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Stock Compensation

2017 assumption and disclosure study

October 2017
People and Organization



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Dear Clients and Friends

PwC is pleased to share with you our ***Stock Compensation 2017 assumption and disclosure study****. This study presents our analysis of the 2016 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 2016 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 2012 through 2016 comparative data as well as information from 2006 (when the original FAS 123(R) took effect) for historical comparison and perspective. Please note that all historical data is for companies that meet the study inclusion criteria for 2016, so companies and data included in our past studies may be different.

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 2017 assumption and disclosure study*** *useful in benchmarking your company's assumptions and other data points associated with your stock compensation plans.*



Ken Stoler
Partner

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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 2017 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 2016 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 2016 data to 2015 data.

Highlights

	Large companies		*High tech companies*	
	2016	2015	2016	2015
Stock Compensation as a Percentage of Pre-tax Earnings (Median) [2]	3.7%	3.3%	14.5%	10.5%
Percent of Equity Awards Granted – By Number of Units (Median)				
• Stock Options[3]	54%	55%	67%	70%
• Restricted Stock[4]	46%	45%	33%	30%
Percent of Equity Awards Granted – By Value of Awards (Median)				
• Stock Options[3]	22%	22%	44%	48%
• Restricted Stock[4]	78%	78%	56%	52%
Use of the Black-Scholes Stock Option Valuation Model (by Company)	82%	82%	98%	98%
Assumptions Used for Stock Option Model (Median)				
• Expected Term	6.0	6.0	5.7	5.7
• Volatility	24.0%	23.9%	46.5%	46.5%
• Risk-free Interest Rate	1.4%	1.6%	1.5%	1.6%
• Dividend Yield	2.7%	2.3%	1.9%	1.5%

[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 right ("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 unit 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 82% of Large companies disclose relying solely on the use of that model in valuing their stock compensation awards. However, 18% of Large companies disclose use of other models such as a **lattice model or a Monte Carlo** simulation in valuing either options or restricted stock[5].

Median Black-Scholes option pricing model assumptions in 2016 generally reflected little change from those reported at December 31, 2015 for Large companies. While the **expected term** remained steady, the **volatility** assumption ticked upwards after many years of decreasing rates. The **risk-free rate** of interest experienced a slight decrease, reflecting a drop in Treasury rates over the last year. The **dividend yield** assumption showed the most change, increasing about 40 basis points, which typically serves to lower the resulting fair values from the Black-Scholes model.

Equity awards granted by Large companies showed a small shift in the mix (by median share **volume**) to 54% stock options, continuing the trend toward restricted stock awards. Also consistent with prior years, the median **value** of restricted stock awards far exceeded the median value of stock options granted in 2016, with restricted stock making up 78% 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 that generally when companies issued both stock options and restricted stock, the value of the restricted stock grants were greater than the stock option grants.

Median stock compensation as a percentage of income before taxes for Large companies increased over the past couple years, moving from 3.3% in 2015 to 3.7% in 2016, 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 98%[6] of the study group disclosing use of this model only in valuing stock compensation awards.

Overall, median Black-Scholes option pricing model assumptions for High Tech companies moved similarly to those of the Large company group, from 2015 to 2016. The **assumed expected term** was unchanged for High Tech companies. While the stock price **volatility** was also steady from a year ago, 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 slight decrease from the prior year and the **dividend yield** assumption increased 40 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 67% of awards being stock options in 2016 and 70% in 2015, but lower since 2006 when 82% of stock compensation awards granted by this group were stock options. However, unlike the Large companies, the median value of restricted stock granted by the group was nearly equal to the value of stock option grants, although we are seeing a trend develop where the median value of stock option grants for 2016 was 44% of the total equity grant, down from 48% last year.

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 14.5% in 2016, nearly three times 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 TSRs and other types of awards, but do not disclose this information due to materiality.

Award types and value



Large companies

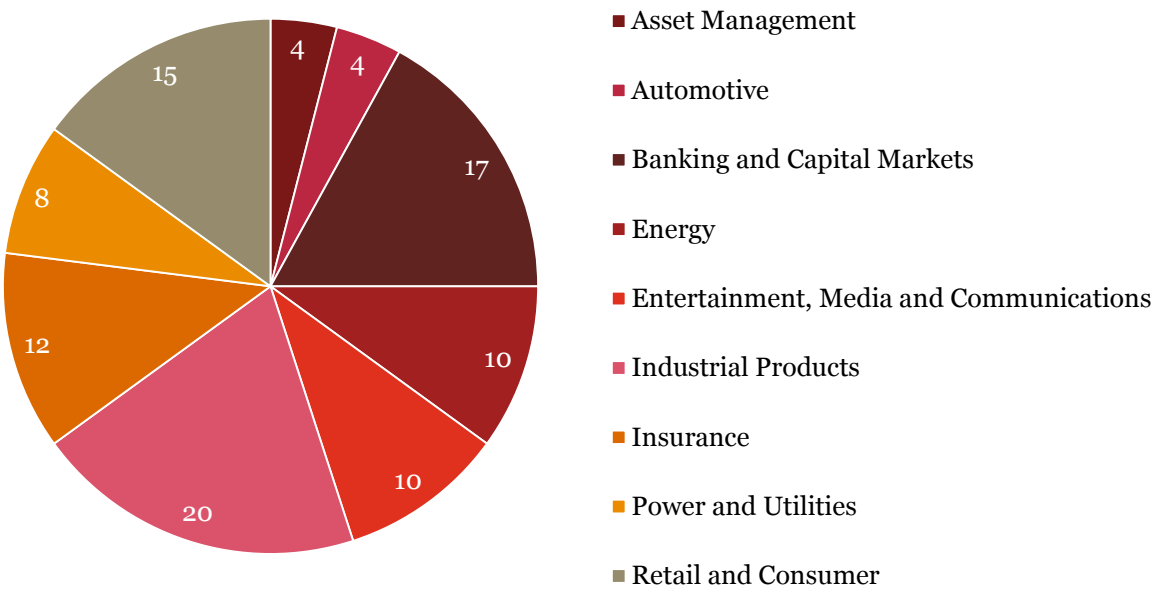
Over the last 5 years, the shift from stock options to restricted stock awards has been consistent. In terms of group median number of awards granted, in 2012 the number of stock options granted compared to the number of restricted stock awards was almost 1.4 to 1, while by 2016 it had dropped to about 1.2 to 1.

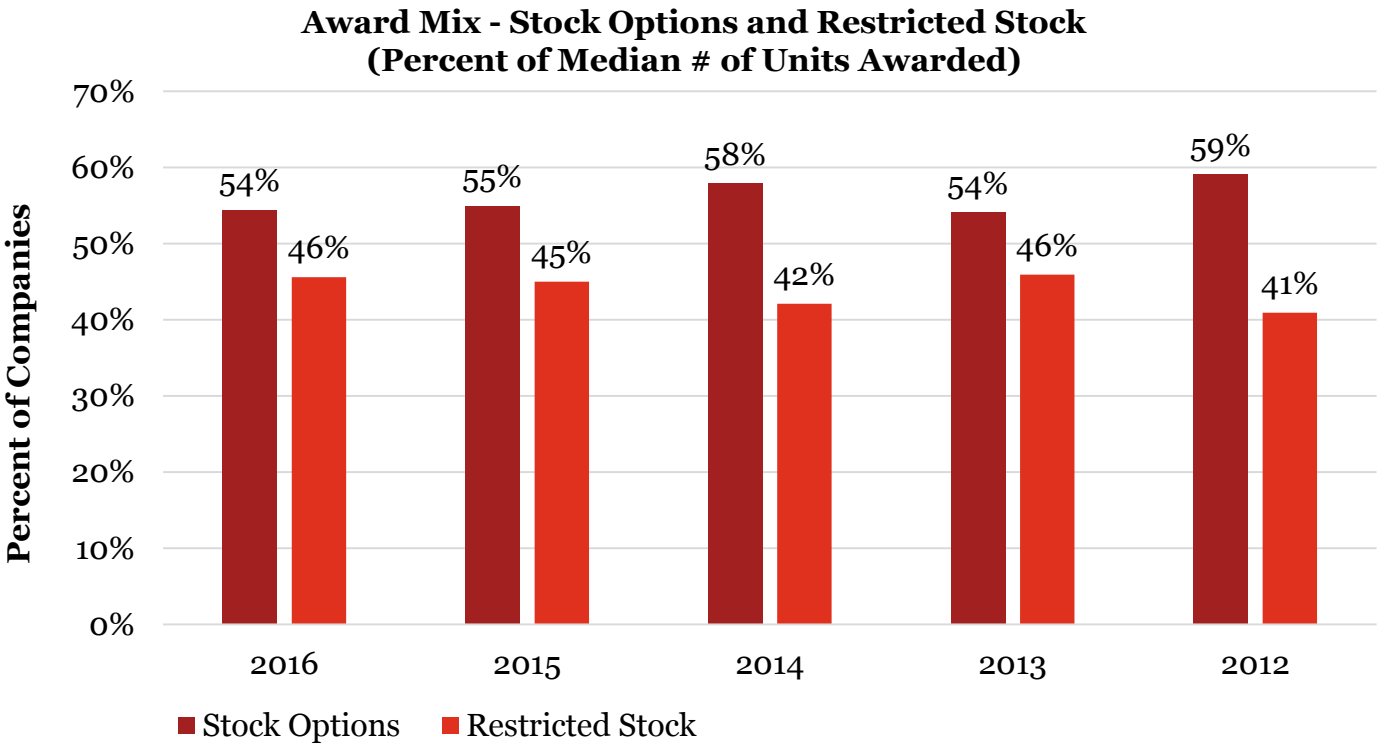
From a value granted perspective, at the median, stock option grants have steadily decreased in comparison to restricted stock awards. In 2012, the ratio of restricted stock award value to stock option award value was just over 2.4 to 1, but since 2013 has been in the range of 3.6-3.8 to 1.

