

Calculation of Compensation Incentives and Firm-related Wealth using Execucomp: Data, Program, and Explanation

Jeffrey L. Coles¹
Naveen D. Daniel²
Lalitha Naveen³

July 2013

Abstract

In response to recent requests from academics and practitioners, this note addresses the data and program we use in our published articles on executive compensation and incentives. First, we detail our methodology for the calculation of delta (pay-performance sensitivity), vega (risk-taking incentives), and firm-specific wealth (inside equity) for executives on the *Execucomp* database. Second, we provide the data on these measures for the period 1992-2010 as well as the accompanying SAS program as downloadable files on our websites.

JEL classification code: G34, J33, M52

Keywords: Executive compensation, compensation incentives, pay-performance sensitivity, risk-taking incentives, inside equity, firm-specific wealth

¹ Professor of Finance, Arizona State University, Tempe, AZ; Jeffrey.coles@asu.edu

² Associate Professor of Finance, Drexel University, Philadelphia, PA; nav@drexel.edu

³ Associate Professor of Finance, Temple University, Philadelphia, PA; lnaveen@temple.edu

The authors are grateful to Stefan Petry for feedback on the SAS code. We enthusiastically welcome feedback on the data and program.

1. Data Definitions

If using our data, you **must** have a subscription to the *Execucomp* database.

Variable Name	Description
GVKEY	unique firm identifier in <i>Execucomp</i>
COPEROL	unique firm-executive identifier (<i>Execucomp</i> variable: CO_PER_ROL)
YEAR	fiscal year of data from <i>Execucomp</i>
DELTA	Dollar change in wealth associated with a 1% change in the firm's stock price (in \$000s)
VEGA	Dollar change in wealth associated with a 0.01 change in the standard deviation of the firm's returns (in \$000s)
FIRM_RELATED_WEALTH	Value of the CEO's stock and option portfolio (in \$000s)

COPEROL-YEAR is the unique identifier in our dataset. GVKEY is provided only for ease of merging with *Compustat* data. All data are as of fiscal year end.

2. Relevant Citations

Please cite papers 1 and 2 if using our data on delta and vega and paper 3 if using our data on firm-related wealth.

1. Core, J., Guay, W., 2002. Estimate the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research* 40, 613-630.
 - develops a method to calculate delta and vega using information provided by *Execucomp* in the pre-2006 period
2. Coles, J., Daniel, N., Naveen, L., 2006. Managerial incentives and risk-taking. *Journal of Financial Economics* 79, 431-468.
 - our program that estimates delta and vega was first developed and used for this paper
3. Daniel, N., Li, Y., and Naveen, L. 2013. No asymmetry in pay for luck. Working Paper.
 - calculates a measure of firm-specific wealth using executives' stock and option portfolios

3. Background

Execucomp recently changed its compensation data reporting in line with accounting changes imposed by the Financial Accounting Standards Board (FASB) as well as expanded compensation disclosure requirements (for pension, severance, change-in-control payouts, and equity based compensation) imposed by the Securities and Exchanges Commission (SEC).

FAS 123R issued by the FASB in 2004 specifies a change in format for accounting for equity-based compensation. The new rules primarily state that equity-based compensation awards must be expensed based on the fair value at the grant date. For fiscal years 1992–2005, all companies on *Execucomp* report using the old reporting format. The data format reporting code is identified using *Execucomp* variable OLD_DATAFMT_FLAG. For fiscal years 2007 and later, all firms on *Execucomp* report compensation using the new format. For 2006, 16% of firms report using the old format while the rest report under the new format. We loosely refer to these different reporting formats as the pre-2006 format (OLD_DATAFMT_FLAG = 1) and the post-2006 format (OLD_DATAFMT_FLAG = 0). Our calculation of incentives under the two reporting regimes is different because of differences in the data reported by firms.

4. Calculation of Incentives Under New Reporting Format

Post-2006, firms report data on executives' outstanding option holdings in their DEF14A filings.¹ We compute incentives as of fiscal year-end based on these data. *Execucomp* provides a separate record for each outstanding option tranche (denoted by a different value of OUTAWDNUM), indicating the number of vested, unvested, and unearned options

¹ These data are available from “Outstanding Equity Awards” table in the WRDS interface for *Execucomp* and in “outstandingawards.sas7bdat” if the data are downloaded from the WRDS server (/wrds/comp/sasdata/execomp).

