

UNDER THE MICROSCOPE

PRIVATE VS PUBLIC COMPANY OPERATING METRICS FOR US COMPANIES

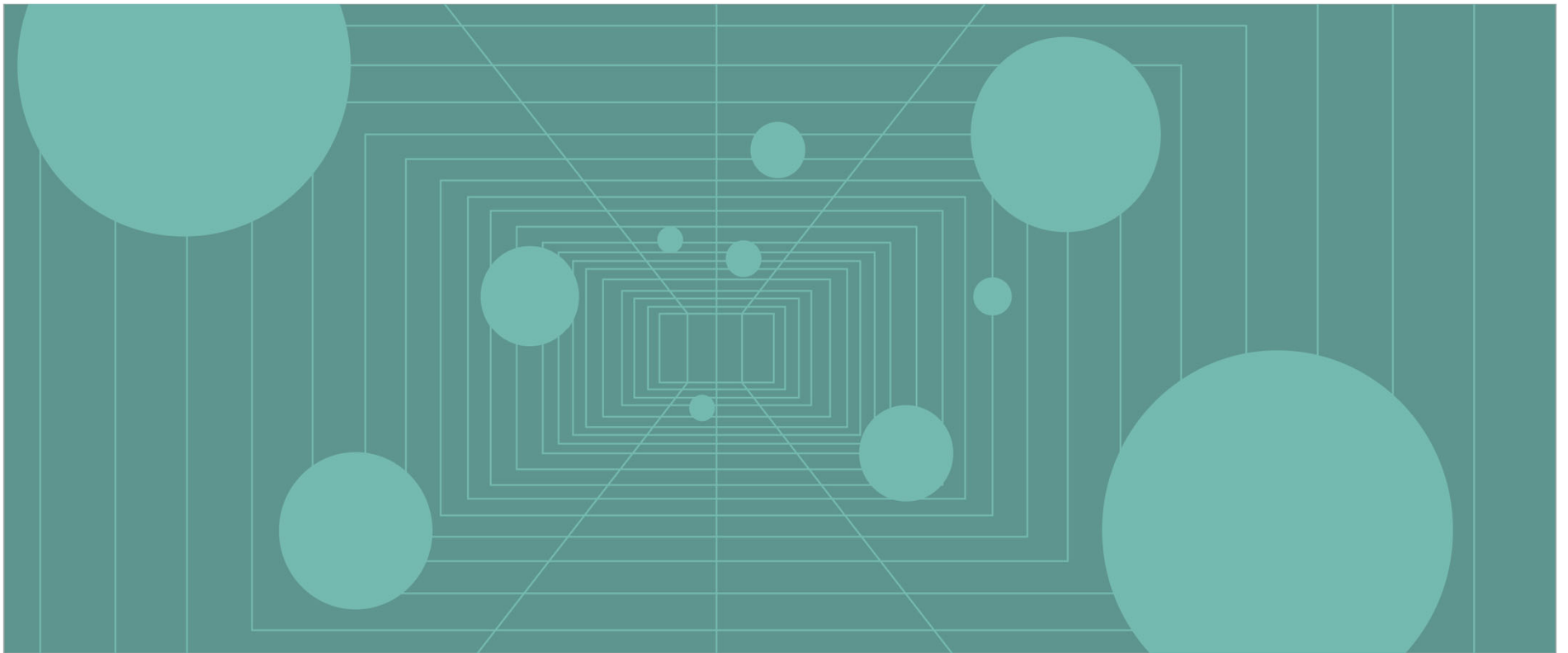


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Introduction to Operating Metrics

- 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 captured and analyzed current and historical data from global PE funds since the year ended December 31, 2011. This year's report includes data through the period ended December 31, 2022.
- 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 nearly 8,000 US-based companies acquired by PE firms from 2000 through 2022 and is subject to change over time. The companies in the universe range in enterprise value from less than \$1 million to more than \$100 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 an interquartile range, a statistical tool 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.
- Deal type categorizations have been made at the company level and reflect information provided by the PE managers.
- 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.
- 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; 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

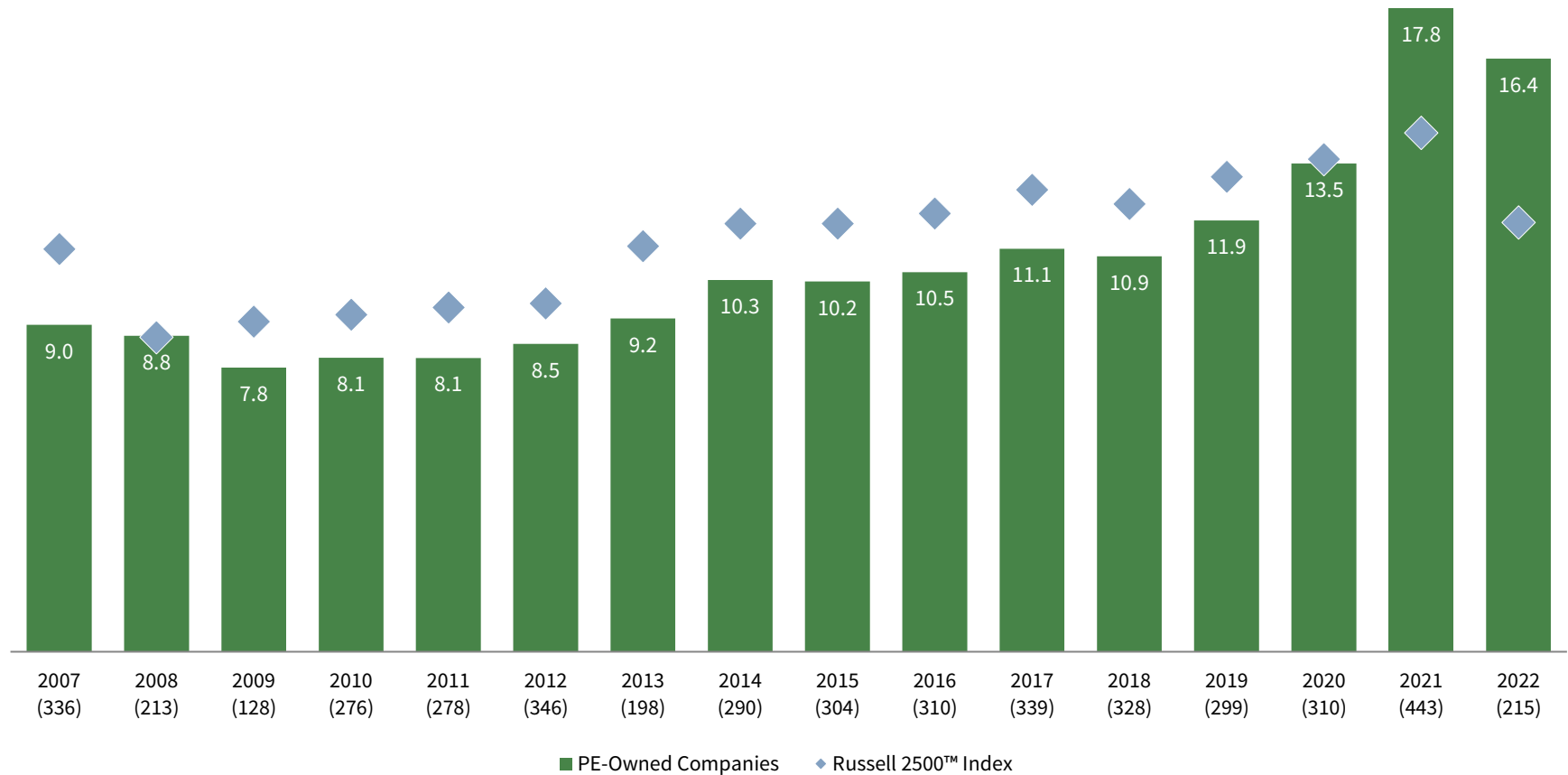
- **EBITDA Purchase Price Multiple**
- Leverage Multiple

PPMs were meaningfully higher for PE than publics in 2021 and 2022

2022 public market declines resulted in a significant drop in the EBITDA valuation for the Russell 2500™

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

As of December 31, 2022 • Enterprise Value/EBITDA

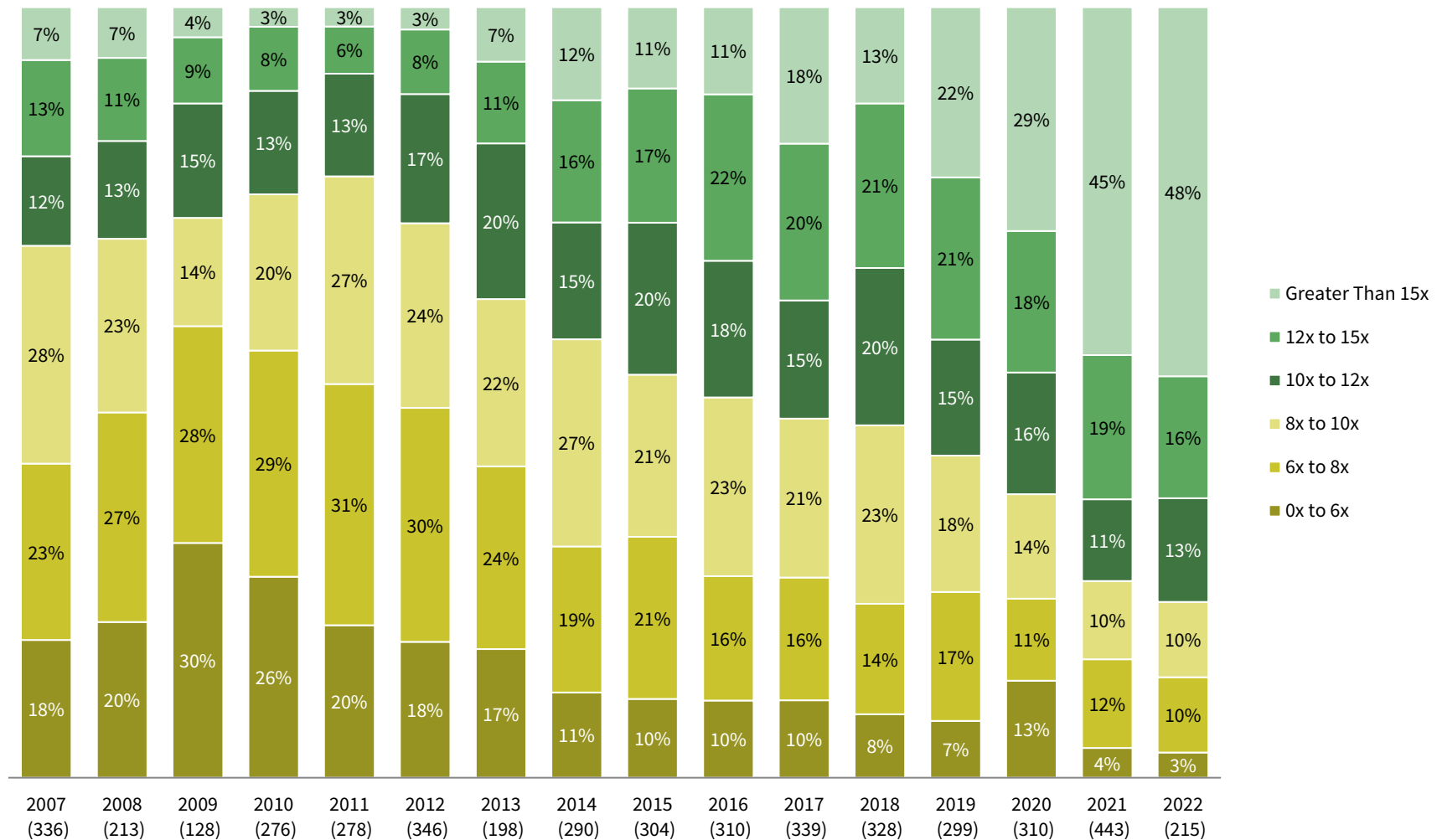


The percentage of deals transacting at EBITDA multiples greater than 10x has risen every year since 2011

Nearly half of the deals completed in 2022 transacted at greater than a 15x multiple

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

As of December 31, 2022 • Enterprise Value/EBITDA

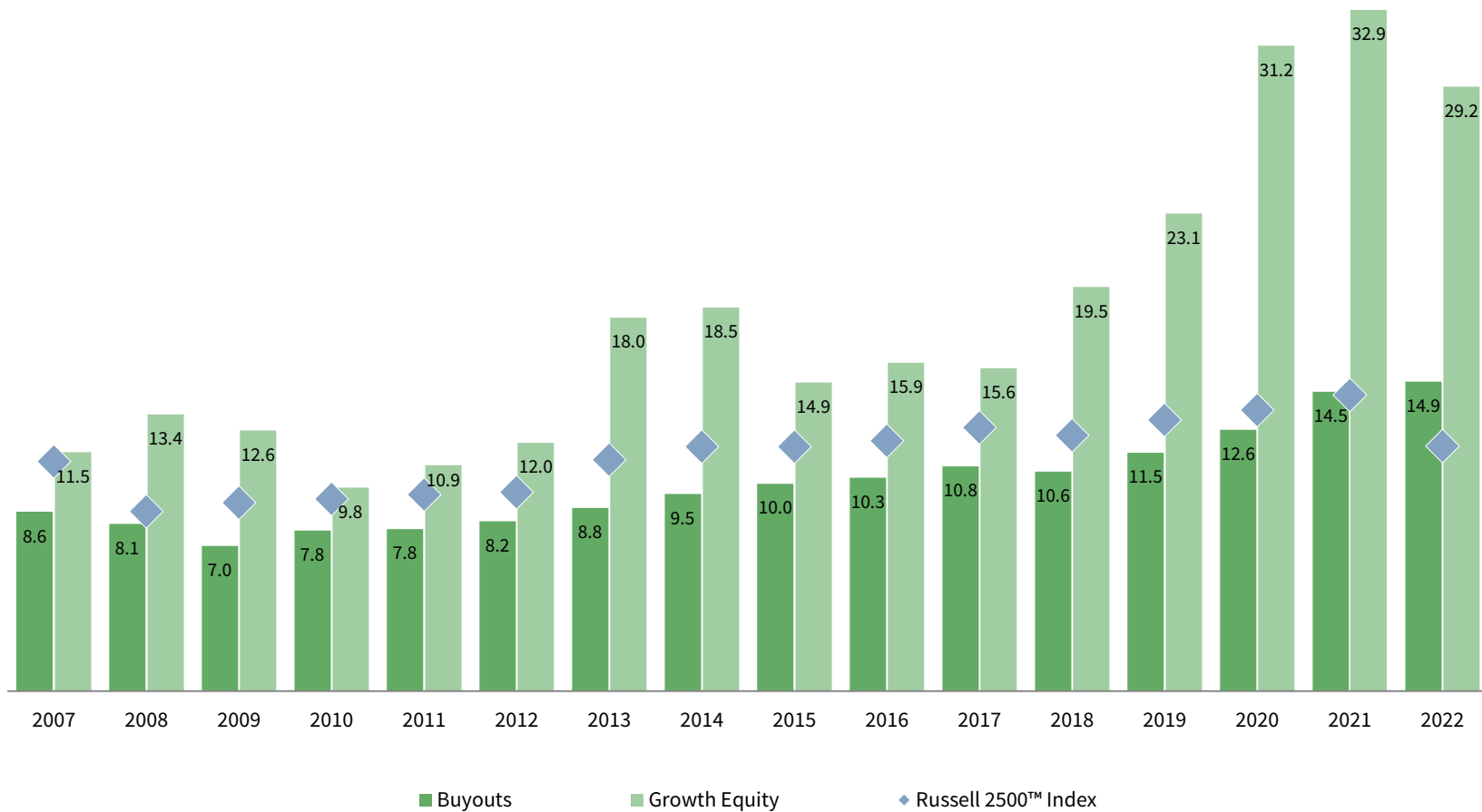


Buyouts sustained their record high multiples in 2022

Growth equity valuations have not been grounded in EBITDA, evidenced by their average multiples of 30x

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

As of December 31, 2022 • Enterprise Value/EBITDA



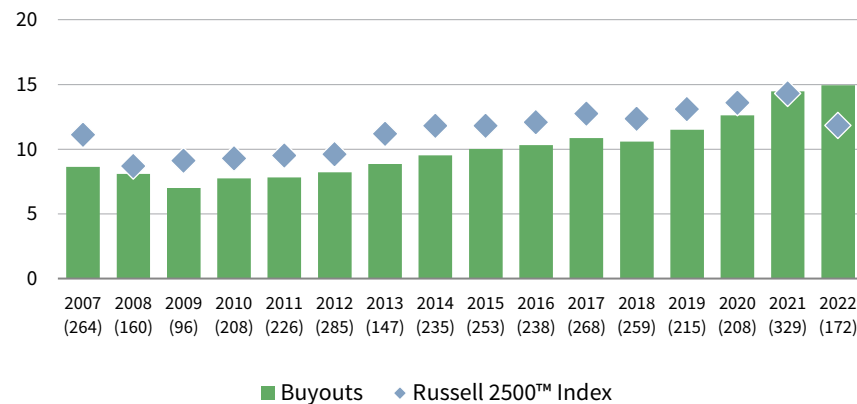
In 2022, as public markets corrected, the longstanding small-cap buyout discount disappeared