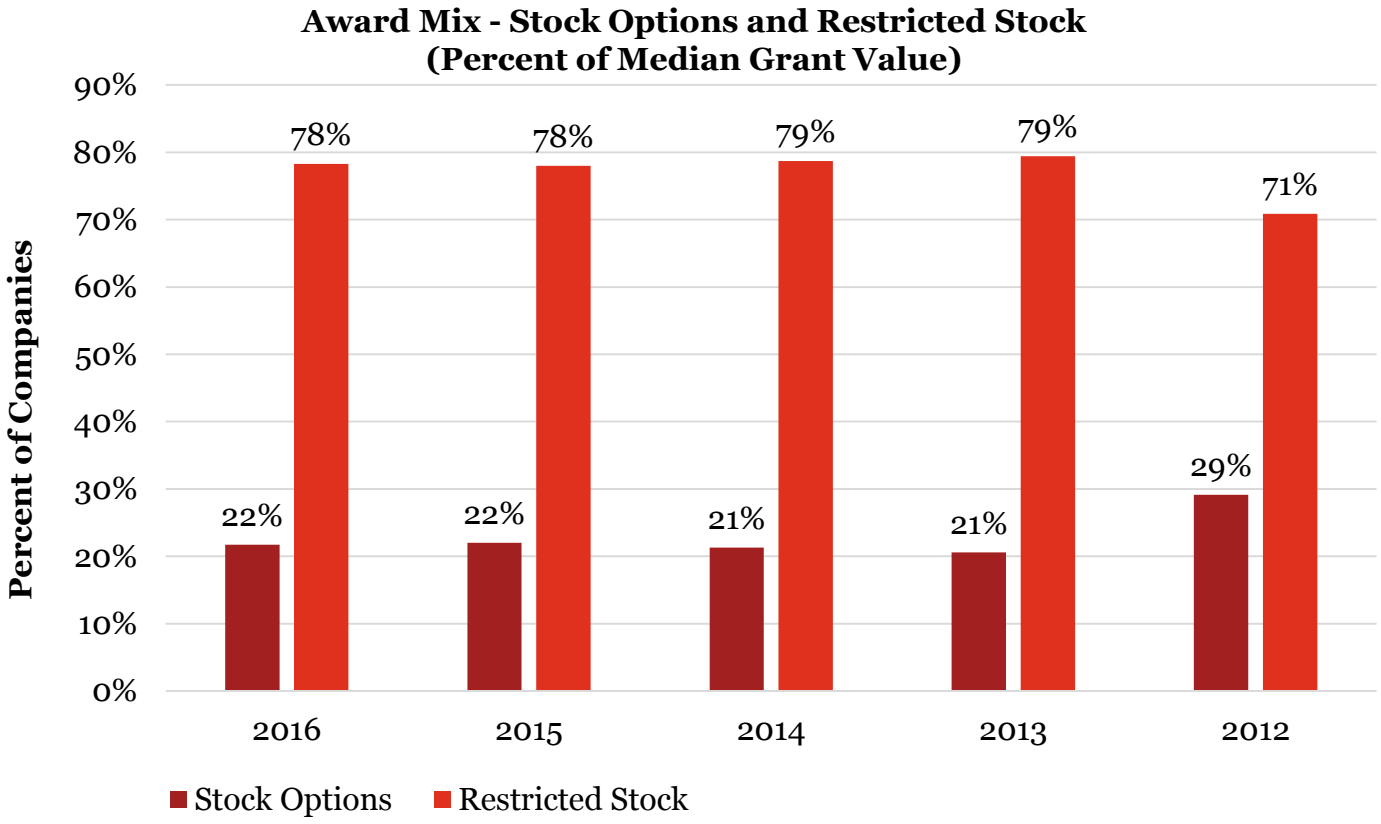
5-year summary

Median Number/Values	2016	2015	2014	2013	2012
Number of stock options	2.0M	1.9M	2.0M	2.0M	2.4M
Grant date option value	$38M	$35M	$31M	$29M	$36M
Number of restricted stock	1.7M	1.5M	1.5M	1.7M	1.5M
Grant date stock value	$135M	$125M	$115M	$110M	$87M

Our Large company group consisted of the following sector distribution:




Award Mix - Stock Options and Restricted Stock
(Percent of Median # of Units Awarded)
Percent of Companies
70%
60%
50%
40%
30%
20%
10%
0%
54%
46%
55%
45%
58%
42%
54%
46%
59%
41%
2016
2015
2014
2013
2012
Stock Options
Restricted Stock


Award Mix - Stock Options and Restricted Stock
(Percent of Median Grant Value)
Percent of Companies
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
22%
78%
22%
78%
21%
79%
21%
79%
29%
71%
2016
2015
2014
2013
2012
Stock Options
Restricted Stock

High tech companies

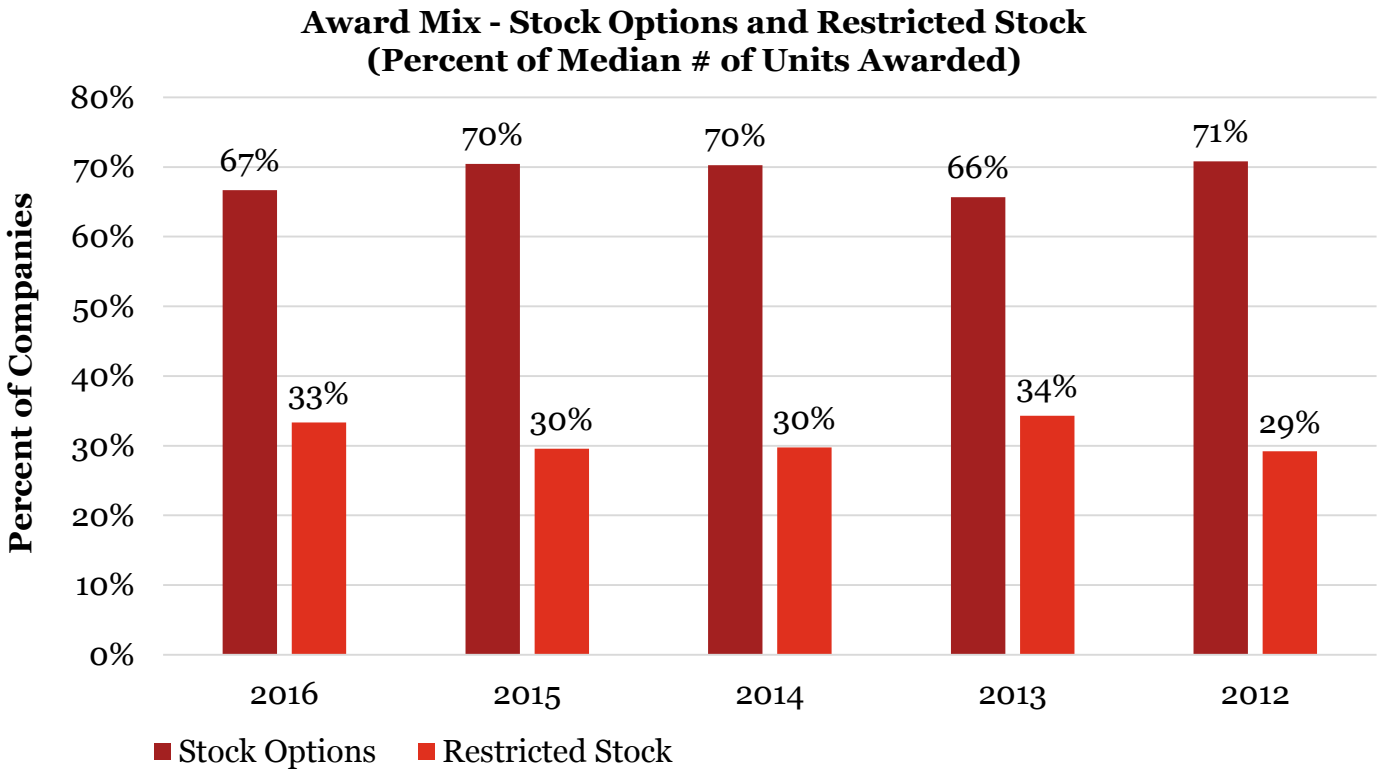
Over the last 5 years, at the median, the High Tech companies have also shown a shift in the mix from stock options to restricted stock awards. The ratio of the number of stock option awards granted to the number of restricted stock awards granted was about 2.5 to 1 in 2012; in 2016 it had closed to just 2.0 to 1 reflecting the change in the distribution of award types that High Tech companies grant.

