial Centre Tower 2, Singapore 018983.

This material is distributed to persons in Australia by Barclays Bank PLC. None of Barclays Bank PLC, nor any other Barclays group entity, holds an Australian financial services licence and instead relies on an exemption from the requirement to hold such a licence. This material is intended to only be distributed to "wholesale clients" as defined by the Australian Corporations Act 2001.

**Middle East:** Nothing herein should be considered investment advice as defined in the Israeli Regulation of Investment Advisory, Investment Marketing and Portfolio Management Law, 1995 ("Advisory Law"). This document is being made to eligible clients (as defined under the Advisory Law) only. Barclays Israeli branch previously held an investment marketing license with the Israel Securities Authority but it cancelled such license on 30/11/2014 as it solely provides its services to eligible clients pursuant to available exemptions under the Advisory Law, therefore a license with the Israel Securities Authority is not required. Accordingly, Barclays does not maintain an insurance coverage pursuant to the Advisory Law.

This material is distributed in the United Arab Emirates (including the Dubai International Financial Centre) and Qatar by Barclays Bank PLC. Barclays Bank PLC in the Dubai International Financial Centre (Registered No. 0060) is regulated by the Dubai Financial Services Authority (DFSA). Principal place of business in the Dubai International Financial Centre: The Gate Village, Building 4, Level 4, PO Box 506504, Dubai, United Arab Emirates. Barclays Bank PLC-DIFC Branch, may only undertake the financial services activities that fall within the scope of its existing DFSA licence. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority. Barclays Bank PLC in the UAE is regulated by the Central Bank of the UAE and is licensed to conduct business activities as a branch of a commercial bank incorporated outside the UAE in Dubai (Licence No.: 13/1844/2008, Registered Office: Building No. 6, Burj Dubai Business Hub, Sheikh Zayed Road, Dubai City) and Abu Dhabi (Licence No.: 13/952/2008, Registered Office: Al Jazira Towers, Hamdan Street, PO Box 2734, Abu Dhabi). Barclays Bank PLC in the Qatar Financial Centre (Registered No. 00018) is authorised by the Qatar Financial Centre Regulatory Authority (QFCRA). Barclays Bank PLC-QFC Branch may only undertake the regulated activities that fall within the scope of its existing QFCRA licence. Principal place of business in Qatar: Qatar Financial Centre, Office 1002, 10th Floor, QFC Tower, Diplomatic Area, West Bay, PO Box 15891, Doha, Qatar. Related financial products or services are only available to Business Customers as defined by the Qatar Financial Centre Regulatory Authority.

**Russia:** This material is not intended for investors who are not Qualified Investors according to the laws of the Russian Federation as it might contain information about or description of the features of financial instruments not admitted for public offering and/or circulation in the Russian Federation and thus not eligible for non-Qualified Investors. If you are not a Qualified Investor according to the laws of the Russian Federation, please dispose of any copy of this material in your possession.

**IRS Circular 230 Prepared Materials Disclaimer:** Barclays does not provide tax advice and nothing contained herein should be construed to be tax advice. Please be advised that any discussion of U.S. tax matters contained herein (including any attachments) (i) is not intended or written to be used, and cannot be used, by you for the purpose of avoiding U.S. tax-related penalties; and (ii) was written to support the promotion or marketing of the transactions or other matters addressed herein. Accordingly, you should seek advice based on your particular circumstances from an independent tax advisor.

© Copyright Barclays Bank PLC (2019). All rights reserved. No part of this publication may be reproduced or redistributed in any manner without the prior written permission of Barclays. Barclays Bank PLC is registered in England No. 1026167. Registered office 1 Churchill Place, London, E14 5HP. Additional information regarding this publication will be furnished upon request.

BRCF2242