Reflecting a greater correlation to public markets, large buyout multiples declined in 2022, but were still second highest among the years analyzed

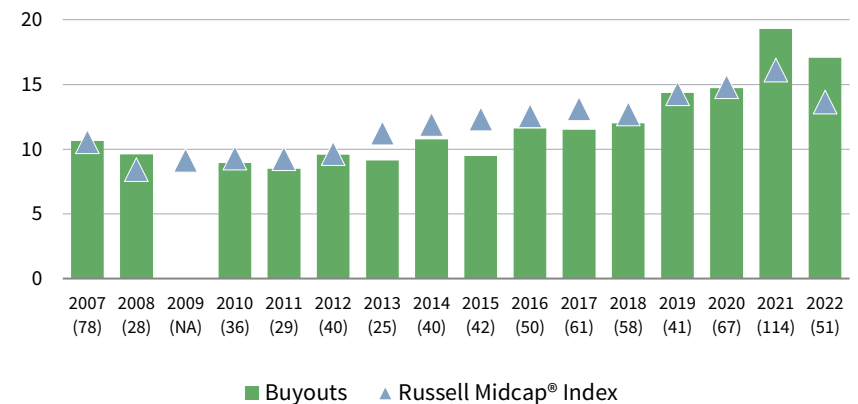
AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF US PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2022 • Enterprise Value/EBITDA

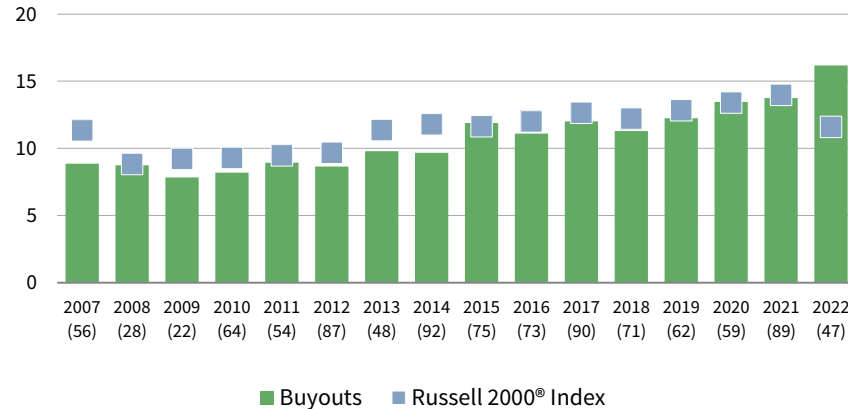
Total Universe



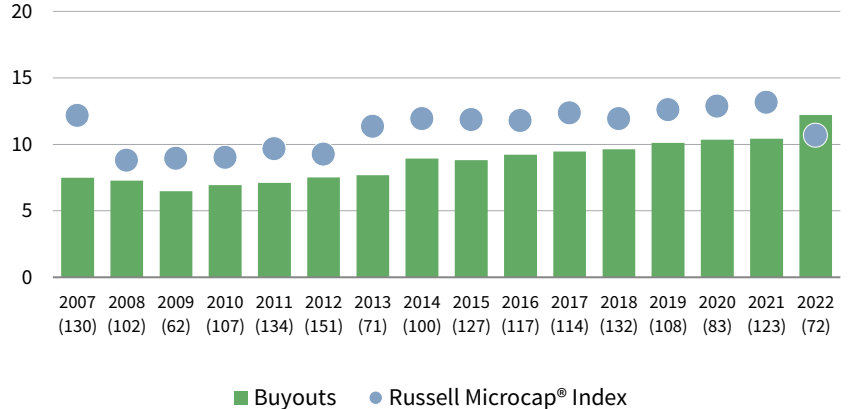
Enterprise Value > \$1 B



Enterprise Value \$250 M – \$1 B



Enterprise Value < \$250 M



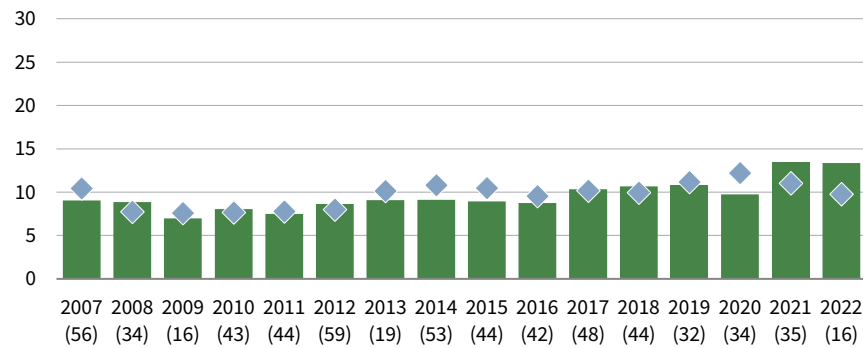
Healthcare was the only sector where PE PPMs perceptibly fell in 2022 (and the only sector that transacted at a discount to public)

PE acquisition multiples rose for industrial businesses, while valuations in consumer and IT remained the same as in 2021

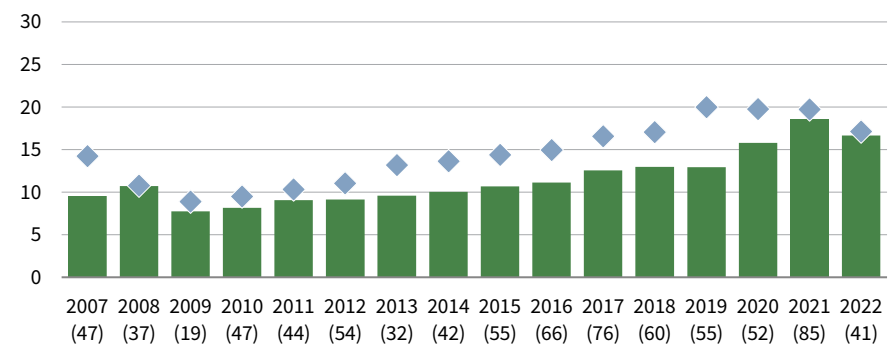
AVERAGE EBITDA PURCHASE PRICE MULTIPLES AT ACQUISITION OF US PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • Enterprise Value/EBITDA

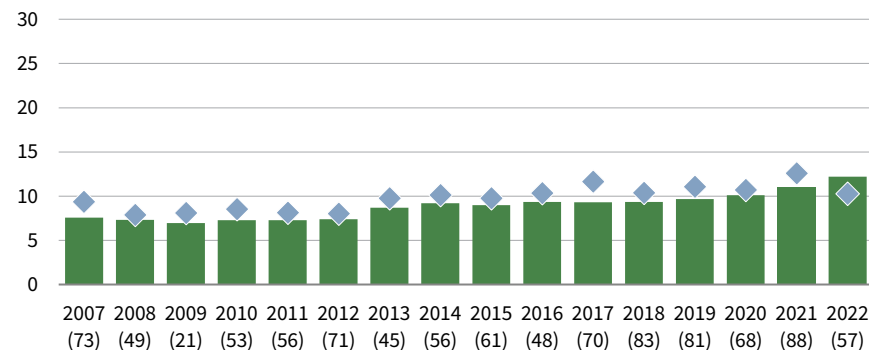
Consumer Discretionary



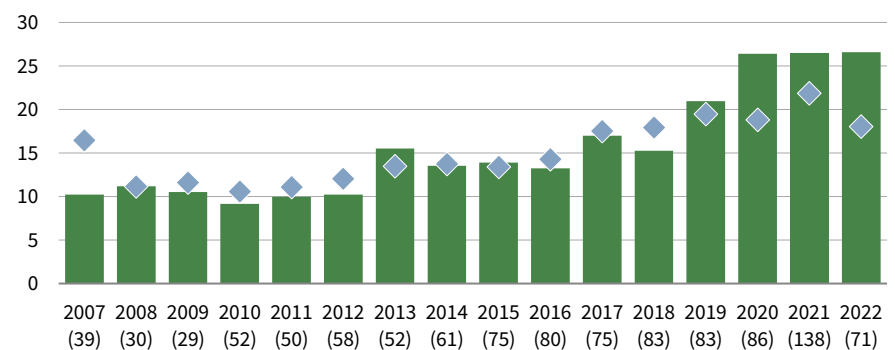
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™

PURCHASE THE COMPANY AND OPTIMIZE CAPITAL STRUCTURE

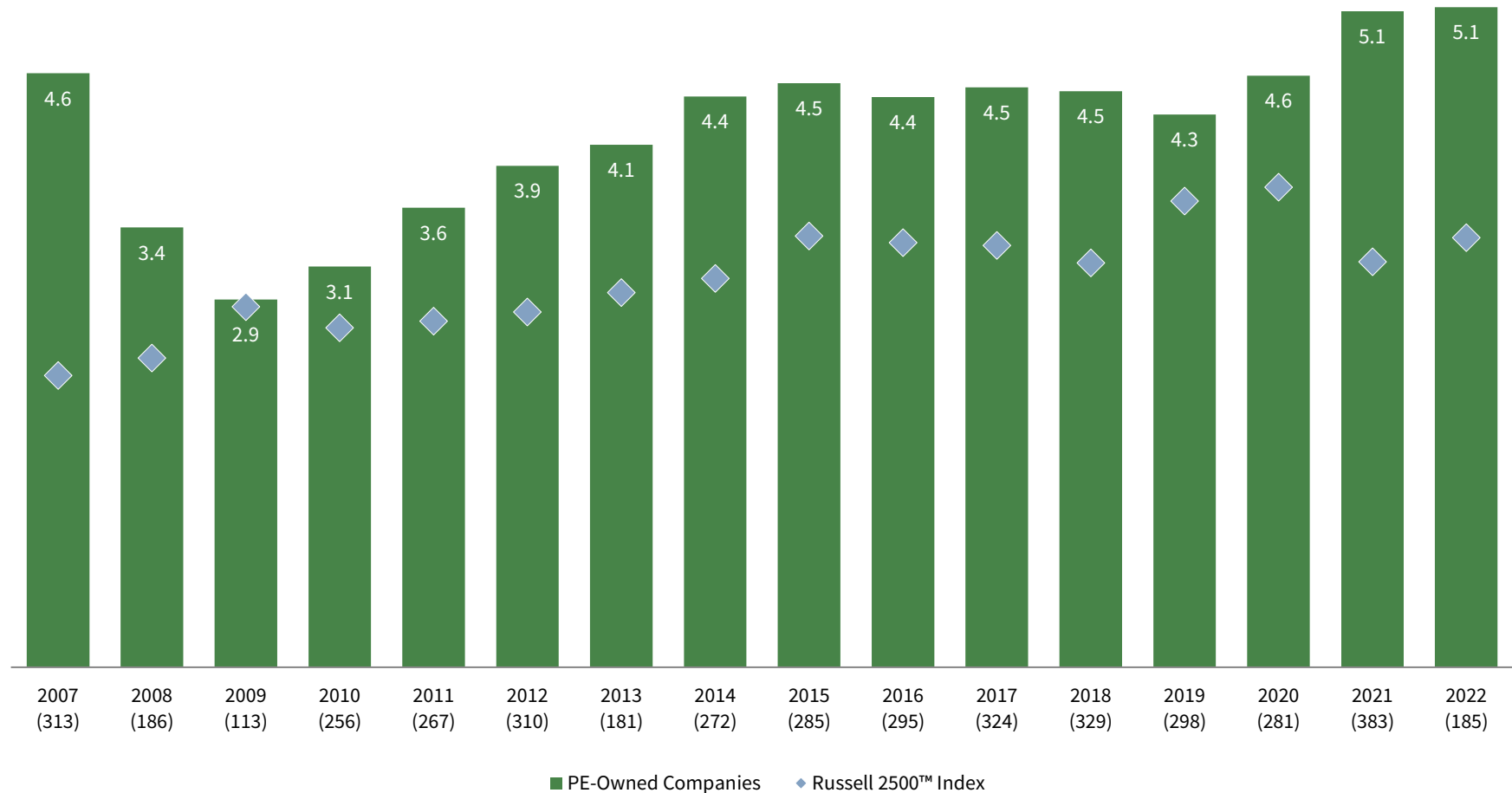
- EBITDA Purchase Price Multiple
- **Leverage Multiple**

On average, PE leverage multiples stayed high in 2022

In 2021 and 2022, they exceeded those of public companies by nearly two turns

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

As of December 31, 2022 • Net Debt/EBITDA

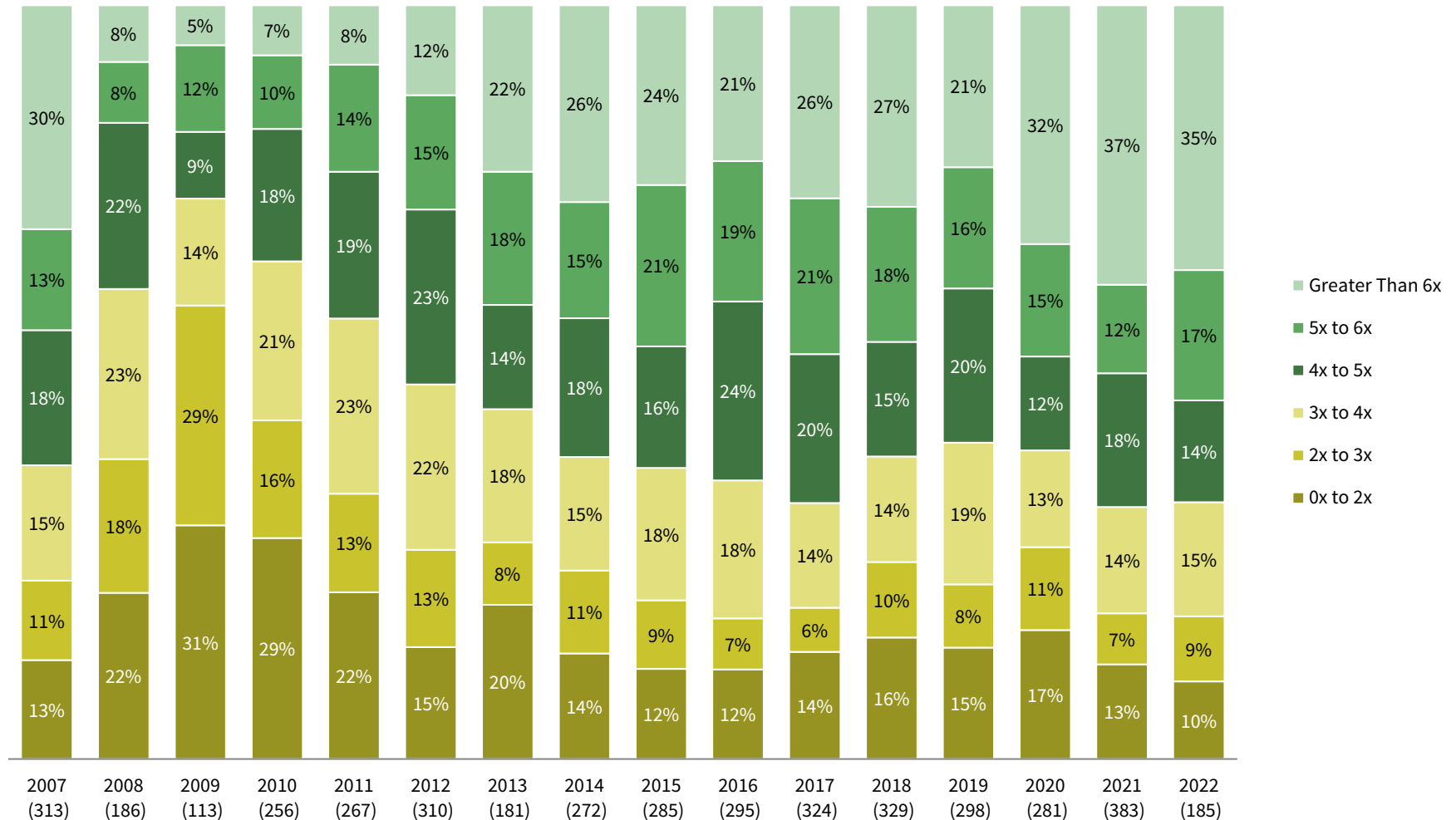


More than one-third of deals closed in 2020–22 were levered by at least 6x EBITDA

The only other year with a similar percentage was 2007

LEVERAGE MULTIPLE BREAKDOWN OF US PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2022 • Net Debt/EBITDA