(OPTS_UNEX_EXER, OPTS_UNEX_UNEXER, OPTS_UNEX_UNEARN) of each tranche, and their corresponding exercise price (EXPRIC) and expiration date (EXDATE).

For calculation of delta and vega, we use only the vested and unvested shares and options. We do not use the unearned awards (e.g., unvested awards for which future vesting is contingent or accelerated based on achieving stock price or accounting hurdles) because the data required to calculate incentives for these awards are not available in electronic format in *Execucomp* for any firm.² Ignoring the unearned awards underestimates the true delta and vega.³ These unearned shares or options will be classified as either shares or options when they are earned, and, if these grants are still held by the executive as of the end of the year, they will be included in the delta and vega calculation at that point.

To compute the incentives from options, we need the following data:

Variable	Definition
OPTS_UNEX_EXER, OPTS_UNEX_UNEXER	Number of vested and unvested option awards
EXPRIC	Exercise price
EXDATE	Expiration date of option, needed to compute the maturity of the options as of the fiscal year end
PRCCF	Stock price at fiscal year end

² Even in the proxy statements, firms do not always disclose the exact definition of these performance measures and the value of the performance measures that need to be achieved to trigger the equity award. For example, IBM indicates in its 2013 proxy statement that the performance criteria for its executives are revenue growth, operating net income, operating EPS, and free cash flow, but does not indicate the exact definition of these variables or what levels of these measures have to be achieved for the awards to vest. The firm states “IBM is not disclosing specific targets under the annual and long-term plans because it would signal IBM’s strategic focus areas and impair IBM’s ability to leverage these areas for competitive advantage.” Data on such performance-vesting provisions, when reported by the company, are available from Incentive Lab. See Bettis, Bizjak, Coles, and Kalpathy (2013).

³ See Bettis, Bizjak, Coles, and Kalpathy (2013) for how to estimate incentives provided by grants with performance-vesting provisions.

Variable	Definition
SIGMA (Variable name used in our program)	This is our estimate of stock volatility. We calculate this in a separate program because <i>Execucomp</i> stopped providing this variable (BS_VOLATILITY) as of 2006. We follow the Execucomp methodology as closely as possible. Accordingly, we (i) use annualized standard deviation of stock returns estimated over the 60 months prior to the beginning of the fiscal period; (ii) require at least 12 months of returns data; (iii) use mean volatility (across all firms) for that year if 12 months of data are not available; and (iv) winsorize the volatility estimates at the 5 th and 95 th levels.
BS_YIELD (Variable name used in our program, also used by <i>Execucomp</i> formerly)	This is our estimate of dividend yield. We calculate this because <i>Execucomp</i> stopped providing this variable (BS_YIELD) as of 2006. We follow their methodology as closely as possible. We (i) use the average of DIVYIELD provided by <i>Execucomp</i> over the current year and the two prior years and (ii) winsorize the values at the 5 th and 95 th levels. The DIVYIELD is expressed as a percentage in Execucomp and we divide by 100 to use it in the Black-Scholes formula.
RFC, RFYEAREND, RFVEST, RFUNVEST (Variable names used in our program)	Risk-free rate corresponding to the (rounded) maturity of the options as of fiscal year end. The risk-free rate is obtained from historical data provided by the Federal Reserve on their website for “Treasury constant maturities” using the “annual” series: (http://www.federalreserve.gov/releases/h15/data.htm#fn11). The website provides data for 1, 2, 3, 5, 7, and 10 year Treasury securities. We interpolate the rates to obtain the risk-free rates for 4, 6, 8, and 9 years. If the option maturity is more than 10 years, we use the 10 year rate. The rates are expressed as a percentage and we divide by 100 to use them in the Black-Scholes formula.

We use the values for the variables defined above in the formulae for delta and vega provided in Core and Guay (2002), which in turn is the Black-Scholes (1973) option valuation model as modified by Merton (1973) to account for dividends. The delta and vega of all vested and unvested tranches of options are summed up for each executive-year to give the delta and vega of the option portfolio.⁴

⁴ We do not make any adjustment for the maturity of the options, but use the maturity as stated in the proxy. This is slightly different than what *Execucomp* assumes in their (pre-2006) calculation of Black-Scholes value—they

Finally, we obtain the delta and vega of the equity portfolio. To compute the overall delta, we add the delta of the portfolio of options and the delta of the portfolio of shares. *Execucomp* provides the number of restricted stocks outstanding at the end of each year (SHRS_UNVEST_NUM), but not data on unrestricted stock holding. Therefore we use the variable SHROWN_EXCL_OPTIONS, which is the sum of both restricted and unrestricted shares⁵. The delta from shares is computed as $\text{SHROWN_EXCL_OPTIONS} \times \text{PRCCF} \times 0.01$.

