

UNDER THE MICROSCOPE

PRIVATE VS PUBLIC COMPANY OPERATING METRICS FOR US COMPANIES

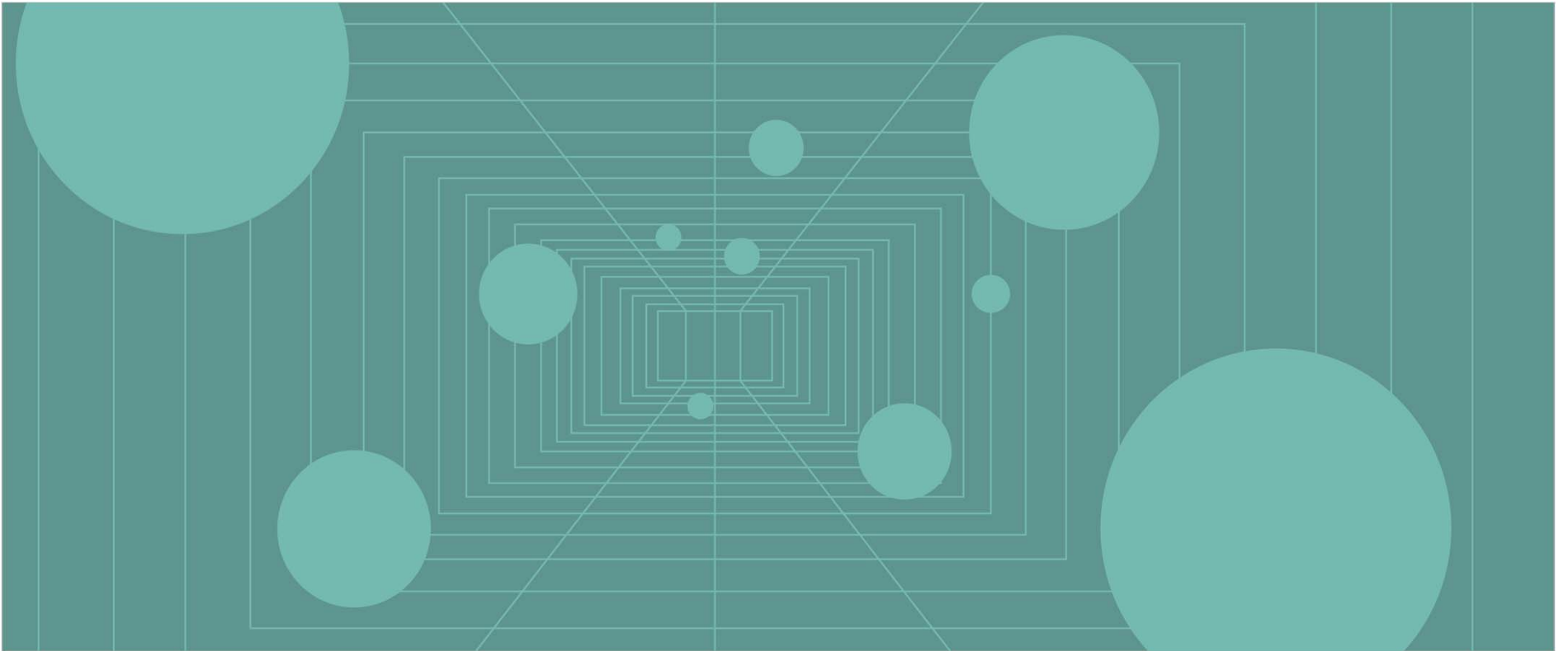


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Introduction to Operating Metrics

- The data in this report on operating metrics provide insights into key parts of the process by which private equity (PE) managers execute their strategy:
 - Purchasing the company and optimizing the capital structure
 - Improving the performance of the company and transforming the business
- PE managers aim to purchase companies at attractive prices, optimize their capital structures, and then—with operational improvements, revenue growth, and/or other acquisitions—seek to sell the company at a higher price.
- Similar metrics can be used to evaluate both private and public companies, though public market analysts typically focus on company earnings and price-earnings ratios rather than EBITDA (earnings before interest, tax, depreciation, and amortization) and use EBITDA multiples as their proxy for cash flow.
- Cambridge Associates has now captured and analyzed current and historical data from global PE funds for eight consecutive years. This year's report includes data through the period ended December 31, 2018.
- Our analysis allows for the comparison of private and public companies across industry sectors and company sizes for various parts of the investment process. The data shed light on key levers and value drivers in private equity, as well as the risks and returns of private equity versus public equity.

Notes on the Data

- Cambridge Associates collected information from PE firms of all sizes with broad mandates, as well as specialized and sector-focused strategies. The sample of private investments includes more than 4,300 US-based companies acquired by PE firms from 2000 through 2018 and is subject to change over time. The companies in the universe range in enterprise value from less than \$1 million to larger than \$65 billion.
- Within the report, depending on the metric analyzed, the set of companies included will vary. This is due to the acquisition and disposition of companies during the period analyzed. Additionally, this reflects the impact of a statistical tool, an interquartile range, used to screen for outliers as part of each calculation. Lastly, restatements in company data that sometimes occur may lead to changes in historical metrics.
- Operating metrics data were collected directly from investment managers and have not been independently verified.
- Unless specified, the exhibits include unrealized and realized investments.
- For comparisons between the total company universe and public markets, the Russell 2500™ Index was selected based on the market capitalization of the underlying stocks. When breaking down companies by enterprise value, other Russell indexes with more appropriate market cap ranges have been used.
- Sector classifications are based on the Global Industry Classification Standard (GICS). GICS was developed and is the exclusive property and a service mark of MSCI Inc. and S&P Global Market Intelligence LLC and is licensed for use by Cambridge Associates. GICS sector classifications changed in late 2018 and this report reflects the new definitions.
- Individual company operating metrics (e.g., revenue and EBITDA) have not been adjusted for acquisitions.
- The analyzed holding period for some companies represented in the dataset is short, and thus EBITDA growth rates may be muted initially, as PE owners do not seek to maximize EBITDA in the first several years of ownership.
- Any company with a negative metric for EBITDA, net debt, or revenue was excluded from analysis using that metric.
- Company counts for each analysis reflect all submitted transactions, excluding outliers. We eliminate “duplicate” transactions completed by the same firm across funds in a given year. For “club” or syndicated deals that involve two or more separate firms, there are two or more companies in our universe.
- When the operating metrics information is disaggregated into deal type, enterprise value, and sectors, the sample sizes are smaller and may be biased by one or several data points. Time periods with fewer than 15 observations have been marked NA.
- Past results are not an indication of future results, provide no guarantee for the future, and will not be constant over time.

PURCHASE THE COMPANY AND OPTIMIZE CAPITAL STRUCTURE

- **EBITDA Purchase Price Multiple**
- Leverage Multiple

Key Valuation Metric: Purchase Price Multiple

- Amid an increasingly volatile public equity market and a forgiving debt market, the cycle of frothy valuations continued in 2018, and previous observations about the relationship between PE-backed and public company PPMs held steady.
- In 2018, public and private purchase price multiples (PPMs) moved in different directions, and **after maintaining a healthy discount to public companies from 2009 to 2017, PE and public valuations “converged” in 2018.**
- Private equity companies in aggregate transacted at the highest multiple of EBITDA seen in the time period analyzed, driven largely by growth equity deals as buyout pricing was virtually the same as in 2017.
- Looking at the distribution of **private equity PPMs by year shows a real shift in valuations beginning in 2013.** From 2007 to 2012, on average, 27% of PE transactions were priced at 10x EBITDA or more; from 2013 to 2018, that average rose to 51%. Similarly, the percentage of deals consummated at a greater than 15x EBITDA multiple has tripled (from 6% in 2013 to 19% in 2018).
- Universally, **IT has been a growing and notably more expensive segment** of public and private markets. Reflecting this trend, **half of the 2018 PE transactions in the 15x EBITDA range were IT deals** (but there was no deal type concentration).
- **Buyouts, the largest component of the PE universe analyzed, continued to trade more “cheaply” than public companies.**

Key Valuation Metric: Purchase Price Multiple (cont)

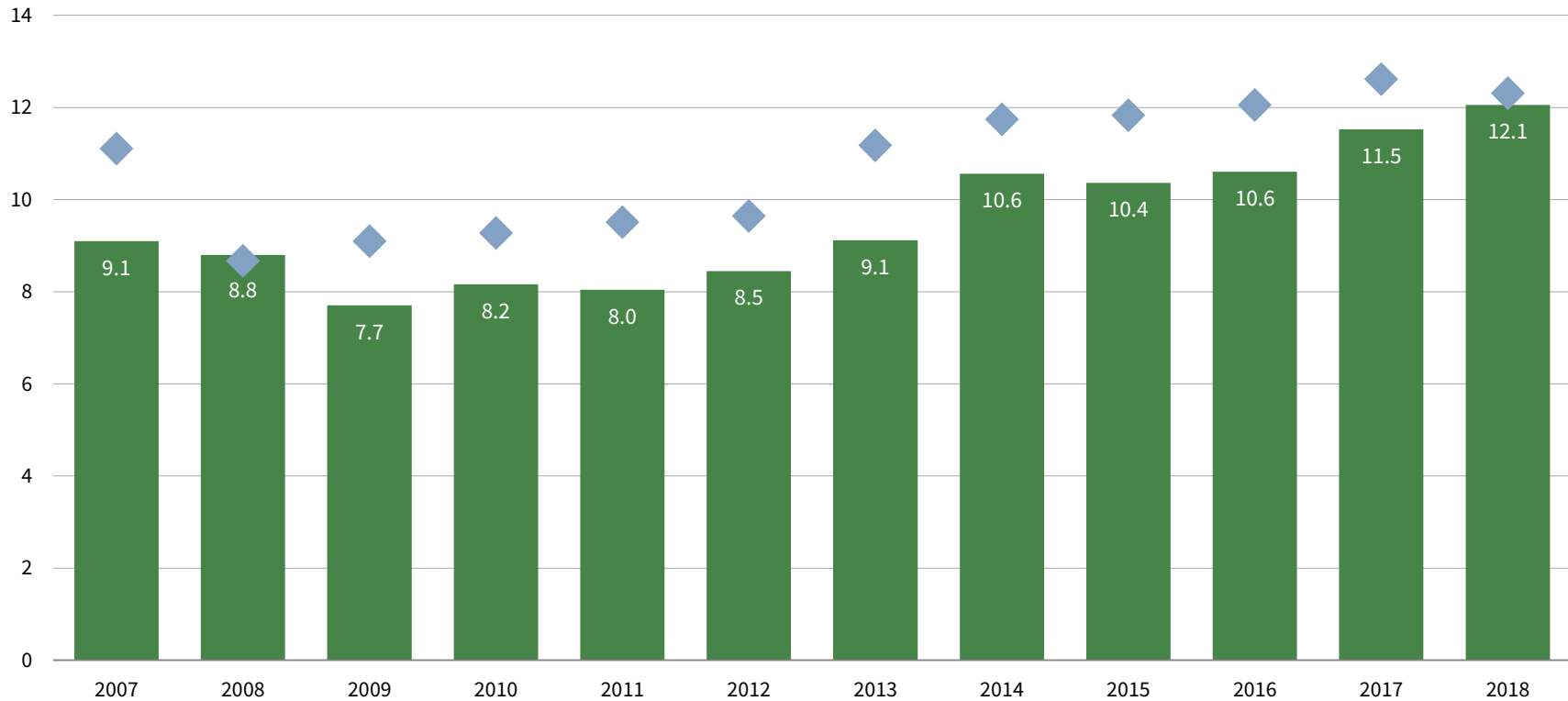
- The much smaller sample of **growth equity deals**, buoyed by IT valuations, **averaged PPMs of 20x** EBITDA in 2018. While high, it likely suggests a move to paying for expected growth and a shift away from the conventional private equity valuation metric of trailing 12-month EBITDA.
- **Revenue PPMs**, the more applicable valuation measure for IT and growth companies, **indicate that PE and public companies have been priced similarly over time**. When analyzed by deal type, growth equity PPMs have exceeded both buyouts and public companies. (All revenue PPM analyses can be found in the appendix.)
- Company size remained correlated with buyout EBITDA PPMs. Across time, **small buyouts have been the least pricey** among all buyouts, and the **only size range with a persistent discount to public companies**.
- Among the four key sectors in the buyouts sample, **healthcare has continued to be the only one to trade at meaningfully lower multiples than public counterparts**. And while 2018 GICS reclassifications had small impacts on the consumer discretionary and IT sectors' sample sizes, EBITDA PPMs were only marginally affected and the relationships between private and public did not change.

Private equity discount to publics fell to lowest level since 2008

Private and public valuations remain elevated

AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Enterprise Value/EBITDA



Number of Companies

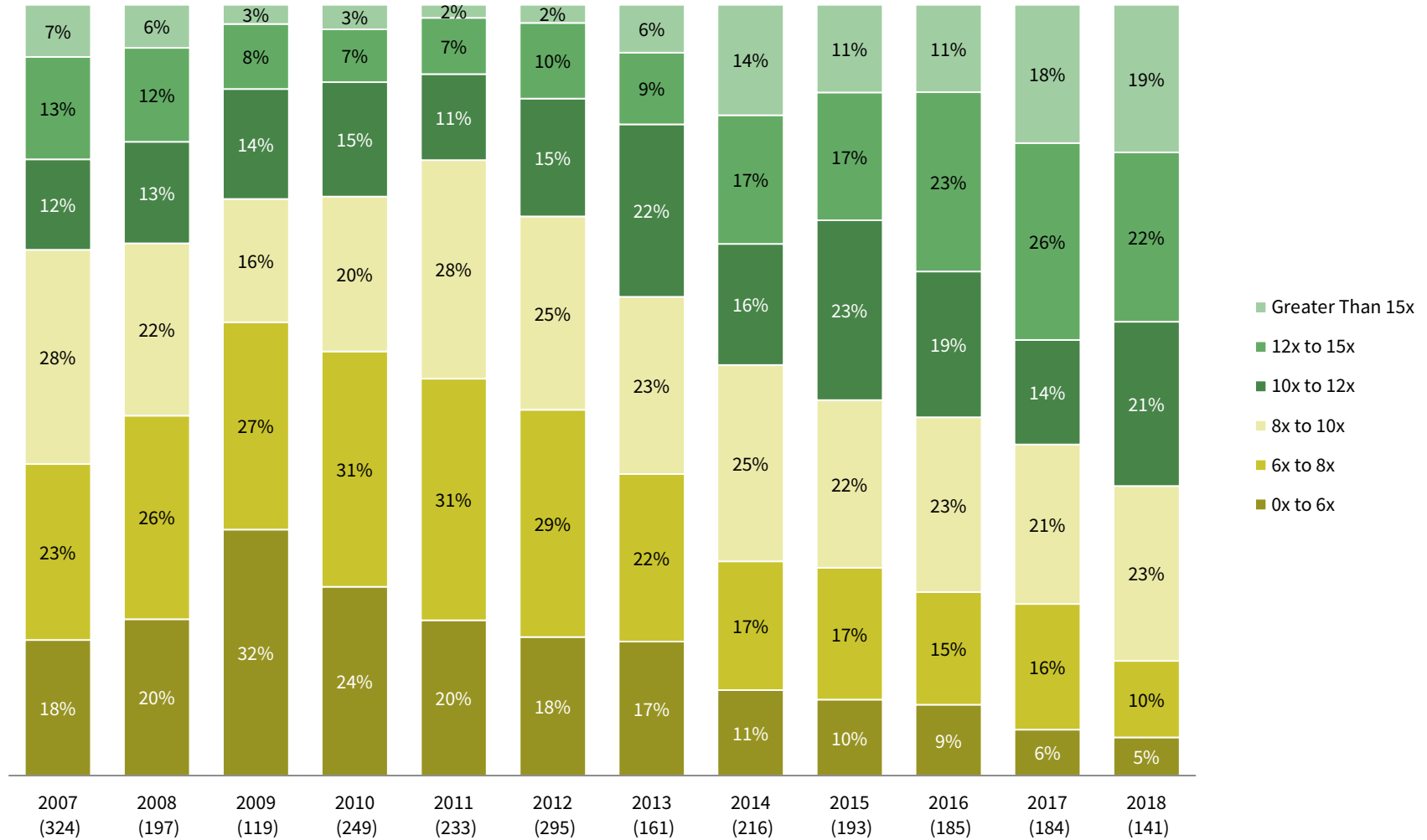
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	324	197	119	249	233	295	161	216	193	185	184	141
Russell 2500™ Index	1,492	1,519	1,597	1,646	1,613	1,653	1,637	1,657	1,639	1,619	1,604	1,581

In 2018, private equity valuations continued to trend higher

Distribution of PPMs has shifted steadily toward the expensive end since 2013

AVERAGE EBITDA PURCHASE PRICE MULTIPLE BREAKDOWN OF PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2018 • Enterprise Value/EBITDA



Growth equity commanded premium multiples

Buyout companies transacted at lower multiples than public companies in each year

AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF BUYOUT AND GROWTH EQUITY COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Enterprise Value/EBITDA



Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	228	138	80	177	167	226	111	160	148	138	129	97
Growth Equity Companies	59	41	26	54	39	52	39	45	33	41	43	29
Russell 2500™ Index	1,492	1,519	1,597	1,646	1,613	1,653	1,637	1,657	1,639	1,619	1,604	1,581

