

Stock Compensation

2018 Assumption and Disclosure Study

August 2018
People and
Organization





Dear Clients and Friends,

PwC is pleased to share with you our ***Stock Compensation 2018 assumption and disclosure study***. This study presents our analysis of the 2017 calendar year-end assumptions and disclosures separately for large, non-high tech US public companies and for high tech US public companies.

In preparing this year's study, we considered only companies with a late December fiscal year-end that reported stock compensation expense in their 2017 Form 10-K. Our "large company" group is comprised of the top 100 non-high tech companies based on market capitalization in the S&P 500 meeting the reporting criteria.

We also looked at a "high tech company" group, consisting of the top 100 companies on the NASDAQ technology, biotech, and pharmaceutical industry lists (equally distributed) also meeting our reporting criteria. Some side-by-side comparative information for the two groups is also provided.

We included 2013 through 2017 comparative data as well as information from 2006 (when the original FAS 123(R) took effect) for historical comparison and perspective. Please note that companies and their data included in our past studies may be different from the current year's data.

The study highlights are summarized in the first section, followed by more detailed comparative information and discussion. Comparatives relative to 2006 are summarized at the end of the report.

We hope you will find the results of our ***Stock Compensation 2018 assumption and disclosure study*** useful in benchmarking your company's assumptions and other data points associated with your stock compensation plans.

A handwritten signature in black ink, appearing to read "Ken Stoler".

Ken Stoler
Partner

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I – Summary



Study basis criteria

We performed an analysis of the stock compensation disclosures made by 100 Large non-high tech companies and 100 High Tech companies. All information in this analysis is based on published annual reports of the selected companies. Due to changes in market capitalization, corporate transactions or plan design changes, some of the companies in our Large and High Tech groups in our study in prior years are not included in this 2018 study. Also, as companies may not have issued stock-based compensation awards in all prior years, data for some years may consist of less than 100 companies.¹

Large companies refer to the top 100 companies in the S&P 500 by market capitalization with stock compensation expense in 2017 and a fiscal year-end in late December that are not in the technology, pharmaceutical, or biotechnology sectors. **High Tech companies** refer to the top 100 companies on the NASDAQ technology, biotechnology, and pharmaceutical industry lists, evenly distributed, with stock compensation expense in 2016 and a fiscal year-end of late December.

The following table highlights the results of our study and compares the 2017 data to 2016 data.

Highlights

	Large companies		High tech companies	
	2017	2016	2017	2016
Stock compensation as a percentage of pre-tax earnings (Median)²	3.9%	3.7%	14.9%	14.5%
Percent of equity awards granted – Number of units (Median)				
• Stock options ³	55%	54%	70%	67%
• Restricted stock ⁴	45%	46%	30%	33%
Percent of equity awards granted – Value of awards (Median)				
• Stock options ³	19%	22%	39%	44%
• Restricted stock ⁴	81%	78%	61%	56%
Use of the Black-Scholes option valuation model (by Company)	77%	82%	97%	98%
Assumptions used for stock option model (Median)				
• Expected term	6.0	6.0	5.8	5.7
• Volatility	22.6%	24.0%	46.0%	46.5%
• Risk-free interest rate	2.1%	1.4%	2.0%	1.5%
• Dividend yield	2.3%	2.7%	1.7%	1.9%

¹ When non-zero data exists for less than 100 companies, results are for only those companies reporting data (i.e., proportional distribution will add up to 100% even when there are less than 100 companies in the analysis).

² Excludes companies with a net operating loss.

³ For purposes of these highlights, “stock options” is used to refer to both employee stock option and stock appreciation rights (“SAR”) awards granted by a company, unless separately presented and identified.

⁴ For purposes of this study, “restricted stock” is used to refer to restricted stock, restricted stock units and nonvested share awards granted by a company.

Large companies

When valuing stock options, companies continue to rely heavily on the **Black-Scholes option pricing model**, with 77% of Large companies relying solely on the use of that model in valuing their stock option awards. However, 23% of Large companies disclose use of other models such as a **lattice model or a Monte Carlo** simulation in valuing their stock options⁵.

Median Black-Scholes option pricing model assumptions in 2017 generally reflected some change from those reported at December 31, 2016 for Large companies. While the **expected term** remained steady, the **volatility** assumption ticked downward slightly. However, the **risk-free rate** of interest experienced a jump of 70 basis points, reflecting changes in Treasury rates over the last year and the **dividend yield** assumption dropped about 40 basis points.

Equity awards granted by Large companies showed a small shift in the mix (by median share **volume**) to 55% stock options, showing continued use of stock options, in theory. But, consistent with prior years, the median **value** of restricted stock awards far exceeded the median value of stock options granted in 2017, with restricted stock making up 81% of the total median grant value.

We noted that a number of banking and financial services companies issued significant amounts in only restricted stock and, overall, only 57% of the Large companies issued both stock options and restricted stock, a decrease from 60% last year.

Median stock compensation as a percentage of income before taxes for Large companies increased over the past couple years, moving from 3.7% in 2016 to 3.9% in 2017, but remained in a narrow range observed for many years.

High Tech companies

High Tech companies continue to rely heavily on the Black-Scholes option pricing model with 97%⁶ of the study group disclosing use of this model only in valuing stock option awards.

Overall, median Black-Scholes option pricing model assumptions for High Tech companies moved similarly to those of the Large company group, from 2016 to 2017. The **assumed expected term** was nearly unchanged for High Tech companies, moving from 5.7 to 5.8 years in 2017. While the stock price **volatility** was also steady from a year ago (46.0% in 2017 vs. 46.5% a year earlier), it remained almost double the rate for Large companies.

Similar to the Large companies, the assumed **risk-free rate** of interest for High Tech companies experienced a jump of 50 basis points from the prior year and the **dividend yield** assumption decreased by 20 basis points from the assumed yield in the prior year.

Stock option awards continue to be a popular type of equity award granted (by median share volume) for these companies, with 70% of awards being stock options in 2017, but lower since 2006 when 82% of stock compensation awards granted by this group were stock options. And, like the Large companies, the median value of restricted stock granted by the group was greater than the value of stock option grants, where the median value of restricted stock grants for 2017 was 61% of the total equity grant, up from 56% last year. 72% of the High Tech companies granted a mix of awards, in contrast to the Large companies.

Like the Large company group, the median stock compensation as a percentage of income before taxes for High Tech companies increased over the last year to 14.9% in 2017, and remains significantly higher than the rate for Large companies.

⁵ For the valuation basis, “Black-Scholes model” is the percentage of companies using solely the Black-Scholes valuation model and “Lattice model” is all other companies which may use the lattice model alone or in addition to the Black-Scholes model to value either stock options or market-based vesting restricted stock.

⁶ We suspect more Large and High Tech companies are using other models to value Total Shareholder Return awards (“TSRs”) and other types of market conditioned awards, but do not disclose this information due to materiality. See section IV for more on award restrictions/vesting criteria.

II – Award types and value



Large companies

Over the last 5 years, the reliance on the value of restricted stock awards has been consistent. In terms of group median **number of awards** granted in each of the last 5 years, stock options granted slightly exceeded the number of restricted shares granted for the Large company group.

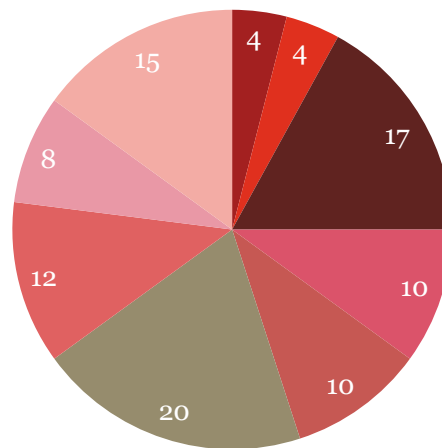
But, from a **value granted** perspective, at the median, restricted stock value is more than 4 times the value of stock options granted for the group.