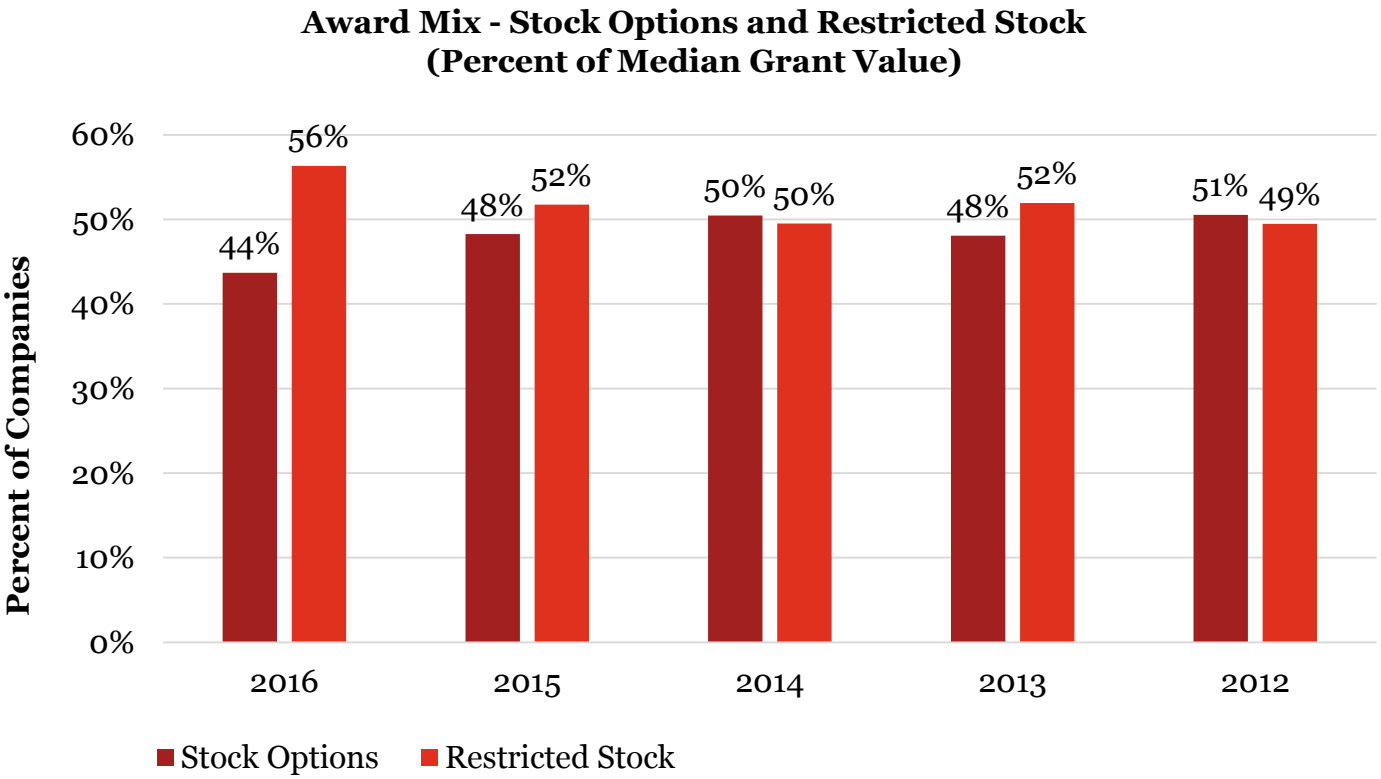
From a value granted perspective, at the median, restricted stock now exceeded the value of stock option awards in a measurable way. The ratio of the value of restricted stock awards to stock option awards was up to 1.2 to 1 whereas the prior 4 years were all near the ratio of about 1 to 1.

5-year summary

Median Number/Values	2016	2015	2014	2013	2012
Number of stock options	1.5M	1.2M	1.4M	1.1M	1.5M
Grant date option value	$20M	$19M	$16M	$13M	$9M
Number of restricted stock	0.7M	0.5M	0.6M	0.6M	0.6M
Grant date stock value	$25M	$21M	$15M	$14M	$9M




Award Mix - Stock Options and Restricted Stock
(Percent of Median # of Units Awarded)
Percent of Companies
80%
70%
60%
50%
40%
30%
20%
10%
0%
67%
33%
70%
30%
70%
30%
66%
34%
71%
29%
2016
2015
2014
2013
2012
Stock Options
Restricted Stock


Award Mix - Stock Options and Restricted Stock
(Percent of Median Grant Value)
Percent of Companies
60%
50%
40%
30%
20%
10%
0%
44%
56%
48%
52%
50%
50%
48%
52%
51%
49%
2016
2015
2014
2013
2012
Stock Options
Restricted Stock

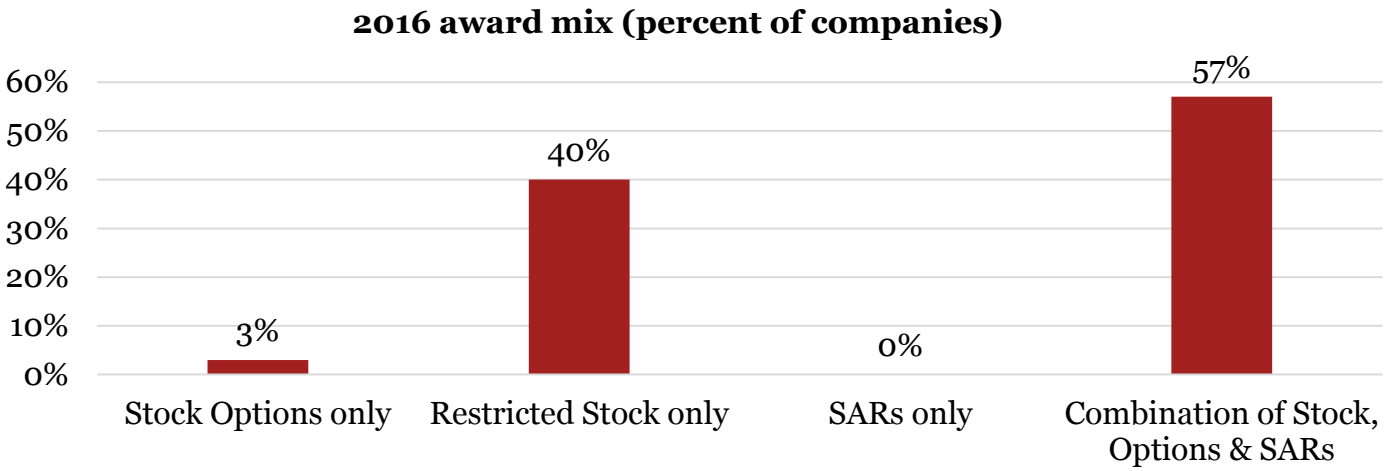
Mix of awards granted



Large companies

Of the Large companies in our study for 2016, 43% of companies granted just one type of equity award (3% stock options only and 40% restricted stock only).

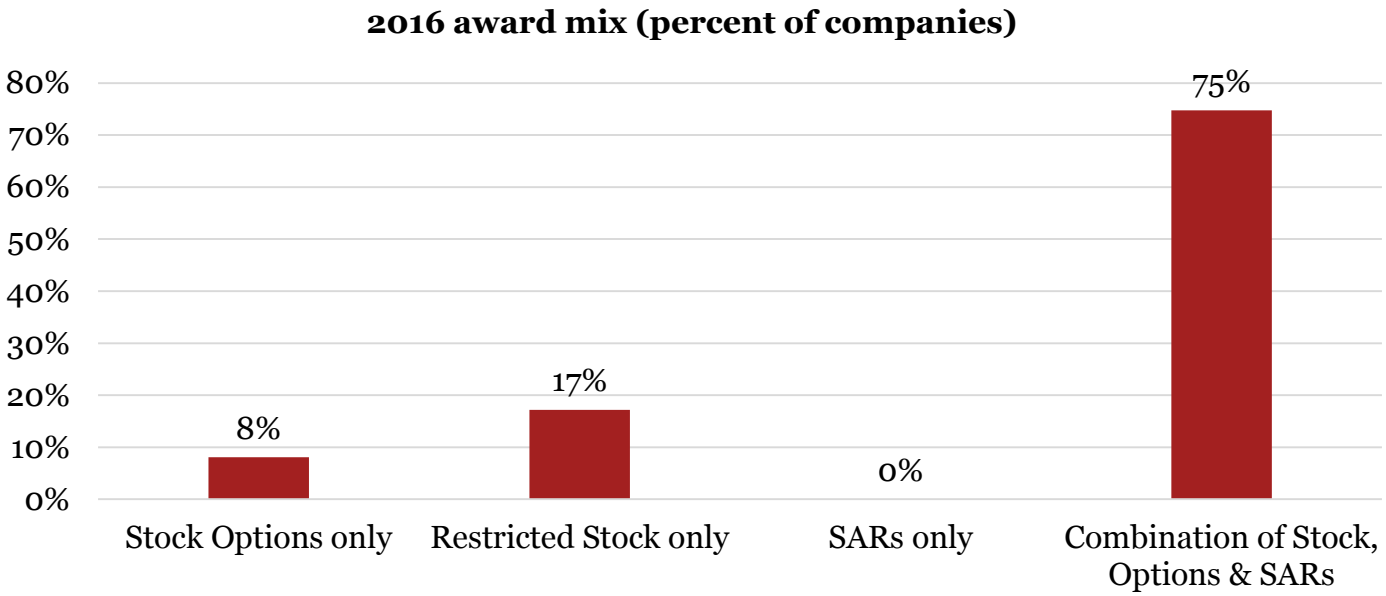
The 57% of companies granting a mix of equity award types provided stock options, restricted stock and SARs.



High tech companies

Of the High Tech companies in our study for 2016, only 25% of companies granted just one type of equity award (8% granted stock options only and 17% granted restricted stock only).

The majority of companies (75%) provided a mix of equity award types as was the case with Large companies



Vesting and other restrictions



Vesting periods for equity awards is generally 3 or 4 years for both Large Companies and High Techs. However, on average Large Companies have somewhat shorter vesting periods.