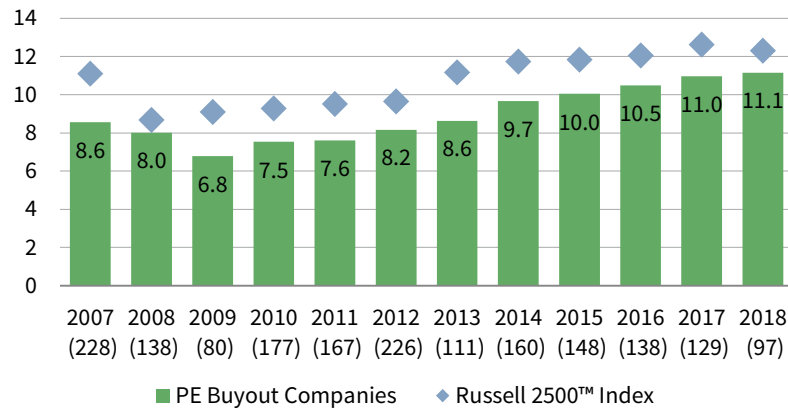
Buyout PPMs rise with size of company

Small buyouts are the most discounted compared to public peers

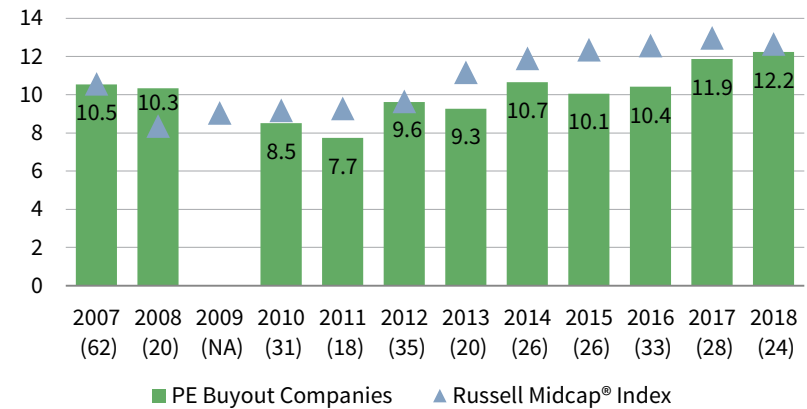
AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2018 • Enterprise Value/EBITDA

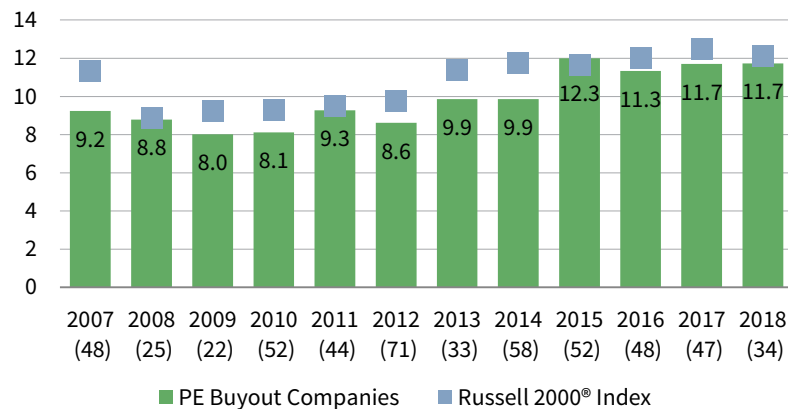
Total Universe



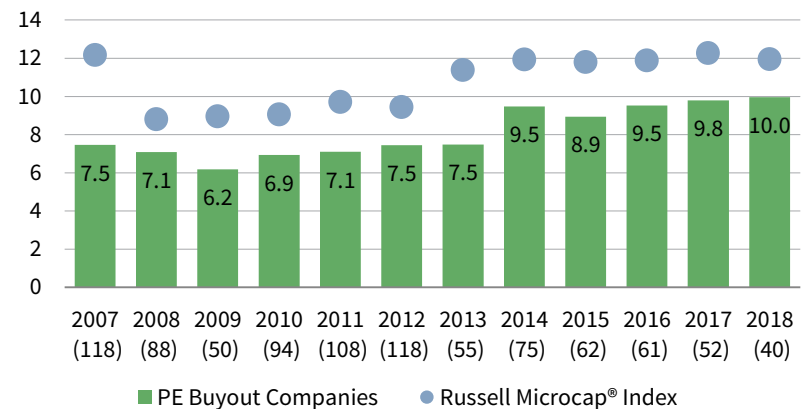
Enterprise Value > \$1B



Enterprise Value \$250M – \$1B



Enterprise Value < \$250M



Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Numbers in parentheses represent number of private equity-owned companies in each year.

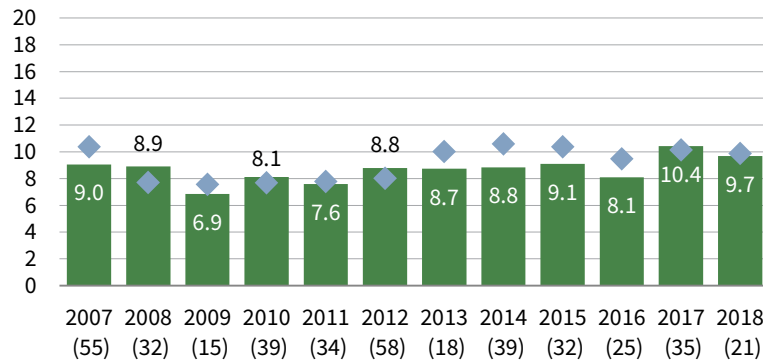
In a frothy market, IT and healthcare PPMs have been highest

In IT, private PPMs have been neck and neck with public valuations; in healthcare, private companies transacted at meaningfully lower multiples

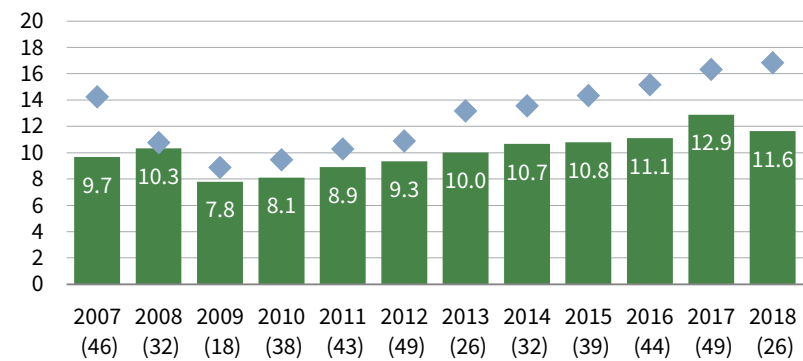
AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • Enterprise Value/EBITDA

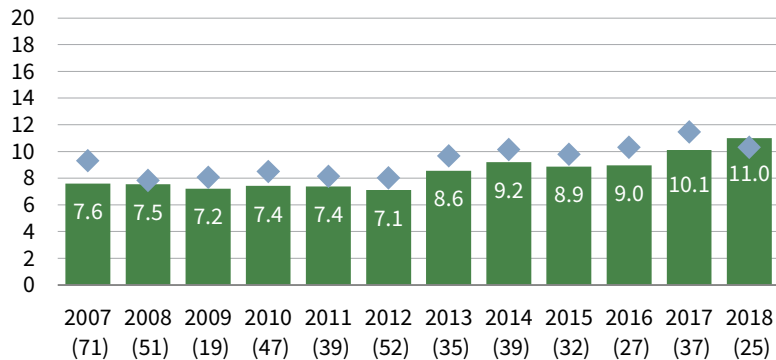
Consumer Discretionary



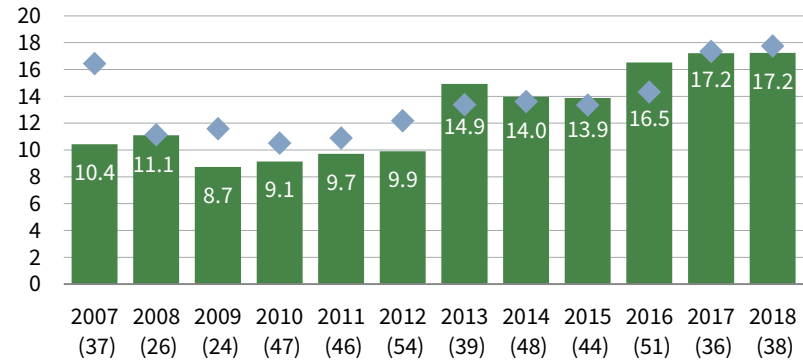
Healthcare



Industrials



Information Technology



■ Private Equity-Owned Companies

◆ Russell 2500™ Index

PURCHASE THE COMPANY AND OPTIMIZE CAPITAL STRUCTURE

- EBITDA Purchase Price Multiple
- **Leverage Multiple**

Key Capital Structure Metric: Leverage Multiple

- From a total universe perspective, **PE-owned companies have historically been more highly levered than public counterparts** and that trend continued into 2018.
- Leverage levels have risen gradually since 2013, driven mostly by buyout transactions, which are the predominant deal type in the PE universe. Low rates and permissive credit markets have contributed to the increased use of leverage.
- While leverage multiples have averaged north of 4x EBITDA since 2013, the distribution of multiples has changed within the sample. For instance, **at least 30% of 2017 and 2018's PE transactions involved leverage multiples of 6x EBITDA or more**; the average over the prior four years was 24%.
- There have also been shifts in the lower leverage ranges. From 2012 to 2016, an average of 42% of deals were transacted with leverage multiples of 0 to 4x EBITDA; in 2017 and 2018, that average fell to 32%.
- **Buyout company leverage multiples** rose from 2010 to 2018, **eclipsing 5x EBITDA in 2017 and 2018**. Growth equity companies have employed leverage levels similar to or lower than public ones since 2007.
- In aggregate, **leverage levels have increased less than purchase prices, reflecting increased equity contributions**. PE funds have more equity at risk in the current vintage of deals.

Key Capital Structure Metric: Leverage Multiple (cont)

- Company size is a contributor to leverage usage; **the larger the company, the larger the leverage multiple**. The largest buyouts continued to be significantly more levered than similarly sized public companies and small- and mid-sized buyouts.
- **Large buyout leverage multiples rose nearly a full turn from 2016 to 2018, but still trailed the 2007 peak** of 7.0x EBITDA; small buyout leverage multiples were at their highest in 2018 (at 4.2x), but trailed mid-sized companies by a full turn and large by 2.5 turns.
- From 2007 to 2018, **in each of the four large sectors, private company leverage multiples at acquisition averaged at least 4.1x EBITDA** (ranging from 4.1x for industrial companies to 4.3x for consumer discretionary). **Public companies** during that time **employed much less leverage** (with average multiples ranging from 1.7x for IT to 2.8x for consumer discretionary).
- Private company leverage trends within the sectors have varied, though. For example, **IT and industrial company leverage usage hit new heights in 2018**, whereas consumer discretionary leverage peaked in 2007 and by 2018, the multiple had dropped to a level not seen since 2010.
- In the other major sector, **healthcare**, over the full time period analyzed, the private company **leverage multiple peaked at 5.4x EBITDA in 2017** and over the last five years (2014–18), leverage at acquisition averaged 4.8x EBITDA.

Private equity leverage levels have crept up

Leverage in public universe decreased slightly from 2015 to 2018

AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Net Debt/EBITDA



Number of Companies

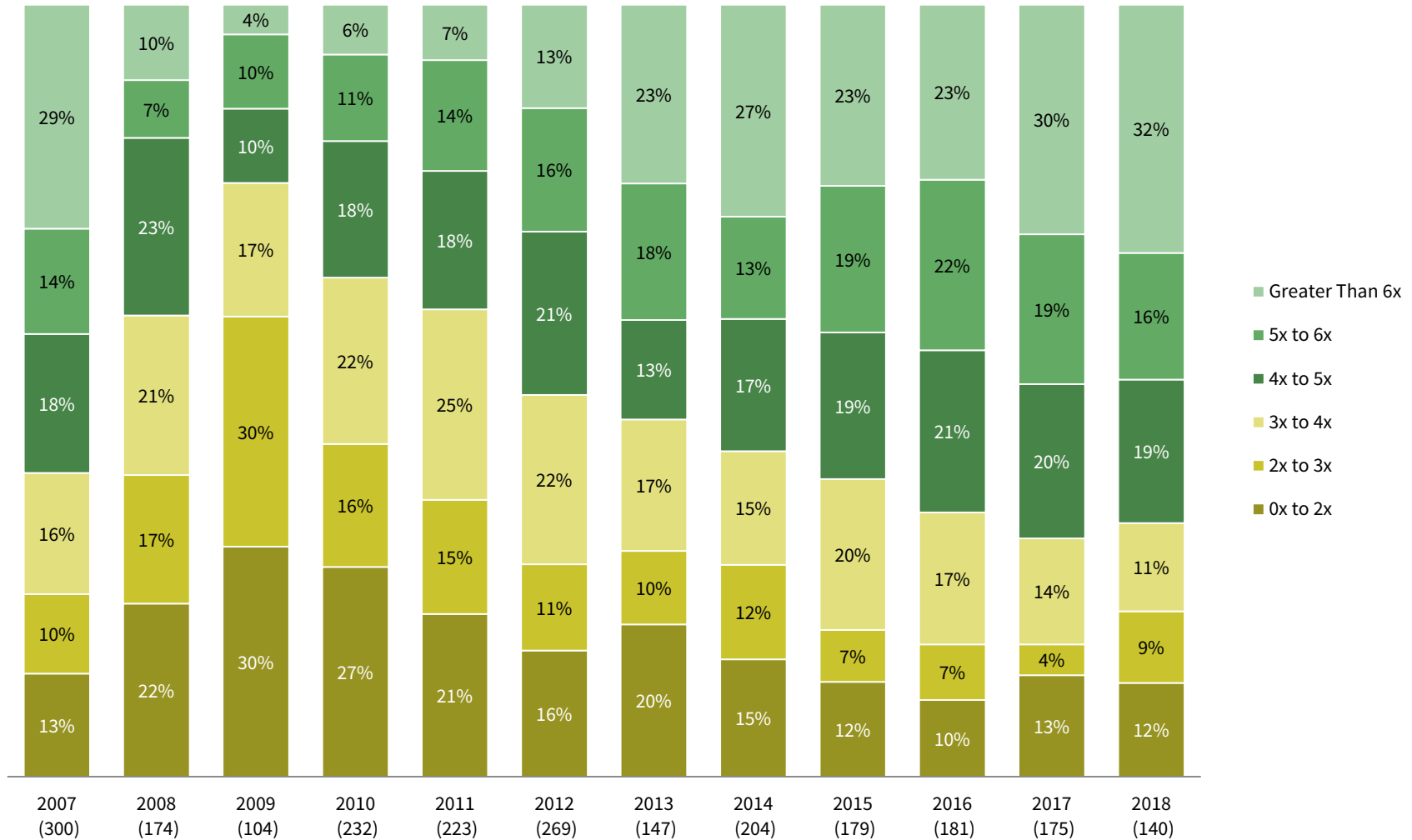
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	300	174	104	232	223	269	147	204	179	181	175	140
Russell 2500™ Index	955	996	1,022	1,028	1,037	1,125	1,144	1,190	1,228	1,221	1,241	1,237

Since 2013, the majority of deals have been levered at least 4x EBITDA

By 2017, nearly a third of deals were levered at 6x or more

AVERAGE LEVERAGE MULTIPLE BREAKDOWN OF PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2018 • Net Debt/EBITDA



Higher leverage observed in buyouts in recent vintages are comparable to 2007's pre-recession buyouts

On average, growth equity and public company multiples have been roughly equal since 2007

AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF BUYOUT AND GROWTH EQUITY COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Net Debt/EBITDA



Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	227	126	70	174	173	222	111	158	136	142	129	96
Growth Equity Companies	39	28	21	39	26	31	27	35	22	27	31	24
Russell 2500™ Index	955	996	1,022	1,028	1,037	1,125	1,144	1,190	1,228	1,221	1,241	1,237

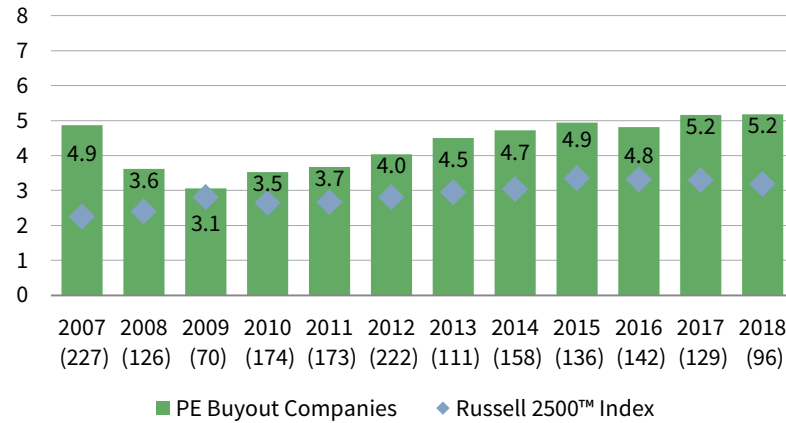
For buyout companies, size and leverage are positively correlated

The reverse is true for public companies

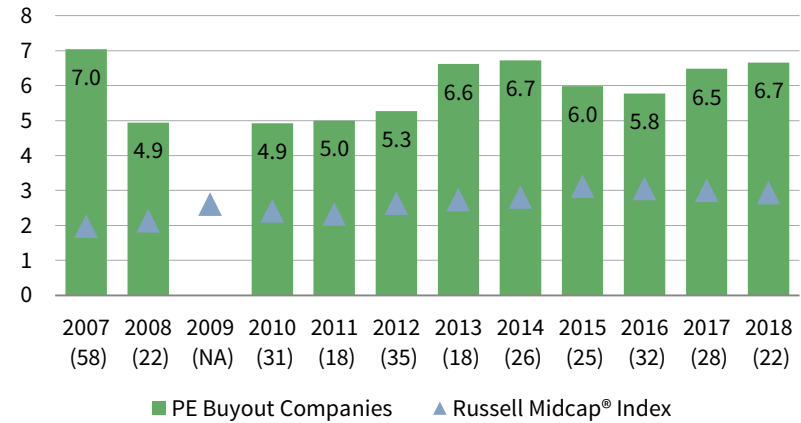
AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2018 • Net Debt/EBITDA