5-year summary

Median Number/Values	2017	2016	2015	2014	2013
Number of stock options	1.7M	2.0M	1.9M	2.0M	2.0M
Grant date option value	\$29M	\$38M	\$35M	\$31M	\$29M
Number of restricted stock	1.4M	1.7M	1.5M	1.5M	1.7M
Grant date stock value	\$123M	\$135M	\$125M	\$115M	\$110M

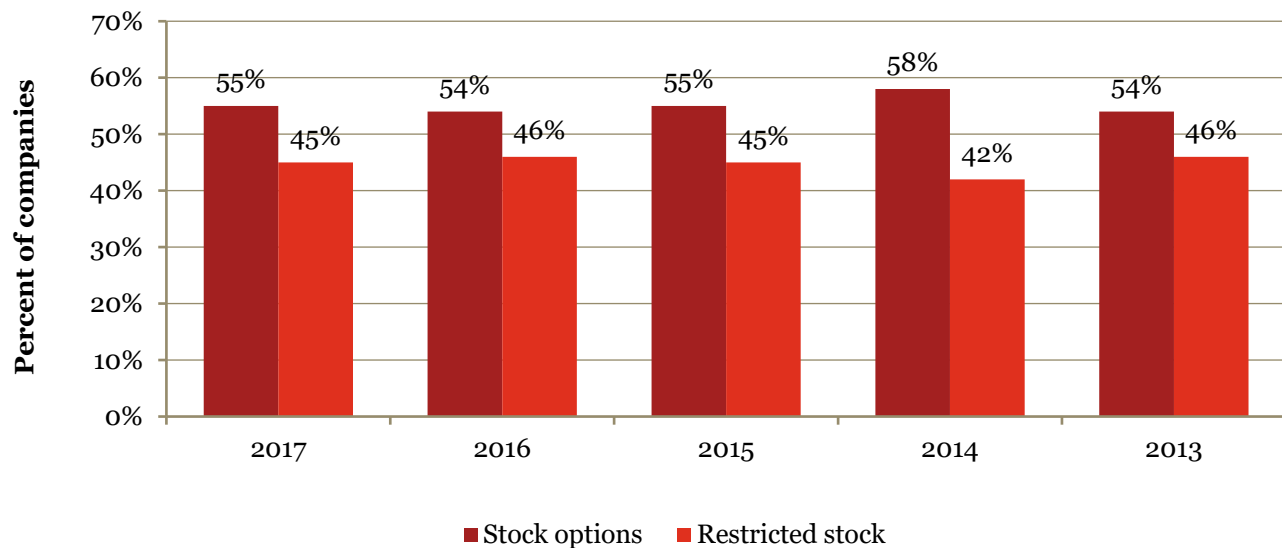
Our Large company group consisted of the following sector distribution:

Large Companies – Distribution by Sector

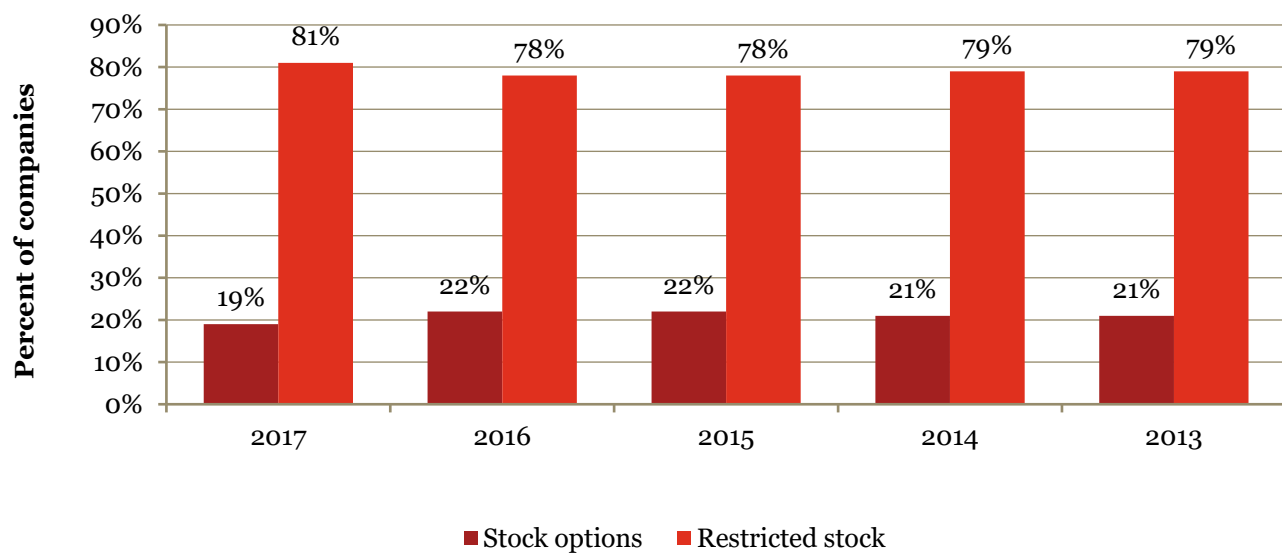


- Asset management
- Automotive
- Banking and capital markets
- Energy
- Entertainment, media and communications
- Industrial products
- Insurance
- Power and utilities
- Retail and consumer

Award mix - stock options and restricted stock (Percent of median # of units awarded)



Award mix - stock options and restricted stock (Percent of median grant value)



High Tech companies

Over the last 5 years, at the median, the High Tech companies has shown a shift in the mix from stock options to restricted stock awards. From a **number of awards** perspective, stock options granted have run about double the number of restricted stock grants for the High Tech company group.

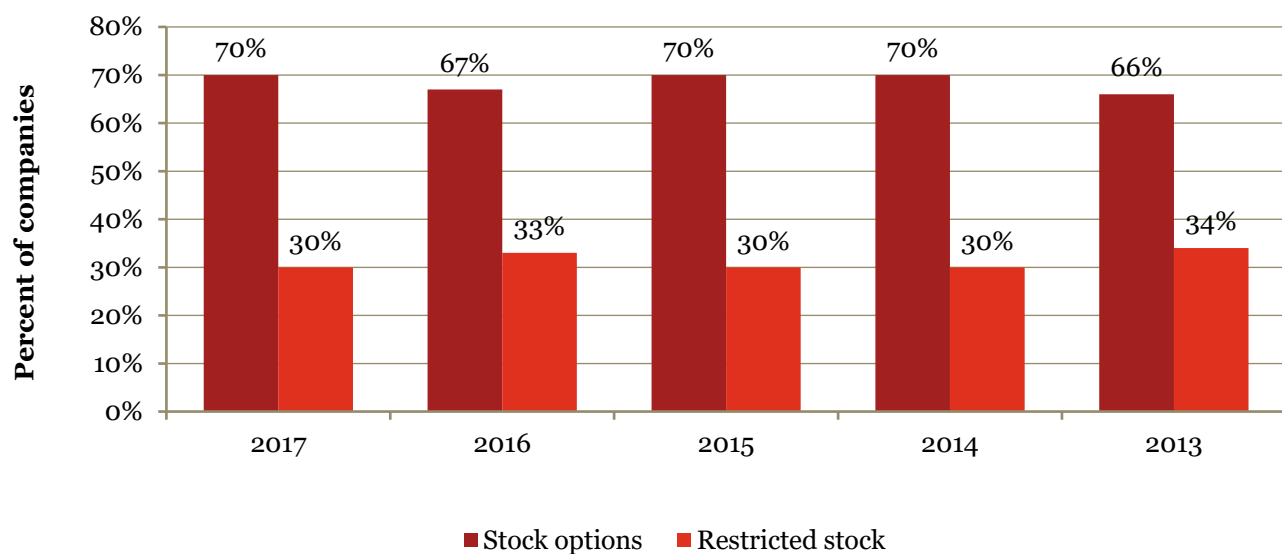
But from a **value granted** perspective, at the median, restricted stock has exceeded the value of stock option awards for 3 years running, and in 2017, has exceeded the value of stock options by more than 50%.