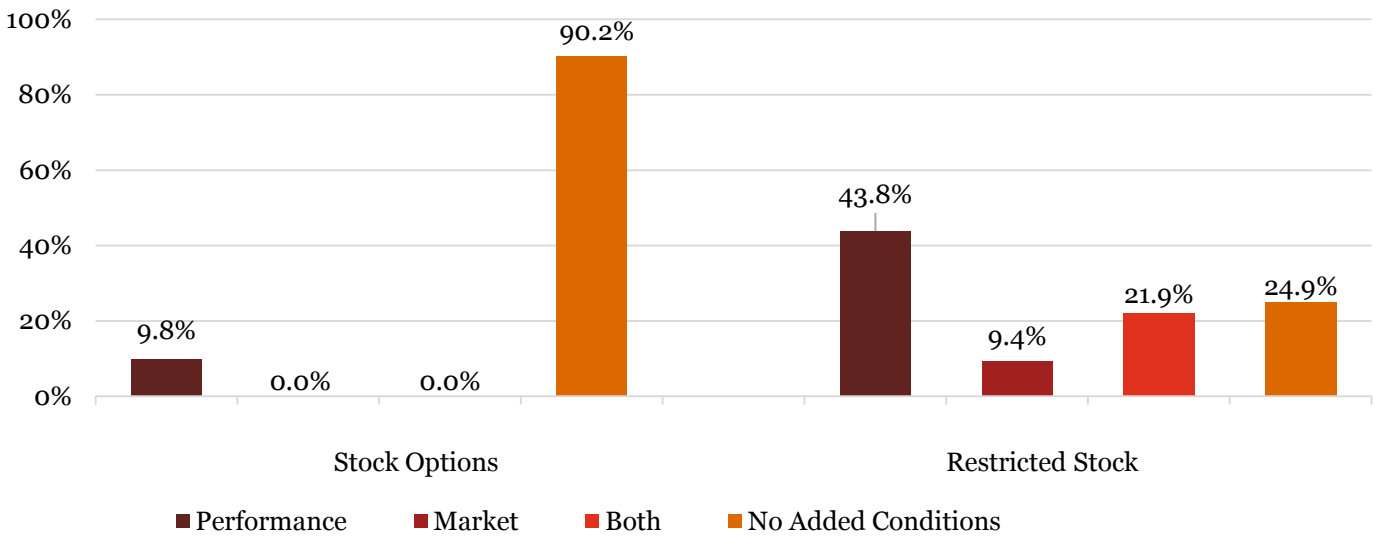
	Large companies		***High tech companies***	
Vesting Period Reported	*Stock Options*	*Restricted Stock*	*Stock Options*	*Restricted Stock*
Low	3.0[7]	2.0	3.0	1.0
Average	3.5	3.7	4.3	3.8
High	5.0	10.0	10.0	5.0

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). And 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.

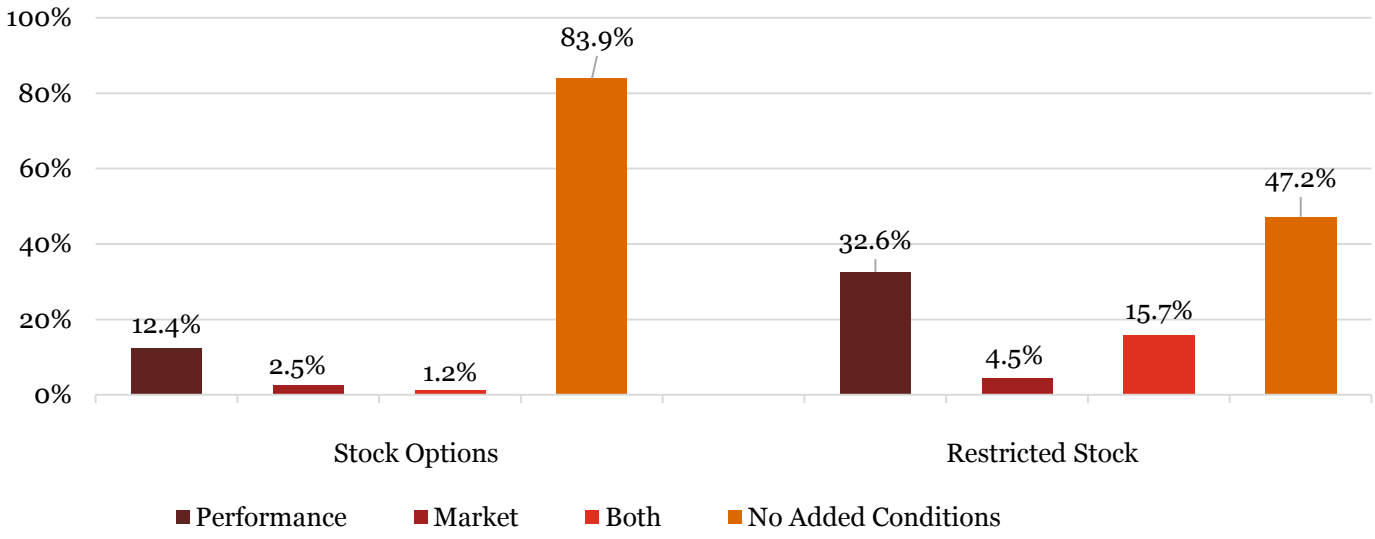
	Large companies		***High tech companies***	
Criteria beyond Service	*Options*	*Stock*	*Options*	*Stock*
Performance	9.8%	43.8%	12.4%	32.6%
Market	0.0%	9.4%	2.5%	4.5%
Both	0.0%	21.9%	1.2%	15.7%
Sub-Total	9.8%	75.1%	16.1%	52.8%
No Added Conditions	90.2%	24.9%	83.9%	47.2%
Total Granting	100.00%	100.00%	100.00%	100.00%

[7]"Excludes one large company providing fully vested stock options at grant"

Large Companies Criteria Beyond Service



High Tech Companies Criteria Beyond Service



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 (i.e., provisions indexed to the value of the issuer's shares) generally need to be valued using a more sophisticated approach, such as a lattice model[8].

"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[9].

Large companies

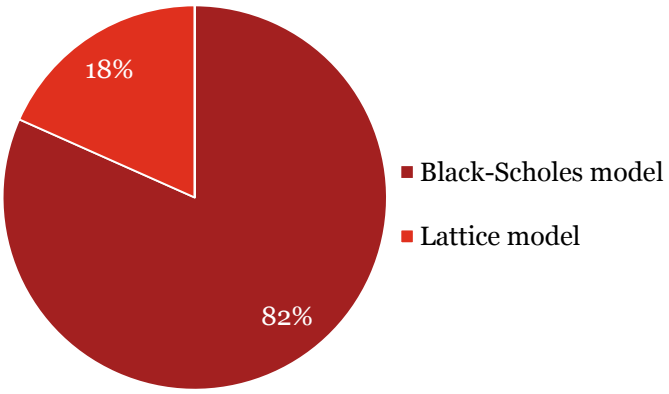
For Large companies, the model of choice continues to be the Black-Scholes option pricing model, with 82% of the companies reporting its use exclusively.

Approximately 18% of companies disclosed they used a different model, likely reflecting the increasing popularity of awards with market-based vesting criteria, such as increases in share price vs. peer group or total shareholder return measures.

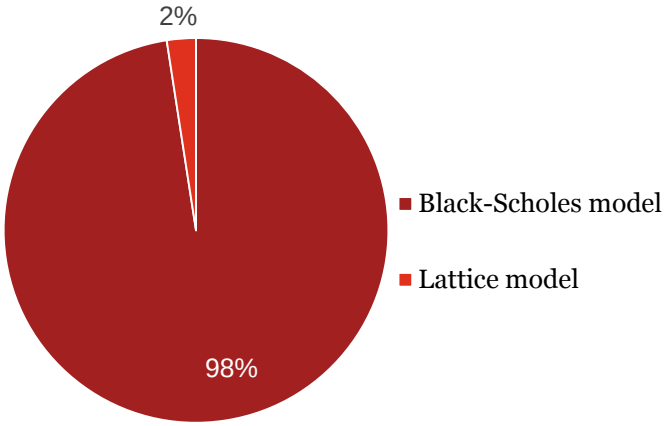
High tech companies

For High Tech companies, the Black-Scholes model is also most common, with 98% of the companies reporting its use exclusively, reflecting both a more simplified valuation approach and few market conditioned stock options. Other valuation models were disclosed by only 2% of the High Tech companies.

2016 Valuation Basis – Large companies



2016 Valuation Basis – High tech companies



[8] "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.