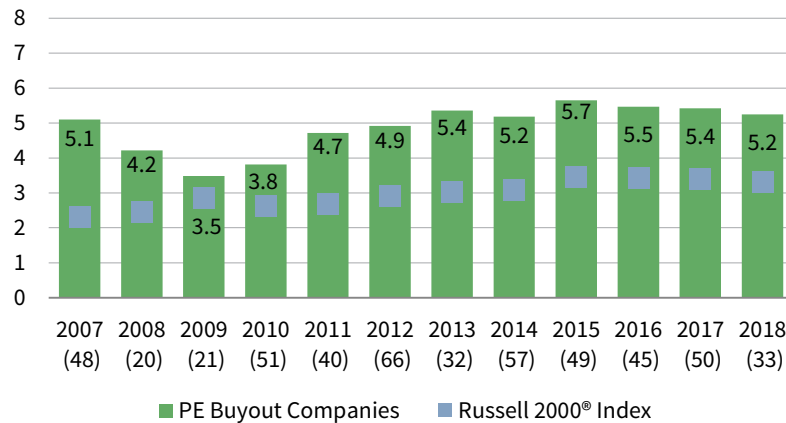
Total Universe



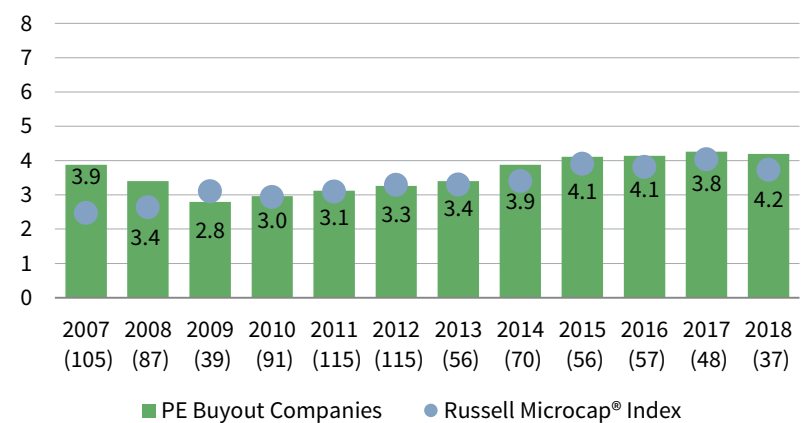
Enterprise Value > \$1B



Enterprise Value \$250M – \$1B



Enterprise Value < \$250M



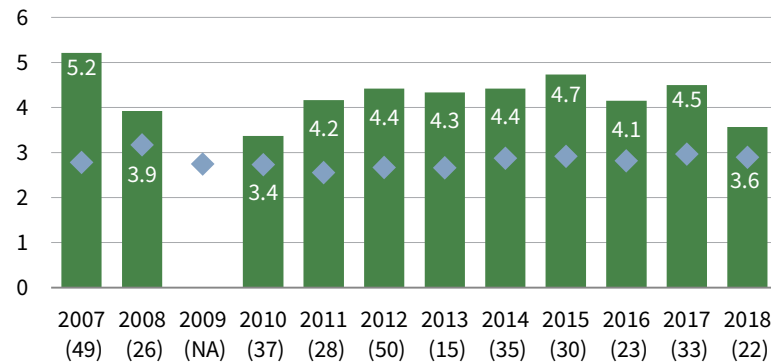
Industrial and IT leverage hit new heights in 2018

2017 healthcare leverage remained highest observed for any sector across time period

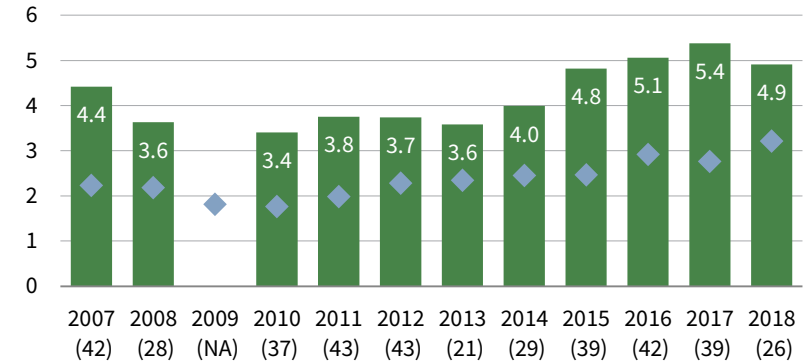
AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • Net Debt/EBITDA

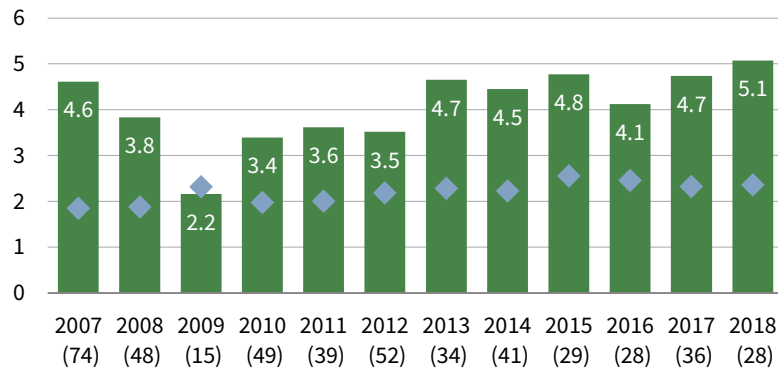
Consumer Discretionary



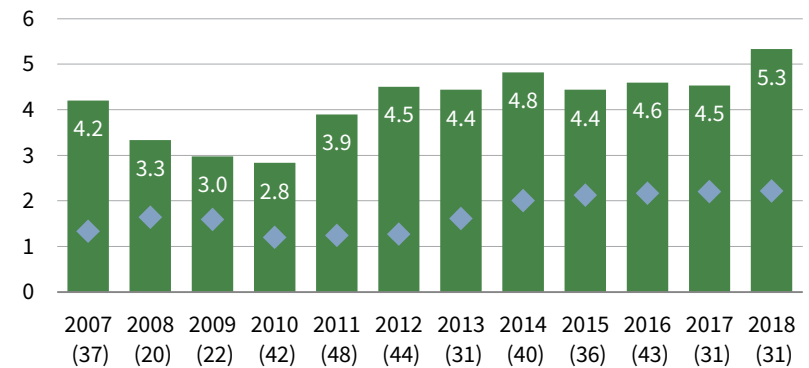
Healthcare



Industrials



Information Technology



■ Private Equity-Owned Companies ◆ Russell 2500™ Index

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

- **Revenue Growth**
- EBITDA Growth
- EBITDA Margin
- Exit Metrics

Key Company Performance Metric: Revenue Growth

- PE-owned companies maintained their sizable edge over public market peers based on annual revenue growth; outperformance for the analyzed period reached a new height in 2018.
- When looking at the distribution of annual revenue growth rates, 2009 is a clear outlier. In all other years, at least 35% of PE companies grew revenue by at least 10%. And while the proportion of private companies with flat to growing revenue has stayed constant, in 2017 and 2018, there was a discernible uptick in the percentage of PE-backed companies with annual revenue growth north of 30%.
- Consistent with that trend, growth equity companies grew revenue at their fastest rates in 2017 and 2018, bringing their average annual growth to 17.7% from 2008 to 2018. Over that same time period, buyouts and public companies averaged growth of 7.2% and 5.7%, respectively.
- As with other metrics, whether public or private, revenue growth varies with the size of the company. Among buyouts, from 2008 to 2018, the smallest companies produced the highest average annual revenue growth at 9.3%, compared with 6.4% and 3.7% for mid-sized and large buyout brethren, respectively.
- Small buyouts were the only PE-backed companies to meaningfully outperform similarly sized public peers (9.3% to 5.0%) over the 11-year period. Other buyout size ranges saw revenue growth comparable to public companies, with mid-sized buyouts outperforming by 0.3% (averaging 6.4% to 6.1%) and large buyouts on average underperforming by 0.5% (3.7% to 4.2%).

Key Company Performance Metric: Revenue Growth (cont)

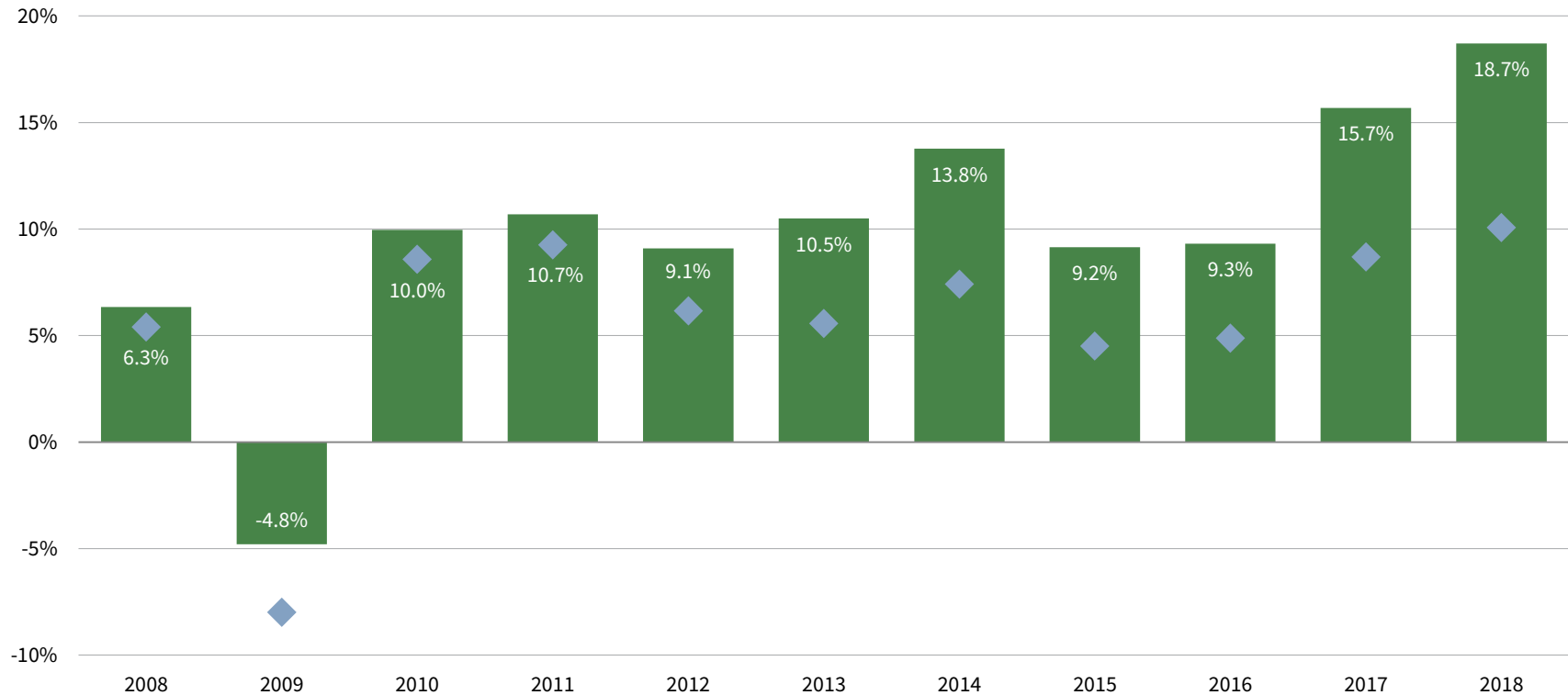
- **Within private equity's key sectors, PE-owned company revenue growth has outpaced that of publics, on average. The private company advantage is largest in the IT sector and smallest in consumer discretionary.**
- **Among private equity-backed businesses, IT (14.3%) and healthcare (13.9%) companies increased revenue nearly twice as fast as industrials (7.2%) and consumer discretionary (6.2%).**

Private equity companies grew revenue faster than publics in each year

Revenue growth has averaged almost 12% since the 2009 recession

AVERAGE ANNUAL REVENUE GROWTH OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)



Number of Companies

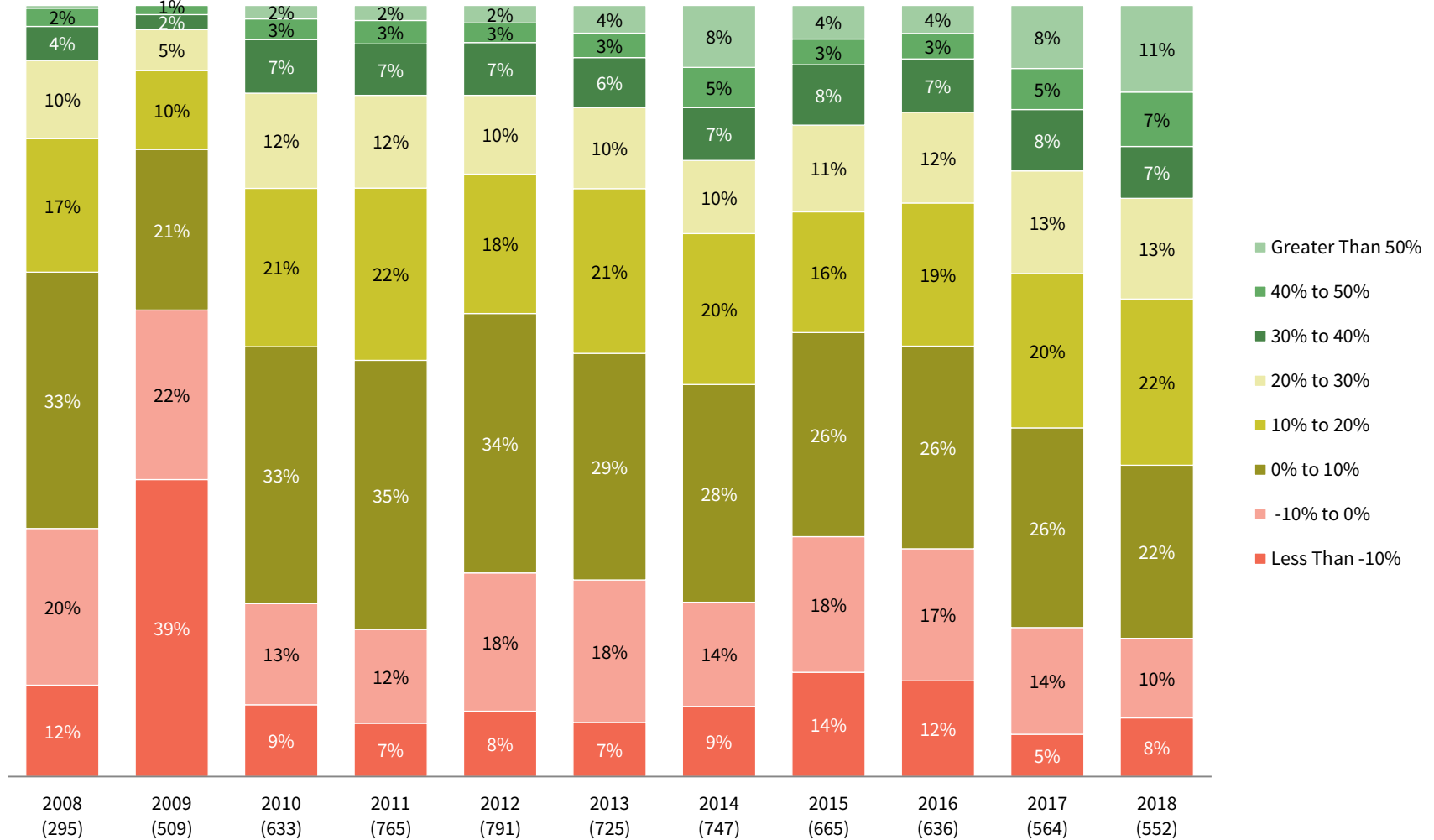
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	295	509	633	765	791	725	747	665	636	564	552
Russell 2500™ Index	2,026	2,020	2,086	2,070	2,061	2,033	2,039	2,036	2,005	1,976	1,999

On average, nearly 45% of PE companies grew revenue by at least 10% per annum

And ~25% saw revenue decline

AVERAGE ANNUAL REVENUE GROWTH BREAKDOWN OF PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)

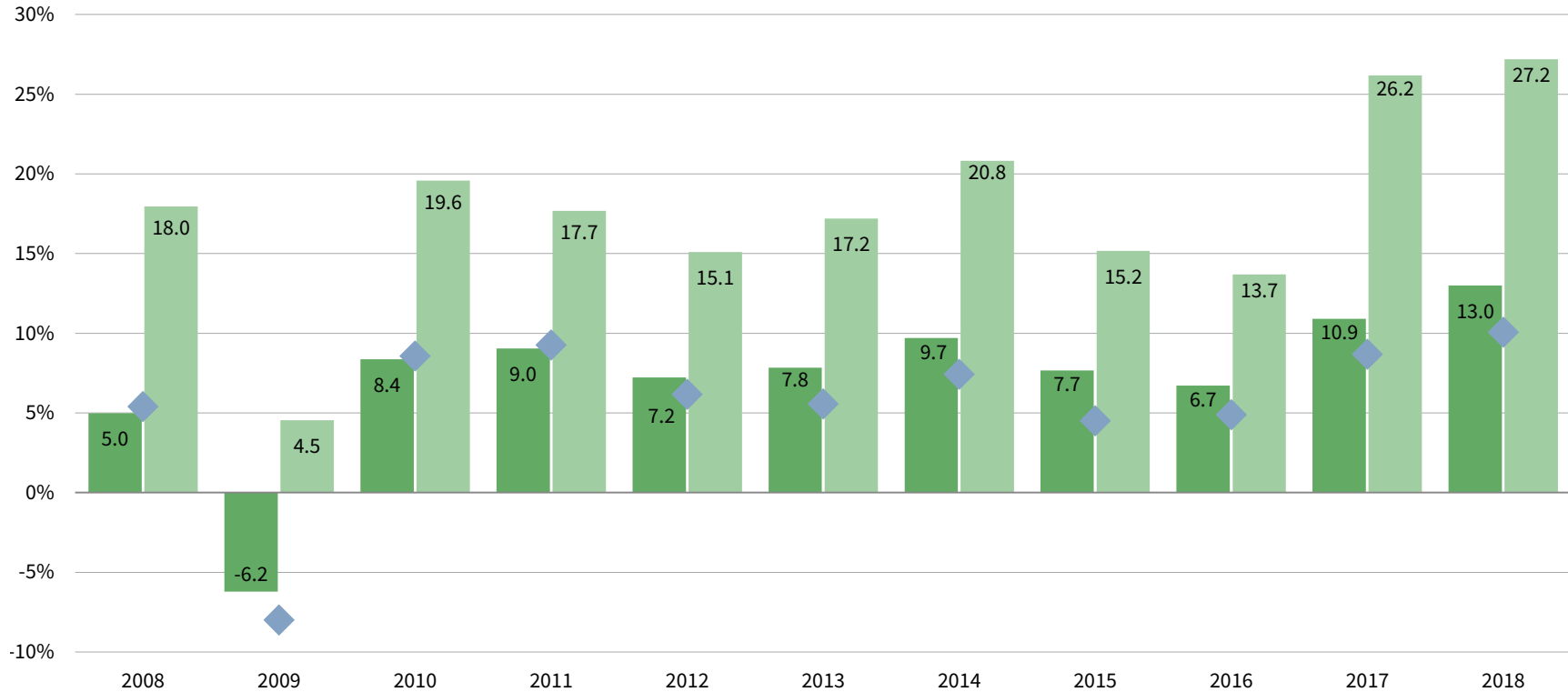


Revenue growth hit new heights for all market segments in 2018

Growth equity's increase has been particularly dramatic

AVERAGE ANNUAL REVENUE GROWTH OF BUYOUT AND GROWTH EQUITY COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)