5-year summary

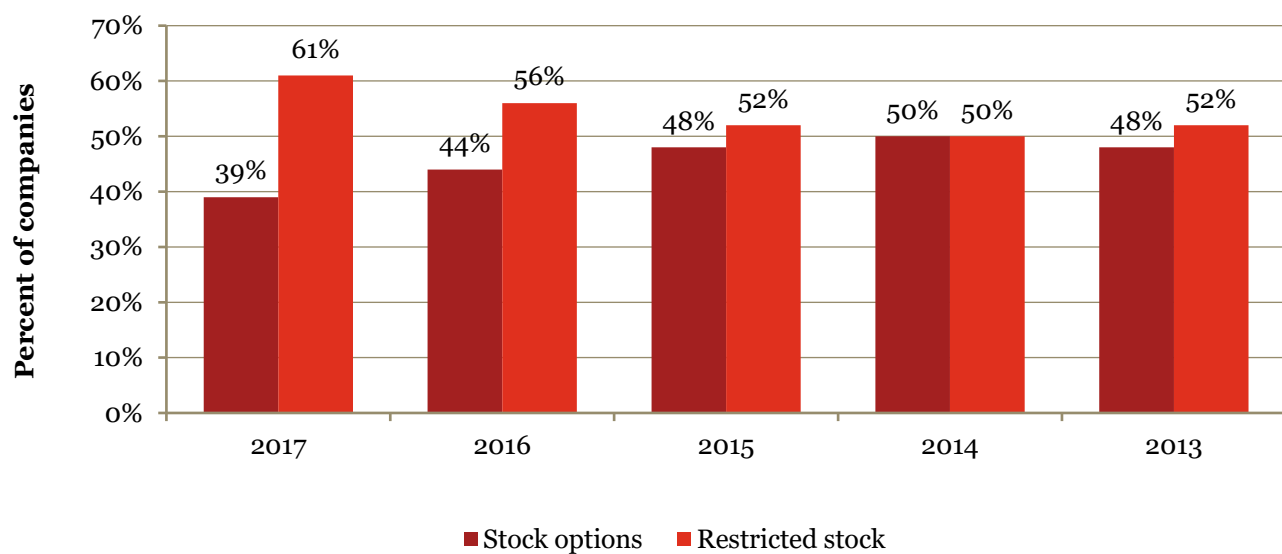
Median Number/Values	2017	2016	2015	2014	2013
Number of stock options	1.6M	1.5M	1.2M	1.4M	1.1M
Grant date option value	\$21M	\$20M	\$19M	\$16M	\$13M
Number of restricted stock	0.7M	0.7M	0.5M	0.6M	0.6M
Grant date stock value	\$33M	\$25M	\$21M	\$15M	\$14M



Award mix - Stock options and restricted stock (Percent of median # of units awarded)



Award mix - Stock options and restricted stock (Percent of median grant value)



III – Mix of awards granted

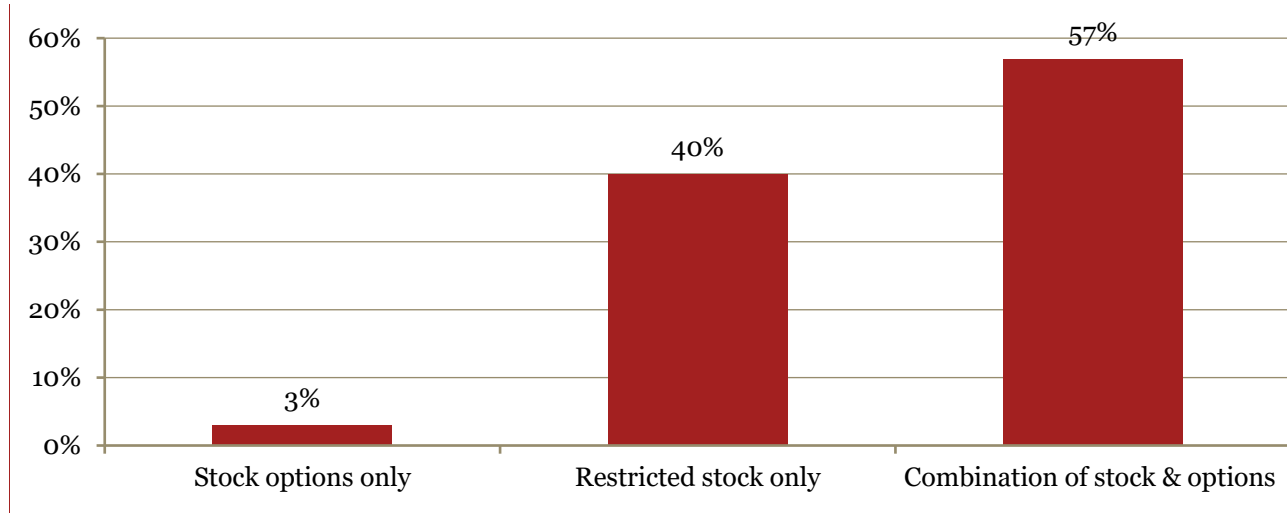


Large companies

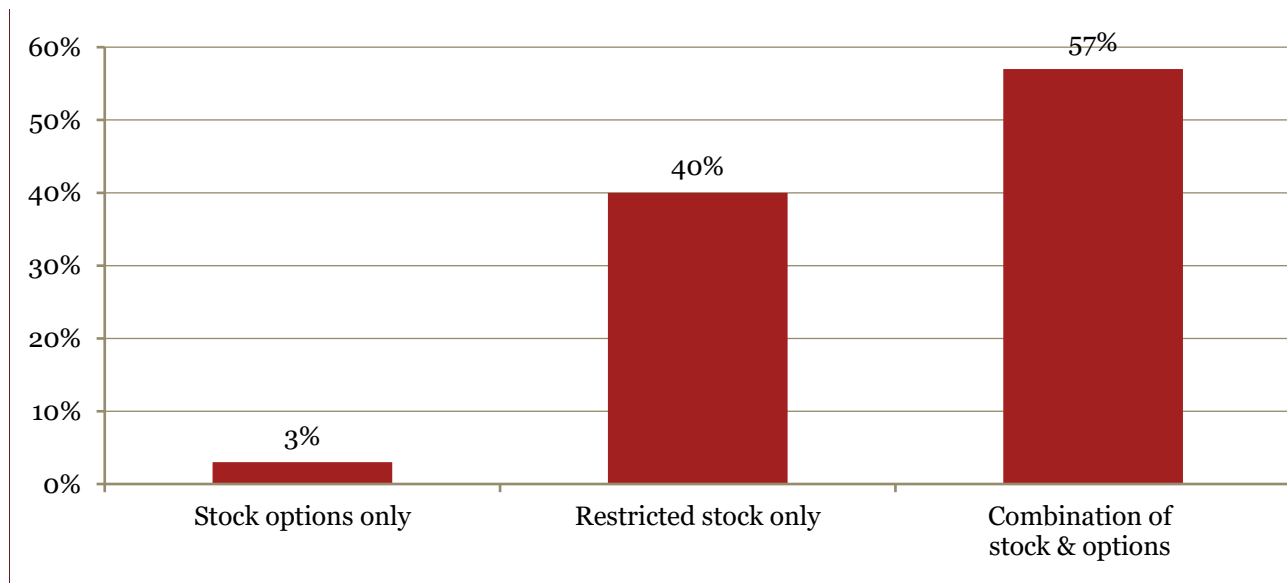
Of the Large companies in our study for 2017, 43% of companies granted just one type of equity award (3% stock options only and 40% restricted stock only).

The remaining 57% of companies granted a mix of equity award types, providing both stock options and restricted stock. These results are identical to prior year results.