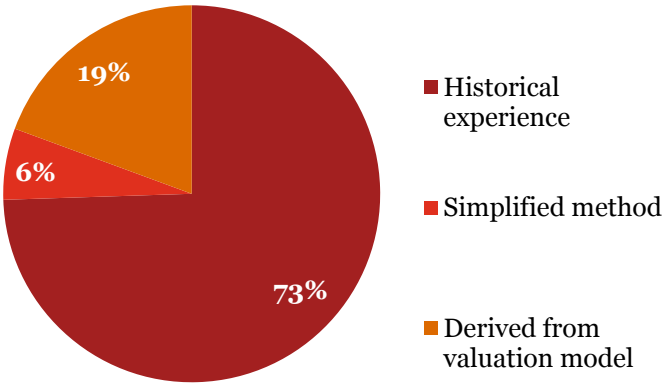
[9] "For the valuation basis, "Black-Scholes model" is the percentage of companies using solely the Black-Scholes valuation model and "Lattice model" is all other companies which may use the lattice model alone or in addition to the Black-Scholes model to value either stock options or market-based vesting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

Basis for expected term and volatility – Large companies

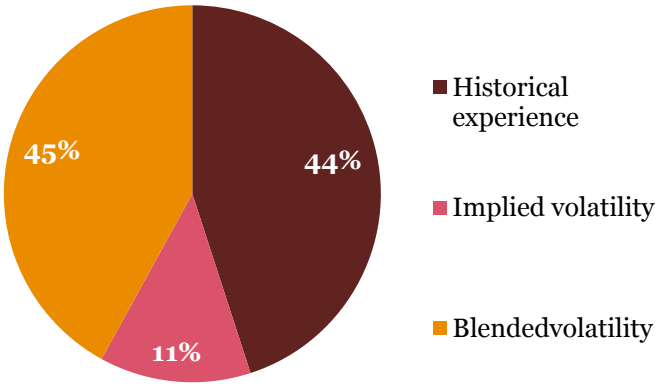
Large companies have continued to rely mostly on historical experience in developing assumptions for valuing stock options in 2016. For Large companies that granted stock options in 2016 and disclosed its **expected term** methodology, 73% relied solely on historical experience, 8% used the so-called simplified method[7], 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 2016 and disclosed **volatility** methodology, 45% relied solely on historical stock price data for the volatility assumption, 11% of the companies in the analysis relied solely on implied volatility[8] (i.e., the volatility inherent in the company's market traded options), and 44% used a blend of historical and implied volatilities. None of the Large companies in our study group disclosed using peer group volatility.

2016 Expected Term Rationale



2016 Volatility Basis



[7] 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.

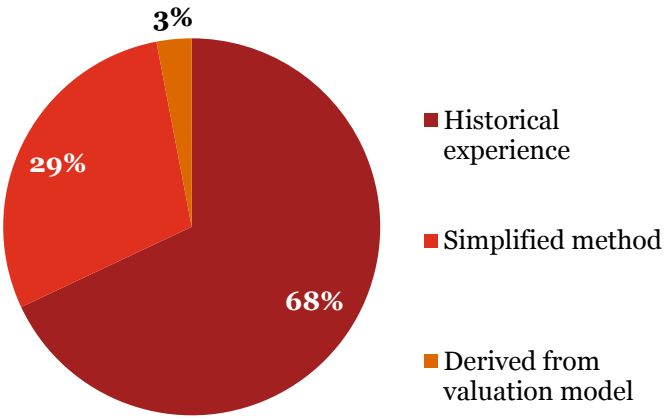
[8] As described in ASC 718-10-S99; a company should consider whether they have met the various criteria in the standard (e.g., plain vanilla option, option contracts of 1-year or longer only, at or near-the-money contracts, sufficient volume, etc.) in order to rely solely on implied volatility.

Basis for expected term and volatility – High tech companies

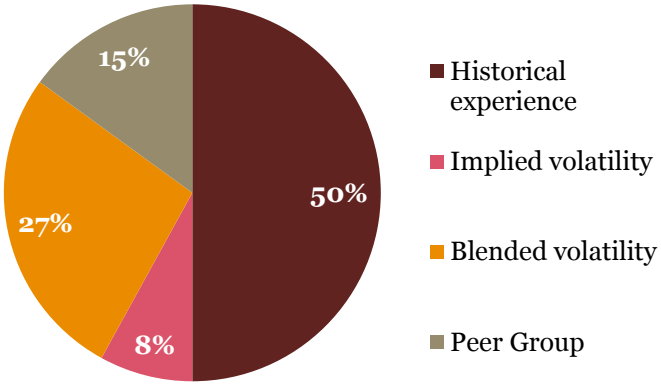
When setting the expected term or volatility assumptions for valuing stock options (the more significant assumptions for the Black- Scholes pricing model), the High Tech companies in our study continued to rely heavily on historical experience. For High Tech companies that disclosed the **expected term** assumption for 2016, 68% of companies relied solely on historical experience while 29% used the simplified method and another 3% relied on other methods (e.g., derived from a lattice model or Monte Carlo simulation). Even though the majority of companies now have credible historical data they can track and analyze, a significant number of companies continue to use the simplified method.

Of the High Tech companies that granted stock options in 2016 and disclosed the **volatility** methodology, 50% of the companies used historical stock price data as the sole basis for the volatility assumption, 8% of the companies relied solely on implied volatility, 27% used a blend of historical and implied volatilities, and the remaining 15% relied on peer group data.

2016 Expected Term Basis



2016 Volatility Basis



Option pricing model assumptions – Expected term



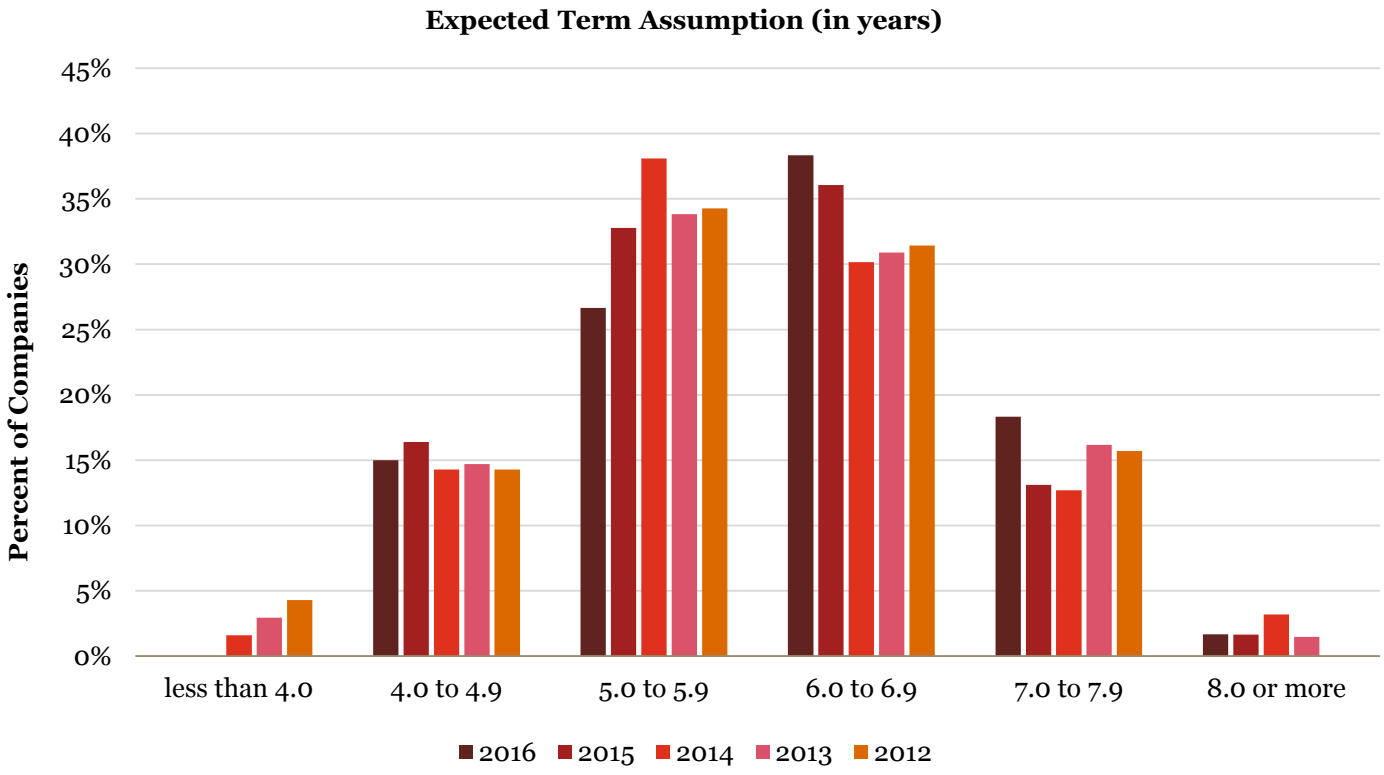
Large companies

Similar to the 2016 median expected term assumption for Large companies, the **average** expected term assumption in 2016 for Large companies was 5.92 years, reflecting a small increase from the average in 2015 (5.83 years) and slightly longer than the average in 2012 (5.74 years).

For 2016, the expected term assumption for the 20th to 80th percentiles ranged from 5.00 years to 6.68 years, nearly unchanged from the 2012 range of 5.00 years to 6.72 years. The percentage of Large companies in 2016 with an expected term of 5 or more years was 85%, increasing since 2012 (81%). Large companies assuming an expected term of 7 or more years was 20%, up from 15% in 2012. On the low end, no Large companies assumed an expected term of less than 4 years in 2016 while in 2012, 4% of the group did so.