Number of Companies

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	241	388	459	538	509	421	431	332	350	305	299
Growth Equity Companies	47	89	137	172	201	235	241	250	228	199	224
Russell 2500™ Index	2,026	2,020	2,086	2,070	2,061	2,033	2,039	2,036	2,005	1,976	1,999

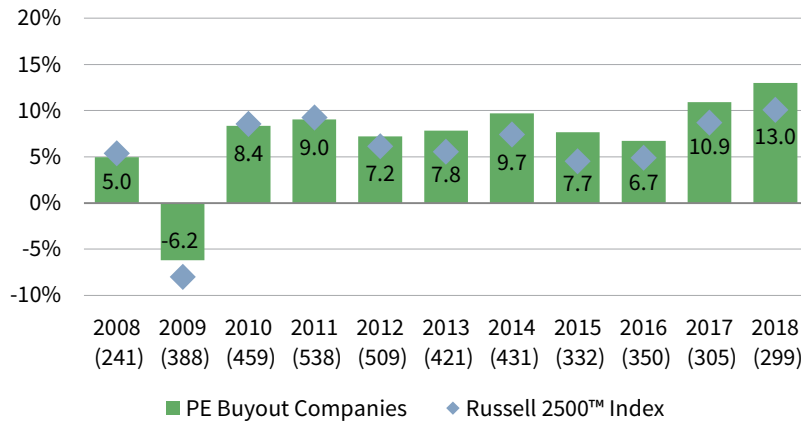
In all but two years, small buyout revenue growth exceeded all others

Large buyouts were the only size segment to underperform publics over the time period

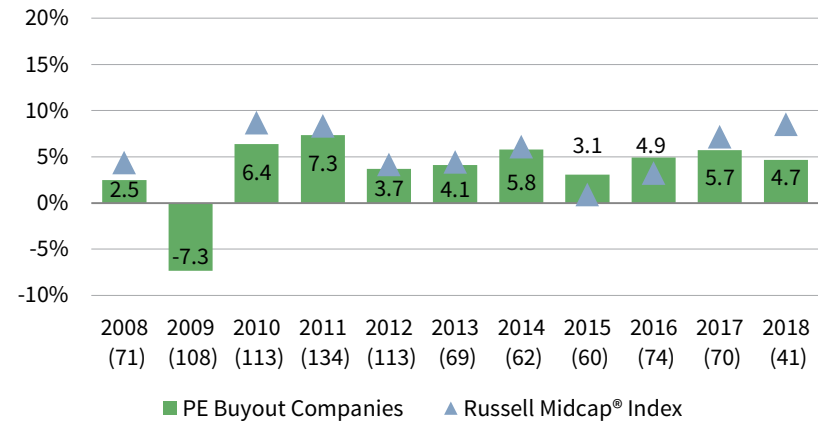
AVERAGE ANNUAL REVENUE GROWTH OF PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2018 • Annual Growth Rate (%)

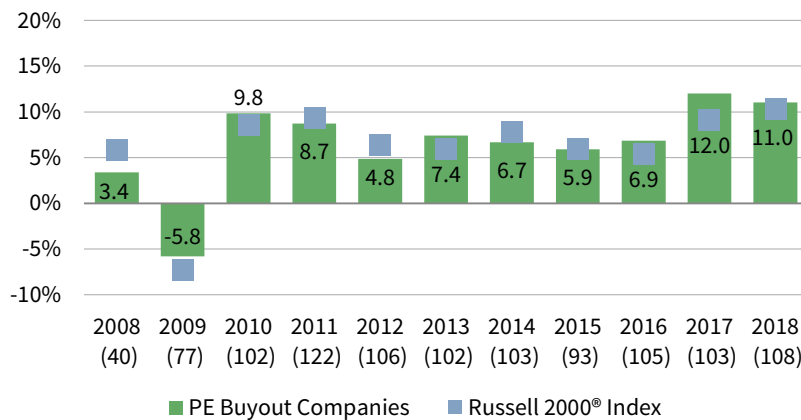
Total Universe



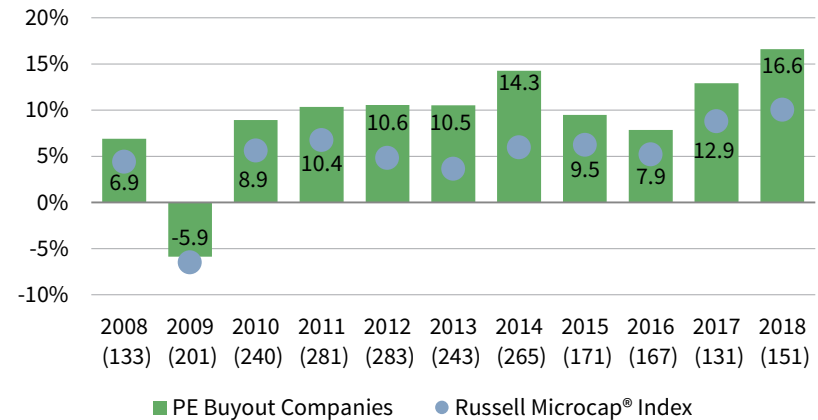
EV > \$1B



EV \$250M – \$1B



EV < \$250M



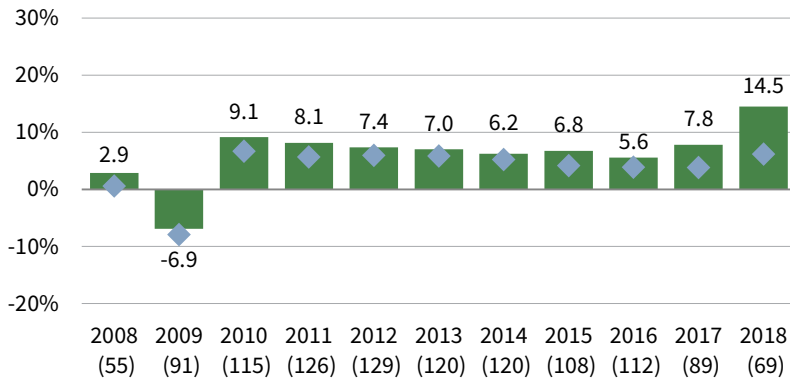
Across all sectors, PE company revenue growth surpasses that of public peers

Private IT and healthcare had strongest revenue growth

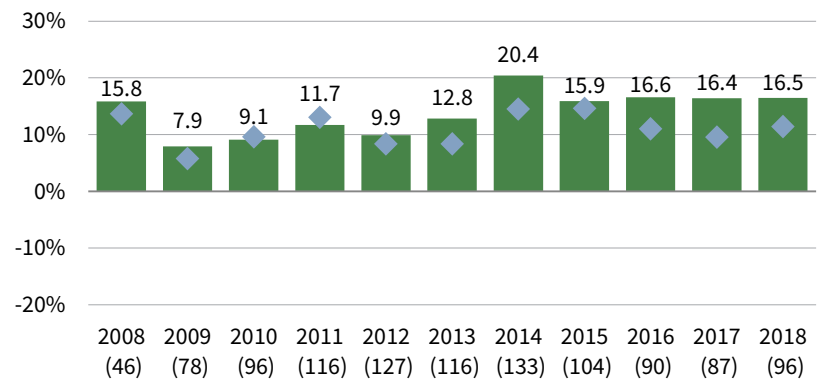
AVERAGE ANNUAL REVENUE GROWTH OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • Annual Growth Rate (%)

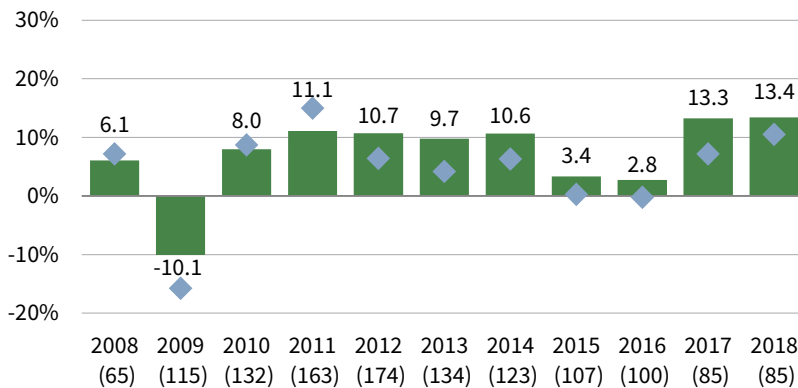
Consumer Discretionary



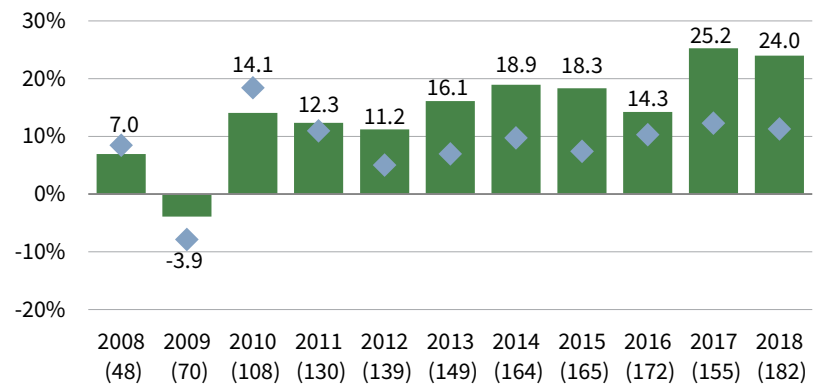
Healthcare



Industrials



Information Technology



■ Private Equity-Owned Companies

◆ Russell 2500™ Index

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

- Revenue Growth
- **EBITDA Growth**
- EBITDA Margin
- Exit Metrics

Key Company Performance Metric: EBITDA Growth

- As of 2018, PE companies maintained their “lead” over public companies, growing EBITDA at an average rate of 7.9%, versus 6.6% for public market companies.
- Private company outperformance has been more pronounced in the last five years, when they averaged 9.3% annual EBITDA growth and public companies averaged 7.0%; similar to revenue, PE company EBITDA growth hit new heights in 2018.
- Notwithstanding strong overall growth within the PE universe, in every year, EBITDA declined in at least 25% of the companies. Driving that growth are the at least 15% of companies increasing EBITDA by 30% or more. These distributions are in line with what is observed in the public markets.
- By company type, since 2008, growth equity has outperformed buyouts and public companies, with average annual EBITDA growth of 12.0% compared to 7.3% and 6.6% for the other two, respectively.
- Buyout average annual EBITDA growth over the last five years (9.5%) has been considerably stronger than over the longer time period.
- Among buyouts, the small and mid-sized company segments generated similar EBITDA growth from 2008 to 2018 (8.1% and 7.8%, respectively). Both sizes produced particularly strong growth from 2014 to 2018, averaging at least 10.0% for the period.
- Over the last five years, small buyouts bested their public counterparts, the Russell Microcap® Index, by 310 bps. Likewise, mid-sized buyouts outperformed the Russell 2000® Index, but by a smaller margin (220 bps).

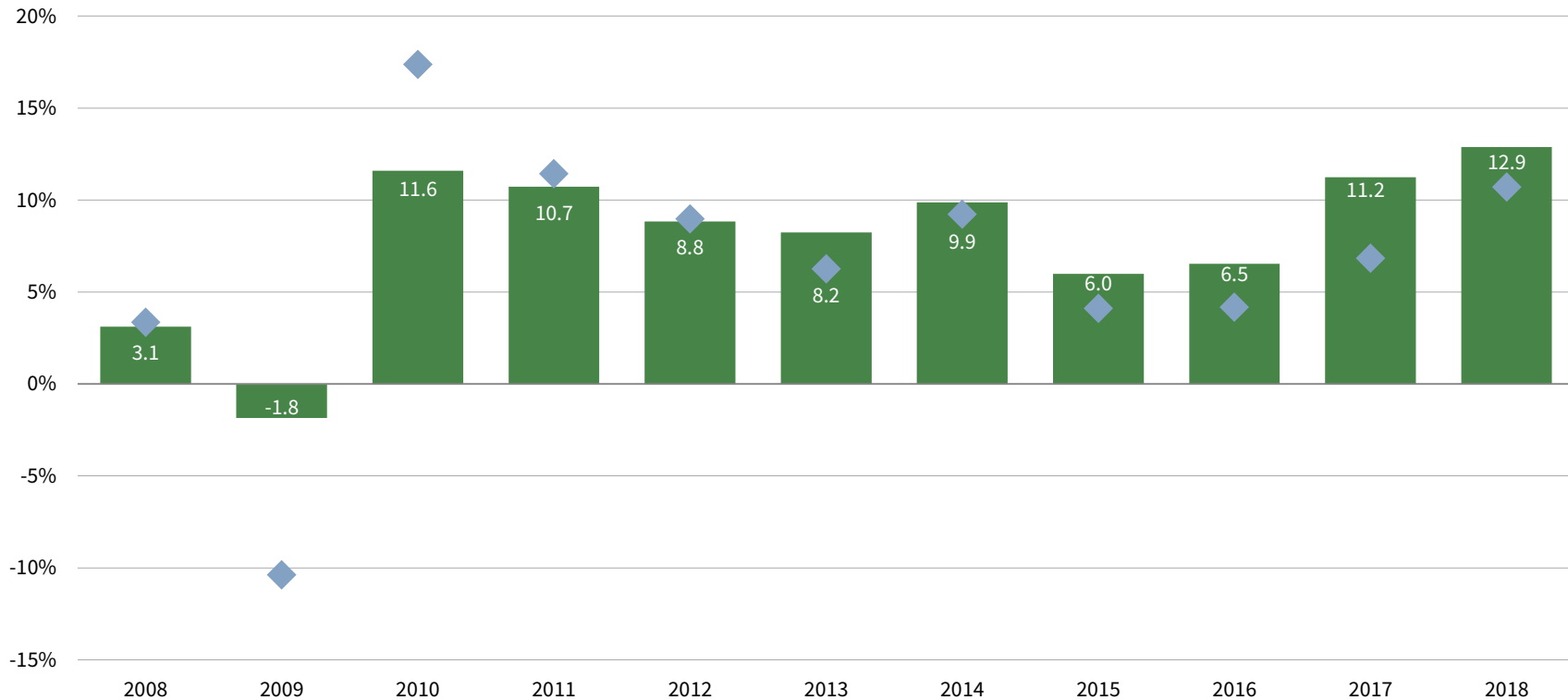
Key Company Performance Metric: EBITDA Growth (cont)

- **Large buyout company EBITDA growth** fell short of those for the two smaller size segments, however, it **did outpace** the average growth achieved by its **public market counterpart**, the Russell Midcap® Index.
- **EBITDA growth has varied by sector** and in both the private and public universes, healthcare and consumer discretionary companies exhibited the best and the worst EBITDA growth, respectively, over the 11 years analyzed.
- **Private healthcare companies** are the only ones among the major sectors to **substantially outperform public peers** (their advantage since 2014 was more than 700 bps). PE-backed consumer discretionary companies have struggled to keep pace with their public counterparts.
- During the 11-year period, **IT company EBITDA growth** has been somewhat volatile, **strong from 2010 to 2013 and then again from 2016 to 2018**, when it reached new levels. **The only years private IT companies trailed public peers were 2010 and 2014.**
- Historically, private and public company EBITDA growth in the industrial sector averaged 6.9% and 5.9%, respectively. Low growth in 2015 and 2016, likely related to commodity-related businesses, brought down the average for the period.
- Notwithstanding the generally positive comparisons to public markets noted above (i.e., private company EBITDA growth has been strong relative to public), **it's notable that the dramatic revenue growth outperformance has not translated to similar EBITDA growth comparisons.**

PE-owned companies had roughly equal or better EBITDA growth than their public counterparts since 2012

AVERAGE ANNUAL EBITDA GROWTH OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)