2017 Award Mix (Percent of Companies)



2016 Award Mix (Percent of Companies)

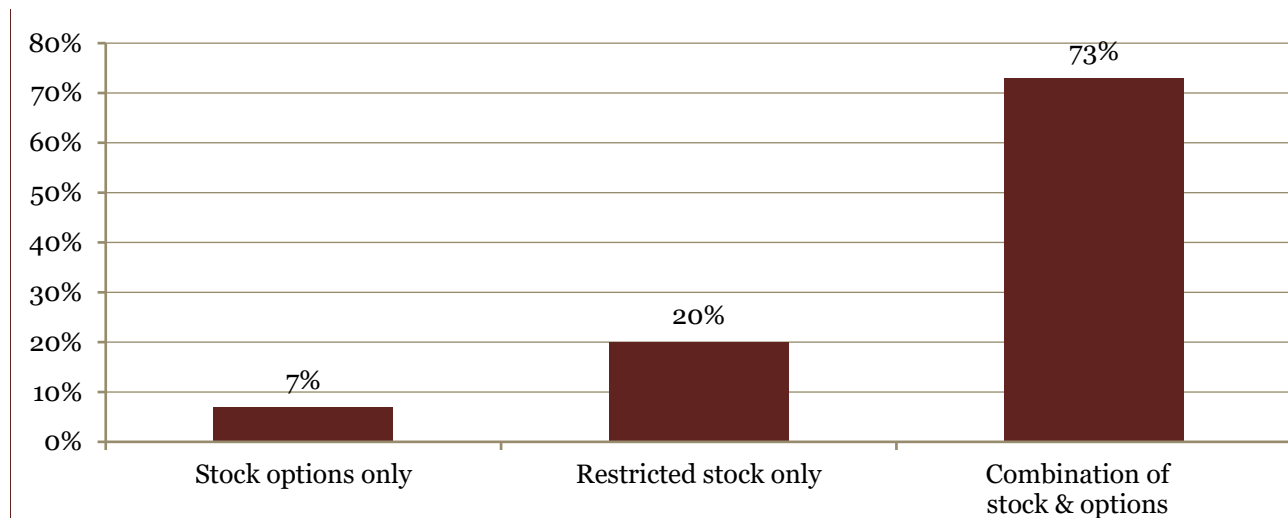


High Tech companies

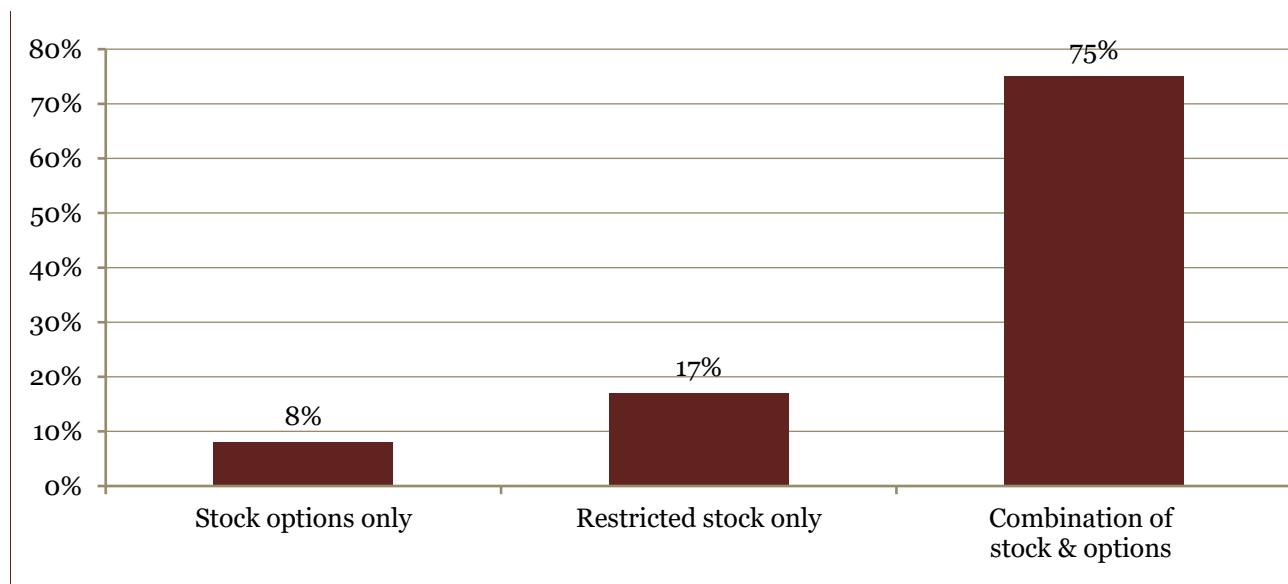
Of the High Tech companies in our study for 2017, only 27% of companies granted just one type of equity award, up from last year's 25% (7% granted stock options only and 20% granted restricted stock only).

The majority of companies (72% vs. last year's 75%) provided a mix of equity award types, and unlike the Large company group, did not focus as heavily on restricted stock awards.

2017 Award Mix (Percent of Companies)



2016 Award Mix (Percent of Companies)



IV – Vesting and other restrictions



Vesting Conditions

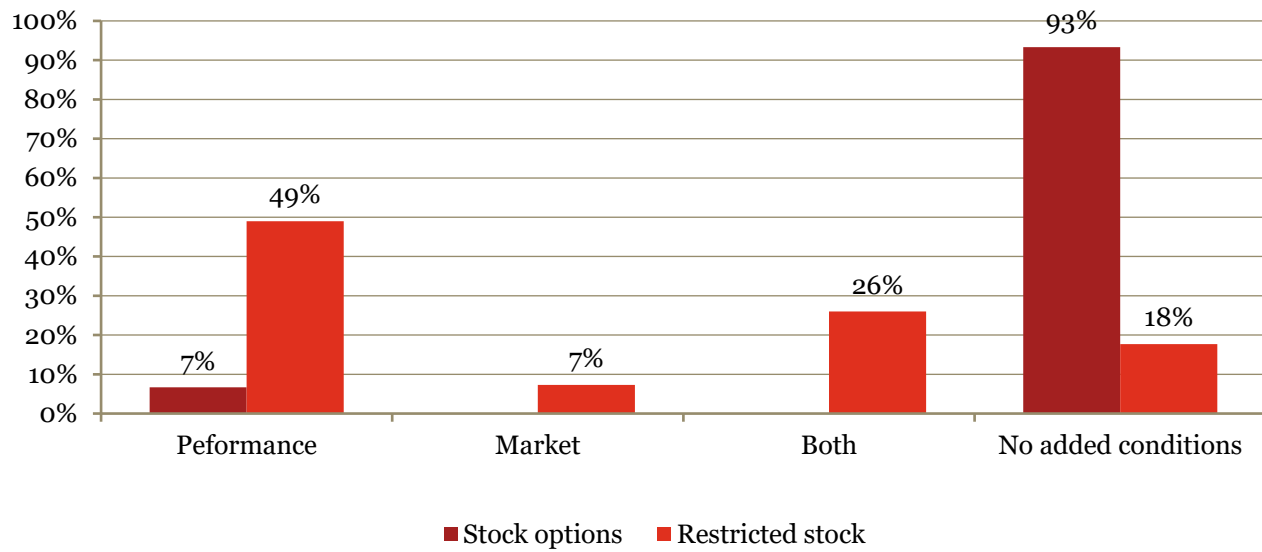
Vesting periods for equity awards is generally 3 or 4 years for both Large Companies and High Techs. However, on average, Large Companies are showing now a somewhat shorter vesting period as the average vesting period has decreased from last year for the Large company group and increased from last year for the High Tech Company group.

	<i>Large companies</i>		<i>High tech companies</i>	
Vesting period reported	Stock options	Restricted stock	Stock options	Restricted stock
<i>Low</i>	3.0	2.0	3.0	3.0
<i>Mean</i>	3.0	2.0	3.0	3.0
<i>Average</i>	3.5	3.7	4.1	3.8
<i>High</i>	5.0	10.0	5.0	5.0

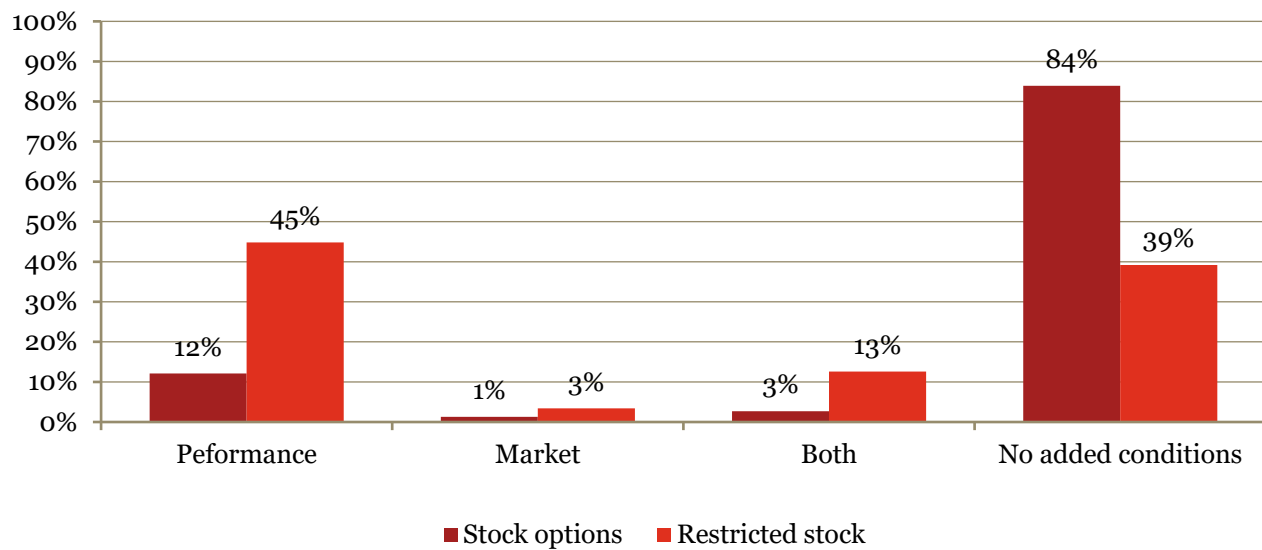
Over time, we've observed more companies incorporating various performance criteria in equity compensation programs. Some are instituting "performance conditions" (based on company operating measures such as earnings per share or return on equity), while others are using "market conditions" (such as total shareholder return compared to peers). Often these conditions incorporate relative measures against other companies or indices. Use of performance metrics is more common with restricted stock awards than with stock options and very often is reserved primarily for executives who are seen to have greater influence over operating results and share price.