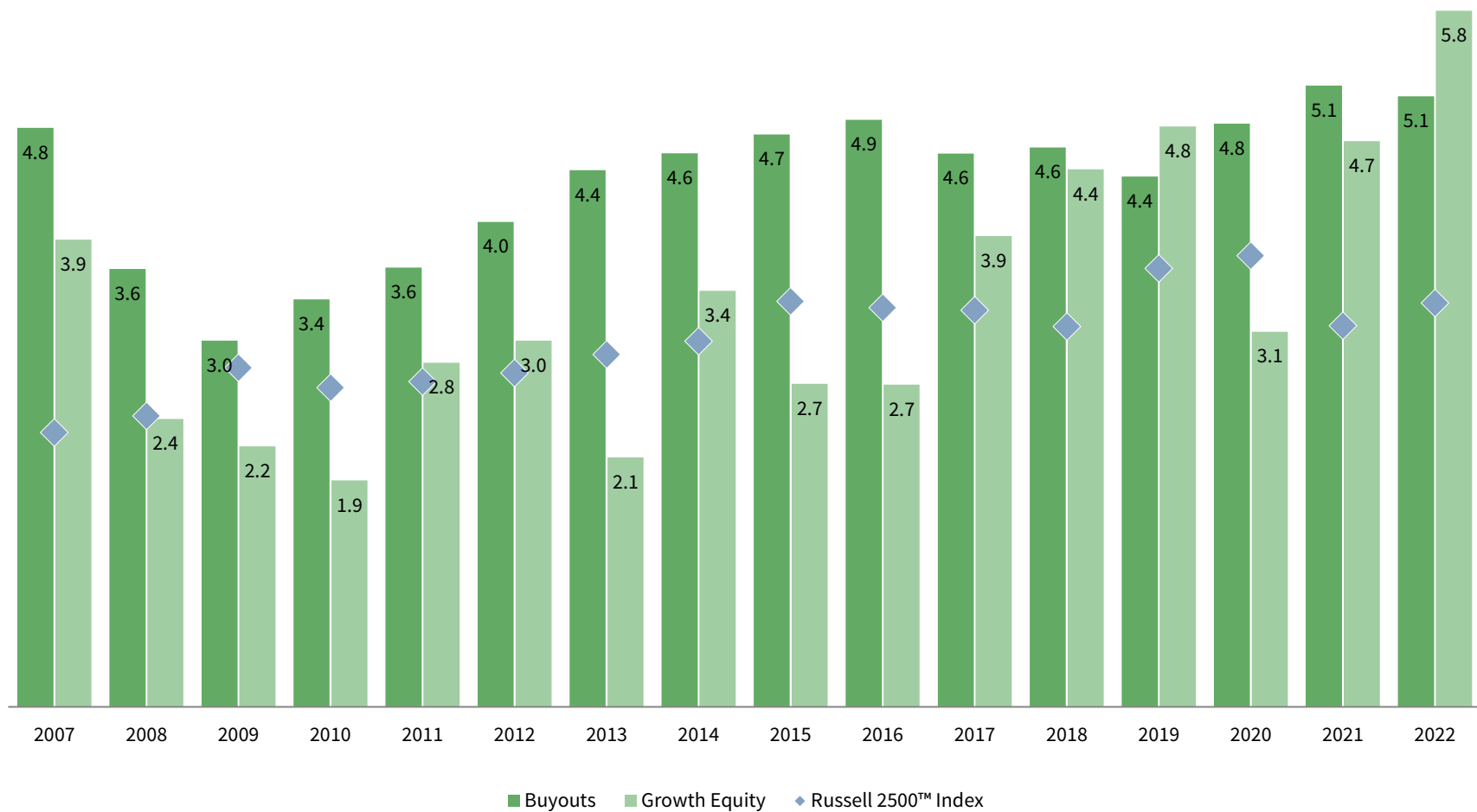


Growth equity investors increased their use of leverage, hitting a new high in 2022

Buyout leverage multiples sustained their high level through 2022

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

As of December 31, 2022 • Net Debt/EBITDA



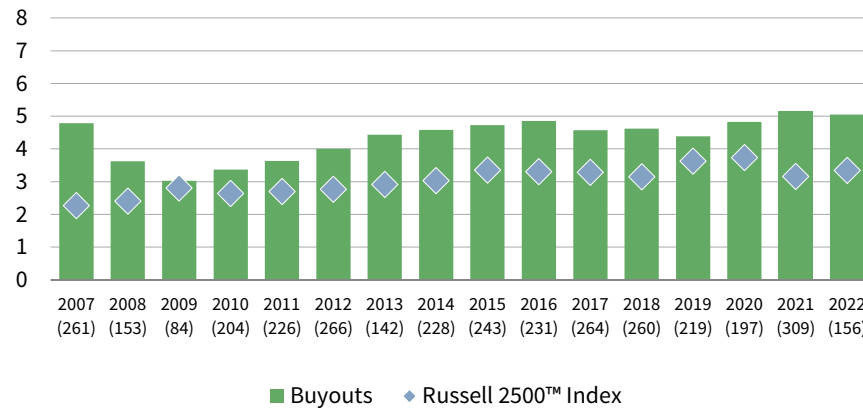
Large buyouts was the only size segment where leverage multiples declined in 2022, though off an extreme high of 7x in 2021

Multiples for mid- and small-cap buyouts and public companies increased compared to 2021

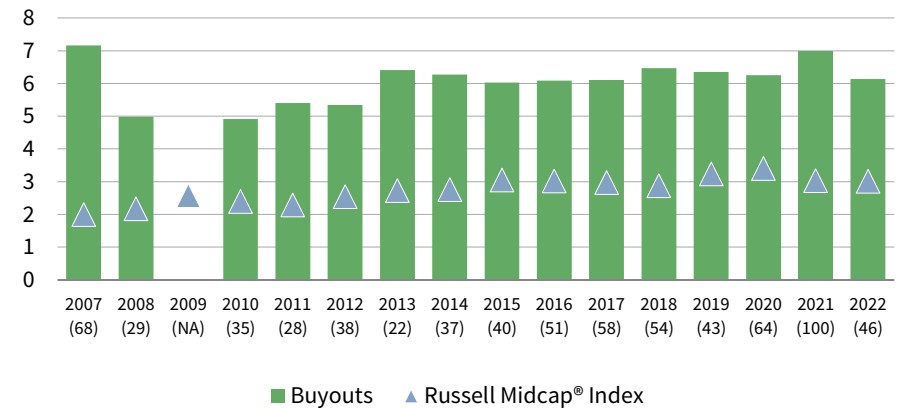
AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF US PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2022 • Net Debt/EBITDA

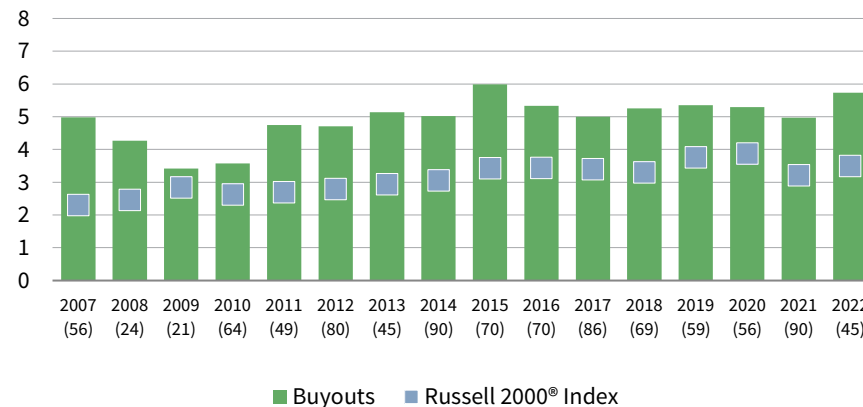
Total Universe



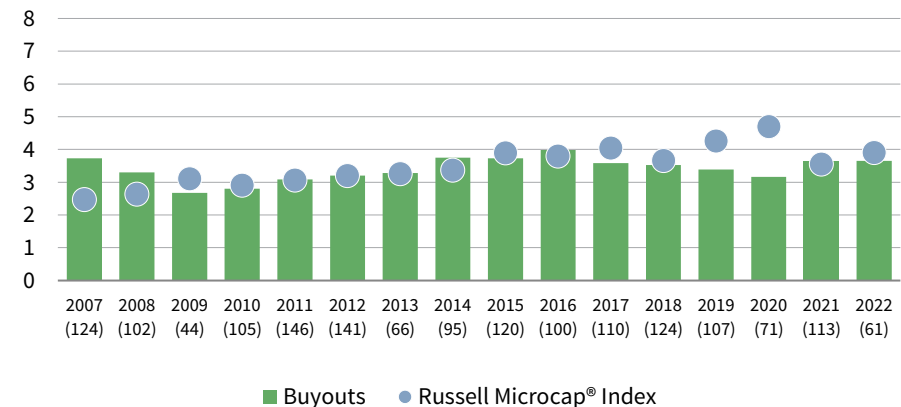
Enterprise Value > \$1 B



Enterprise Value \$250 M – \$1 B



Enterprise Value < \$250 M



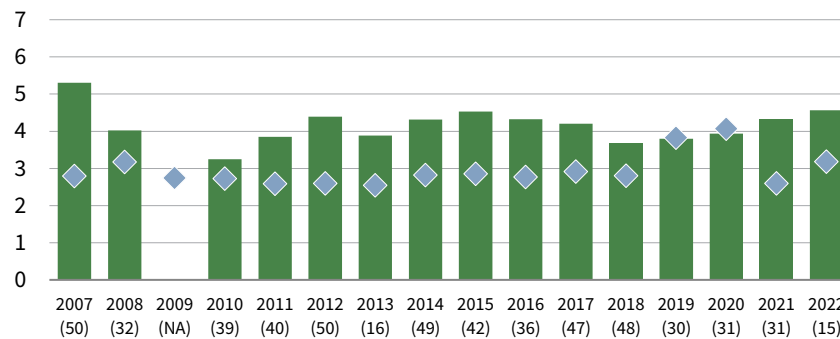
PE-backed IT companies averaged the highest leverage multiples in every year but one since 2011

PE leverage multiples in healthcare and IT outpaced publics by the largest margin on record in 2021

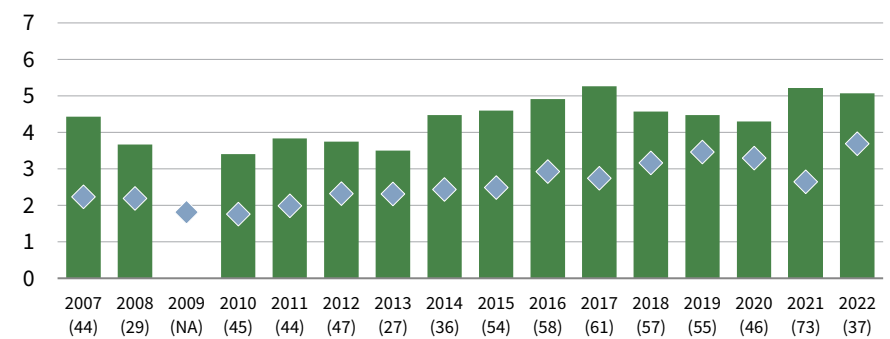
AVERAGE EBITDA LEVERAGE MULTIPLES AT ACQUISITION OF US PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • Net Debt/EBITDA

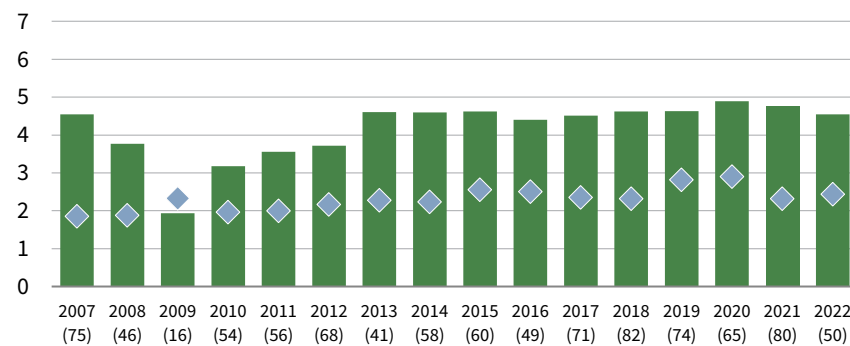
Consumer Discretionary



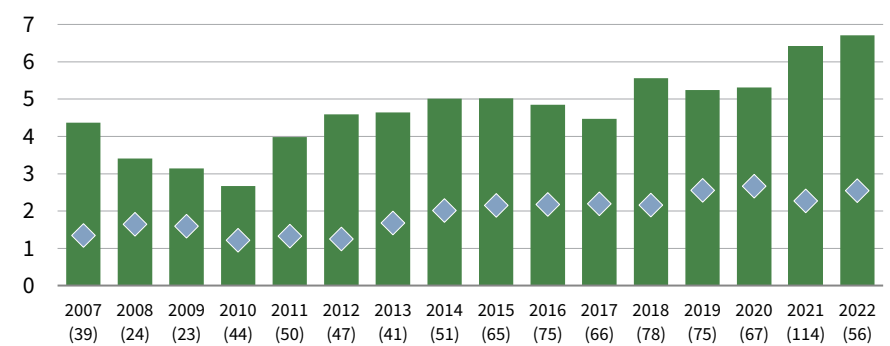
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

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

PE company average revenue growth remained strong through 2022

Since 2017, PE company revenue growth has averaged 19% annually, outpacing public company growth by ~10% per year

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

As of December 31, 2022 • Annual Growth Rate (%)

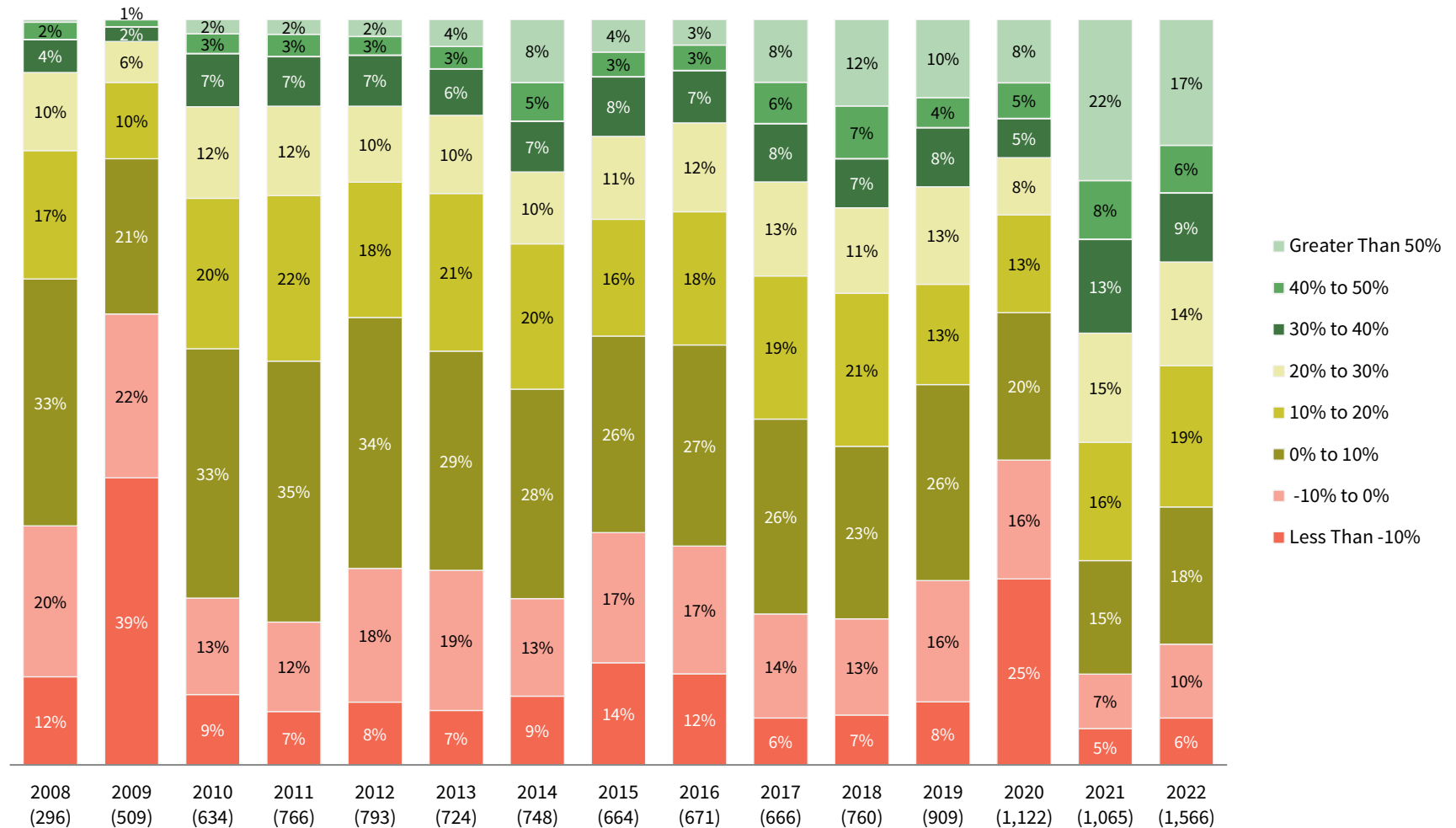


Despite increasing headwinds, 84% of PE companies grew revenue in 2022

And almost one-third grew revenue by more than 30%

ANNUAL REVENUE GROWTH BREAKDOWN OF US PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2022 • Annual Growth Rate (%)



Buyouts and growth equity companies continued to post strong growth rates in 2022

Revenue growth was down from 2021's highs, but was still second best of the 15-year period

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

As of December 31, 2022 • Annual Growth Rate (%)