Number of Companies

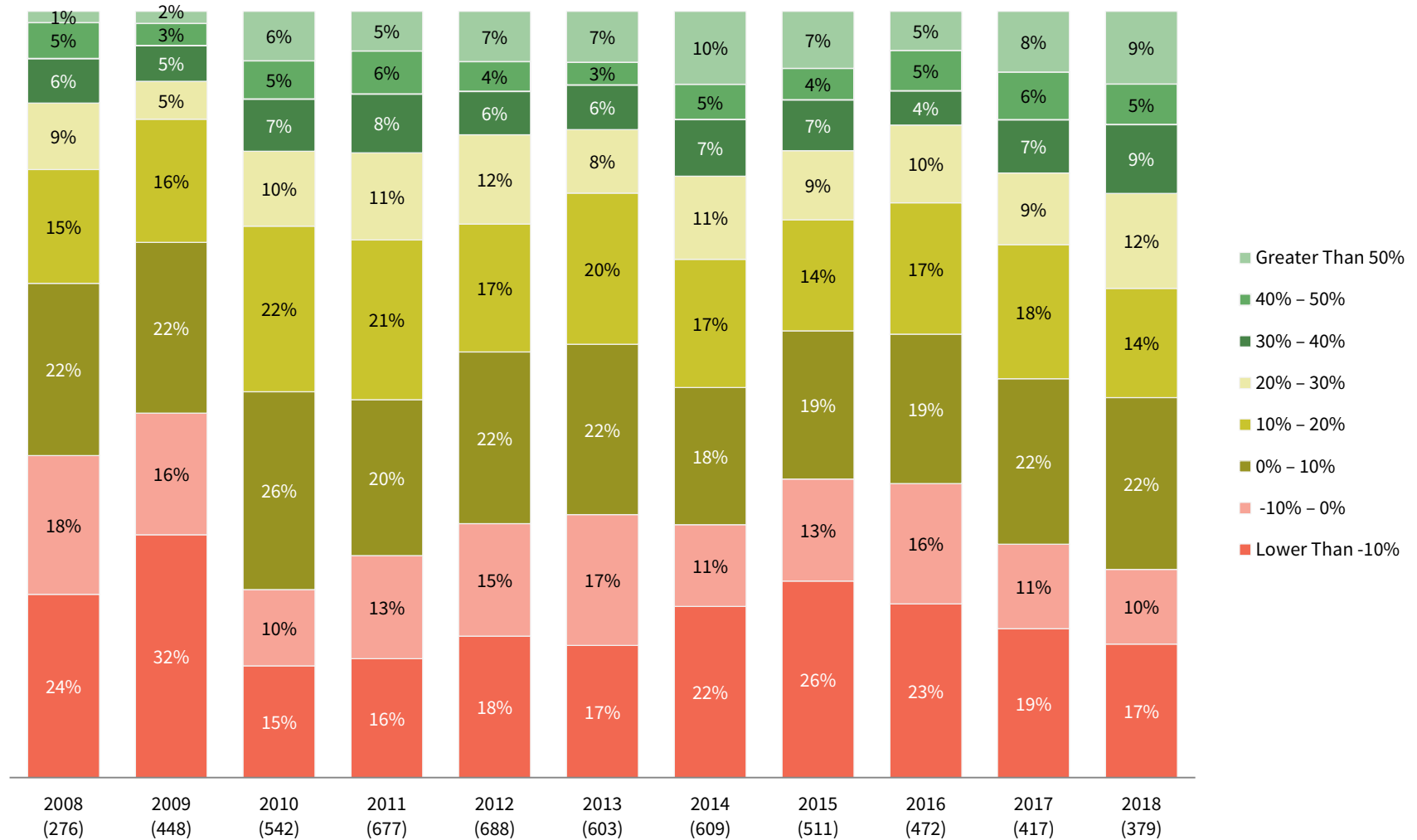
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	276	448	542	677	688	603	609	511	472	417	379
Russell 2500™ Index	1,313	1,290	1,418	1,488	1,480	1,472	1,451	1,436	1,407	1,401	1,397

In any given year, EBITDA declines for 25% or more of PE-owned companies

Conversely, EBITDA grows at least 10% for 30% or more of the universe

AVERAGE ANNUAL EBITDA GROWTH BREAKDOWN OF PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)

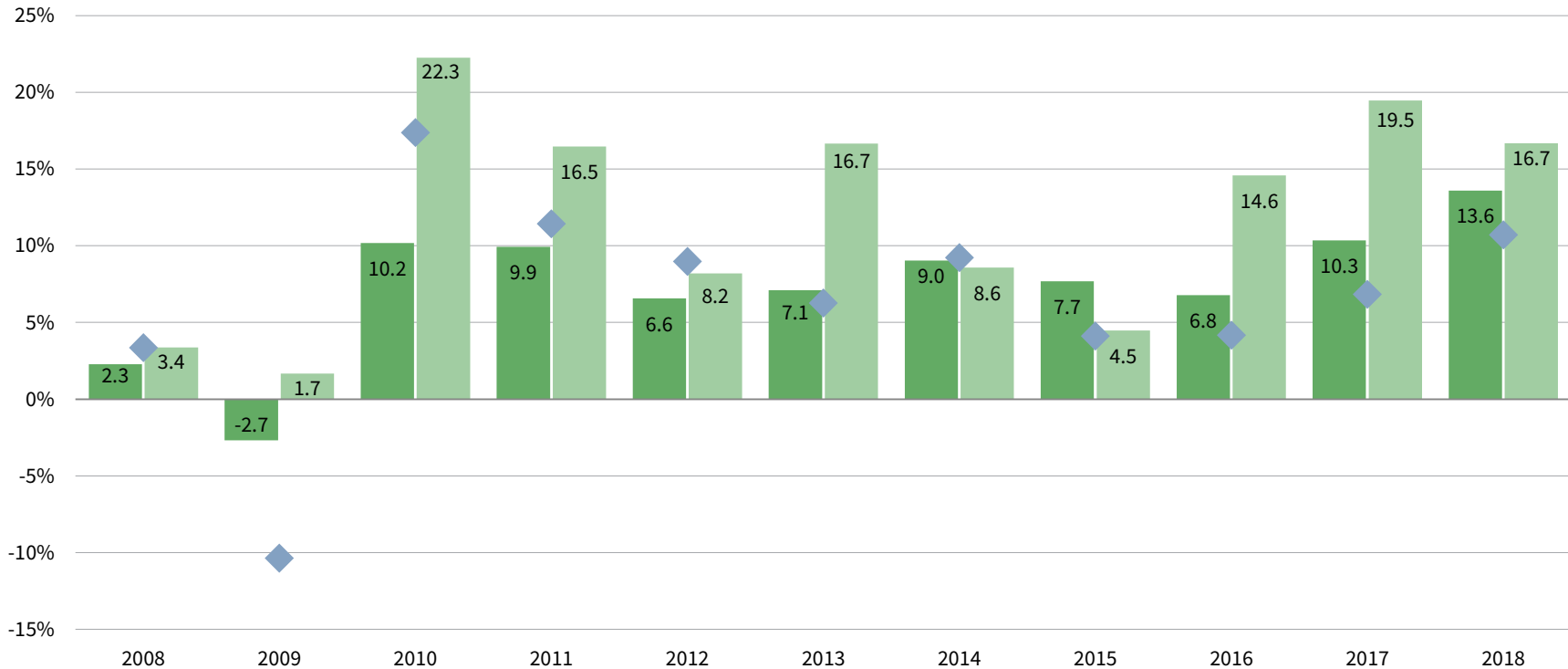


In five of the last six years, buyout and growth equity companies outperformed public ones

Over the full period, growth equity companies grew EBITDA annually by 5.4% more than publics, on average

AVERAGE ANNUAL EBITDA GROWTH OF BUYOUT AND GROWTH EQUITY COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Annual Growth Rate (%)



Number of Companies

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	232	359	403	506	482	402	415	317	310	288	273
Growth Equity Companies	32	61	104	133	145	148	146	134	112	92	96
Russell 2500™ Index	1,313	1,290	1,418	1,488	1,480	1,472	1,451	1,436	1,407	1,401	1,397

Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Private equity-owned companies were identified by the manager's strategy.

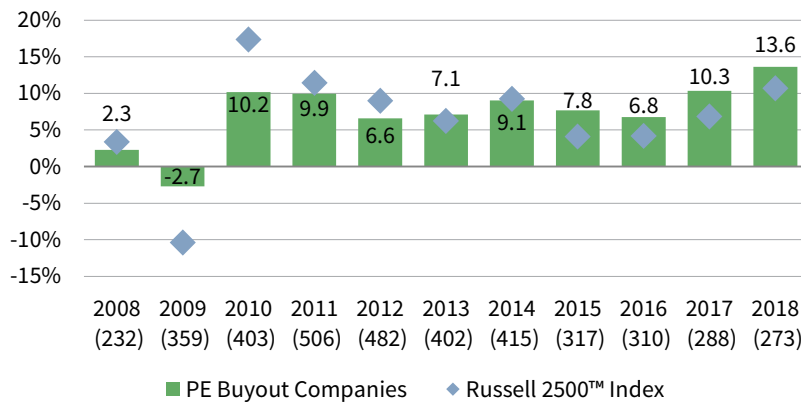
All buyout size segments bested their respective public peers over the period

Growth in the middle market and lower middle market size segments demonstrated a strong trajectory over the last three years

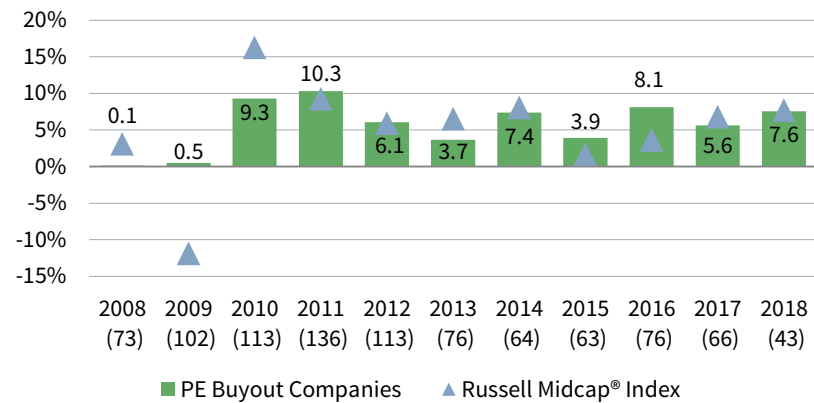
AVERAGE ANNUAL EBITDA GROWTH OF PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2018 • Annual Growth Rate (%)

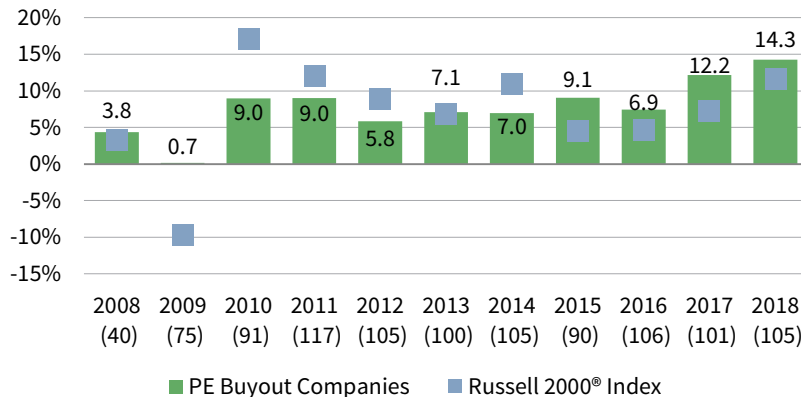
Total Universe



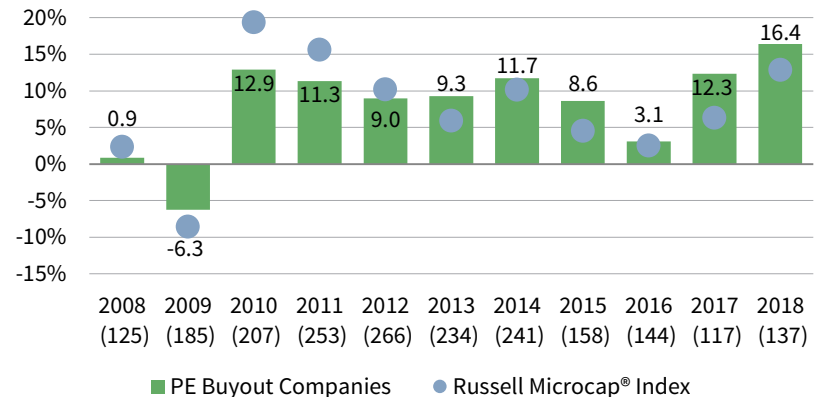
Enterprise Value > \$1B



Enterprise Value \$250M – \$1B



Enterprise Value < \$250M



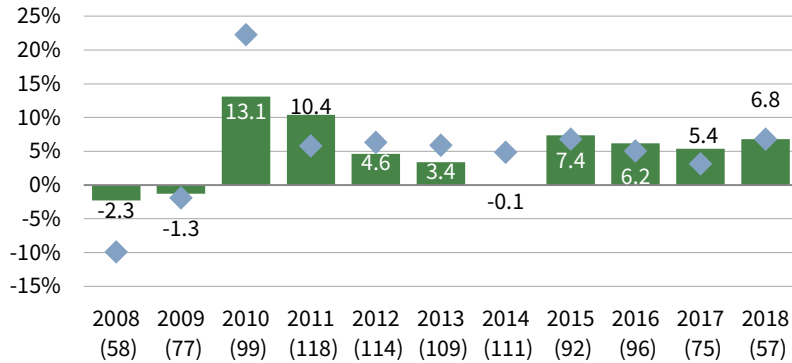
Healthcare EBITDA growth best by far; IT steadily increased since 2014, and reached a new high in 2018

Industrial businesses struggled in the 2015–16 period, likely due to commodity exposures

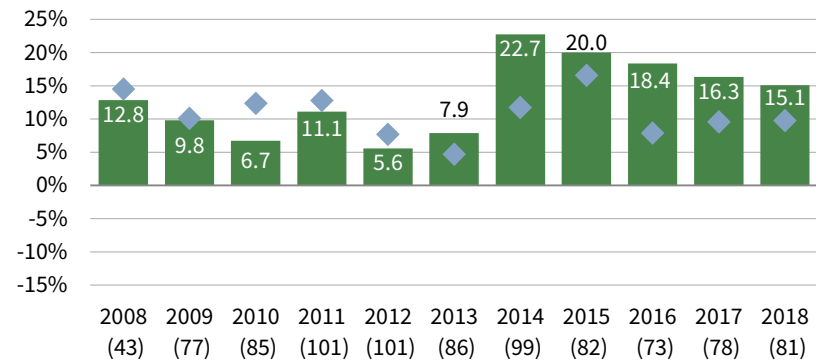
AVERAGE ANNUAL EBITDA GROWTH OF PRIVATE EQUITY–OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • Annual Growth Rate (%)

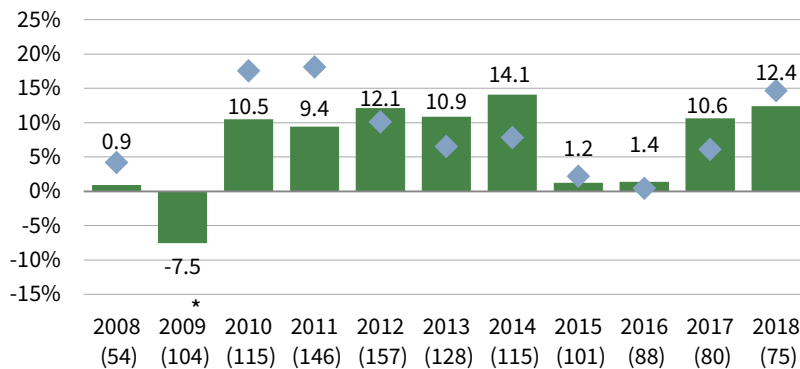
Consumer Discretionary



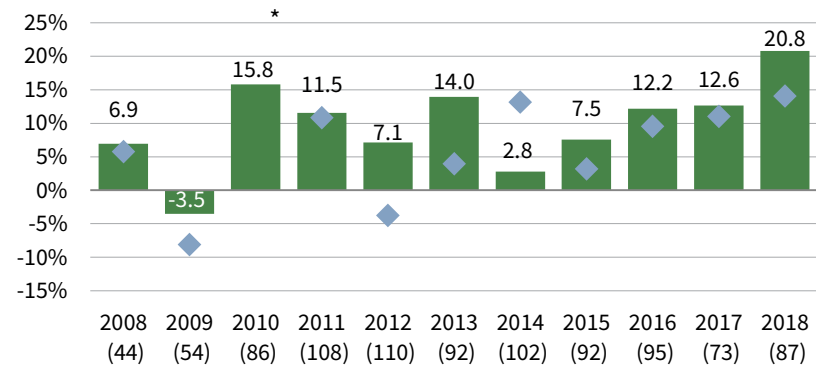
Healthcare



Industrials



Information Technology



■ Private Equity–Owned Companies ◆ Russell 2500™ Index

* Axis has been capped at -15% and 25% for scaling purposes. Industrials in the Russell 2500™ saw EBITDA growth of -23.5% in 2009; IT companies in the Russell 2500™ saw EBITDA growth of 35.5% in 2010.

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

- Revenue Growth
- EBITDA Growth
- **EBITDA Margin**
- Exit Metrics

Key Company Performance Metric: EBITDA Margin

- **PE-owned companies operated at higher EBITDA margin levels than publics from 2007 to 2018;** outperformance has decreased over time as public company margins have improved and private ones have stayed constant. From 2007 to 2013, PE-owned companies averaged nearly 400 bps higher margins than public companies; over the last five years, on average, PE-owned company margins were only 160 bps higher.
- **Analyzing private company margin distributions illustrates the consistency of operations over time;** and the lack of variability within the margin “buckets.” Among public companies, a higher average proportion of companies (about a third) have margins that are less than 10%.
- Over the 12-year period analyzed, the relationship between buyout and growth equity margins has shifted. **From 2007 to 2013, buyout company EBITDA margins trailed those of growth equity companies** by an average of almost 400 bps. **Over the last five years (2014 to 2018), buyout margins were higher** and public company margins were nearly equal to growth equity.
- As with other metrics, such as leverage multiples, **size and margins appear to be positively correlated. Large companies, whether private or public, had the highest margins.** Over the past four years, when larger public company margins were elevated, they exceeded those of PE-backed companies by an average of more than 2.5% per year.
- **EBITDA margins for medium-sized buyout companies averaged at least 20% in every year** analyzed. In this size range, PE-backed companies operated at significantly higher margins than their public counterparts, as measured by the Russell 2000® Index.