	<i>Large companies</i>		<i>High tech companies</i>	
Criteria beyond service	Stock options	Restricted stock	Stock options	Restricted stock
<i>Performance only</i>	6.7%	49.0%	12.1%	44.8%
<i>Market only</i>	0.0%	7.3%	1.3%	3.4%
<i>Both</i>	0.0%	26.0%	2.7%	12.6%
<i>Sub-Total</i>	6.7%	82.3%	16.1%	60.8%
<i>No added conditions</i>	93.3%	17.7%	83.9%	39.2%
<i>Total</i>	100.00%	100.00%	100.00%	100.00%

Large companies - Criteria beyond service



High Tech companies - Criteria beyond service



V – Option pricing model



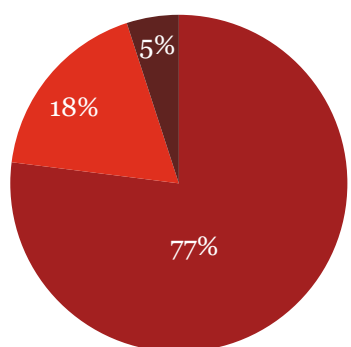
Model choices

Companies generally have a choice of what option pricing model to use in valuing stock awards. However, more complex awards or those with market conditions generally need to be valued using a more sophisticated approach, such as a lattice model.⁷ Without such complexities, the Black-Scholes model is much simpler to use.⁸

Large companies

For Large companies, the model of choice continues to be the Black-Scholes option pricing model, with 77% of the companies reporting its use exclusively. Other companies wanting to use more refined approaches use a lattice model (18%) or a combination of models (5%) such as one to derive the expected term and the Black-Scholes model to determine fair value.

Large companies - Valuation basis

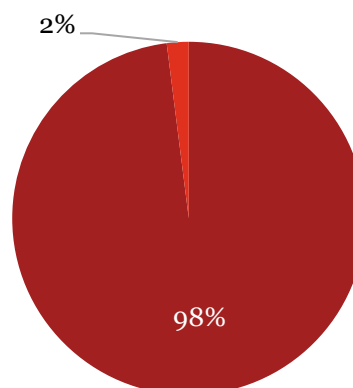


- Black-Scholes model
- Lattice model
- Other/multiple models

High Tech companies

For High Tech companies, the Black-Scholes model is also the most common, with 98% of the companies reporting its use exclusively, reflecting both a more simplified valuation approach and few market conditioned stock options. Lattice valuation model usage was disclosed by only 2% of the High Tech companies, with none in our group of companies reporting use of another model type.

High Tech companies - Valuation basis



- Black-Scholes model
- Lattice model
- Both models

⁷ “Lattice model” for this study refers to lattice models, Monte Carlo simulations, and other complex modeling that is generally required for valuing options and restricted stock with complex features.

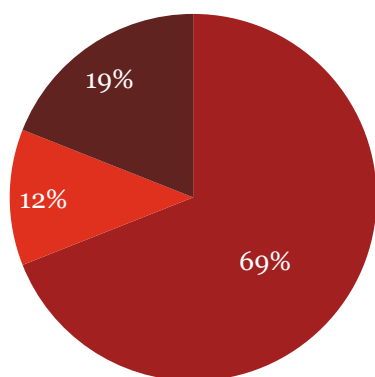
⁸ “For the valuation basis, “Black-Scholes model” is the percentage of companies using solely the Black-Scholes valuation model and “Lattice model” is all other companies which may use the lattice model alone or in addition to the Black-Scholes model to value either stock options or market-based vesting restricted stock.

Basis for expected term and volatility –Large companies

Large companies have continued to rely mostly on historical experience in developing assumptions for valuing stock options. For Large companies that granted stock options in 2017 and disclosed an **expected term** methodology, 69% relied solely on historical experience (down from 73% last year), 12% used the simplified method⁹, and another 19% relied on other methods (e.g., derived from a lattice model or Monte Carlo simulation).

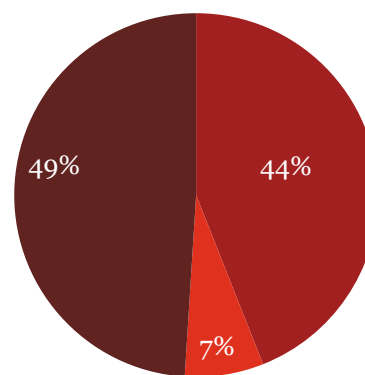
Of the Large companies that granted stock options in 2017 and disclosed **volatility** methodology, 44% relied solely on historical stock price data for the volatility assumption, 7% of the companies in the analysis relied solely on implied volatility¹⁰ (i.e., the volatility inherent in the company's market traded options), and 49% used a blend of historical and implied volatilities (up from 45% last year). None of the Large companies in our study group disclosed using peer group volatility.

Expected term rationale



- Historical experience
- Simplified method
- Derived from valuation model

Volatility basis



- Historical experience
- Implied volatility
- Blended volatility

⁹ As described in ASC 718-10-S99; a company should consider whether there is relevant historical data available for awards with similar terms and issued to employees with similar characteristics, among other criteria to substantiate the lack of credible data and reliance upon the simplified method as described in SAB Topic 14.

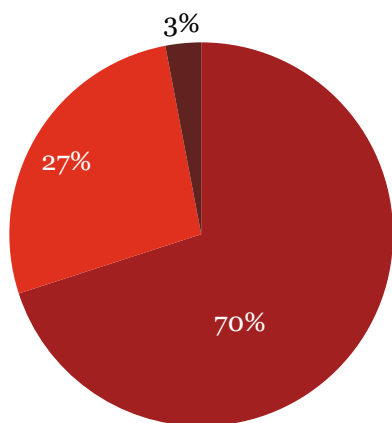
¹⁰ As described in ASC 718-10-S99; a company should consider whether they have met the various criteria in the standard (e.g., plain vanilla option, option contracts of 1-year or longer only, at or near-the-money contracts, sufficient volume, etc.) in order to rely solely on implied volatility.

Basis for expected term and volatility – High Tech companies

When setting the expected term or volatility assumptions for valuing stock options (the more significant assumptions for the Black-Scholes pricing model), the High Tech companies in our study continued to rely heavily on historical experience. For High Tech companies that disclosed the **expected term** assumption for 2017, 70% of companies relied solely on historical experience while 27% used the simplified method and another 3% relied on other methods (e.g., derived from a lattice model or Monte Carlo simulation). A significant number of companies continue to use the simplified method, most likely due to lack of credible historical data.

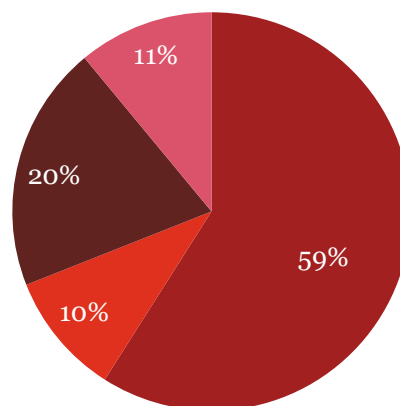
Of the High Tech companies that granted stock options in 2017 and disclosed the **volatility** methodology, 59% of the companies used historical stock price data as the sole basis for the volatility assumption, 10% of the companies relied solely on implied volatility, 20% used a blend methods (typically an average of historical and implied volatilities), and the remaining 11% relied on peer group data.

Expected term rationale



- Historical experience
- Simplified method
- Derived from valuation model

Volatility basis



- Historical experience
- Implied volatility
- Blended volatility
- Peer group

VI – Option pricing model assumptions – Expected term



Large companies

The **average** expected term assumption in 2017 for Large companies was 5.84 years, reflecting a small decrease from the average in 2016 (5.92 years) and slightly longer than the average 5 years ago (5.74 years).