Expected term

	2016	2015	2014	2013	2012
Low	4.00	4.00	3.75	1.00	1.50
Median (middle)	6.00	6.00	5.80	5.88	5.80
Mean (average)	5.92	5.83	5.77	5.74	5.74
High	8.00	8.00	8.00	8.00	7.80



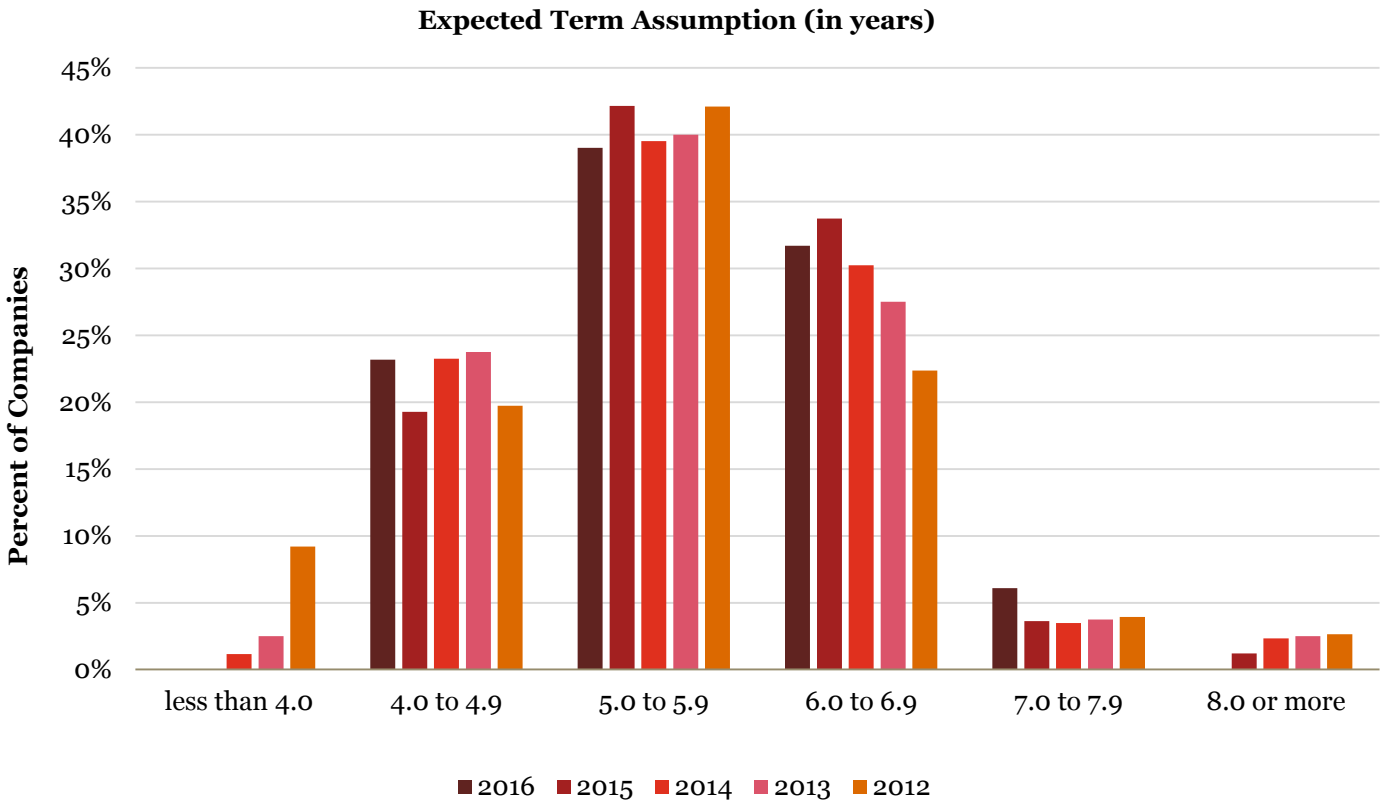
High tech companies

Similar to the 5.70 median expected term assumption for High Tech companies, the average **expected term** assumption in 2016 for High Tech companies was 5.63 years in 2016, increasing slightly from 5.60 years in 2015 and from 5.43 years in 2012.

For 2016, the expected term assumption for the 20th to 80th percentiles ranged from 4.94 years to 6.13 years, while in 2012 the range was slightly broader, from 4.52 years to 6.19 years. Additionally, the percentage of High Tech companies in 2016 with an expected term of 5 or more years was 77%, whereas in 2012 it was 71%. There was a slight increase in the percentage of High Tech companies assuming an expected term of 7 or more years, with 6% of the companies in 2016 compared to just 5% in 2015. However, the low end assumed expected term in 2016 was again not less than 4 years, up significantly from the low in 2012.

Expected term

	2016	2015	2014	2013	2012
Low	4.00	4.00	3.92	3.00	3.24
Median (middle)	5.70	5.66	5.70	5.50	5.50
Mean (average)	5.63	5.60	5.57	5.50	5.43
High	7.62	8.01	9.10	9.10	9.10



Option pricing model assumptions – Volatility



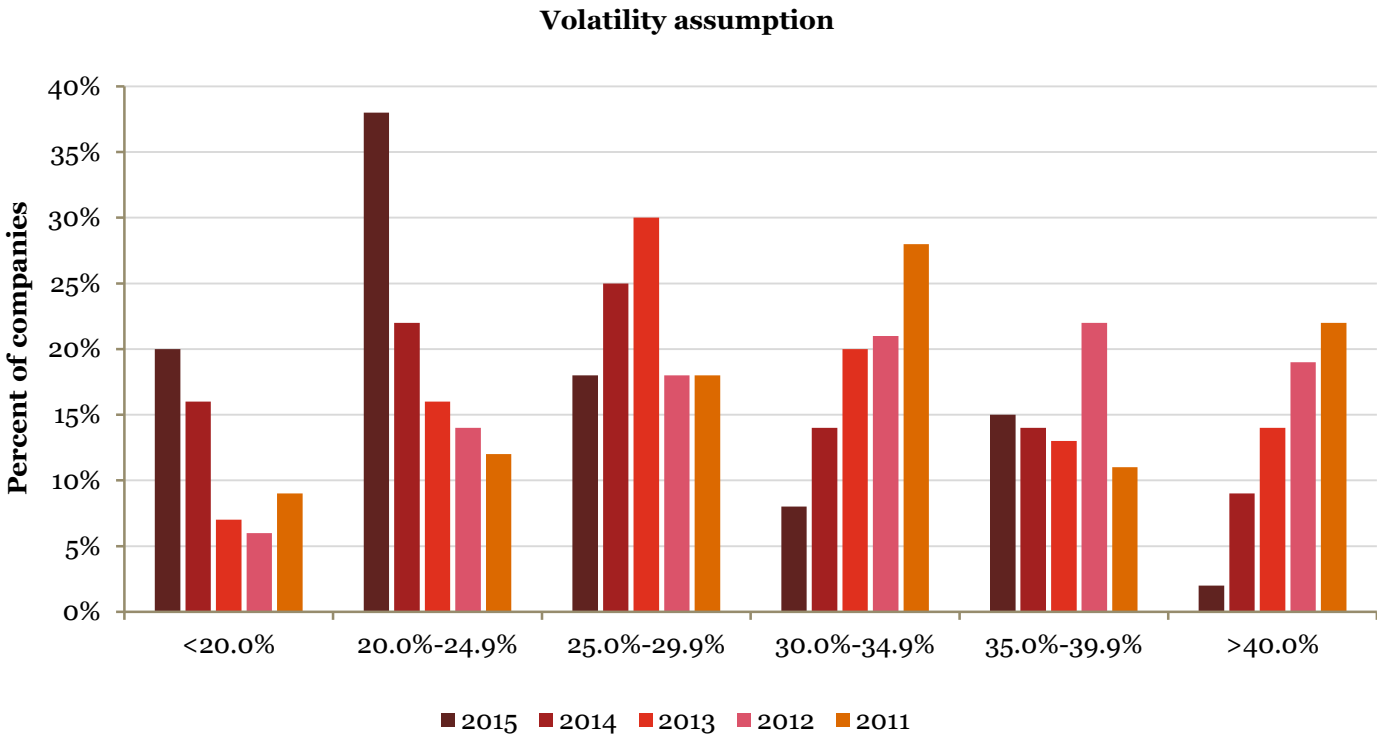
Large companies

Similar to the change in the median volatility, for Large companies, the **average** volatility assumption has decreased from 33.09% in 2011 to about 25.60% in 2016. 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.

For 2016, the volatility assumption for the 20th to 80th percentiles ranged from 20.00% to 33.40%, while in 2011 the range was 24.34% to 40.00%. Also reflecting the decrease in stock price volatility over that period, 2% of Large companies reported a volatility assumption of 40% or higher in 2016, whereas in 2011, 22% of the companies reported a volatility assumption of 40% or higher.

Volatility

	2016	2015	2013	2012	2011
Low	13.41%	13.41%	15.40%	12.86%	12.54%
Median (middle)	23.75%	27.00%	29.90%	32.75%	32.25%
Mean (average)	25.60%	28.18%	31.03%	33.05%	33.09%
High	44.50%	51.50%	52.50%	60.00%	74.45%