For vega of the equity portfolio, we use only the vega of the option portfolio calculated above. We assume, as in Guay (1999), that vega of the share portfolio is zero.

5. Calculation of Incentives Under Old Reporting Format

For the pre-2006 data, we use the approximation method detailed in Core and Guay (2002) to calculate delta and vega of the option portfolio. Since we follow their methodology, obviously there is overlap between the discussion here and that in Core and Guay. Nevertheless, we provide a detailed discussion to ensure that this note is self-contained and to enable the interested reader to follow the SAS program.

As per the old reporting format, firms were required to report tranche level details only for the current year's option grants. That is, we have the number of options granted, the exercise price, and the maturity of each tranche of options awarded in the current year. Firms were not required to report tranche-level details on previously granted options. Instead, they only had to

assume that the options will be held only up to 70% of the stated time-to-maturity. It is very simple, however, to make this change in our program.

⁵ For this variable, Standard & Poor's, the provider of *Execucomp* data, states: "For (stock ownership) item we are using the Stock-Based Holdings column which includes the restricted stock. We have also made corrections to past years. As with much of the *Execucomp* database, what we collect is largely dependent on how the company reports the data. When possible we will try to include restricted stock with this item, however sometimes the company doesn't provide a concise picture and it's not possible."

report the intrinsic value and number separately for the portfolio of vested options and the portfolio of unvested options. Therefore, as in Core and Guay, we consider three option portfolios: (i) current year's option grants, (ii) portfolio of unvested options from previously-granted awards, and (iii) portfolio of vested options. The executive's incentives are given by the summation of the incentives from these three portfolios.

To calculate incentives for each of these portfolios, we obtain firm-level variables (PRCCF, SIGMA, BS_YIELD) and risk-free rates as described earlier. We obtain option-specific details as follows.

(i) For the current year's option grants, we obtain the number of options granted during that year (NUMSECUR), the stated exercise price (EXPRIC), and maturity (based on expiration date, EXDATE).⁶ NUMSECUR is the number of options at the tranche level, while the aggregate across tranches is OPTION_AWARDS_NUM.

(ii) For the portfolio of previously-granted unvested options, we estimate the exercise price in three steps. First, we estimate the total number of options in the portfolio and the average exercise price of each option in the portfolio. As in Core and Guay, we net off the total number of options granted in the current year from the number of unvested options to estimate the number of previously granted unvested options.⁷

$$\begin{aligned} & \text{OPTS_UNVESTED_NUM_EXCL_CURRYEAR (our variable name)} \\ & = \text{OPT_UNEX_UNEXER_NUM} - \text{OPTION_AWARDS_NUM} \end{aligned}$$

⁶ These data are available from "Stock Option Grants – 1992 format" table in the WRDS interface for *Execucomp* and in "stgrttab.sas7bdat" if the data are downloaded from the WRDS server.

⁷ In a few instances, the option awards in the current year are greater than the holdings of unvested options. This happens when the options are given to vest immediately (perhaps the options are performance-vested and not time-vested). For example, the number of options granted in the current year = 50, and the number of unvested options = 40. In this case, we make the number of unvested options excluding the current year's option to be 0 and then reduce the holdings of vested options by 10. A similar adjustment is made to the intrinsic values also.

We then estimate the intrinsic value of the portfolio of previously-granted unvested options by subtracting the intrinsic value of the current year's grants (which is the summation of intrinsic value of each tranche) from the reported intrinsic value of all unvested options.

$$\begin{aligned} &\text{OPTS_UNVESTED_VAL_EXCL_CURRYEAR (our variable name)} \\ &= \text{OPTS_UNVESTED_VAL} - \sum [(\text{PRCCF} - \text{EXPRIC}) * \text{NUMSECUR}] \end{aligned}$$

Finally, the average exercise price of each previously granted unvested option is obtained by subtracting the average intrinsic value of each option in the portfolio from the stock price.

$$\begin{aligned} &\text{XUNVEST (our variable name)} \\ &= \text{PRCCF} - \frac{\text{OPTS_UNVESTED_VAL_EXCL_CURRYEAR}}{\text{OPTS_UNVESTED_NUM_EXCL_CURRYEAR}} \end{aligned}$$

The maturity of previously-granted unvested options (MATUNVEST: our variable name) equals the actual maturity of current year option grants minus one. If there are no grants in the current year, we assume the average maturity of previously-granted unvested options is nine years.