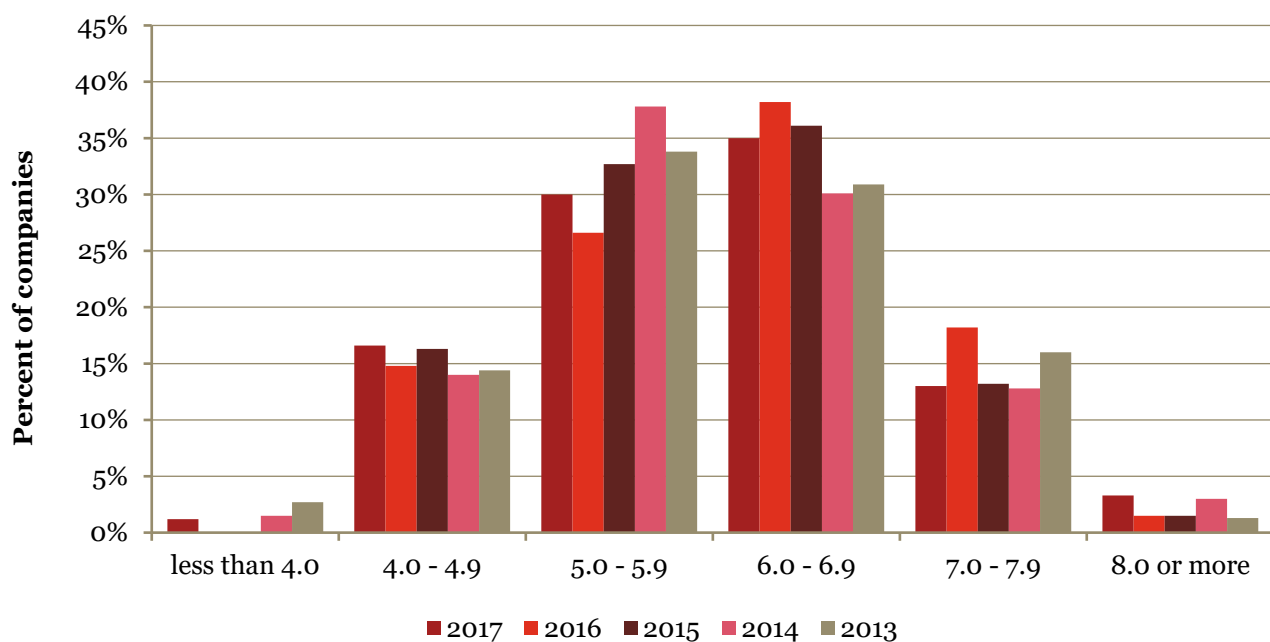
The percentage of Large companies in 2017 with an expected term of 5 or more years was 82%, matching the 2013 level.

Large companies assuming an expected term of 7 or more years was 17%, up from 20% last year and 18% in 2013. On the low end, one Large company assumed an expected term of less than 4 years in 2017 while 2 companies did so in 2013.

Expected term

	2017	2016	2015	2014	2013
<i>Low</i>	3.50	4.00	4.00	3.75	1.00
<i>Median (middle)</i>	6.00	6.00	6.00	5.80	5.88
<i>Mean (average)</i>	5.84	5.92	5.83	5.77	5.74
<i>High</i>	8.56	8.00	8.00	8.00	8.00

Expected term assumption (in years)



High Tech companies

The average **expected term** assumption in 2017 for High Tech companies was 5.52 years, decreasing slightly from 5.63 years in 2016 and slightly higher than the 5.50 in 2013.

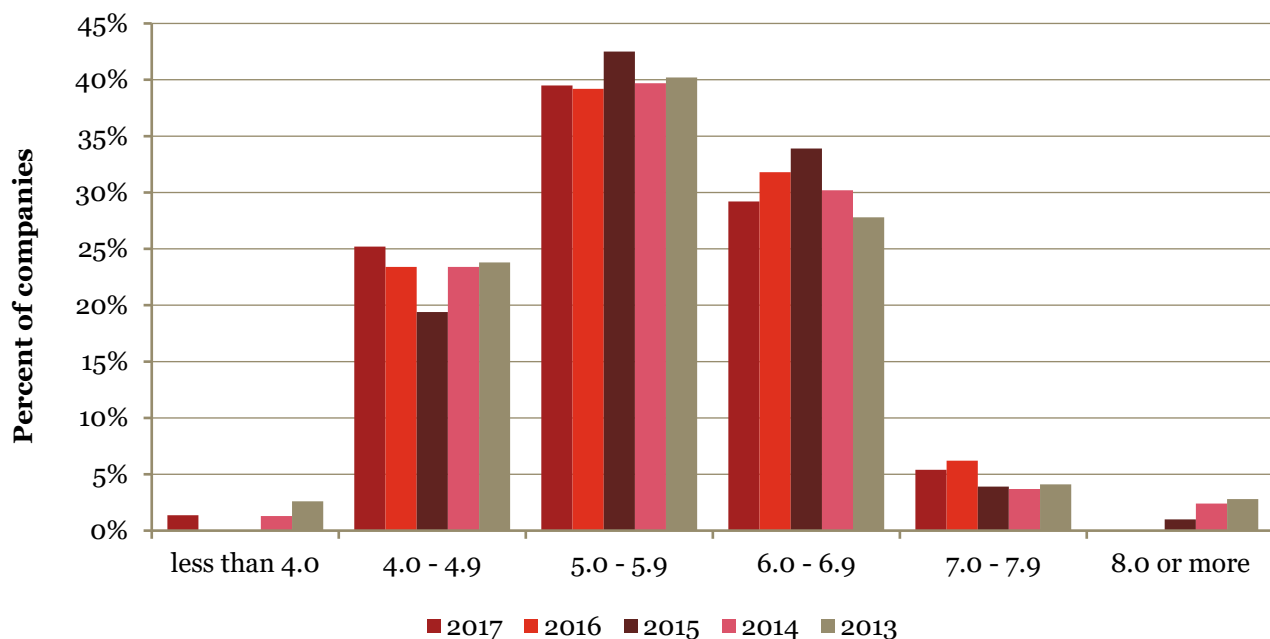
Additionally, the percentage of High Tech companies in 2017 with an expected term of 5 or more years was 77%, matching the average for 2013.

There was a slight decrease in the percentage of High Tech companies assuming an expected term of 7 or more years, with 5% of the companies in 2017 compared to 6% in 2016. However, 1 company in 2017 assumed less than 4 years for the expected term, while 2 companies did so in 2013.

Expected term

	2017	2016	2015	2014	2013
<i>Low</i>	2.92	4.00	4.00	3.92	3.00
<i>Median (middle)</i>	5.75	5.70	5.66	5.70	5.50
<i>Mean (average)</i>	5.52	5.63	5.60	5.57	5.50
<i>High</i>	7.95	7.62	8.01	9.10	9.10

Expected term assumption (in years)



VII – Option pricing model assumptions – Volatility



Large companies

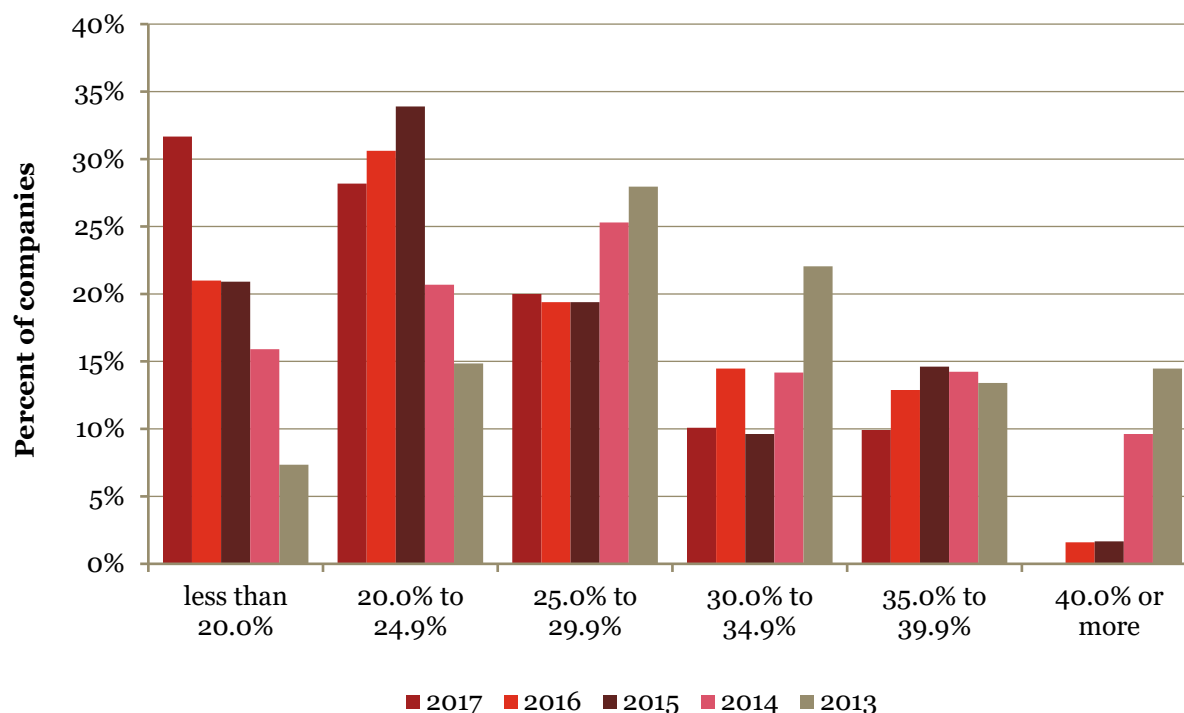
Similar to the change in the median volatility, for Large companies, the **average** volatility assumption has decreased from 31.32% in 2013 to 24.00% in 2017. This decline in the volatility assumption reflects the lessening impact of the 2008 financial crisis on stock price volatility as we continue to put it further behind us.