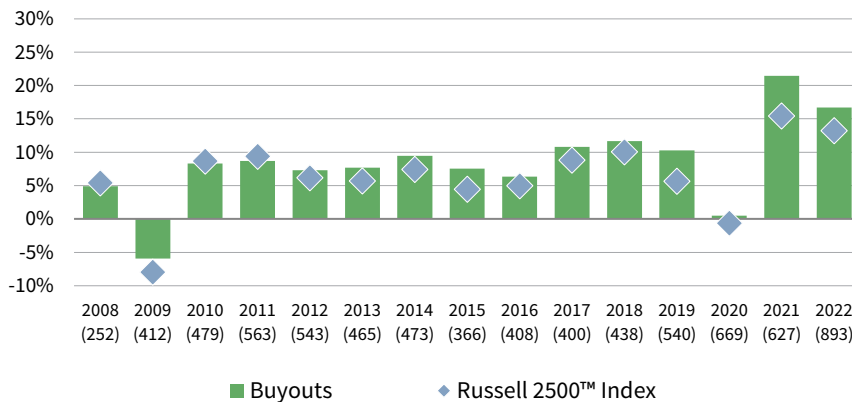
Buyouts across the size segments averaged double-digit growth in 2022

Over the 15-year period, buyouts averaged higher annual revenue growth than their public peers, with small buyouts outpacing small public companies by almost two times (11.0% versus 5.7%)

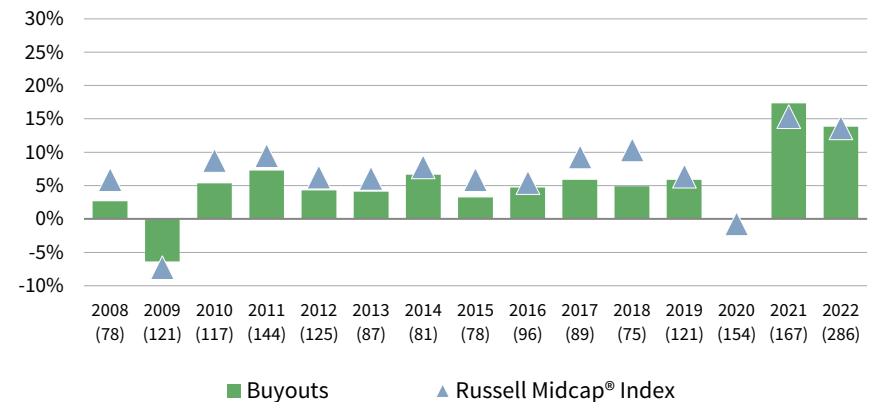
AVERAGE ANNUAL REVENUE GROWTH OF US PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2022 • Annual Growth Rate (%)

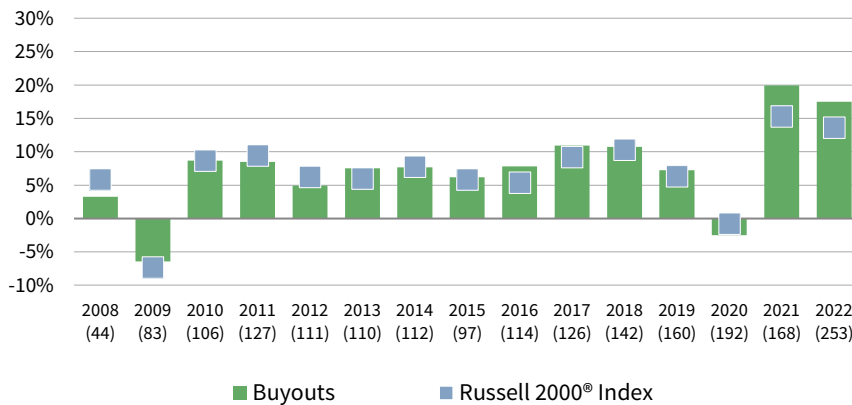
Total Universe



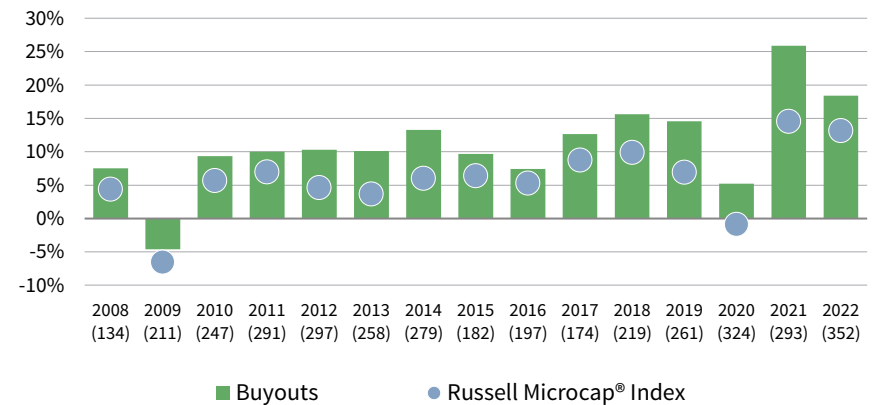
EV > \$1 B



EV \$250 M – \$1 B



EV < \$250 M



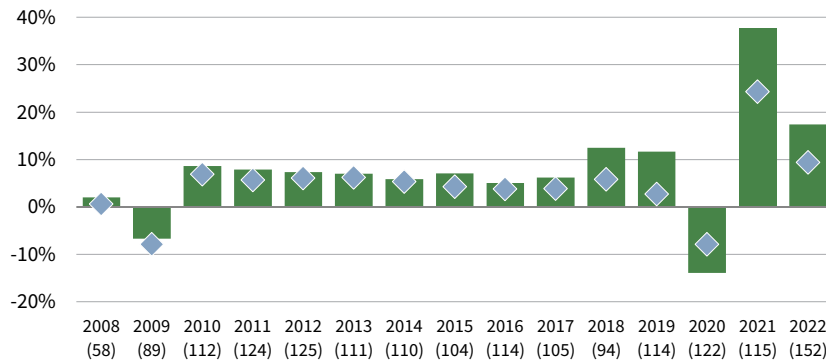
Three of the four sectors sustained strong revenue growth in 2022

Average revenue growth for consumer discretionary companies has been volatile the last three years, highlighting the divergent impacts that the pandemic had on the sector

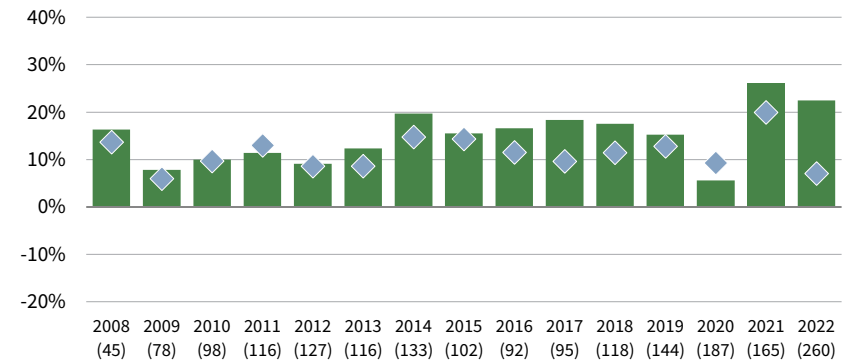
AVERAGE ANNUAL REVENUE GROWTH OF US PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • Annual Growth Rate (%)

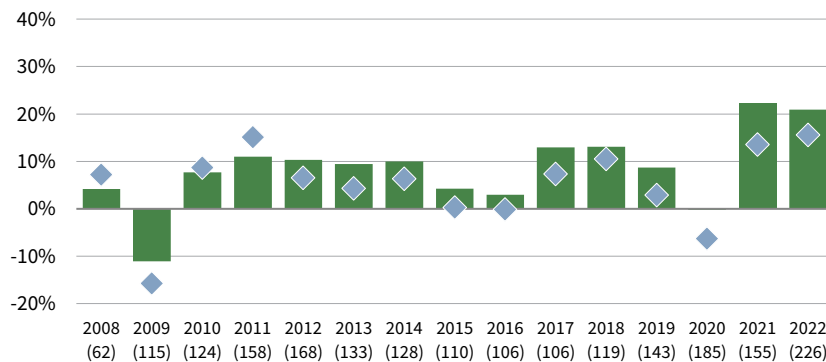
Consumer Discretionary



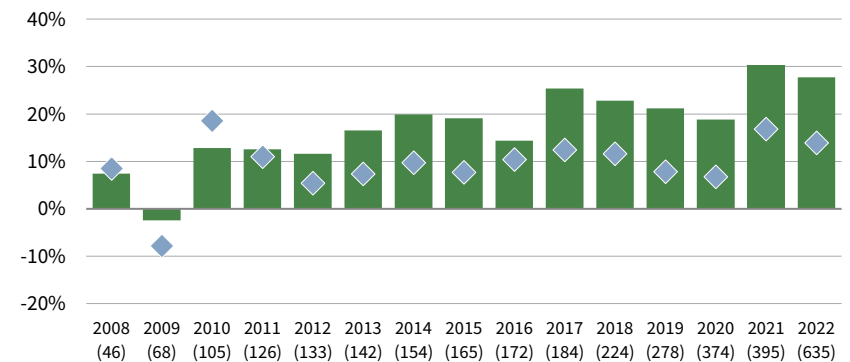
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™



IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

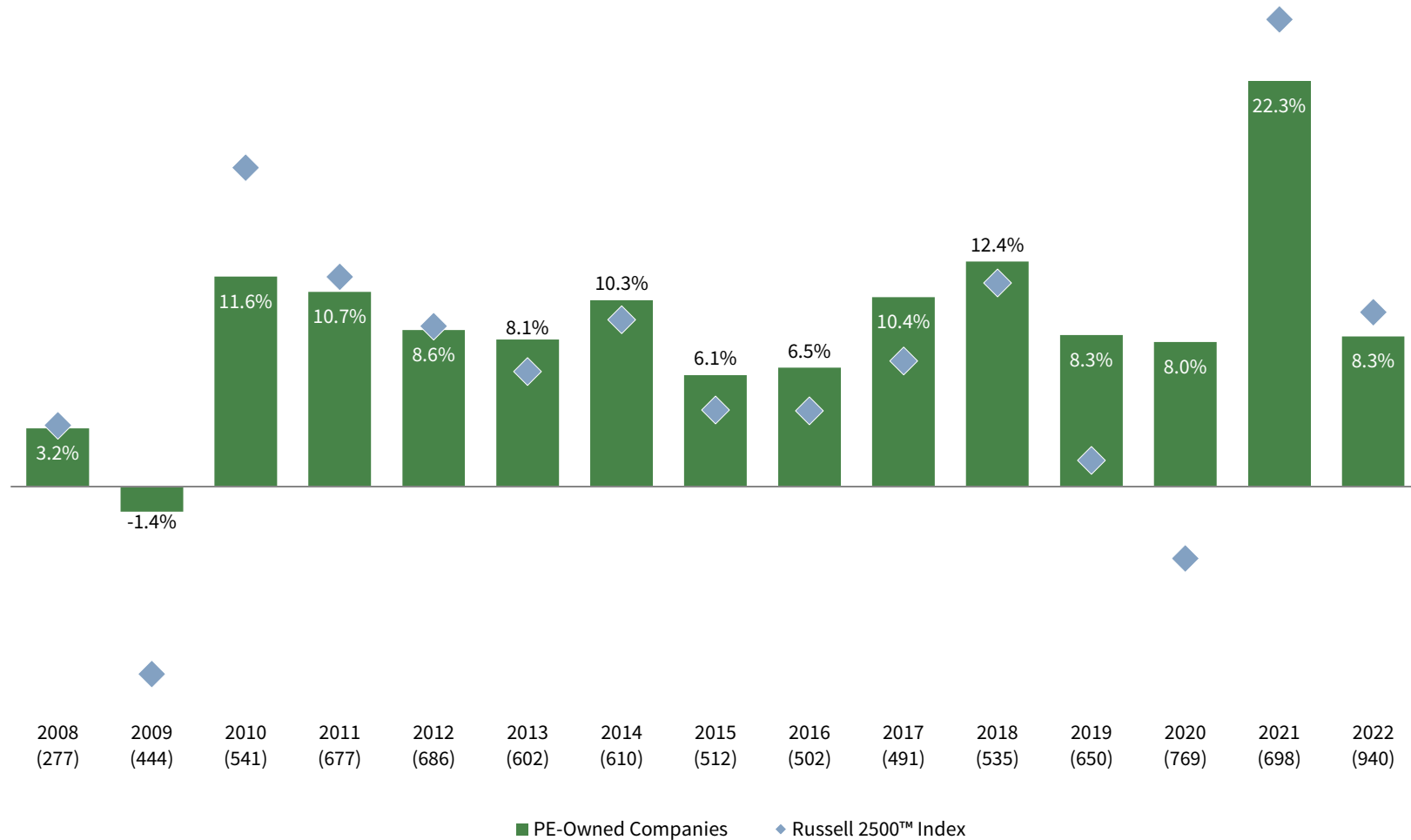
- Revenue Growth
- **EBITDA Growth**
- EBITDA Margin
- Exit Metrics

PE company average EBITDA growth in 2022 was in line with long-term norms (2008–20 was 8.3%)

After trailing in 2013–20, public companies averaged faster EBITDA growth than PE-backed businesses in 2021 and 2022

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

As of December 31, 2022 • Annual Growth Rate (%)

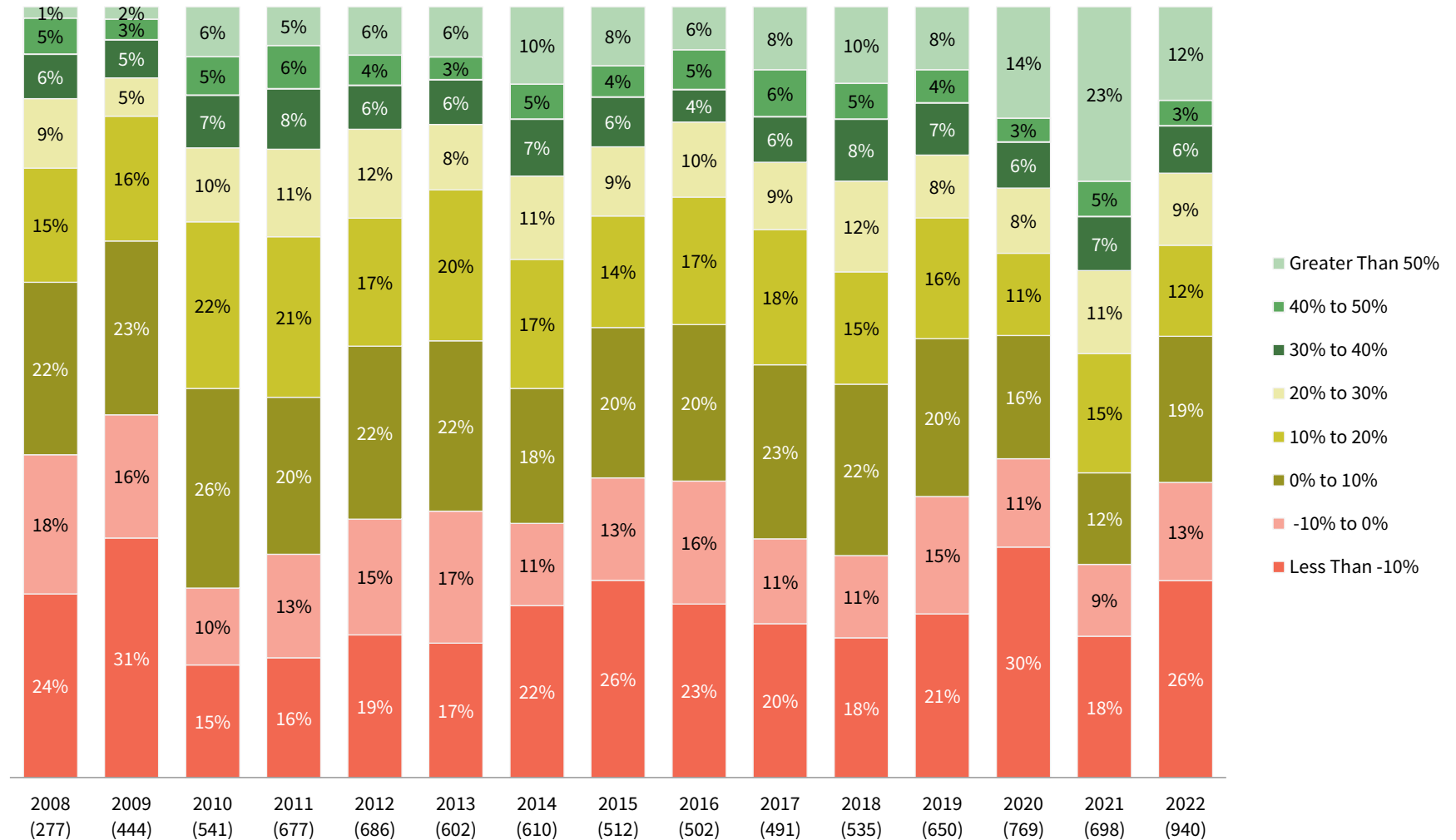


2022 saw a return to the longer-term EBITDA growth profile

2021 appears to have been an outlier, driven by the COVID-era macro environment

ANNUAL EBITDA GROWTH BREAKDOWN OF US PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2022 • Annual Growth Rate (%)