High tech companies

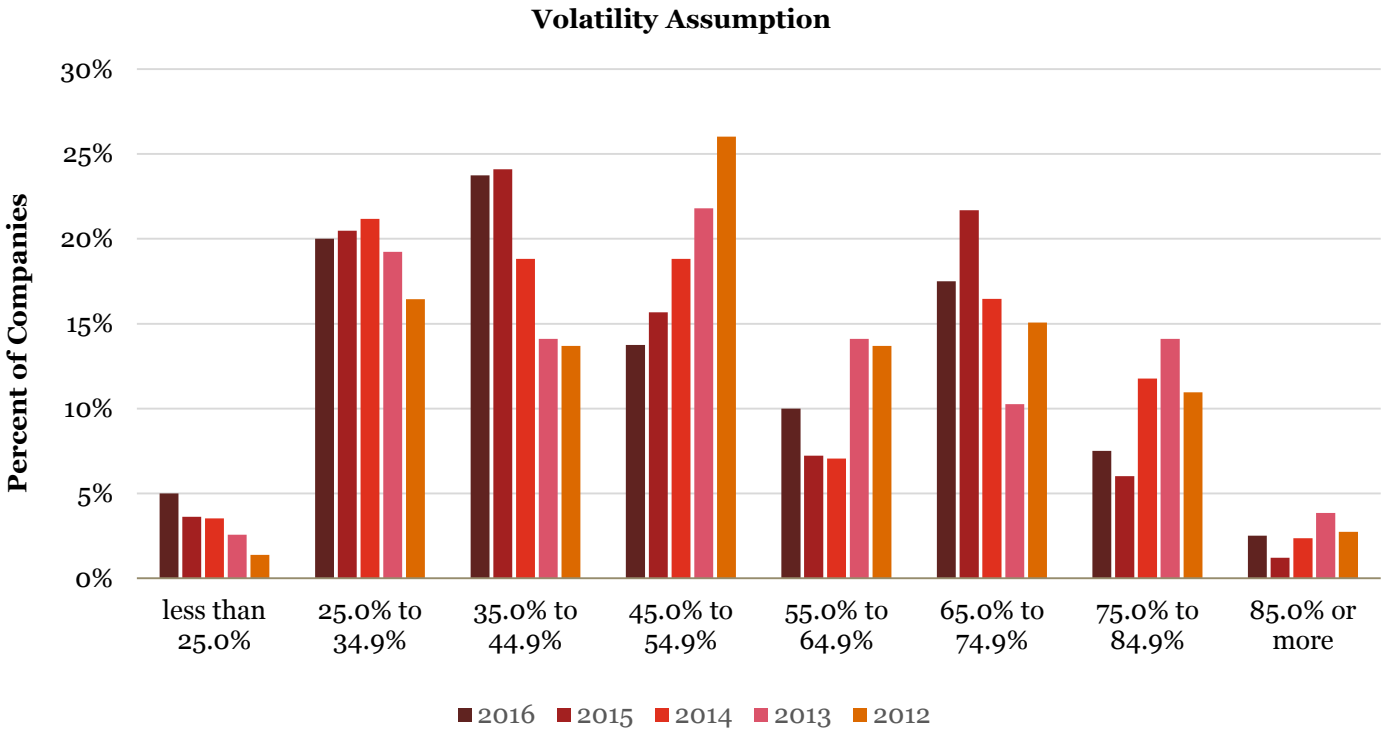
Like for Large companies and similar to the change in the median volatility assumption, for High Tech companies, the average volatility has decreased somewhat over the last 5 years, from 55% in 2012 to almost 50% in 2016.

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

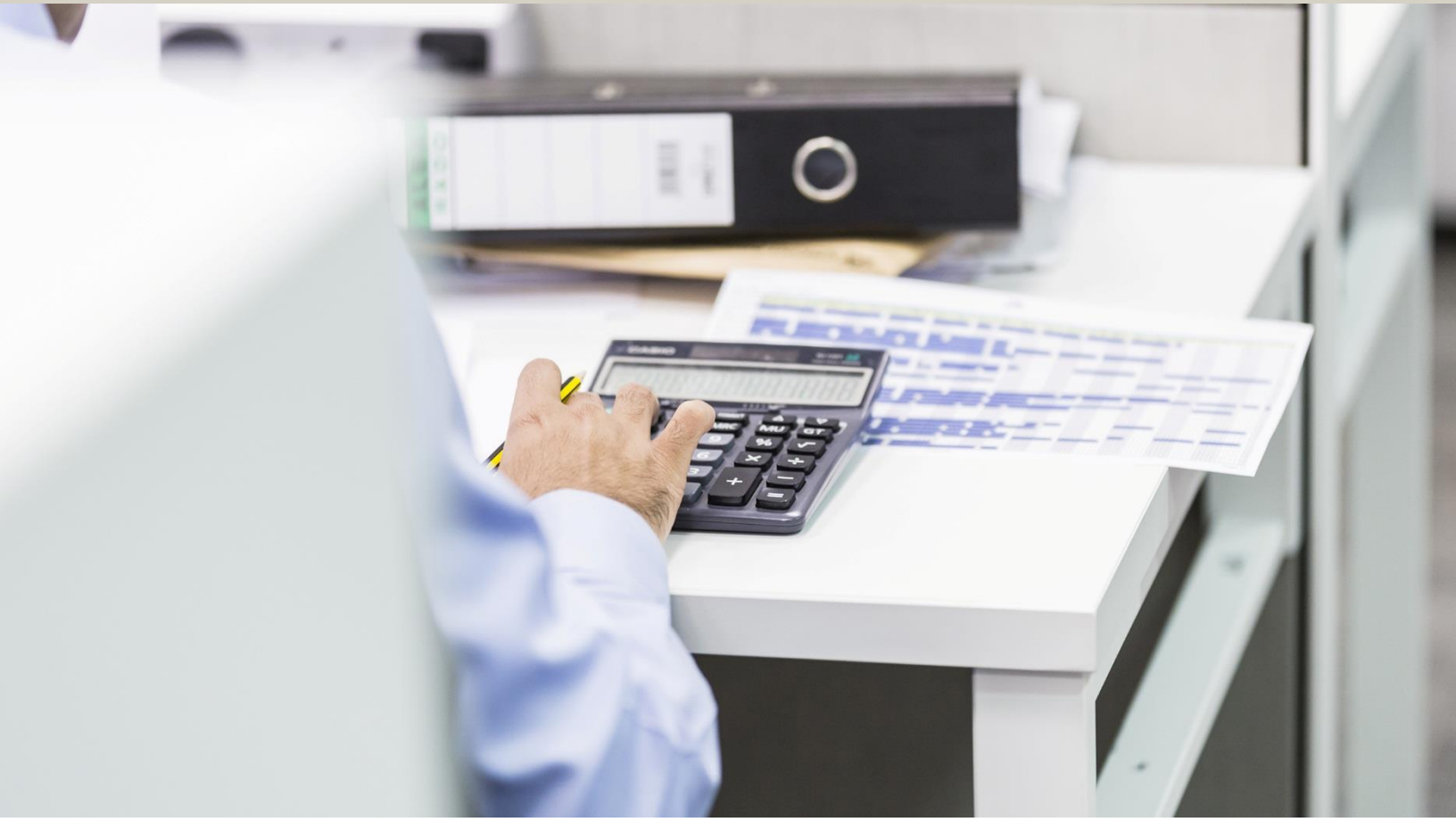
For 2016, the volatility assumption for the 20th to 80th percentiles ranged from 31.90% to 69.98%, slightly lower and broader compared to the range in 2012 of 36.71% to 71.00%. Also reflecting the decrease in stock price volatility over that period, 11% of High Tech companies reported a volatility of 75% or higher (the top two ranges in the graph) in 2016, whereas in 2012, 14% of the companies reported a 75% or higher volatility assumption.

Volatility

	2016	2015	2014	2013	2012
Low	20.30%	19.51%	20.53%	23.10%	22.20%
Median (middle)	46.54%	46.50%	50.10%	51.05%	51.83%
Mean (average)	50.08%	49.69%	53.59%	53.96%	55.00%
High	93.00%	89.00%	110.00%	105.00%	111.00%



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 fair market value of employee stock options.

Similar to the change in the median assumption for Large companies over the last 5 years, the **average** risk-free interest rate waffled from a low in 2012 of 1.08% to 1.78% in 2014 and down to 1.43% in 2016.

Also, both the median and the **average** assumptions for the Large companies reporting a dividend yield assumption about the same in 2016 compared to 2012, both showing a jump of 25 basis points or more.

Risk-free interest rate

	2016	2015	2014	2013	2012
Low	0.78%	0.83%	1.00%	0.31%	0.40%
Median (middle)	1.40%	1.60%	1.70%	1.11%	1.08%
Mean (average)	1.43%	1.57%	1.78%	1.15%	1.08%
High	2.20%	2.20%	2.80%	2.50%	2.19%

Dividend yield[9]

	2016	2015	2014	2013	2012
Low	0.60%	0.07%	0.10%	0.10%	0.10%
Median (middle)	2.65%	2.30%	2.24%	2.50%	2.57%
Mean (average)	2.56%	2.31%	2.29%	2.42%	2.57%
High	4.50%	4.21%	4.90%	4.40%	5.40%

[9] For both Large and High Tech groups, 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 0.99% in 2012, to 1.73% in 2014, and then decreased to 1.47% in 2016, following movement in interest rates observed in the market.

On the other hand, like with Large companies, both the median and **average** assumptions for the High Tech companies reporting a dividend yield assumption increased in 2016 from much lower levels in 2015, with the average showing an increase of over 30 basis points.

Risk-free interest rate

	2016	**2015**	**2014**	**2013**	**2012**
Low	1.10%	1.20%	1.09%	0.40%	0.43%
Median (middle)	1.48%	1.60%	1.71%	1.20%	0.91%
Mean (average)	1.47%	1.60%	1.73%	1.23%	0.99%
High	1.90%	2.00%	2.90%	2.05%	2.70%

Dividend yield

	2016	**2015**	**2014**	**2013**	**2012**
Low	0.25%	0.25%	0.25%	0.25%	1.65%
Median (middle)	1.90%	1.52%	1.61%	1.79%	2.05%
Mean (average)	1.65%	1.32%	1.72%	1.88%	2.14%
High	2.87%	2.52%	3.60%	3.90%	3.30%

Stock compensation expense



Large companies

For the Large companies in our study, the median stock compensation expense has increased each year since 2011, with a similar pattern in the median company earnings over the last 5 years, except for 2012.