(iii) For vested options, we calculate the average exercise price (XVEST: our variable name) based on the realizable value (OPTS_VESTED_VAL) and number of vested options (OPTS_VESTED_NUM).

$$\text{XVEST (our variable name)} = \text{PRCCF} - \frac{\text{OPTS_VESTED_VAL}}{\text{OPTS_VESTED_NUM}}$$

The maturity of vested options (MATVEST: our variable name) equals the maturity of unvested options (MATUNVEST) minus three.

Finally, using these values, we estimate the delta and vega of the equity portfolio as described earlier. The delta is the sum of the delta of current year options, the delta of the portfolio of previously-granted options (both vested and unvested), and the delta from the shares

owned by the executive. The vega is the sum of the vega of the current year options as well as previously-granted options (both vested and unvested).⁸

6. Scaled Incentives

Edmans, Gabaix, and Landier (2009) use scaled wealth-performance sensitivities as incentive measures. They define this as the dollar change in CEO wealth for a 100 percentage point change in firm value, divided by the annual flow compensation. This is equivalent to multiplying our delta measure by 100 and scaling by total annual compensation (*Execucomp* variable *TDC1*). Note that Edmans et al. winsorize the *TDC1* variable at the 2nd and 98th percentile values before taking the ratio.⁹

7. Calculation of Firm-Specific Wealth

Firm-specific wealth is the sum of the value of the stock and option portfolio held by the executive. This measure is the same as the “inside equity” measure that is used in Sundaram and Yermack (1997).¹⁰ The user can readily use our data to calculate inside debt-equity ratio as in Sundaram and Yermack, because post-2006, firms have to report both the present value of pension benefits as well as the present value of deferred compensation.

⁸ As a check of our methodology, we compare the Black-Scholes values obtained from our program with those computed by *Execucomp* in the pre-2006 period. When we use the *Execucomp* estimates of risk-free rate, volatility, and dividend yield, as well as a 70% haircut for time-to-maturity as in their methodology, we obtain a 99.8% correlation between our estimates and theirs. When we use our own estimates of risk-free rate, volatility, and dividend yield, we obtain a 99.2% correlation between our estimates and theirs.

⁹ When we estimate scaled wealth-performance sensitivities as described here using our delta measure, we obtain a 99.9% correlation between our estimates and those in Edmans et al. (2009).

¹⁰ Sundaram and Yermack use a sample of 237 firms from the *Forbes* database rather than the *Execucomp* universe. Consequently, we cannot directly compare our numbers to theirs, but in Table I of their paper, they report the “total inside equity” for Jack Welch of GE. Our estimates of firm-specific wealth for Jack Welch obtained from *Execucomp* for the 5-year period 1997-2001 are within 0.1% – 3% of their estimates (*Execucomp* does not have data on SHROWN_EXCL_OPTIONS for this observation for 1993-1996).

We compute the value of the option portfolio as of the fiscal year end using the Black-Scholes formula and the inputs described above. For pre-2006, we sum up the values of the three option portfolios: current year grants, previously-granted unvested options, and vested options. For post-2006, we sum up the values of all the tranches of options outstanding. We compute the value of the share portfolio by multiplying the number of shares (SHROWN_EXCL_OPTS) by the fiscal year end price (PRCCF). The sum of the two provides the value of the CEO's equity portfolio as of the end of the year.

References

- Bettis, J., Bizjak, J., Coles, J., and Kalpathy, S., 2013. Performance-vesting provisions in executive compensation. Working paper.
- Core, J., Guay, W., 2002. Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research* 40, 613-630.
- Coles, J., Daniel, N., Naveen, L., 2006. Managerial incentives and risk-taking. *Journal of Financial Economics* 79, 431-468.
- Daniel, N., Li, Y., and Naveen, L. 2013. No asymmetry in pay for luck. Working paper.
- Edmans, A., Gabaix, X., and Landier, A., 2009. A multiplicative model of optimal CEO incentives in market equilibrium. *Review of Financial Studies* 22, 4881-4917.
- Sundaram, R., and Yermack, D., 2007. Pay me later: inside debt and its role in managerial compensation. *Journal of Finance* 52, 1551-1588.