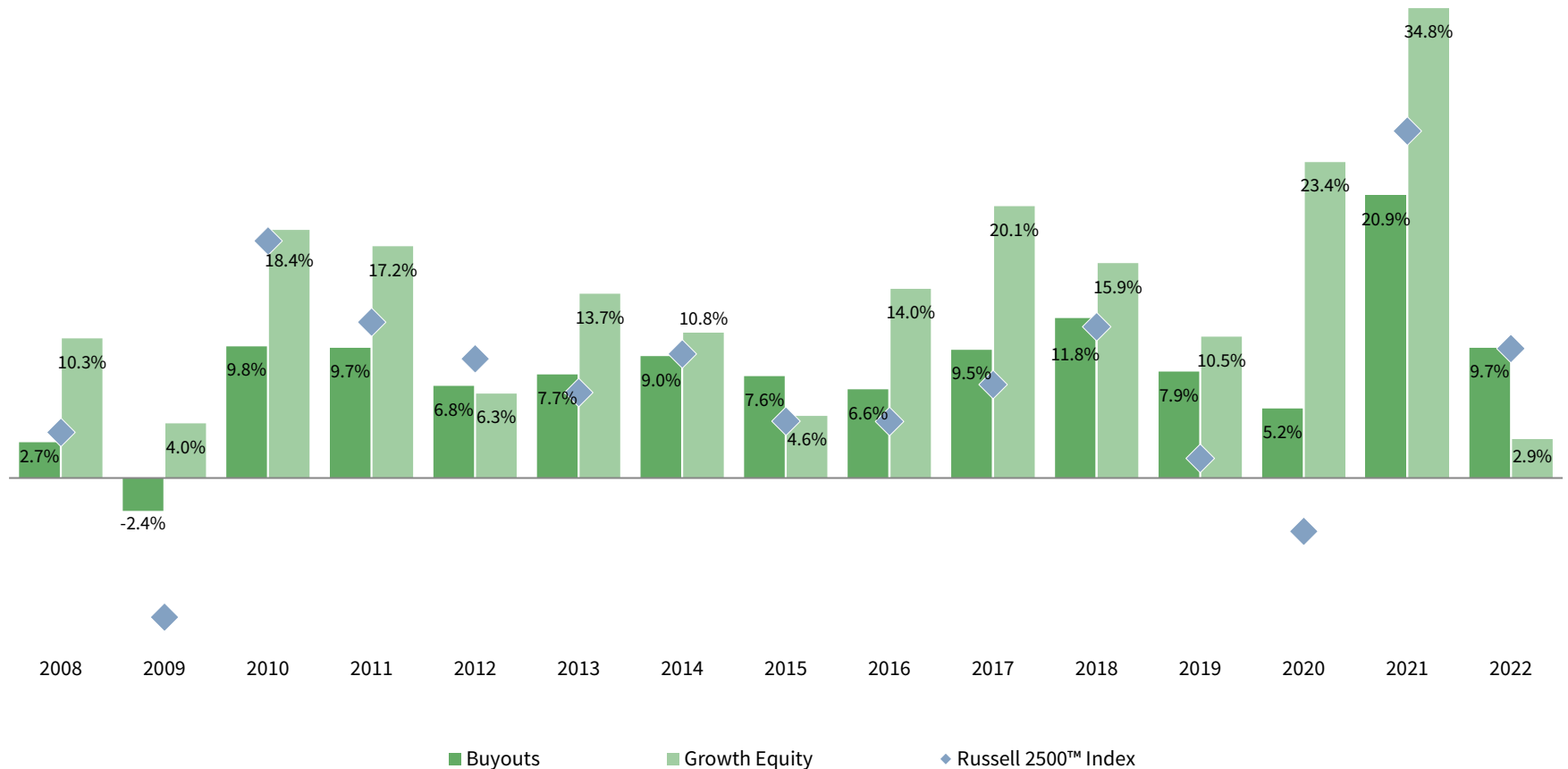


In 2022, growth equity averaged the lowest rate of EBITDA growth of any year analyzed

While still strong, average EBITDA growth for buyouts and public companies fell by more than 50% from their highs of 2021

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

As of December 31, 2022 • Annual Growth Rate (%)



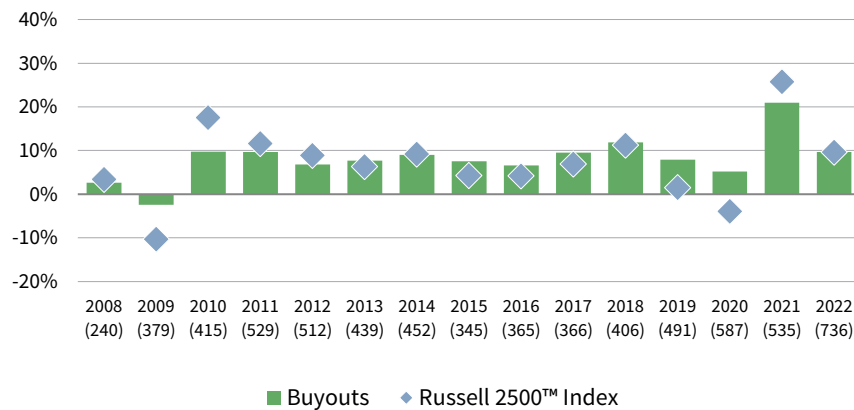
2021 EBITDA growth shined; 2022 was down but still strong

Over the 15-year period, buyouts of all sizes averaged higher EBITDA growth than their public counterparts; small buyouts had the most success

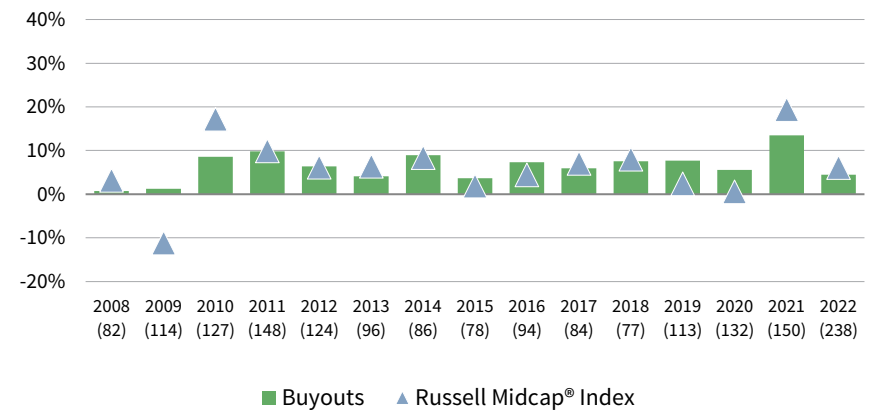
AVERAGE ANNUAL EBITDA GROWTH OF US PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2022 • Annual Growth Rate (%)

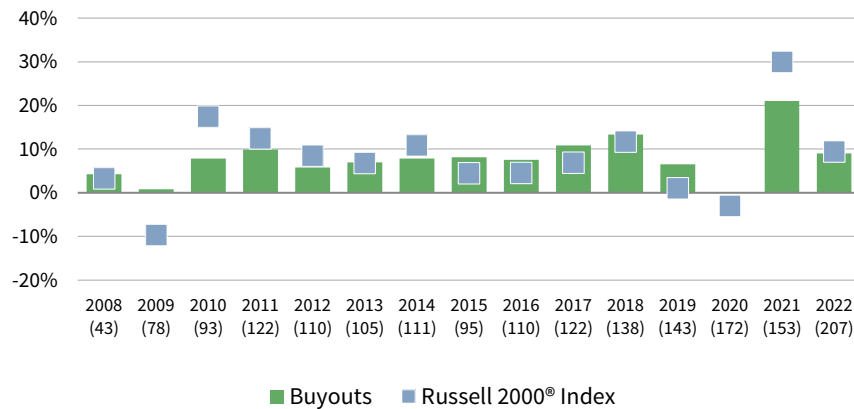
Total Universe



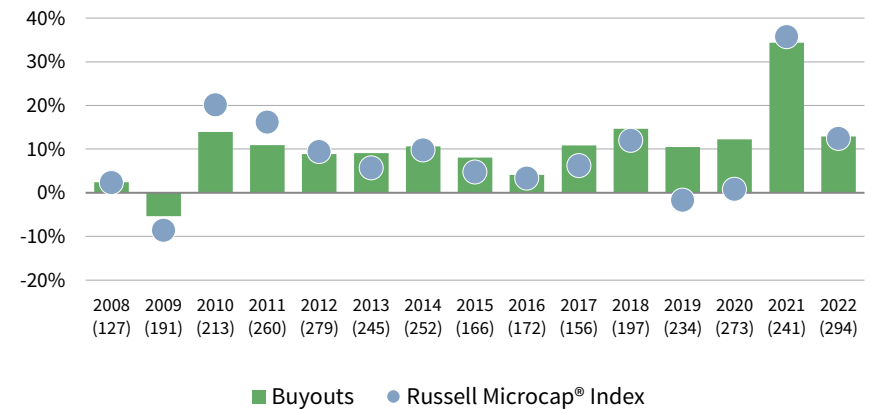
Enterprise Value > \$1 B



Enterprise Value \$250 M – \$1 B



Enterprise Value < \$250 M



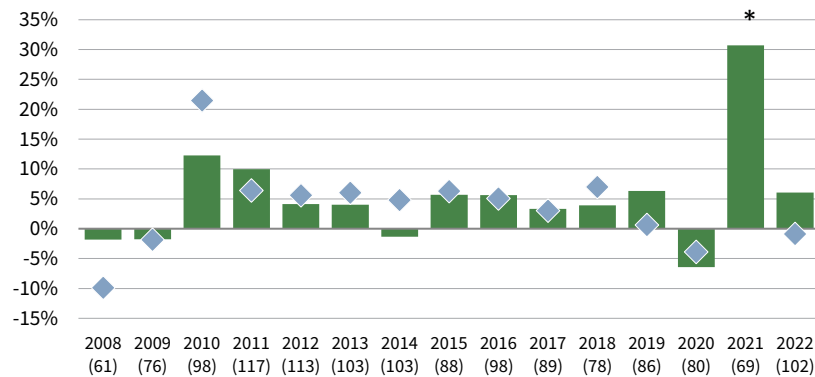
Industrials was the only sector to maintain strong EBITDA growth in 2022

PE-backed IT companies had worst year of the period; public peers still performed well

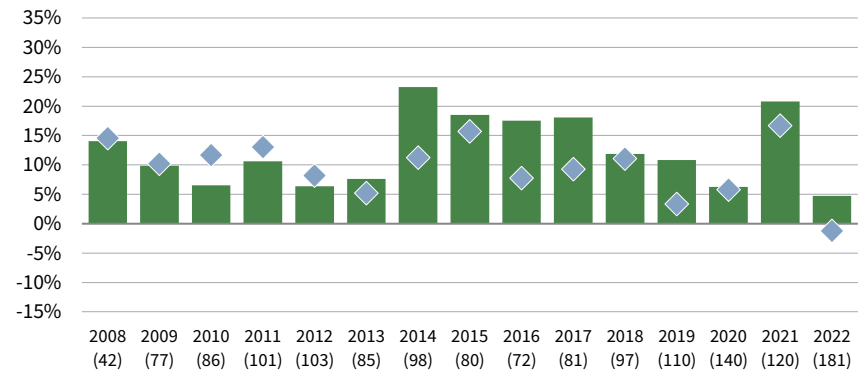
AVERAGE ANNUAL EBITDA GROWTH OF US PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • Annual Growth Rate (%)

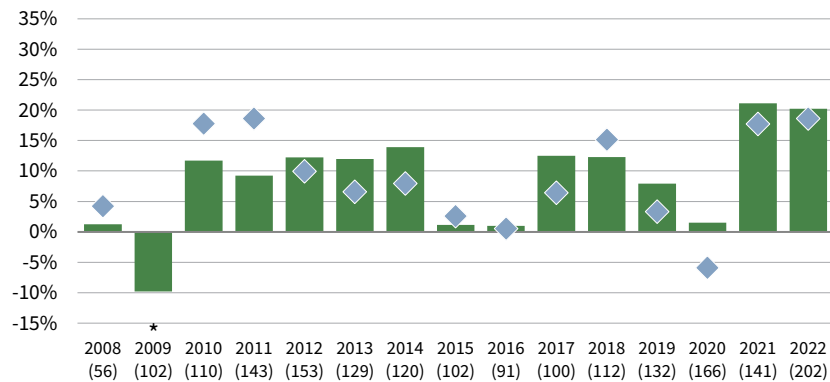
Consumer Discretionary



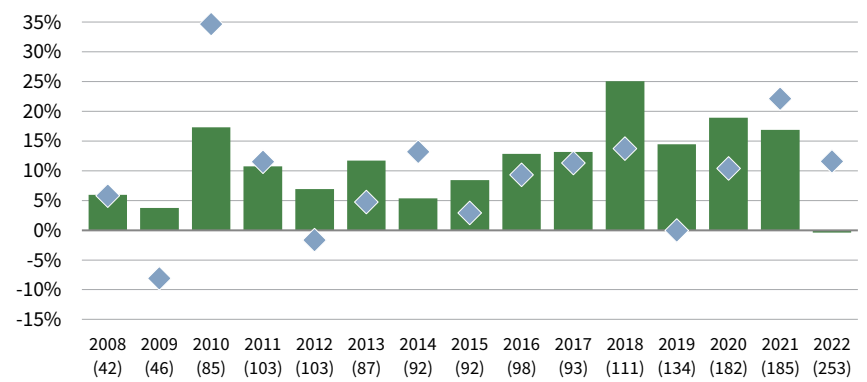
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™

* Axis has been capped at -15% and 35% for scaling purposes. Industrials companies in the Russell 2500™ saw EBITDA growth of -22.7% in 2009. Consumer discretionary companies in the Russell 2500™ saw EBITDA growth of 63.2% in 2021.

IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

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

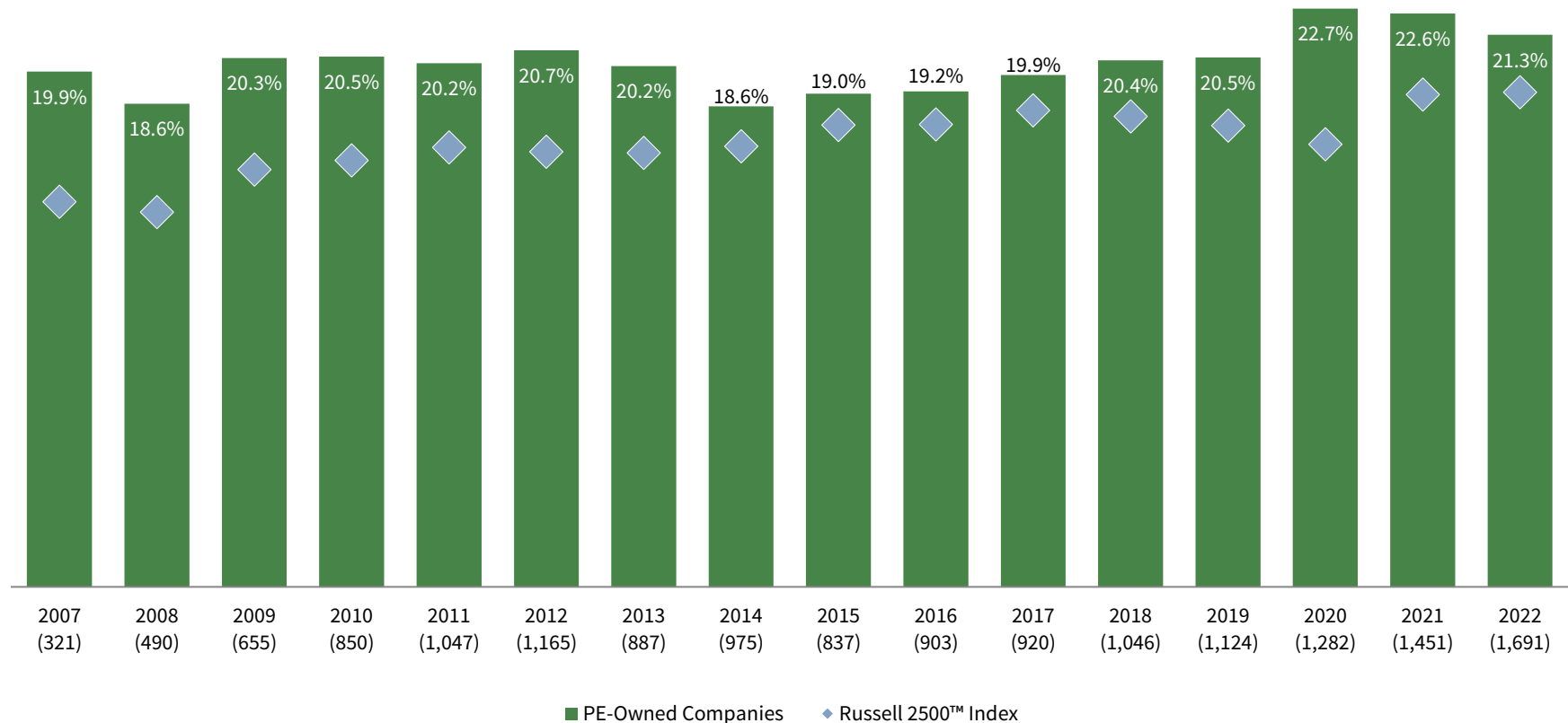


Despite a year-over-year decline, 2022 EBITDA margins were third highest across 16-year span