Pre-tax earnings and stock compensation expense[10]

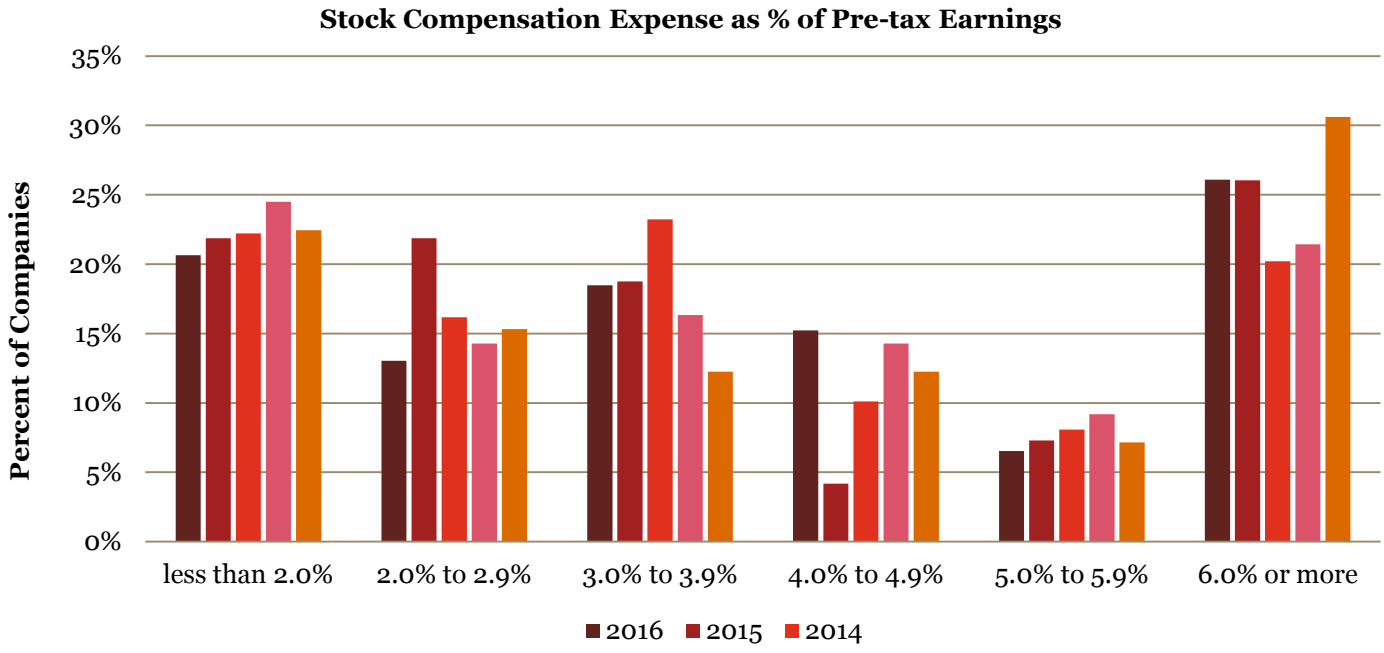
Median	**2016**	**2015**	**2014**	**2013**	**2012**
Stock Comp. Expense	$149M	$136M	$134M	$129M	$118M
Pre-tax Earnings	$3.7B	$3.9B	$3.7B	$3.6B	$2.9B

Stock Compensation Expense as a percentage of earnings (Expense Ratio) was highest in 2012 when earnings were down than at any other point in the 5-year period. However, the Expense Ratio has slightly increased over the past year, yet is still lower than in 2013, as there has been less scrutiny relative to executive compensation while earnings have increased.

Expense Ratio (Stock compensation expense as % of pre-tax earnings)[11]

Median	**2016**	**2015**	**2014**	**2013**	**2012**
Expense Ratio	3.71%	3.34%	3.36%	3.71%	3.98%

For 2016, stock compensation as a percentage of income for the 20th to 80th percentiles ranged from about 1.97% to 7.29%, with the 20th and 80th percentiles narrower than 2012 when the range was about 1.89% to 8.46%.



[10] For both Large and High Tech groups, includes companies reporting a negative stock compensation expense or a net operating loss

[11] For both Large and High Tech groups, 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

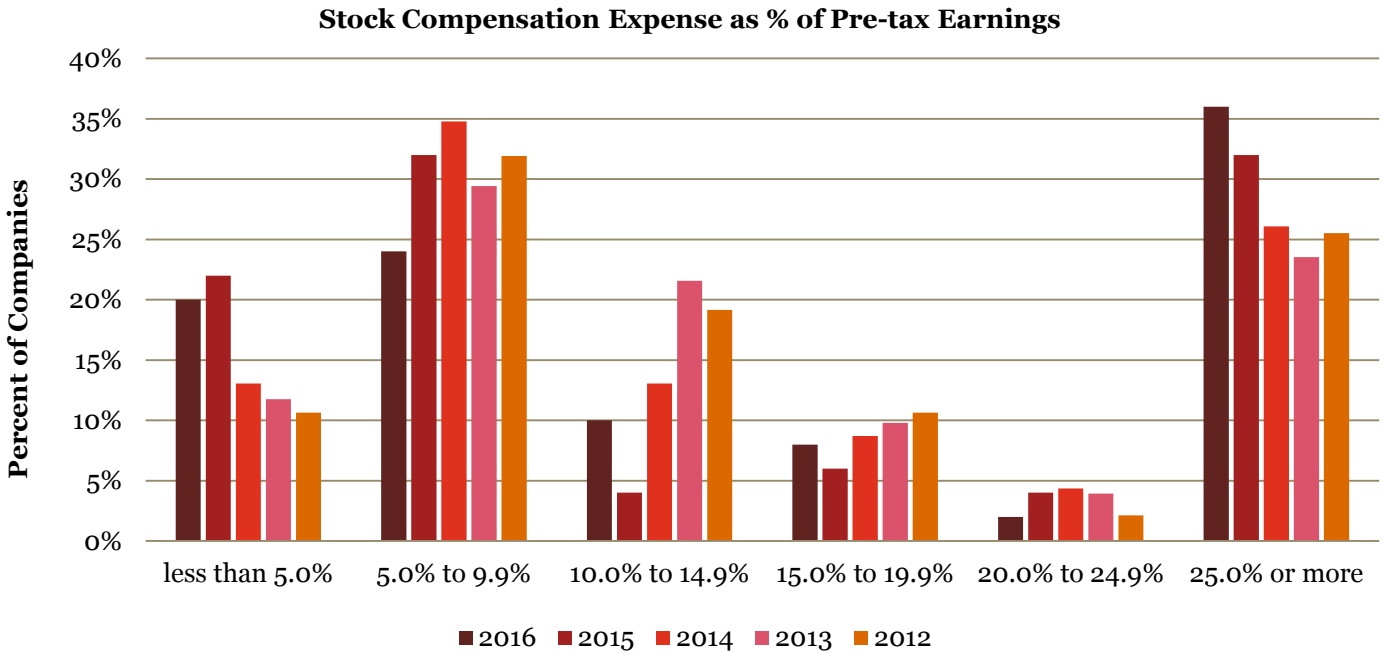
Median	**2016**	**2015**	**2014**	**2013**	**2012**
Stock Comp. Expense	$33M	$30M	$18M	$16M	$15M
Pre-tax Earnings	$15M	$15M	$(5)M	$20M	$10M

Unlike for the Large companies, the High Tech companies' median Expense Ratio was higher in 2011 than at any point in the 5-year period and increased over the past two years. Still, it remains in the double digits for 2016 and is lower than in 2011 and higher than in 2012.

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

Median	**2016**	**2015**	**2014**	**2013**	**2012**
Expense Ratio	14.55%	10.00%	10.63%	12.48%	11.15%

For 2016, stock compensation as a percentage of income for the 20th to 80th percentiles ranged from about 5.19% to 49.88%, with the percentile range generally much lower than 2012 when the range was about 7.33% to 84.88%.



Early adoption of ASU 2016-09



ASU 2016-09

Many companies chose to adopt early the provisions of ASU 2016-09, recognizing (often significant) reductions in income tax expense. Unsurprisingly, we didn't find any early adopters whose income tax expense increased under the new rules.

Other provisions of the ASU[10] were also required to be adopted at the time of early adoption.

For the Large companies, we found 36% of the companies early adopted and for High tech companies 24% early adopted.

Of those early adopting, about 35% of the Large companies and 45% of the High tech companies also changed the method of estimating forfeitures, leaving behind estimates of expected forfeitures in favor of recognizing forfeitures as they occur.

[10] https://taxsource.pwc.com/38d1f0dc-2508-458e-a620-95e88da3a6ed

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



The following is a comparison of 2016 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 High Tech and Large company groups are moving 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 is been in the 3% to 4% range since 2006 for Large companies, but has decreased from 17% in 2006 to 15% in 2016 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**	
	2016	**2006**	**2016**	**2006**
Stock Compensation as a Percentage of Pre-tax Earnings (Median)	3.7%	3.1%	14.5%	17.3%
Types of Equity Awards Granted – By Number of Units (Median)				
Stock Options	54%	73%	67%	82%
Restricted Stock	46%	27%	33%	18%
Types of Equity Awards Granted – By Value of Awards (Median)				
Stock Options	22%	39%	44%	61%
Restricted Stock	78%	61%	56%	39%
Methods Used for Valuation or Assumption Setting Purposes (by Company)				
Use of the Black-Scholes Valuation Model Only	82%	83%	98%	94%
Use of Only Historical Data for Expected Term	73%	79%	68%	55%
Use of Only Historical Data for Volatility	44%	45%	50%	58%
Assumptions Used for Black-Scholes Model (Median)				
Expected Term (years)	6.0	5.4	5.7	5.1
Volatility	24.0%	25.6%	46.5%	56.0%
Risk-free Rate	1.4%	4.6%	1.5%	4.8%
Divided Yield	2.7%	1.8%	1.9%	1.3%

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