Key Company Performance Metric: EBITDA Margin (cont)

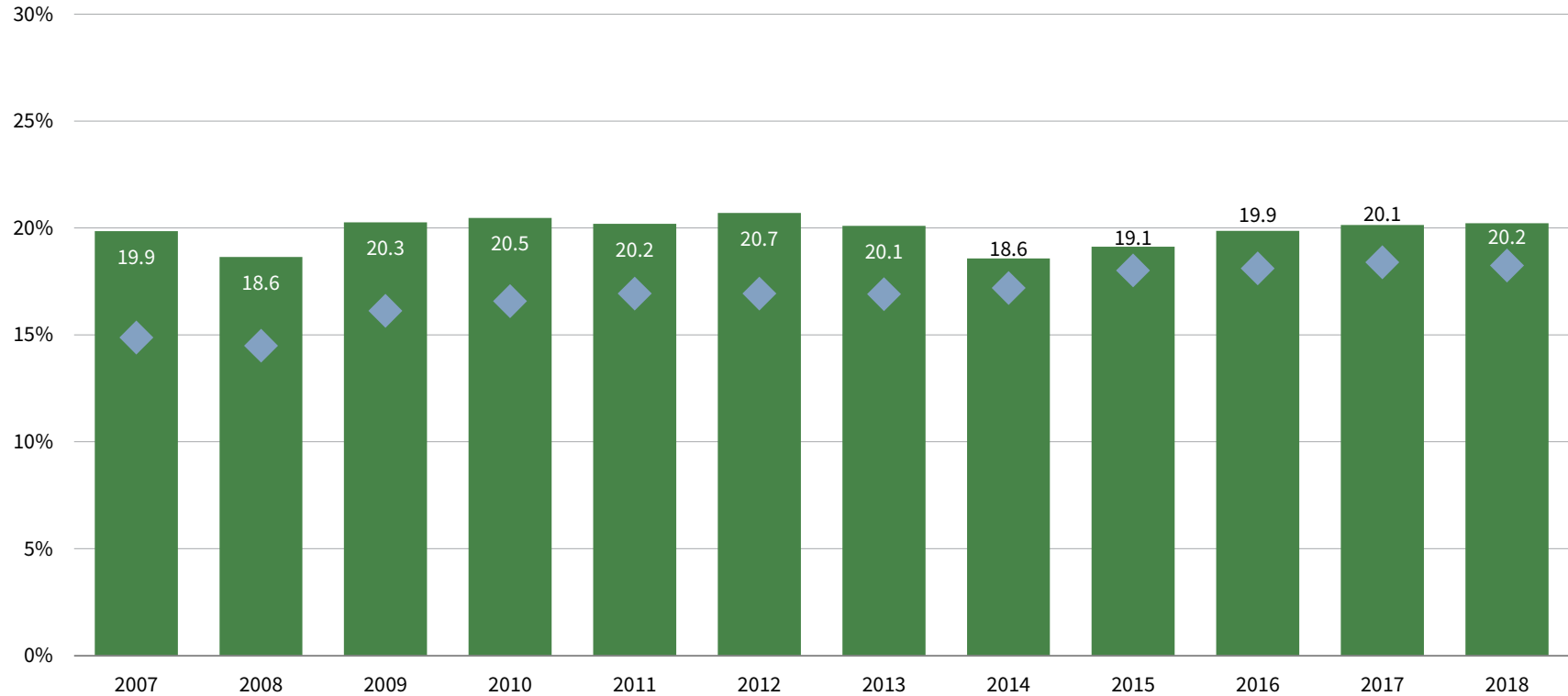
- **Margins for small buyout and public companies** appear to suffer from a lack of size and scale as they consistently trail their larger brethren. But, like the mid-sized company segment, from 2007 to 2018, small buyouts had consistently higher margins than their public brethren in the Russell Microcap® Index (17.2% versus 12.6%).
- **Across the four sectors analyzed, PE-backed companies operated at higher EBITDA margins** than their public market counterparts. In the private realm, IT companies exhibited the highest margins; in the public index, healthcare companies were best.
- **The largest difference between private and public company average EBITDA margins was in the IT sector** (25.2% versus 14.4%), suggesting a different operating philosophy in this segment and, potentially, differences in underlying subsector exposure (e.g., software).
- **The smallest difference between public and private company performance was in the healthcare sector** where average margins were only 150 bps apart.
- Operating margins for PE-owned consumer discretionary (14.8%) and industrial businesses (16.0%), were appreciably lower than for private companies in the other sectors; they exceeded those for public peers, which averaged 12.7% (for both consumer and industrials).

PE-owned companies operated at higher EBITDA margins than publics

Outperformance since 2014 has been less robust

AVERAGE ANNUAL EBITDA MARGIN OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • EBITDA/Revenue (%)



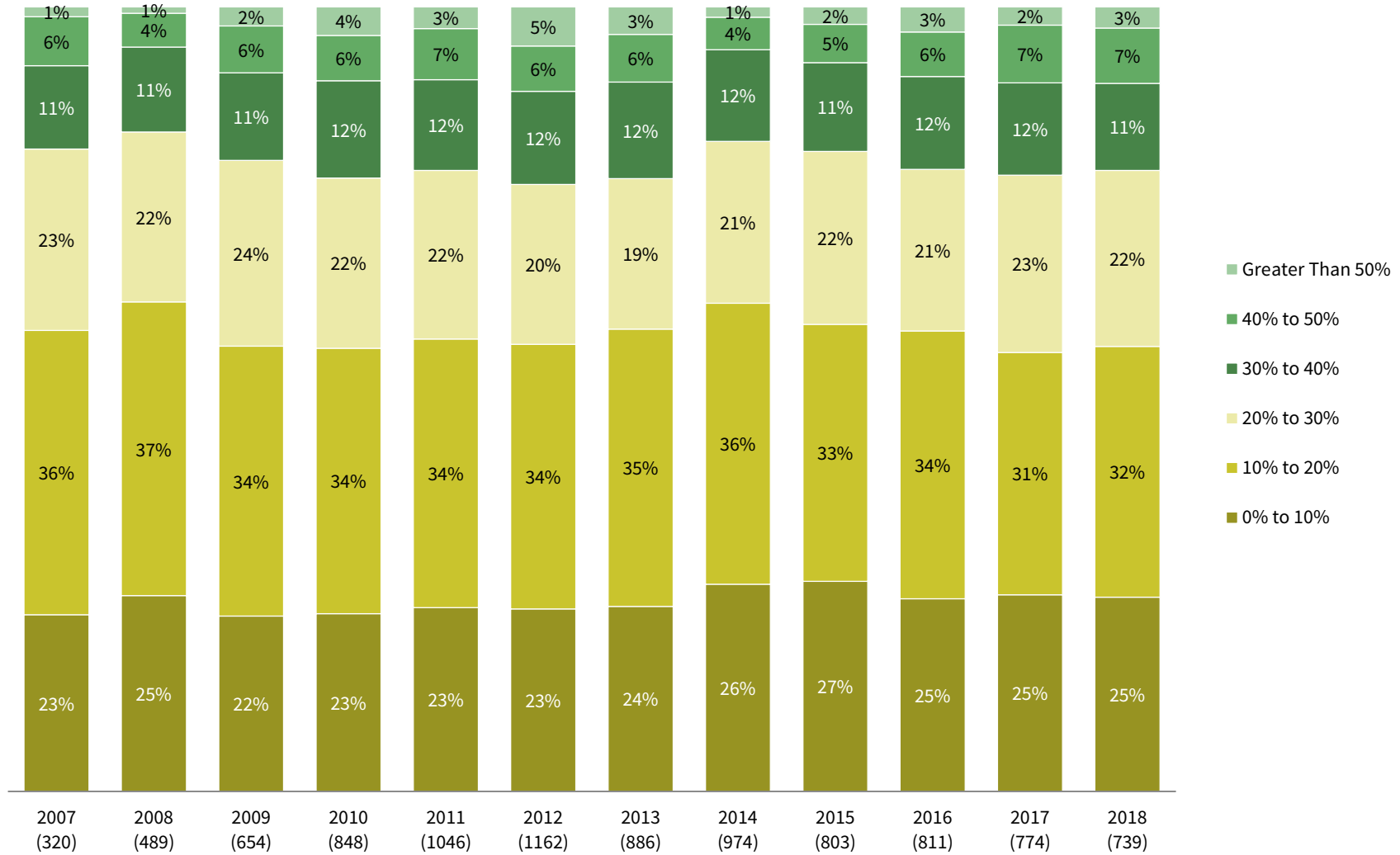
Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	320	489	654	848	1,046	1,162	886	974	803	811	774	739
Russell 2500™ Index	1,564	1,562	1,723	1,757	1,738	1,718	1,691	1,715	1,705	1,639	1,615	1,594

Regardless of environment, PE company EBITDA margins have been consistent

AVERAGE ANNUAL EBITDA MARGIN BREAKDOWN OF PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2018 • EBITDA/Revenue (%)

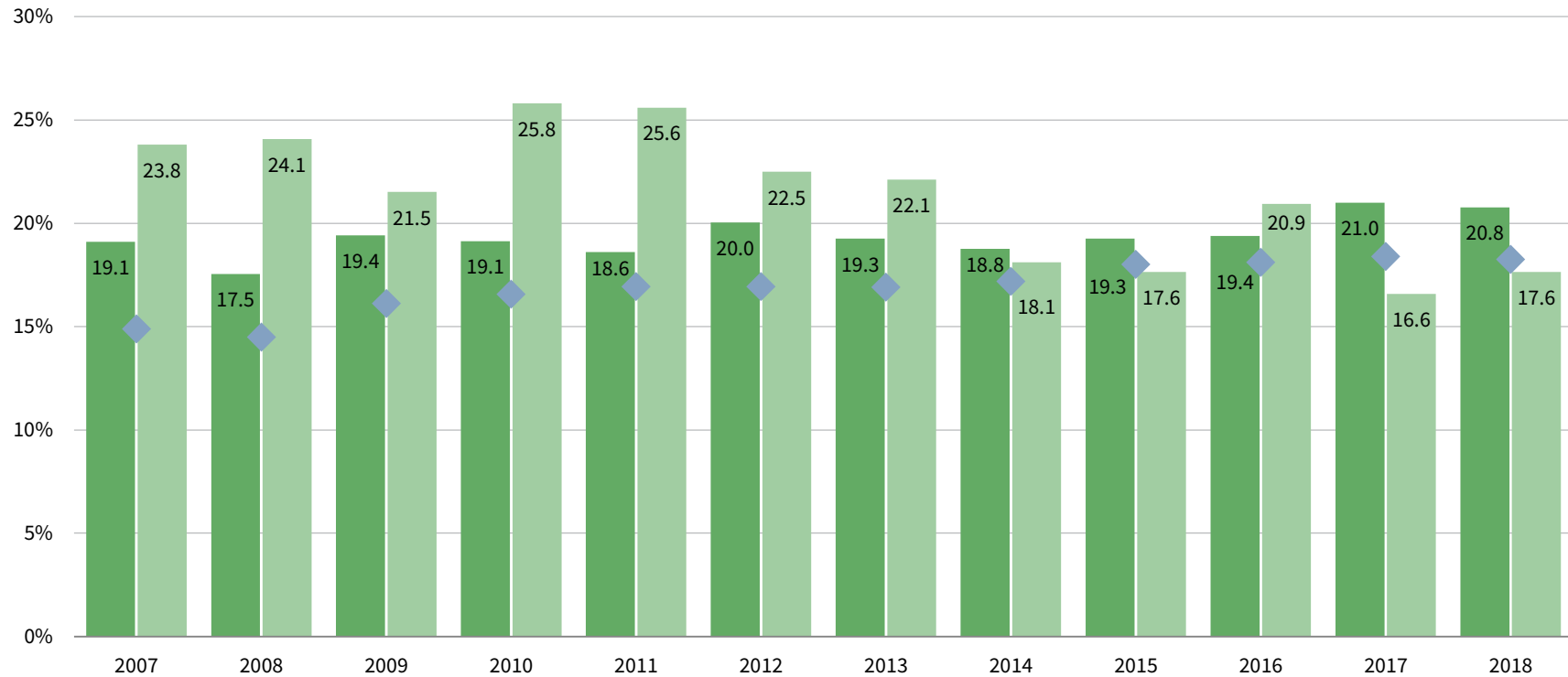


Growth equity margins below 20% in four of the last five years

Buyout margins highest in 2017 and 2018

AVERAGE ANNUAL EBITDA MARGIN OF BUYOUT AND GROWTH EQUITY COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • EBITDA/Revenue (%)



Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	258	387	487	618	737	789	597	677	515	531	529	494
Growth Equity Companies	46	73	122	186	201	247	217	214	189	213	171	185
Russell 2500™ Index	1,564	1,562	1,723	1,757	1,738	1,718	1,691	1,715	1,705	1,639	1,615	1,594

Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Private equity-owned companies were identified by the manager's strategy.

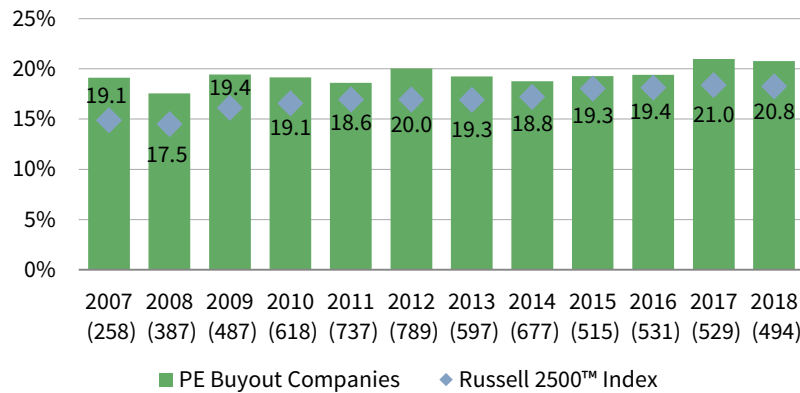
In both private and public universes, the larger the company, the better the margins

On the whole, PE-owned companies operate with higher margins

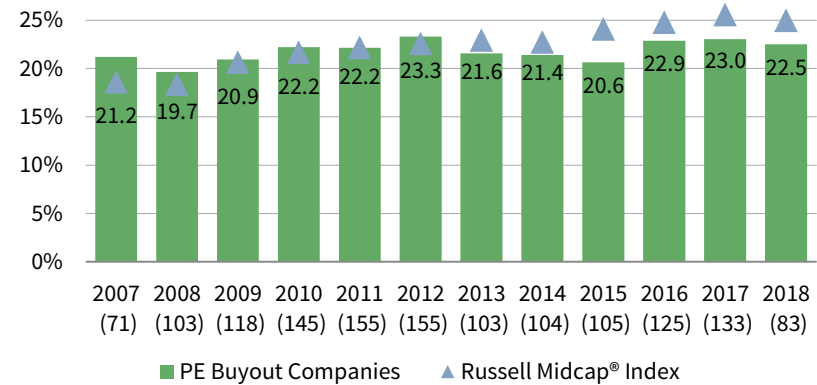
AVERAGE ANNUAL EBITDA MARGIN OF PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2018 • EBITDA/Revenue (%)

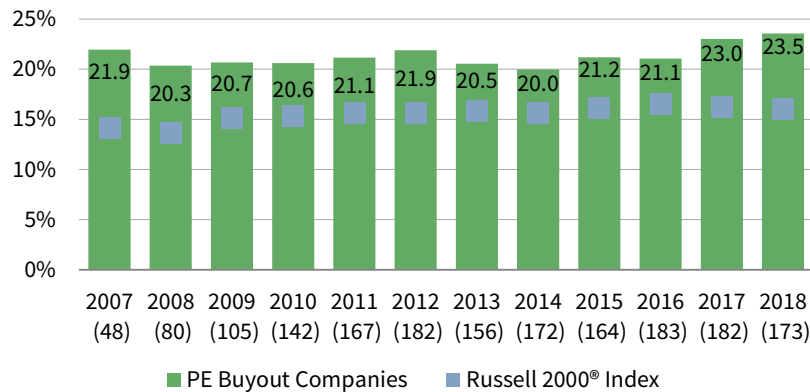
Total Universe



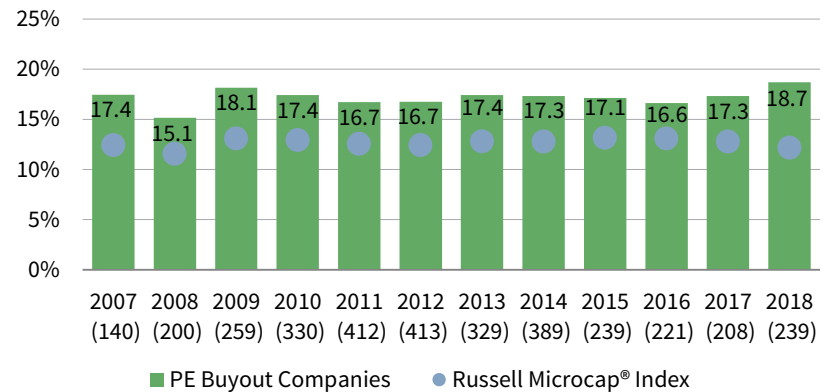
Enterprise Value > \$1B



Enterprise Value \$250M – \$1B



Enterprise Value < \$250M



Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Numbers in parentheses represent number of private equity-owned companies in each year.

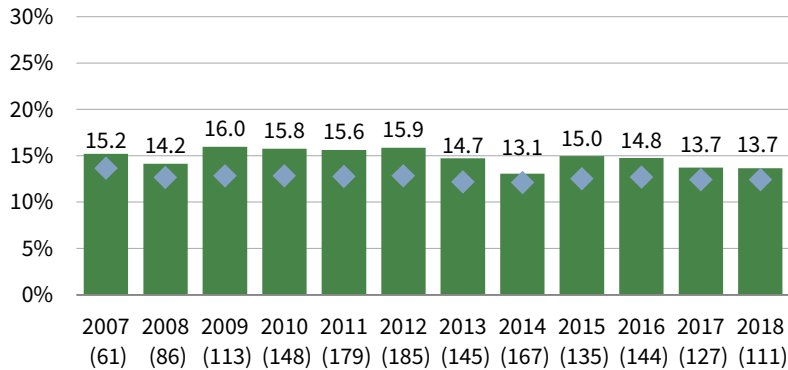
Across all sectors, private companies averaged better margins than publics

PE-owned IT delivered by far the best margins over the time period; consumer trails all.