Public company margins rose in 2021 and 2022, but have remained lower than those of PE businesses

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

As of December 31, 2022 • EBITDA/Revenue (%)

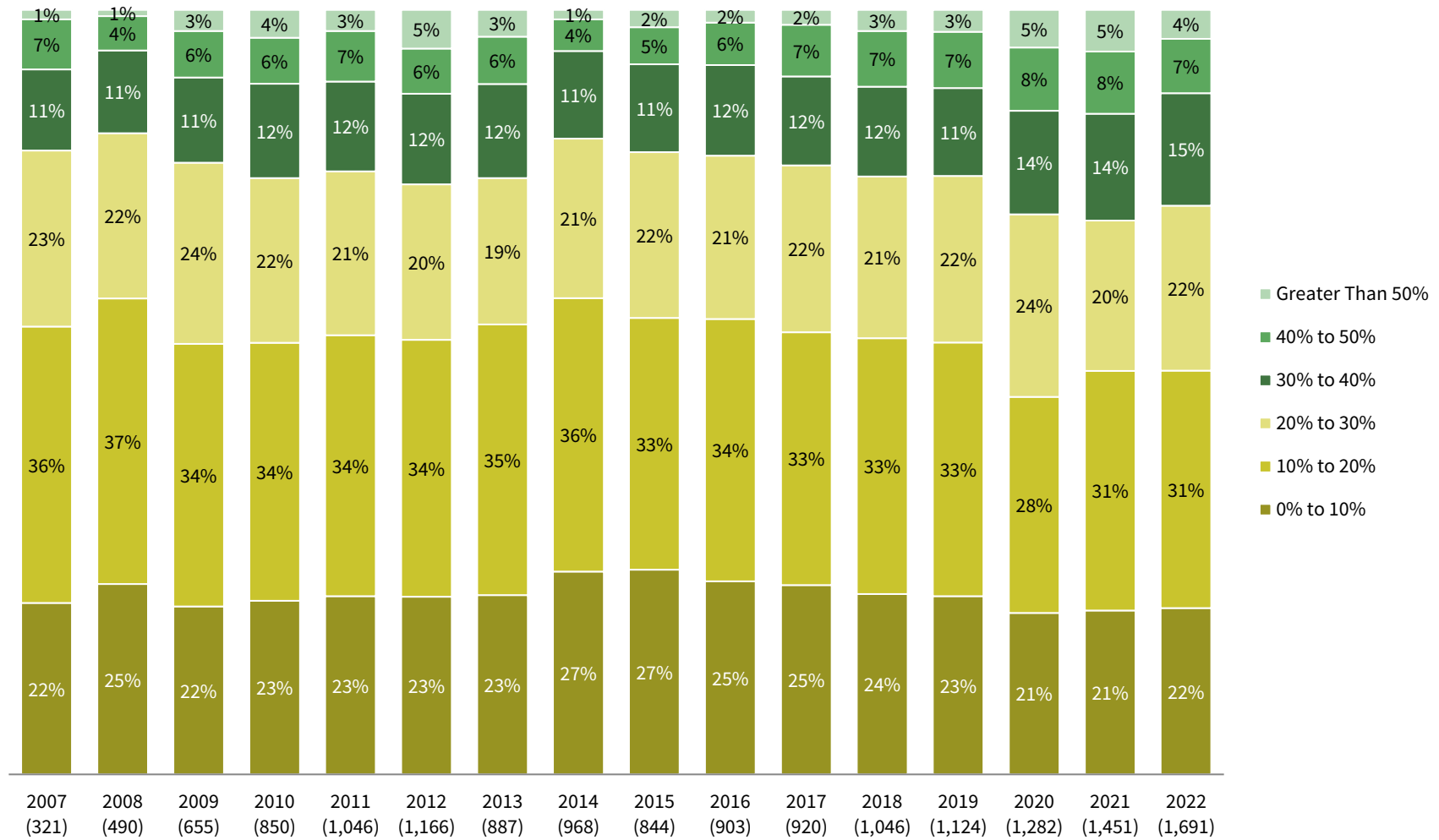


At least 25% of PE companies operated at 30%+ margins in 2020–22

And a slightly lower percentage of PE companies in the sample operated at margins of less than 10%

ANNUAL EBITDA MARGIN BREAKDOWN OF US PRIVATE EQUITY-OWNED COMPANIES

As of December 31, 2022 • EBITDA/Revenue (%)

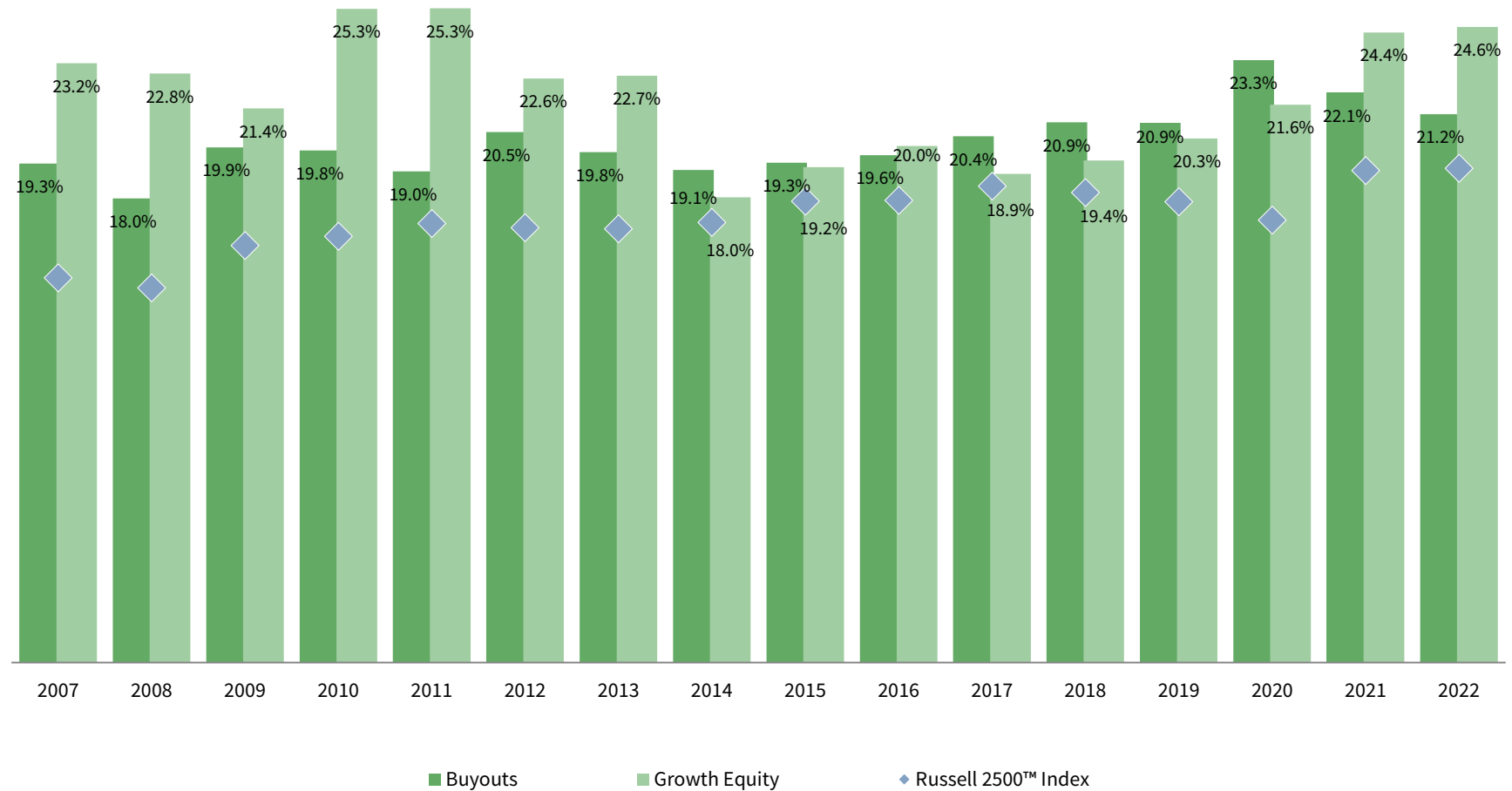


EBITDA margins for growth equity companies increased annually from 2017 to 2022

Buyouts have averaged higher margins than public companies

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

As of December 31, 2022 • EBITDA/Revenue (%)



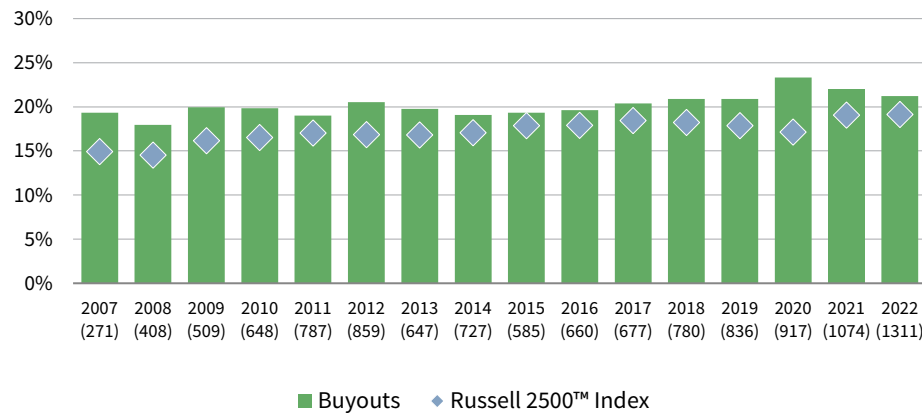
For all buyout size ranges, reported margins peaked in 2020 and have fallen since

Small and mid-sized buyouts have consistently operated at higher margins than public peers

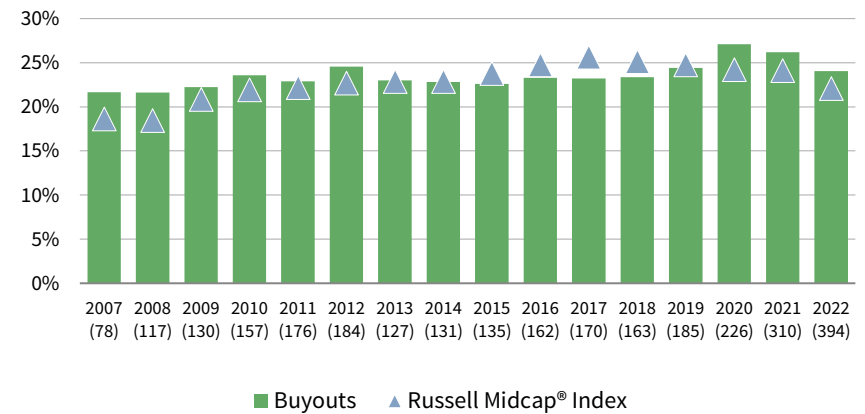
AVERAGE ANNUAL EBITDA MARGIN OF US PRIVATE EQUITY BUYOUT COMPANIES VS PUBLIC COMPANIES BY ENTERPRISE VALUE SEGMENT

As of December 31, 2022 • EBITDA/Revenue (%)

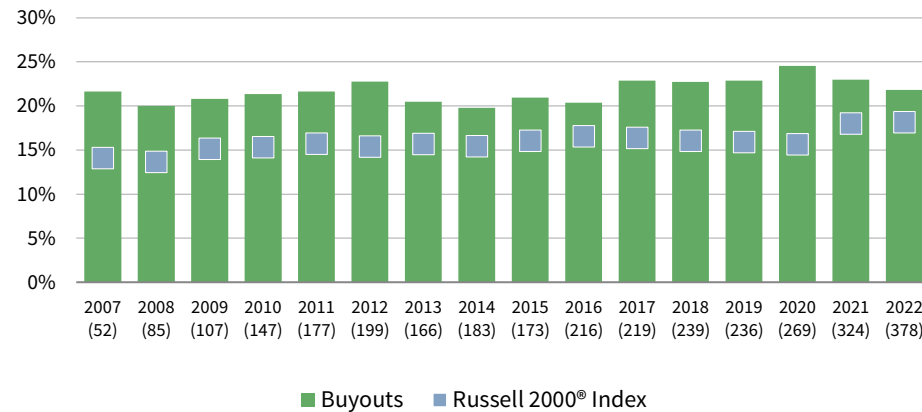
Total Universe



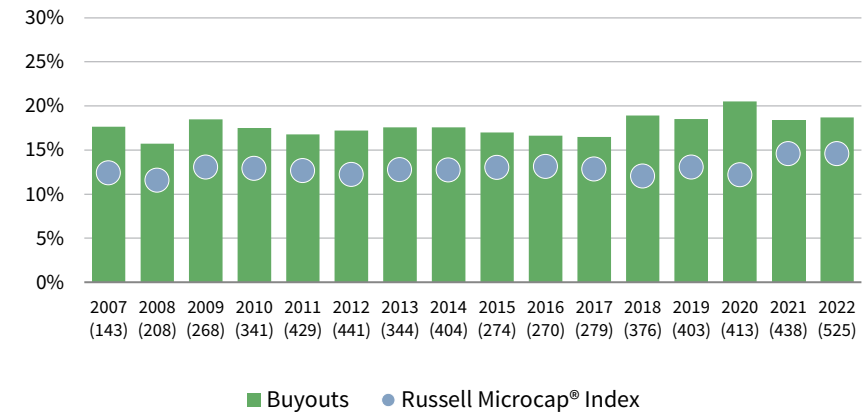
Enterprise Value > \$1 B



Enterprise Value \$250 M – \$1 B



Enterprise Value < \$250 M



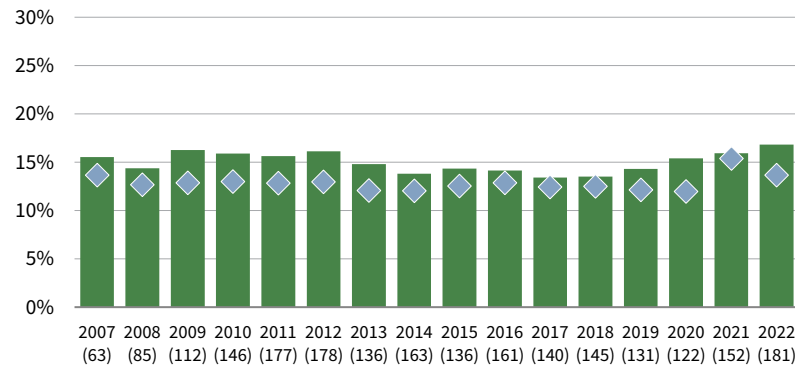
PE-backed consumer discretionary companies averaged their highest margins of any year in 2022

Since 2007, PE-backed IT companies have operated at the highest margins relative to other sectors or ownership type (PE or public)

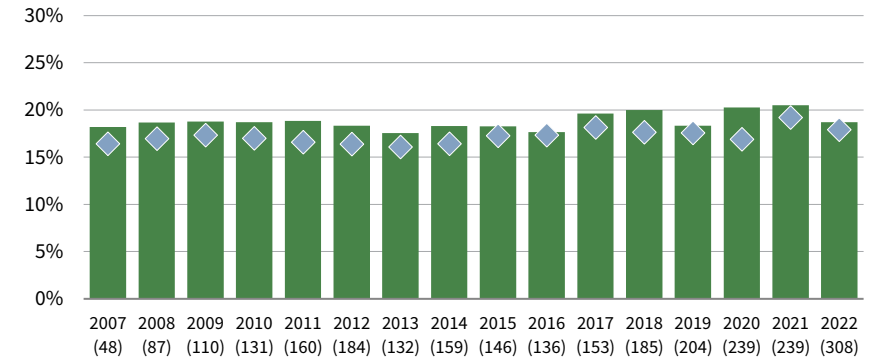
AVERAGE ANNUAL EBITDA MARGIN OF US PRIVATE EQUITY-OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • EBITDA/Revenue (%)