Also reflecting the decrease in stock price volatility over that period, there were no Large companies reporting a volatility assumption of 40% or higher in 2017, whereas in 2013, 15% of the companies reported a volatility assumption of 40% or higher.

Volatility

	2017	2016	2015	2014	2013
Low	11.00%	12.00%	13.41%	13.41%	15.40%
Median (middle)	22.61%	24.00%	23.88%	27.50%	29.99%
Mean (average)	24.00%	25.64%	25.71%	28.32%	31.32%
High	36.50%	45.00%	44.50%	51.50%	52.50%

Volatility assumption



High Tech companies

Like for Large companies and similar to the change in the median volatility assumption, for High Tech companies, the average volatility has decreased over the last 5 years, from 53.96% in 2013 to 48.54% in 2017.

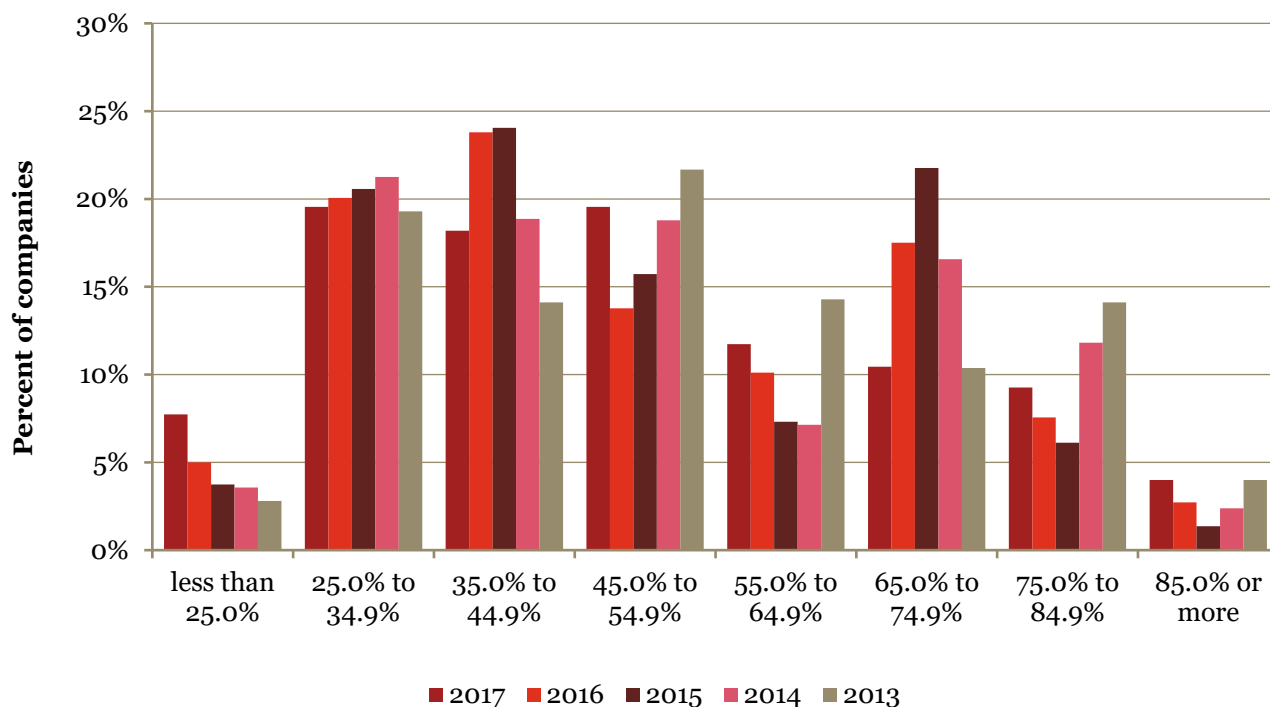
Volatility assumptions for High Tech companies continue to be substantially higher than those in the Large company group, reflecting the relative risk of investing in the companies in the High Tech group and of their industry sectors overall.

Also reflecting the decrease in stock price volatility over the last 5 years, 13% of High Tech companies reported a volatility of 75% or higher (the top two ranges in the graph) in 2016, whereas in 2013, 18% of the companies reported a 75% or higher volatility assumption.

Volatility

	2017	2016	2015	2014	2013
Low	18.72%	20.30%	19.51%	20.53%	23.10%
Median (middle)	46.00%	46.54%	46.50%	50.10%	51.05%
Mean (average)	48.54%	50.08%	49.69%	53.59%	53.96%
High	89.00%	93.00%	89.00%	110.00%	105.00%

Volatility assumption



VIII – Option pricing model assumptions – Risk-free rate and dividend yield



Large companies

Generally, the risk-free rate and the dividend yield assumptions will not have as significant an impact on the option pricing model results compared to the expected term and volatility assumptions, but they are still important factors in determining the fair market value of employee stock options.

Similar to the change in the median assumption for Large companies and reflecting current market

conditions, the average risk-free interest rate average risk-free interest rate increased to 2.05% in 2017, compared to the low point 5 years ago of 1.15%.

Also, both the median and the average dividend yield assumptions for the Large companies decreased from 2016, where the 2017 average dividend yield was 2.35%, down from 2.56% last year and 2.42% in 2013.

Risk-free interest rate

	2017	2016	2015	2014	2013
<i>Low</i>	1.28%	0.78%	0.83%	1.00%	0.31%
<i>Median (middle)</i>	2.07%	1.40%	1.60%	1.70%	1.11%
<i>Mean (average)</i>	2.05%	1.43%	1.57%	1.78%	1.15%
<i>High</i>	2.50%	2.20%	2.20%	2.80%	2.50%

Dividend yield¹¹

	2017	2016	2015	2014	2013
<i>Low</i>	0.40%	0.60%	0.07%	0.10%	0.10%
<i>Median (middle)</i>	2.30%	2.65%	2.30%	2.24%	2.50%
<i>Mean (average)</i>	2.35%	2.56%	2.31%	2.29%	2.42%
<i>High</i>	4.20%	4.50%	4.21%	4.90%	4.40%

¹¹ For both Large companies and High Tech companies, the results for the dividend yield assumption reflect only those companies reporting a non-zero dividend yield assumption.

High Tech companies

Like for Large companies and similar to the change in the median assumption, for High Tech companies over the last 5 years, the average risk-free interest rate assumption increased from 1.23% in 2013, to 1.97% in 2017 following movement in interest rates observed in the market.

On the other hand, unlike with Large companies, the average dividend yield assumption for the High Tech companies remained stable compared to 2016.

Risk-free interest rate

	2017	2016	2015	2014	2013
<i>Low</i>	1.04%	1.10%	1.20%	1.09%	0.40%
<i>Median (middle)</i>	2.00%	1.48%	1.60%	1.71%	1.20%
<i>Mean (average)</i>	1.97%	1.47%	1.60%	1.73%	1.23%
<i>High</i>	2.36%	1.90%	2.00%	2.90%	2.05%

Dividend yield

	2017	2016	2015	2014	2013
<i>Low</i>	0.25%	0.25%	0.25%	0.25%	0.25%
<i>Median (middle)</i>	1.75%	1.90%	1.52%	1.61%	1.79%
<i>Mean (average)</i>	1.66%	1.65%	1.32%	1.72%	1.88%
<i>High</i>	2.80%	2.87%	2.52%	3.60%	3.90%

IX – Stock compensation expense



Large companies

For the Large companies in our study, the median stock compensation expense has increased each year since 2013 but, 2017 expense was basically level with 2016. Pre-tax earnings, however, has decreased the last 2 years, with 2017 coming in at about 2013 levels for this group of companies.