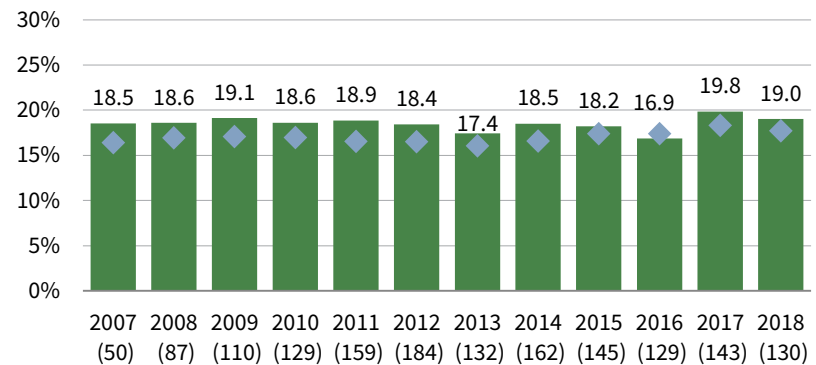
AVERAGE ANNUAL EBITDA MARGIN OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • EBITDA/Revenue (%)

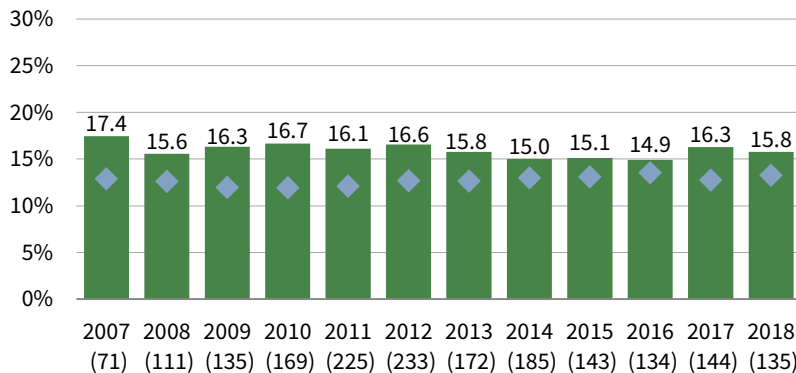
Consumer Discretionary



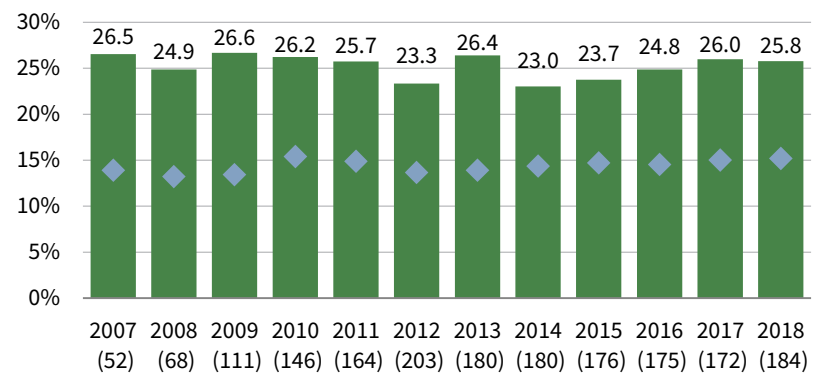
Healthcare



Industrials



Information Technology



■ Private Equity-Owned Companies

◆ Russell 2500™ Index

Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Numbers in parentheses represent number of private equity-owned companies in each year. age | 43

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

- Revenue Growth
- EBITDA Growth
- EBITDA Margin
- **Exit Analyses**

Key Exit Metrics: PPM Expansion and Leverage Compression

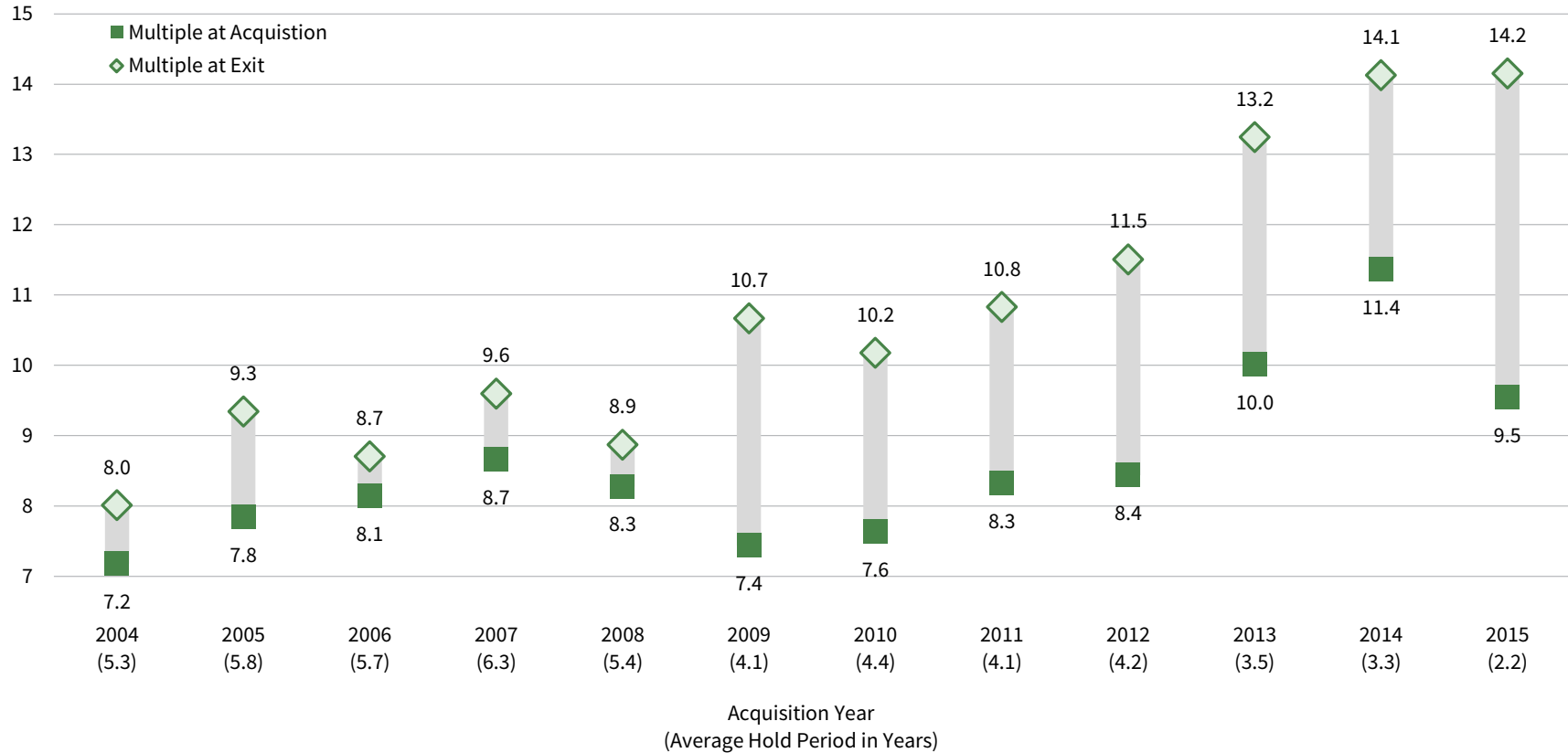
- The continued growth in the number of realized companies in our PE-universe has not changed previous observations regarding multiple expansion and leverage compression for companies acquired and exited since 2004. The data still suggest that **companies acquired in the lead up to the global financial crisis will have different scenarios and return drivers than those acquired during and after the recession.**
- For companies acquired from 2004 to 2008, multiple expansion and deleveraging averaged approximately one turn of EBITDA, while holding periods averaged 5.7 years.
- Multiple expansion for companies acquired from 2009 to 2015 has been more significant, averaging **three turns of EBITDA**. With the exception of the small sample of 2015 acquisitions, **changes in leverage have been *de minimis***. Average hold periods for these companies has been less than four years.
- While the sample sizes are not equal, it is notable that **even as acquisition PPMs escalated from 8.4x in 2012 companies to 11.4x in 2014, managers were able to achieve a roughly 3.0x valuation increase at exit.**
- **Companies acquired in 2013 to 2015 have seen markedly greater growth during their investment hold.** The question remains: Do the higher exit valuations reflect strong continued growth prospects, or just an overvalued market?

PE managers consistently exited at higher valuation multiples than where they acquired ...

... particularly for companies sold recently into the continuing bull market

MEDIAN EBITDA MULTIPLE EXPANSION OF EXITED PRIVATE EQUITY-OWNED COMPANIES BY ACQUISITION YEAR

As of December 31, 2018 • Enterprise Value/EBITDA



Number of Companies

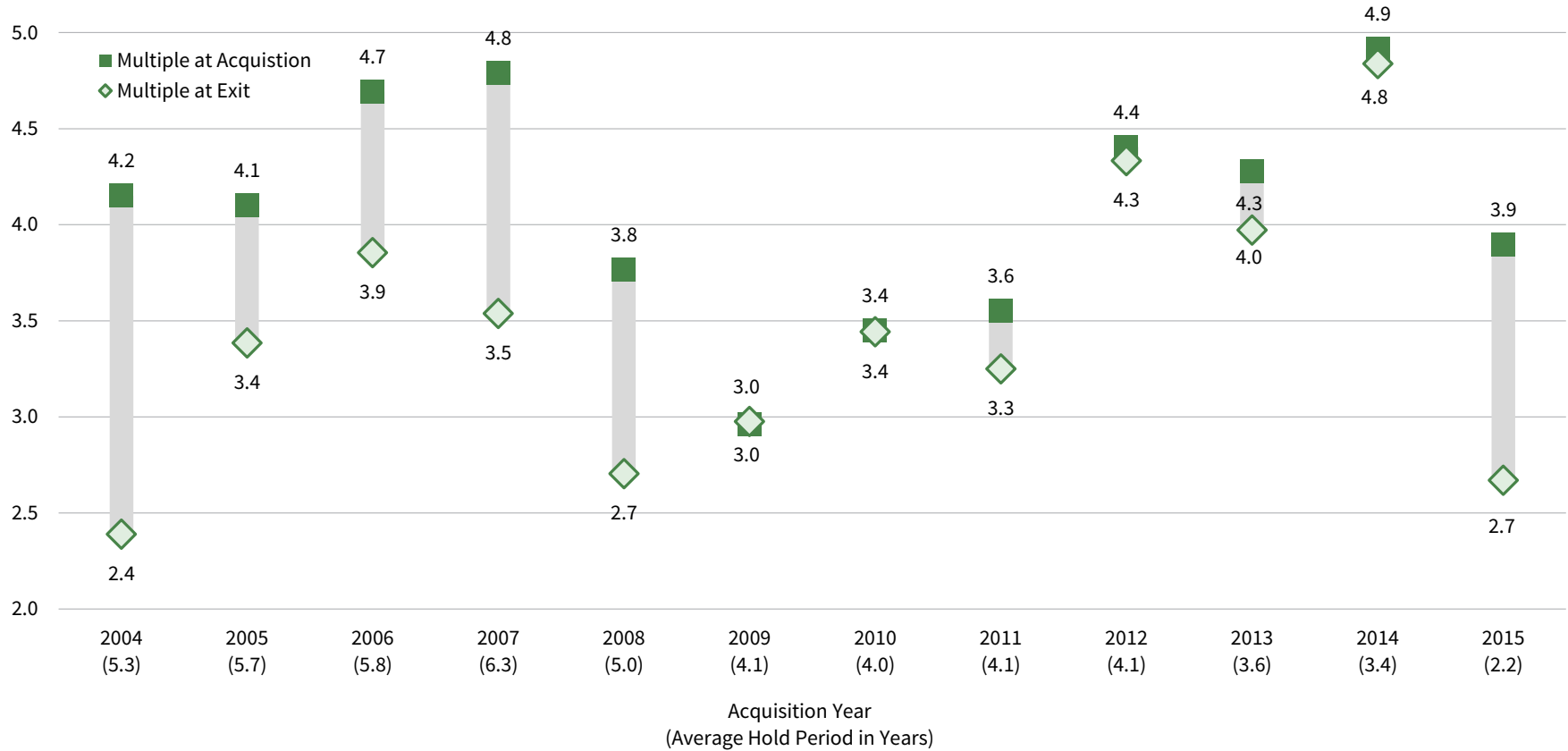
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Private Equity-Owned Companies	88	111	163	195	120	74	143	94	109	52	42	26

The acquisition years with largest multiple expansion and shortest hold periods had the least amount of delevering at exit

It appears that historically cheap financing has minimized the incentive to delever (and encouraged investment in add-on acquisitions and growth)

EBITDA LEVERAGE MULTIPLE COMPRESSION OF PRIVATE EQUITY-OWNED COMPANIES BY ACQUISITION YEAR

As of December 31, 2018 • Net Debt/EBITDA



Number of Companies

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Private Equity-Owned Companies	84	102	144	181	101	57	121	83	92	43	37	19

Source: Cambridge Associates LLC Private Investments Database (as reported by investment managers).

Note: Analysis only includes companies that have both acquisition and exit data.

Key Exit Metrics: Revenue CAGR, EBITDA CAGR, and Margin Expansion

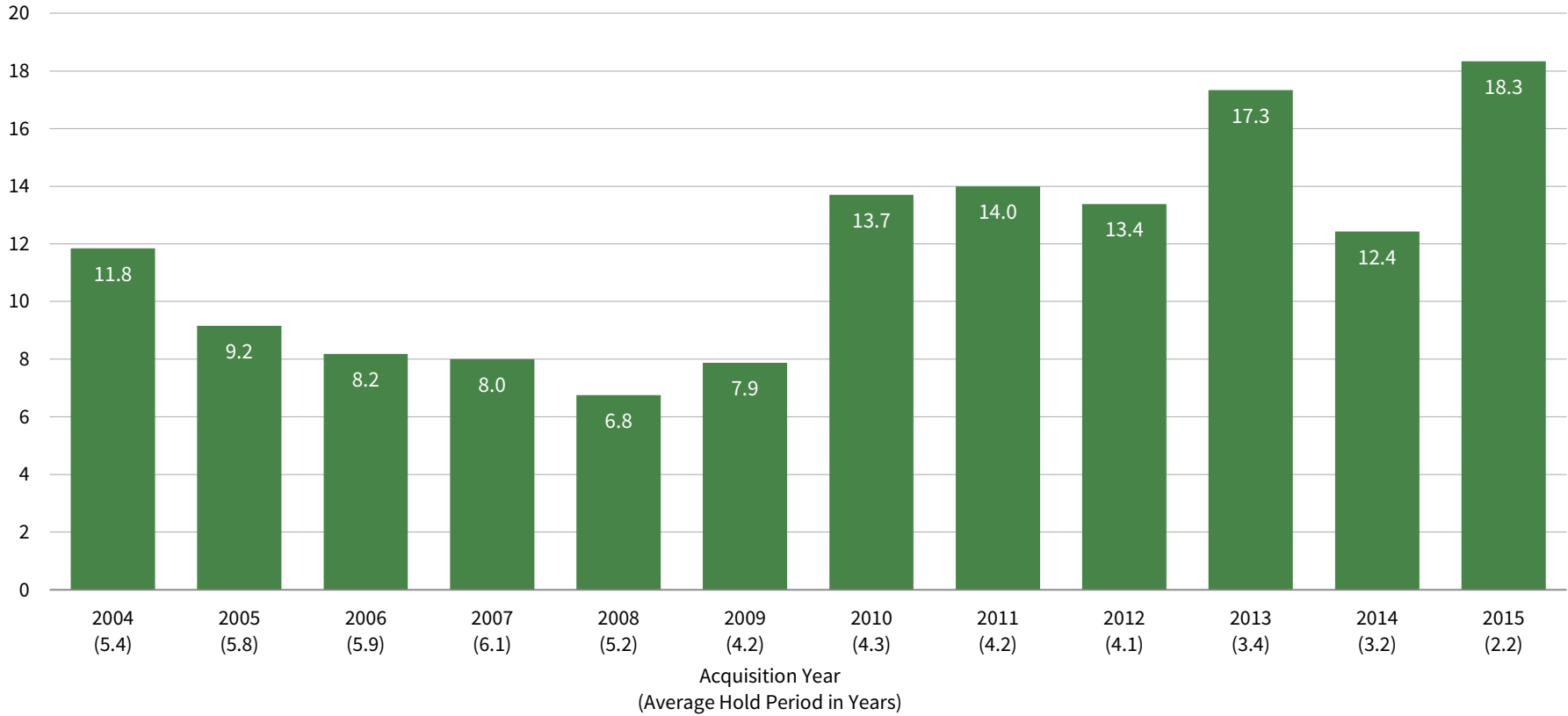
- Not surprisingly given the macro environments, there is a decided difference in revenue and EBITDA compound annual growth rates (CAGRs) during the period of PE ownership between companies acquired from 2004 to 2009 and those acquired from 2010 to 2015.
- The median revenue and EBITDA CAGRs for companies acquired leading up to and during the GFC were 8.4% and 8.8%, respectively.
- Companies acquired in the GFC's aftermath and beyond (2010 to 2015) saw much higher median revenue (14.0%) and EBITDA (14.1%) CAGRs during PE ownership.
- For exited companies, EBITDA margins improved in fewer than half of the time periods analyzed.