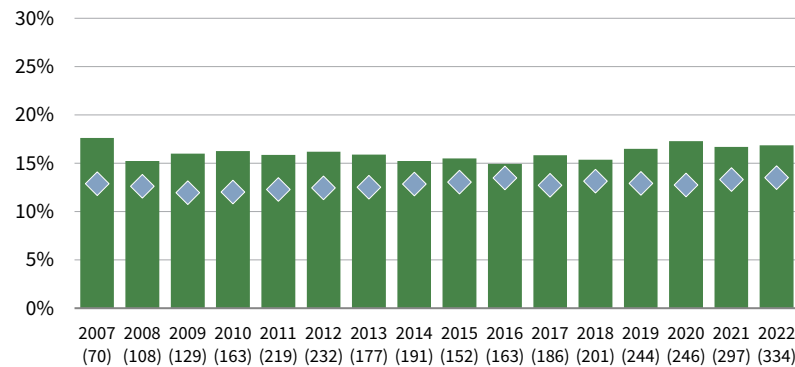
Consumer Discretionary



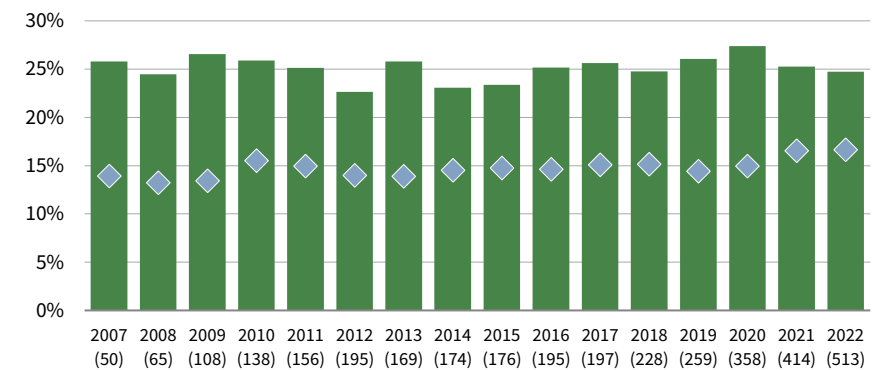
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™



IMPROVE THE PERFORMANCE OF THE COMPANY AND TRANSFORM THE BUSINESS

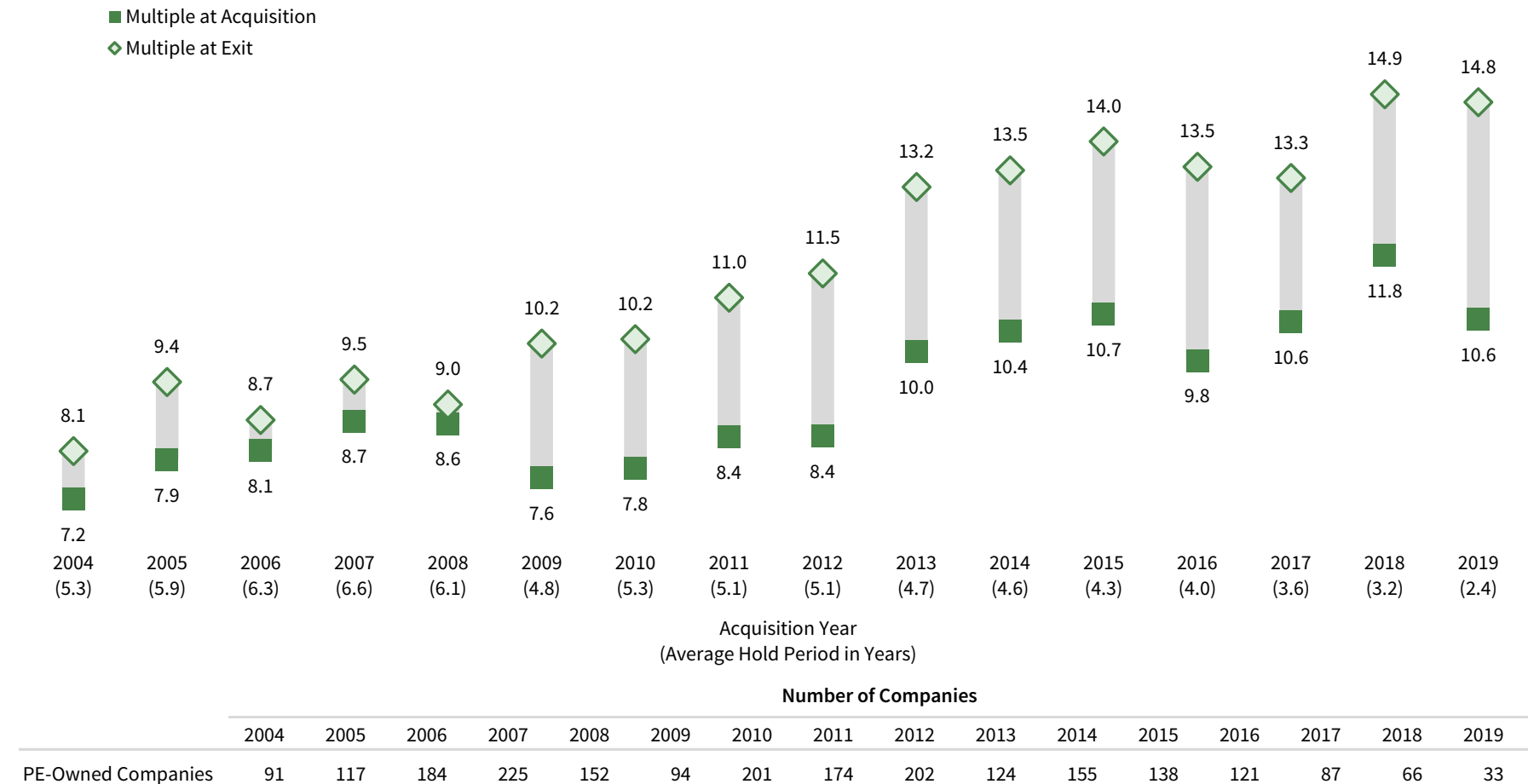
- Revenue Growth
- EBITDA Growth
- EBITDA Margin
- **Exit Analyses**

The equity bull market has buoyed PE returns for a decade, supporting multiple expansion at exit

Exited companies acquired in 2018 and 2019 were realized at record median multiples of nearly 15x EBITDA

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

As of December 31, 2022 • Enterprise Value/EBITDA



Deleveraging as a source of value creation has been muted since the GFC

But recent exits could suggest a renewed trend of multiple compression

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

As of December 31, 2022 • Net Debt/EBITDA



Number of Companies

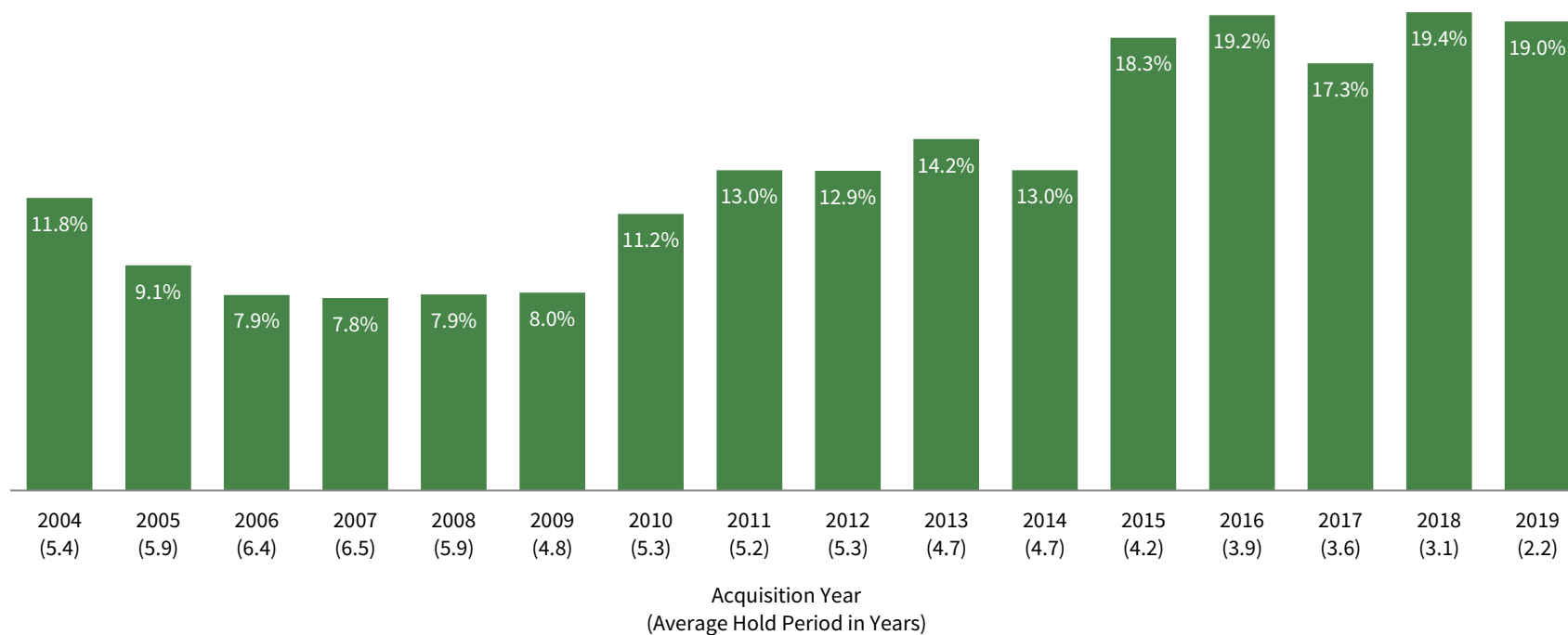
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PE-Owned Companies	87	107	163	205	126	72	176	159	176	97	133	124	110	85	64	33

The median revenue CAGR for exited companies acquired since 2015 was 18.3%

Growth in recent periods has been more than double the growth achieved by companies acquired in 2005–09

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

As of December 31, 2022 • Compound Annual Growth Rate (%)



	Number of Companies															
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PE-Owned Companies	119	143	231	281	186	125	246	215	246	162	223	207	174	144	104	48

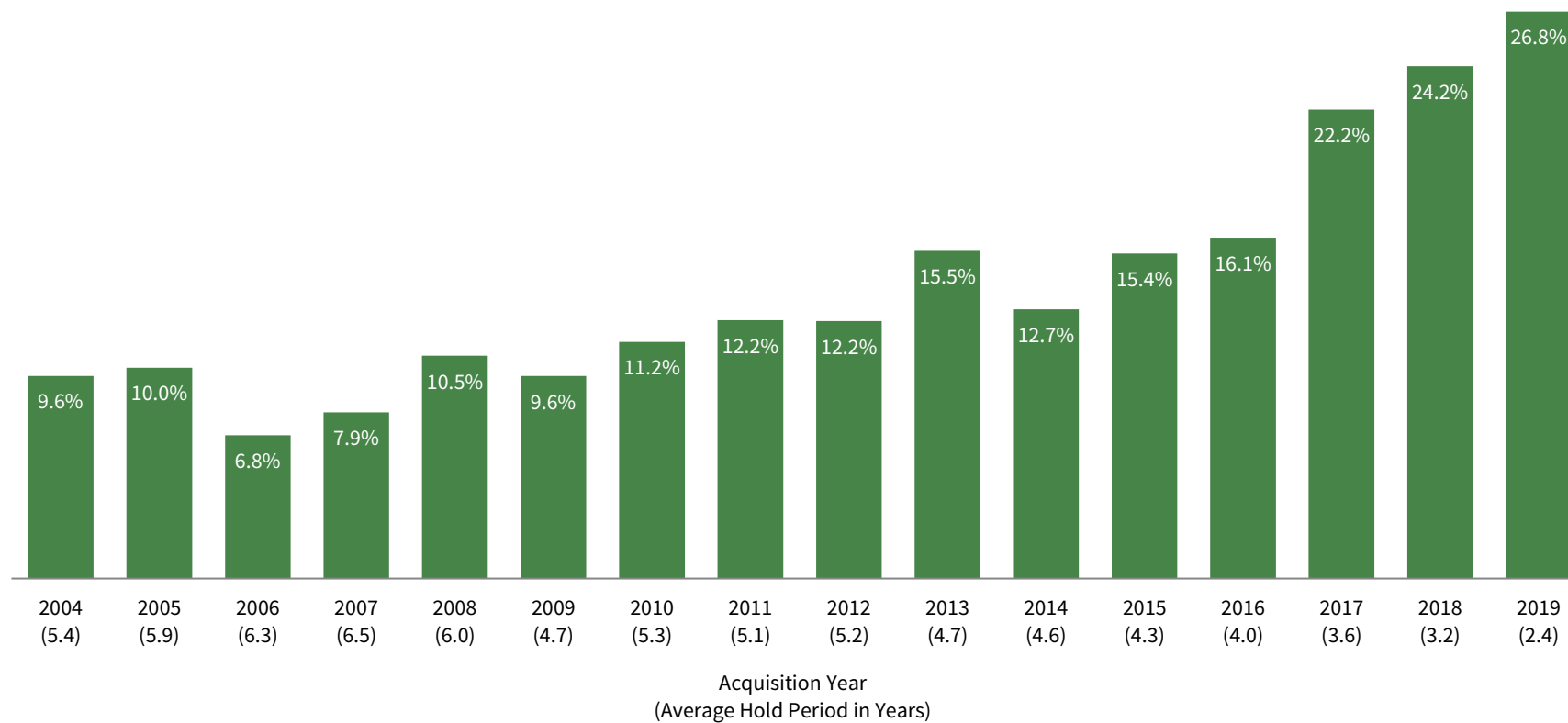
Source: Cambridge Associates LLC Private Investments Database (as reported by investment managers).

The median EBITDA CAGR for exited companies acquired since 2015 was 19.5%

High growth rates and short hold periods suggest managers achieved some quick wins from the 2017–19 vintages

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

As of December 31, 2022 • Compound Annual Growth Rate (%)



	Number of Companies															
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PE-Owned Companies	101	128	195	248	164	100	209	182	209	127	169	152	128	98	69	34

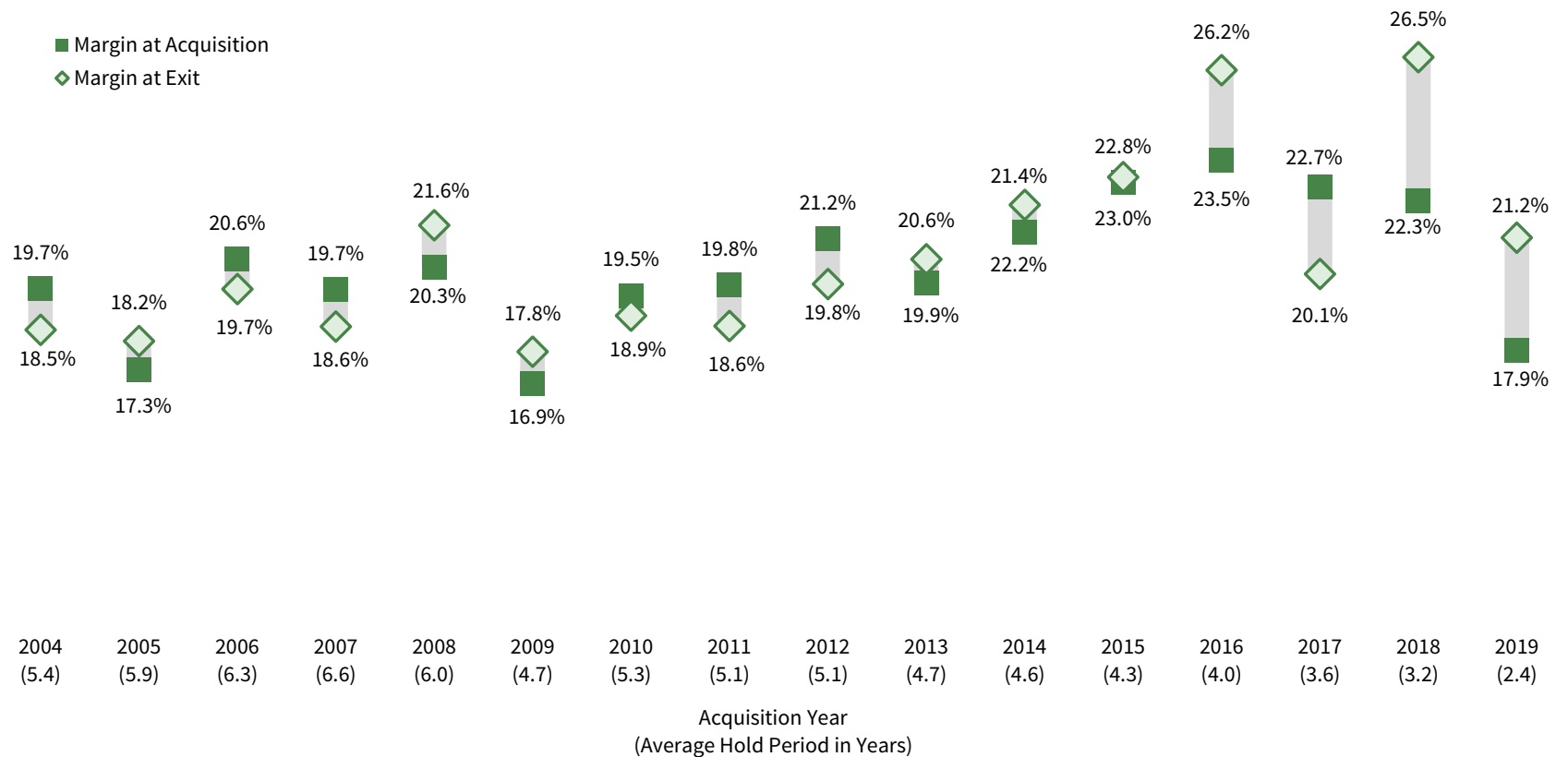
Source: Cambridge Associates LLC Private Investments Database (as reported by investment managers).