Pre-tax earnings and stock compensation expense¹²

Median	2017	2016	2015	2014	2013
Stock compensation expense	\$150M	\$149M	\$136M	\$134M	\$129M
Pre-tax earnings	\$3.5B	\$3.7B	\$3.9B	\$3.7B	\$3.6B

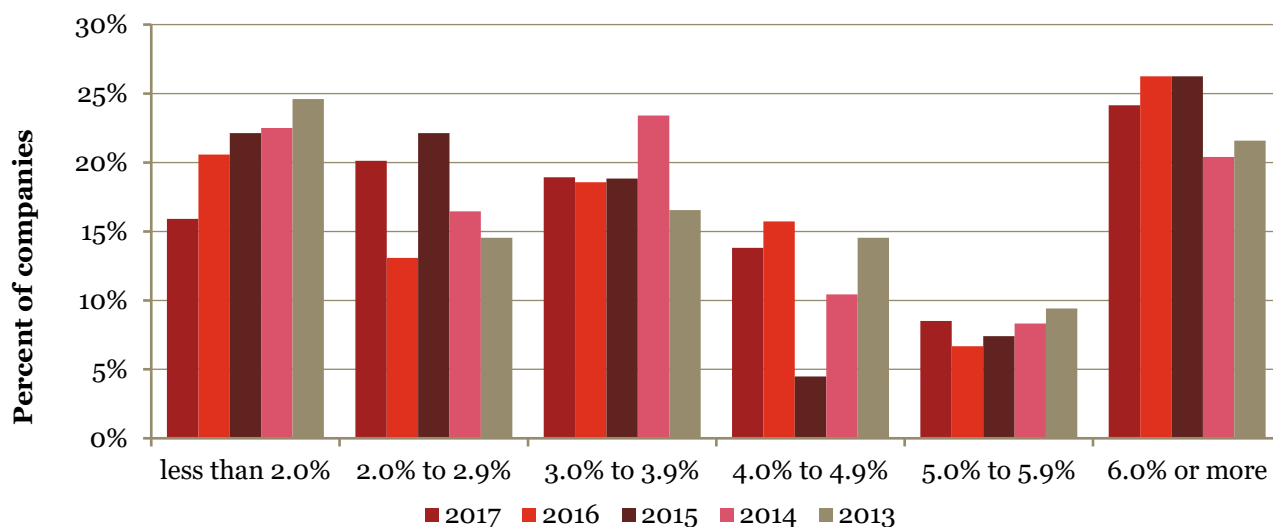
Stock Compensation Expense as a percentage of earnings (Expense Ratio) is at its highest level for the past 5 years, despite being relatively stable from a year ago in terms of dollars, as noted above.

Expense ratio (Stock compensation expense as % of pre-tax earnings)¹³

Median	2017	2016	2015	2014	2013
Expense ratio	3.90%	3.71%	3.34%	3.36%	3.71%

For 2017, stock compensation as a percentage of income for the 20th to 80th percentiles ranged from about 2.31% to 7.53%, with the 20th and 80th percentiles wider than 2013 when the range was about 1.70% to 6.49%. Interestingly, the percentage of companies with less than 2.0% in expense ratio has steadily dropped since 2013.

Stock compensation expense as % of pre-tax earnings



¹² For both Large and High Tech companies, includes companies reporting a negative stock compensation expense or a net operating loss

¹³ For both Large and High Tech companies, excludes companies with a negative stock compensation expense or a net operating loss reported in the year shown; as such, Expense Ratios shown are independent of the stock compensation expense and company earnings shown in the chart above.

High Tech companies

For the High Tech companies in our study, the median stock compensation expense has grown substantially over the last 5 years. However, the median company earnings has varied significantly over the period, reflective of the volatility of earnings for the majority/smaller companies in the grouping.

Stock compensation expense and pre-tax earnings

Median	2017	2016	2015	2014	2013
Stock compensation expense	\$42M	\$33M	\$30M	\$18M	\$16M
Pre-tax earnings	\$39M	\$15M	\$15M	\$(5)M	\$20M

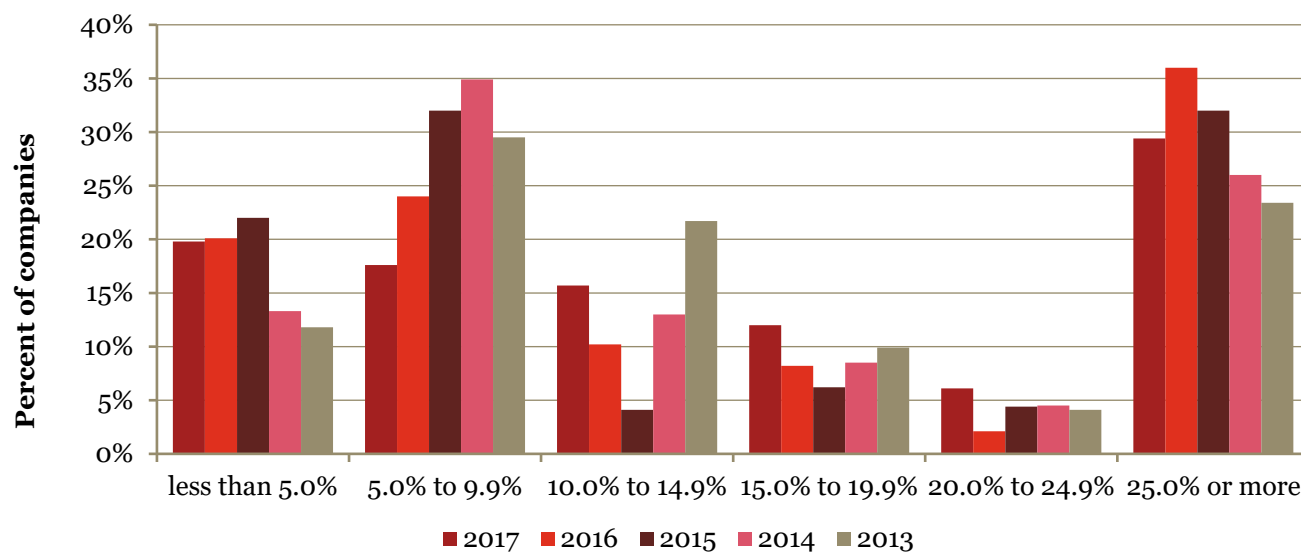
Like with the Large companies, the High Tech companies' median Expense Ratio was highest in 2017. It remains in the double digits for 2017.

Expense ratio (Stock compensation expense as % of pre-tax earnings)

Median	2017	2016	2015	2014	2013
Expense ratio	14.93%	14.55%	10.00%	10.63%	12.48%

For 2017, stock compensation as a percentage of income for the 20th to 80th percentiles ranged from 6.45% to 44.04%, with the percentile range generally higher than 2013 when the range was 6.29% to 34.38%.

Stock compensation expense as % of pre-tax earnings



X – Comparison to year of ASC 718 (formerly FAS 123R) adoption



Comparison of 2017 to 2006

The following is a comparison of 2017 data to data from 2006, the year when the current stock compensation rules were implemented and expense moved from being simply a disclosure item to a P&L impact for most stock compensation awards.

Of note, both Large and High Tech company groups have moved toward greater reliance on restricted stock awards and less on options (in terms of both the median value of grants awarded as well as the median number of units granted). Median stock compensation as a percentage of income has been in the 3% to 4% range since 2006 for Large companies, but has decreased from 17% in 2006 to 15% in 2017 for High Tech companies.

Methods/processes established in 2006 remain prevalent in 2016. The Black-Scholes option valuation model is still widely used, although we note there is nothing to stop a company from using a lattice model with more refined techniques to value

any option award, such as use of exercise rates at different multiples of the original grant date stock price or varying assumptions throughout the exercise period.

Reliance on historical data for the expected term is used by the majority of companies, although Large companies are slightly more likely to use a derived period from a valuation model. Historical data for volatility is also a common basis, but about 30% of companies in both groups rely on implied volatility from market traded company options in combination with historical volatility or on a stand-alone basis.

Since 2006, for the two company groups, median assumptions for the expected term have increased and dividend yield have increased, whereas the median risk-free rate assumption has decreased significantly. For both Large companies and High Tech companies, the median volatility assumptions have decreased in 2016 compared to 2006.

Comparison of 2016 to 2006

	Large companies		High Tech companies	
	2017	2006	2017	2006
Stock compensation as a percentage of pre-tax earnings (Median)	3.9%	3.1%	14.9%	17.3%
Types of equity awards granted – Number of units (Median)				
Stock options	55%	73%	70%	82%
Restricted stock	45%	27%	30%	18%
Types of equity awards granted – Value of awards (Median)				
Stock options	19%	39%	40%	61%
Restricted stock	81%	61%	60%	39%
Methods used for valuation or assumption setting purposes (by Company)				
Use of the Black-Scholes valuation model only	77%	83%	97%	94%
Use of only historical data for expected term	69%	79%	70%	55%
Use of only historical data for volatility	44%	45%	59%	58%
Assumptions used for Black-Scholes model (Median)				
Expected term (years)	6.0	5.4	5.8	5.1
Volatility	22.6%	25.6%	46.0%	56.0%
Risk-free rate	2.1%	4.6%	2.0%	4.8%
Divided yield	2.3%	1.8%	1.7%	1.3%

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