Exited companies averaged double-digit growth

Companies bought and sold during the recent bull market have performed best

MEDIAN REVENUE CAGR OF EXITED PRIVATE EQUITY-OWNED COMPANIES BY ACQUISITION YEAR

As of December 31, 2018 • Compound Annual Growth Rate (%)



Number of Companies

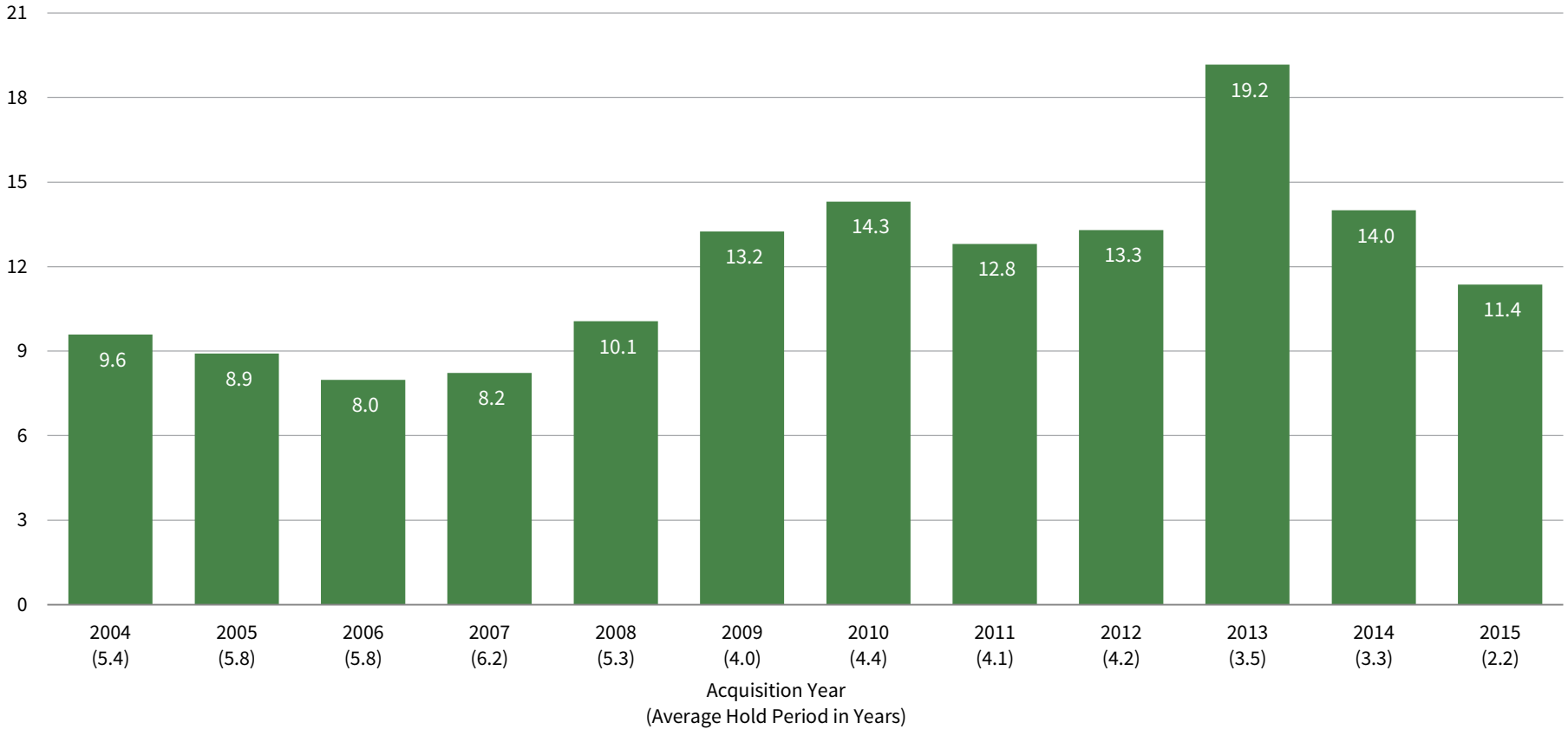
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Private Equity-Owned Companies	113	133	200	240	142	99	171	116	119	62	53	41

EBITDA CAGRs markedly higher for companies acquired post GFC

The average hold period for the fastest growers (those with 50%+ CAGRs) was 2.8 years

MEDIAN EBITDA CAGR OF EXITED PRIVATE EQUITY-OWNED COMPANIES BY ACQUISITION YEAR

As of December 31, 2018 • Compound Annual Growth Rate (%)



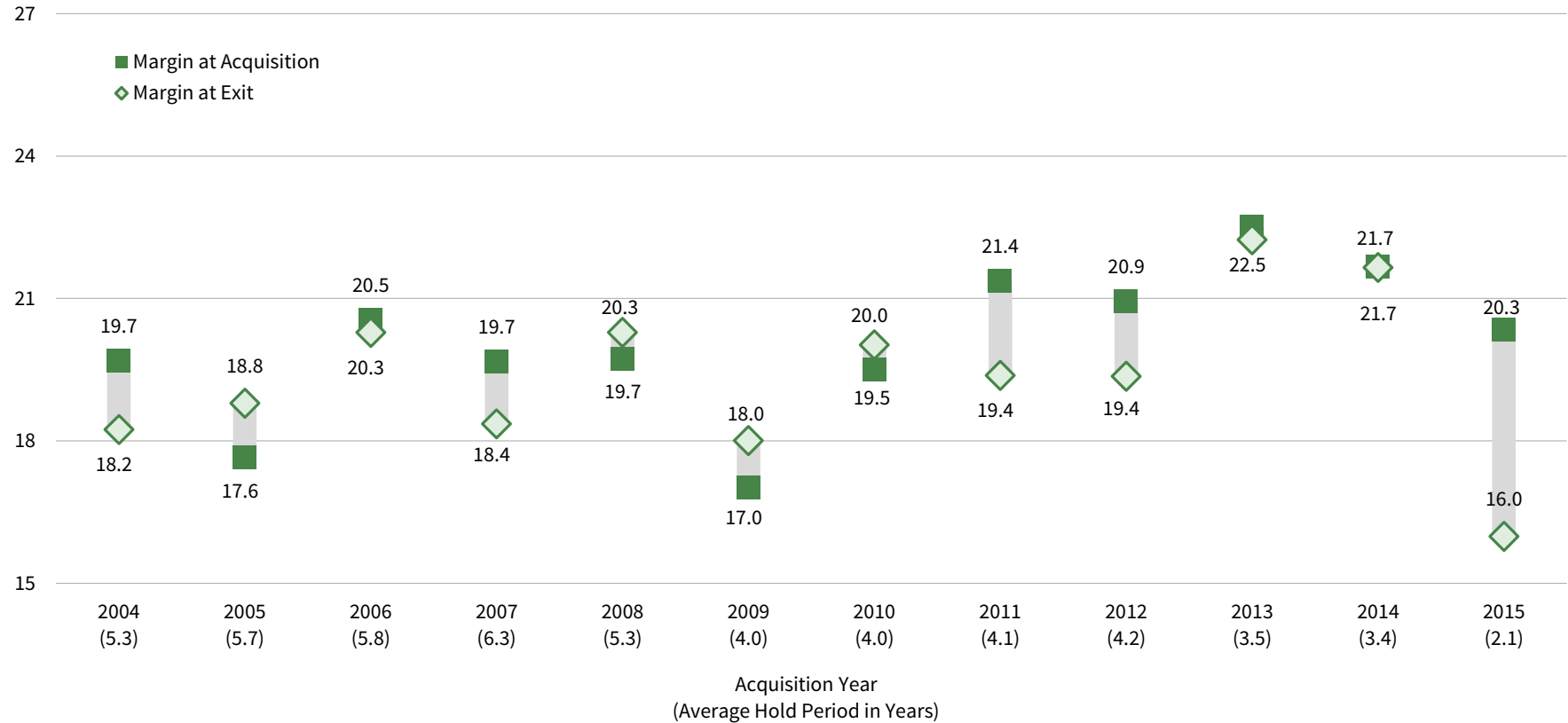
Number of Companies

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Private Equity-Owned Companies	97	121	174	213	130	79	148	98	109	52	43	31

Data imply that PE owners have focused on growth over cost cutting

MEDIAN EBITDA MARGIN EXPANSION OF EXITED PRIVATE EQUITY-OWNED COMPANIES BY ACQUISITION YEAR

As of December 31, 2018 • EBITDA/Revenue (%)



	Number of Companies											
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Private Equity-Owned Companies	94	117	167	202	127	77	145	99	107	52	42	30

Source: Cambridge Associates LLC Private Investments Database (as reported by investment managers).
 Note: Analysis only includes companies that have both acquisition and exit data.

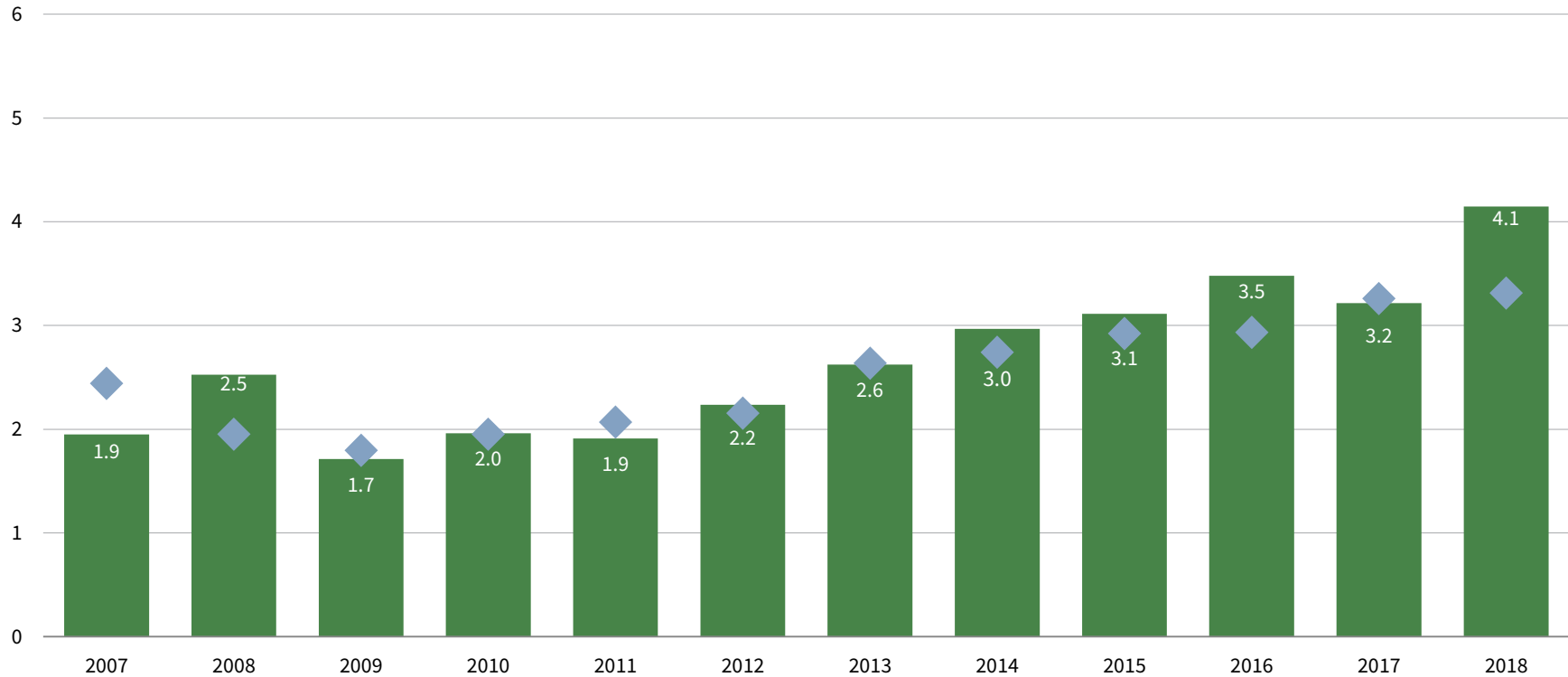


APPENDIX: REVENUE PURCHASE PRICE MULTIPLE

Based on revenue PPMs, public and PE valuations look similar ...

AVERAGE REVENUE PURCHASE PRICE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES

As of December 31, 2018 • Enterprise Value/Revenue



Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Private Equity-Owned Companies	343	218	135	282	260	329	197	265	238	233	235	193
Russell 2500™ Index	2,274	2,323	2,358	2,310	2,297	2,335	2,369	2,393	2,379	2,378	2,406	2,400

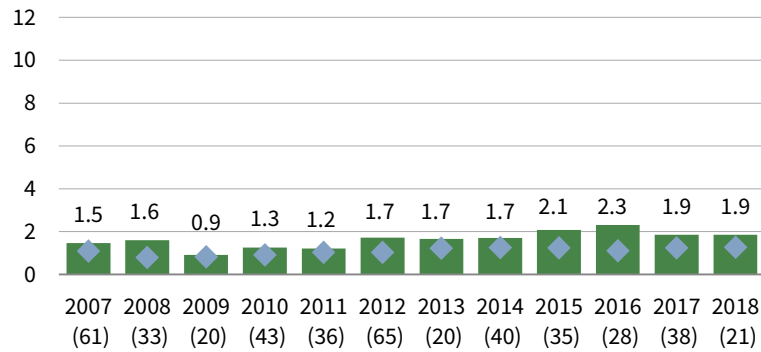
Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.
 Note: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes.

... but analysis based on sectors indicates some significant differences

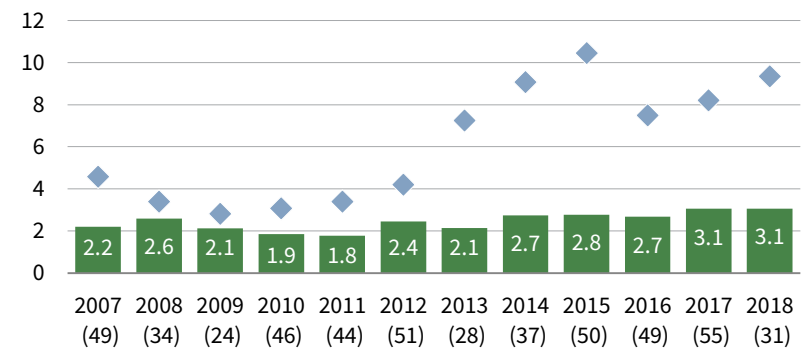
AVERAGE REVENUE PURCHASE PRICE MULTIPLES AT ACQUISITION OF PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2018 • Enterprise Value/Revenue

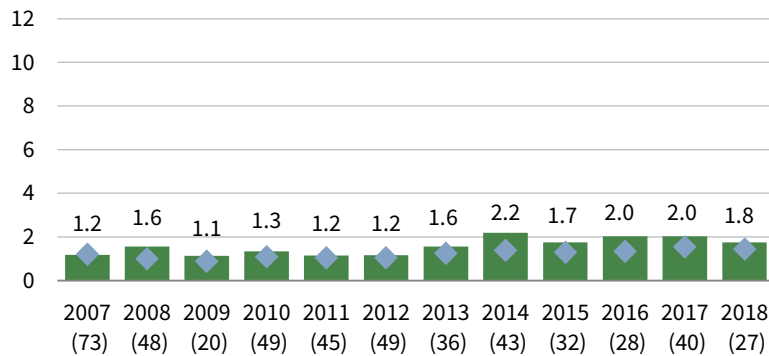
Consumer Discretionary



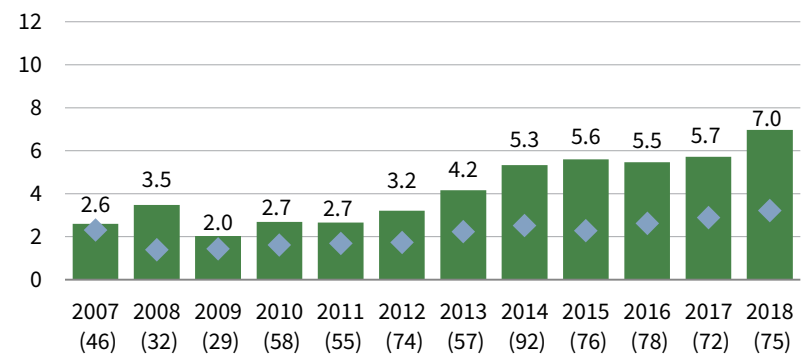
Healthcare



Industrials



Information Technology



■ Private Equity-Owned Companies

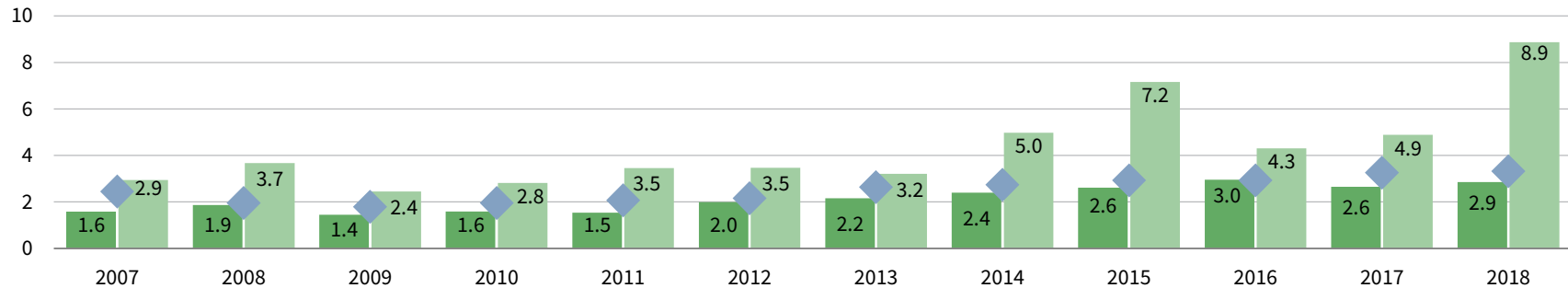
◆ Russell 2500™ Index

For the most relevant deal type (growth equity) and sector (IT), PE revenue multiples outpace publics

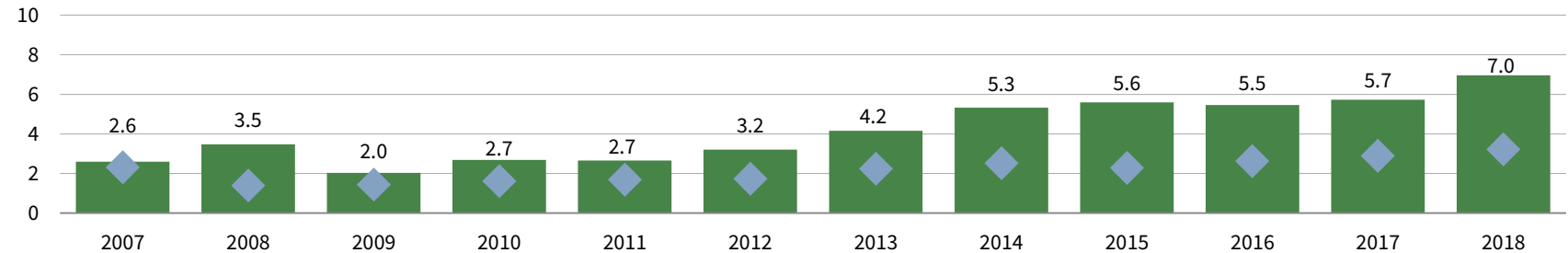
AVERAGE REVENUE PURCHASE PRICE MULTIPLES AT ACQUISITION BY DEAL TYPE AND SECTOR VS PUBLIC COMPANIES

As of December 31, 2018 • Enterprise Value/Revenue

Deal Type



Information Technology



Number of Companies

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Buyout Companies	221	136	84	192	177	234	121	168	157	145	139	107
Growth Equity Companies	74	53	33	63	57	76	56	90	76	73	88	71
Russell 2500™ Index	2,274	2,323	2,358	2,310	2,297	2,335	2,369	2,393	2,379	2,378	2,406	2,400
IT PE-Owned Companies	46	32	29	58	55	74	57	92	76	78	72	75

Sources: Cambridge Associates LLC Private Investments Database (as reported by investment managers), FactSet Research Systems, and Frank Russell Company.

Notes: Outliers were identified and excluded, and the same methodology was applied to the private equity and public company universes. Private equity-owned companies were identified by the manager's strategy (top) and sector (bottom).



CAMBRIDGE
ASSOCIATES

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