There does not appear to be a consistent theme around change in margin during PE ownership

Three of the four most recent acquisition years indicate margin improvement during PE ownership

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

As of December 31, 2022 • EBITDA/Revenue (%)



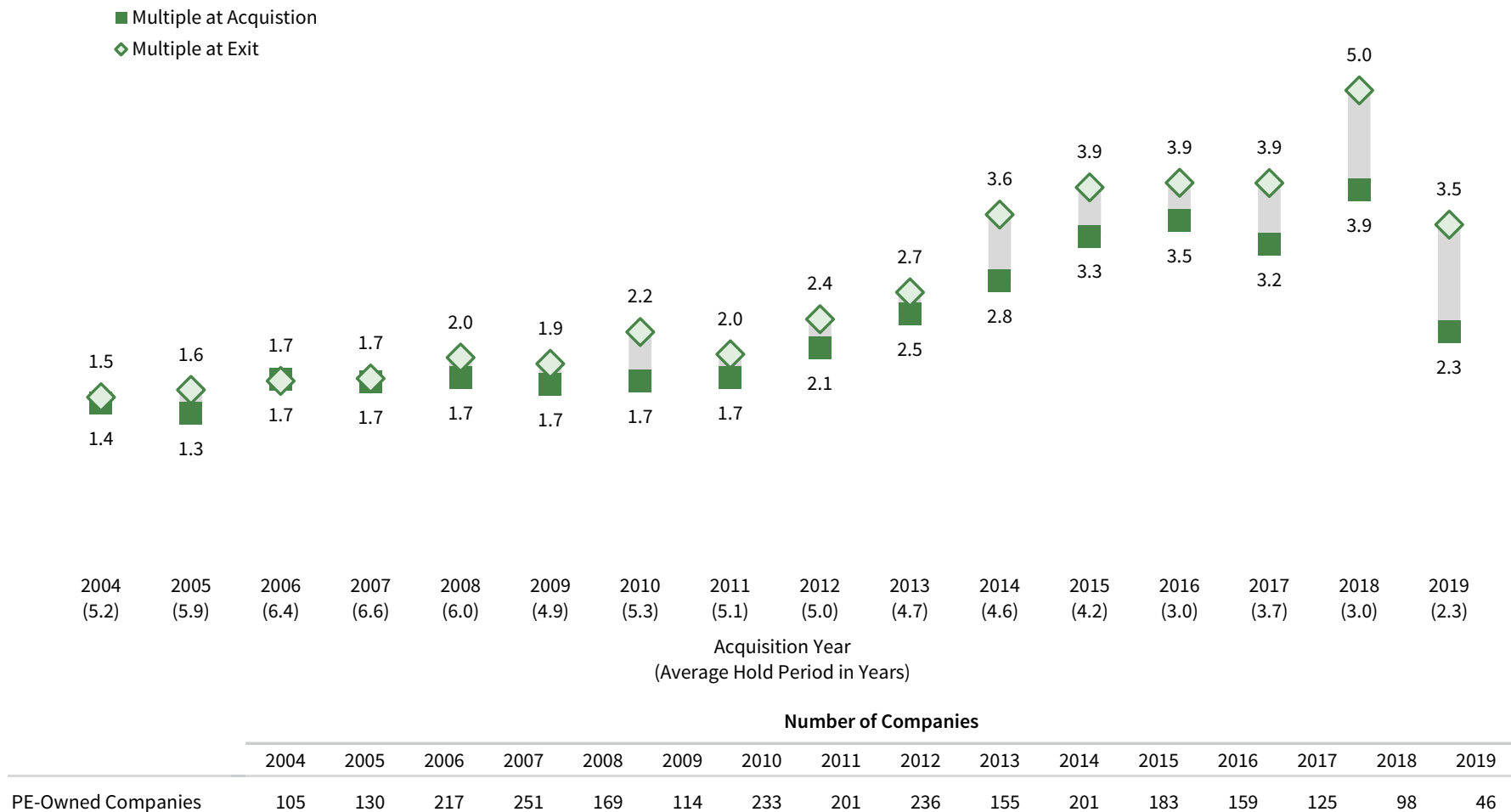
		Number of Companies															
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PE-Owned Companies		98	125	188	236	162	99	207	182	207	128	168	151	126	98	67	33

For all but two acquisition years analyzed, median exit revenue multiples exceeded those at acquisition

Like other exit metrics, “quicker” exits have also meant more multiple expansion, particularly in a market where buyers paid a premium for growth

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

As of December 31, 2022 • Enterprise Value/EBITDA



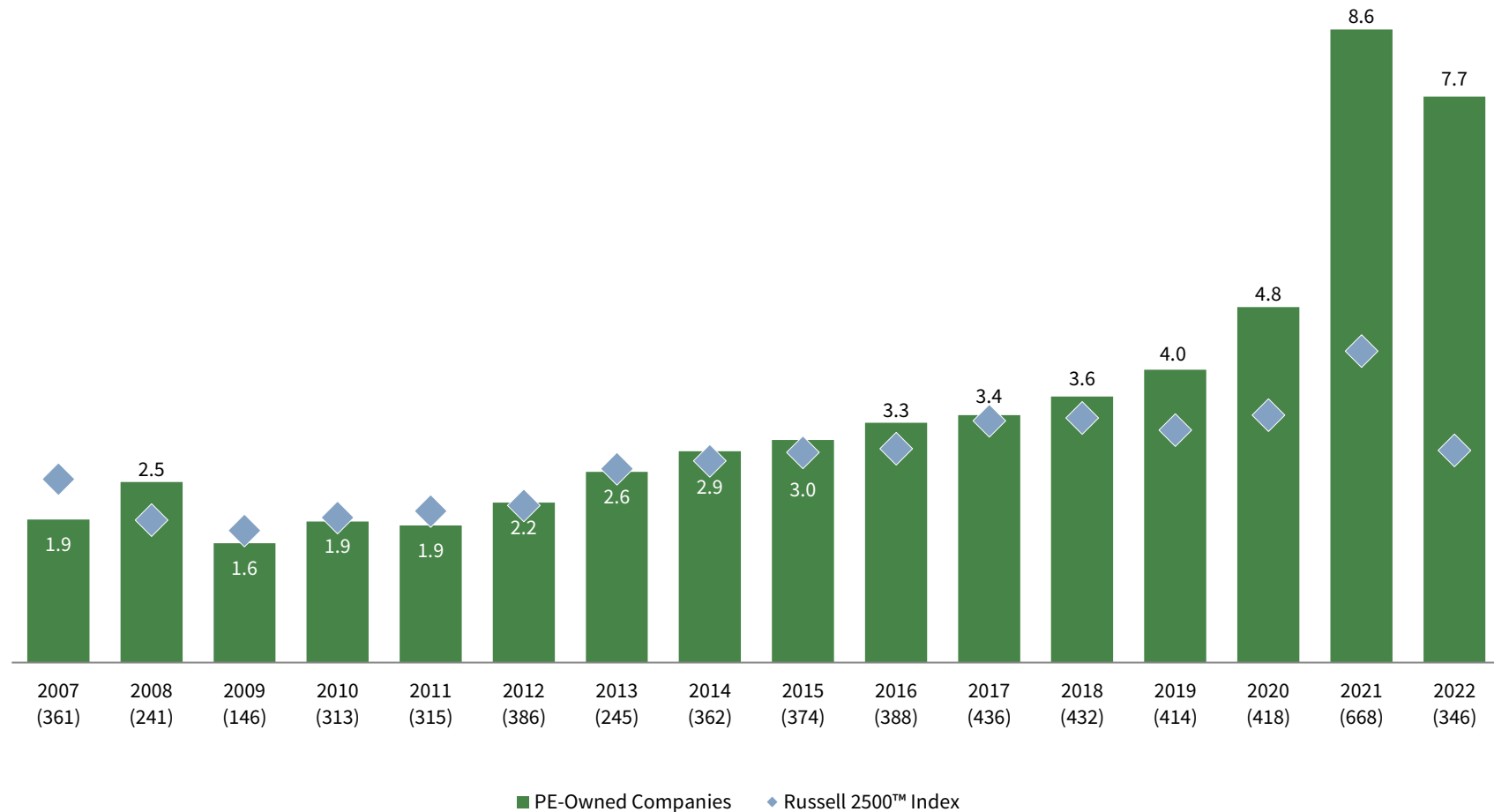
APPENDIX: REVENUE PURCHASE PRICE MULTIPLE

Revenue multiples receded in 2022 but were still substantially above longer-term averages

The difference between private and public revenue PPMs expanded in 2022 as public markets responded more quickly to the changed environment

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

As of December 31, 2022 • Enterprise Value/LTM Revenue



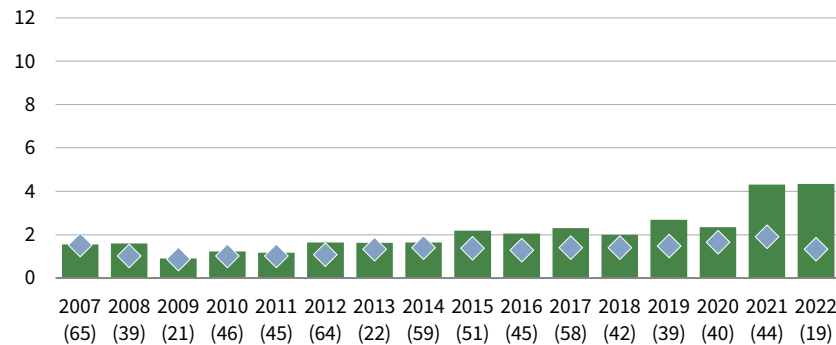
In 2022, revenue PPMs only “corrected” in IT, but at 12x, they were still the highest among the sectors

2022 was the first year where PE revenue multiples in healthcare exceeded those for public companies, in part due to the public market’s heavier weighting in biotech

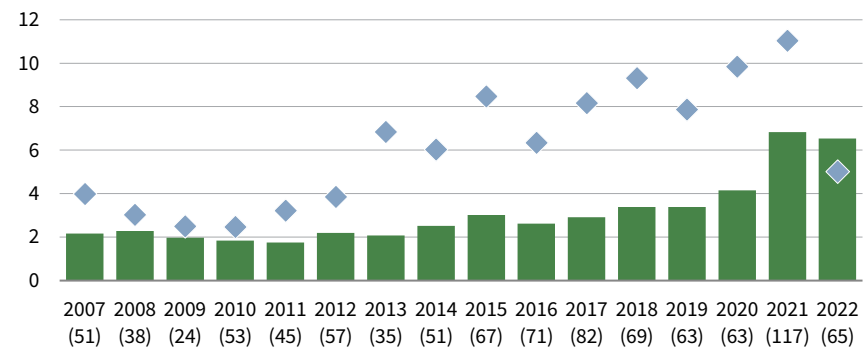
AVERAGE REVENUE PURCHASE PRICE MULTIPLES AT ACQUISITION OF US PRIVATE EQUITY–OWNED COMPANIES VS PUBLIC COMPANIES BY SECTOR

As of December 31, 2022 • Enterprise Value/Revenue

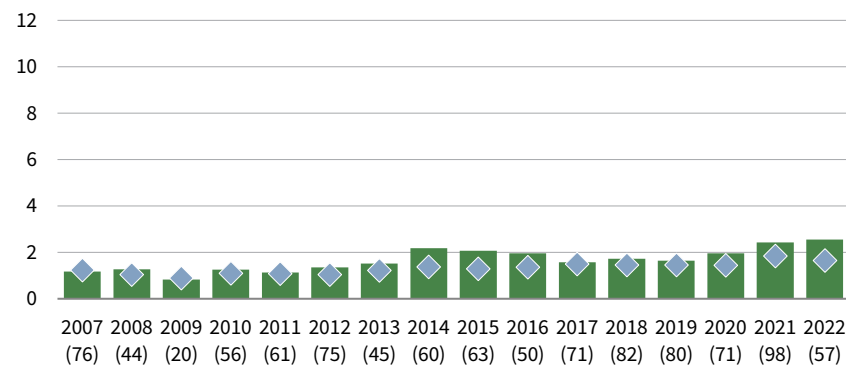
Consumer Discretionary



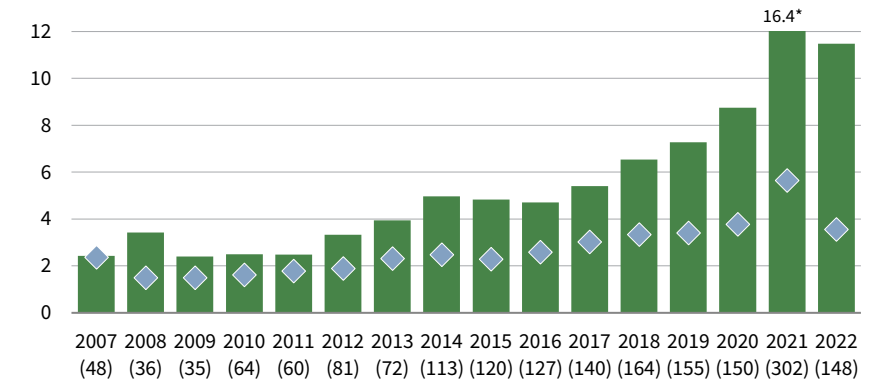
Healthcare



Industrials



Information Technology



■ PE-Owned Companies

◆ Russell 2500™

* Axis has been capped at 12x for scaling purposes.

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.

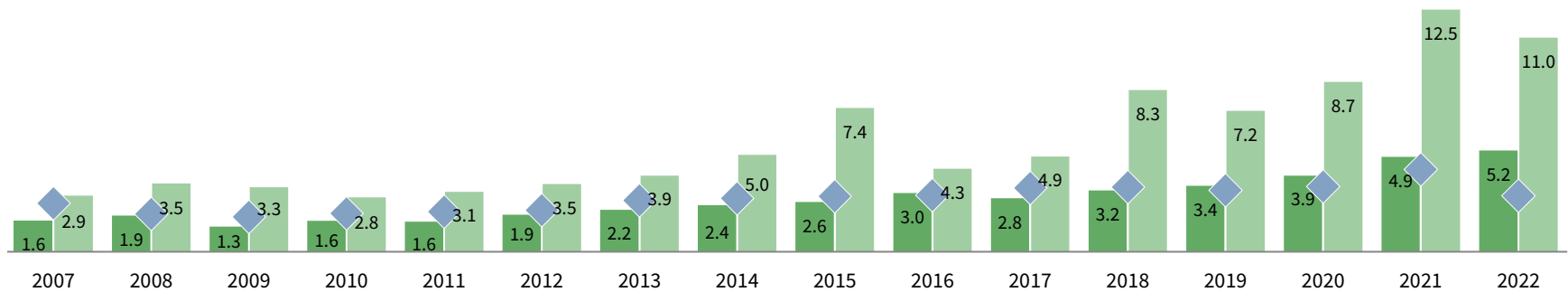
Growth has continued to command premium valuations, particularly in IT

In 2021 and 2022, average revenue multiples for growth equity IT companies were double the average from 2007–20

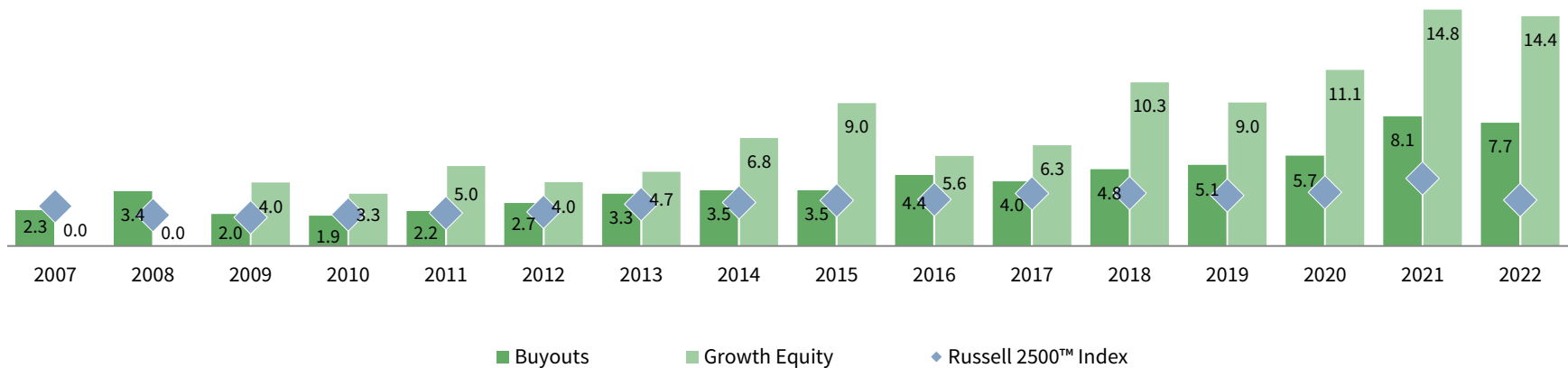
AVERAGE REVENUE PURCHASE PRICE MULTIPLES AT ACQUISITION BY DEAL TYPE AND SECTOR VS PUBLIC COMPANIES

As of December 31, 2022 • Enterprise Value/LTM Revenue

Deal Type: All Companies



Deal Type: IT Companies





**CAMBRIDGE
ASSOCIATES**

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