Executive Compensation

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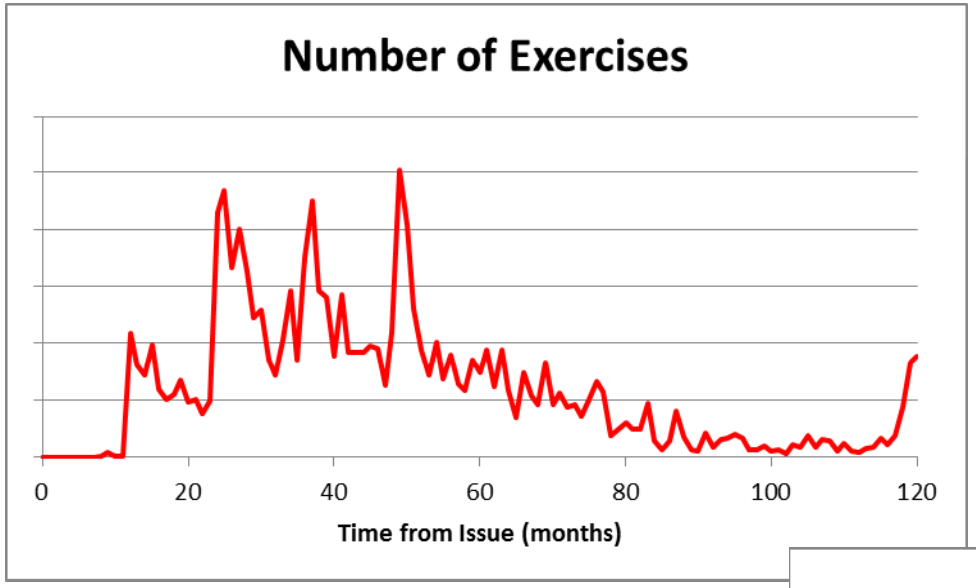
Long Term Compensation Plans

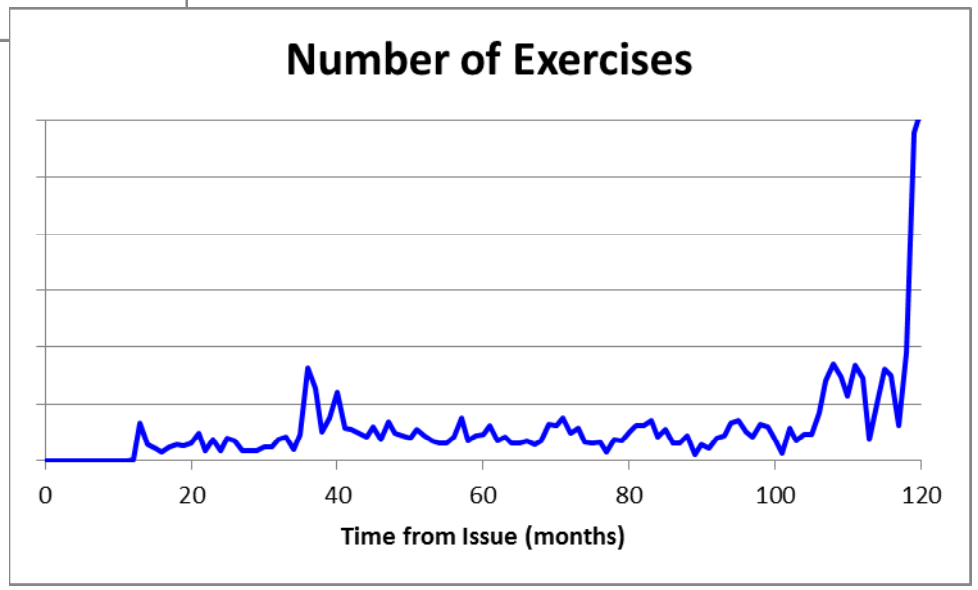
- Restricted Share Units (RSU)
  - Receive 1 share after T-year vesting period
- Executive Stock Options (ESO)
  - Receive 1 American call after T-year vesting period
  - Strike price = closing Stock price on issue date
  - Option expires after T + τ years
  - Discussion centered on early exercise behavior
- Market-Leveraged Stock Units (MSU)

ESO Early Exercise Behavior

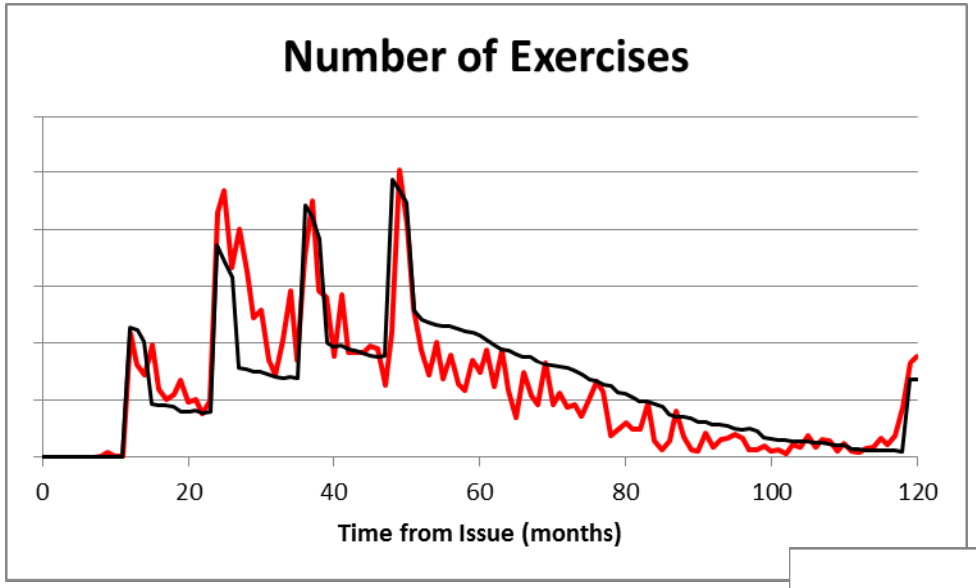
- Modelling approaches
  - Utility based (Carpenter and many others)
  - Ad hoc exercise rules (Hull & White)
- Proposed model
  - P_X = a + b*D + c *(S/K)
  - D is a dummy variable that is 1 in the four months following vesting

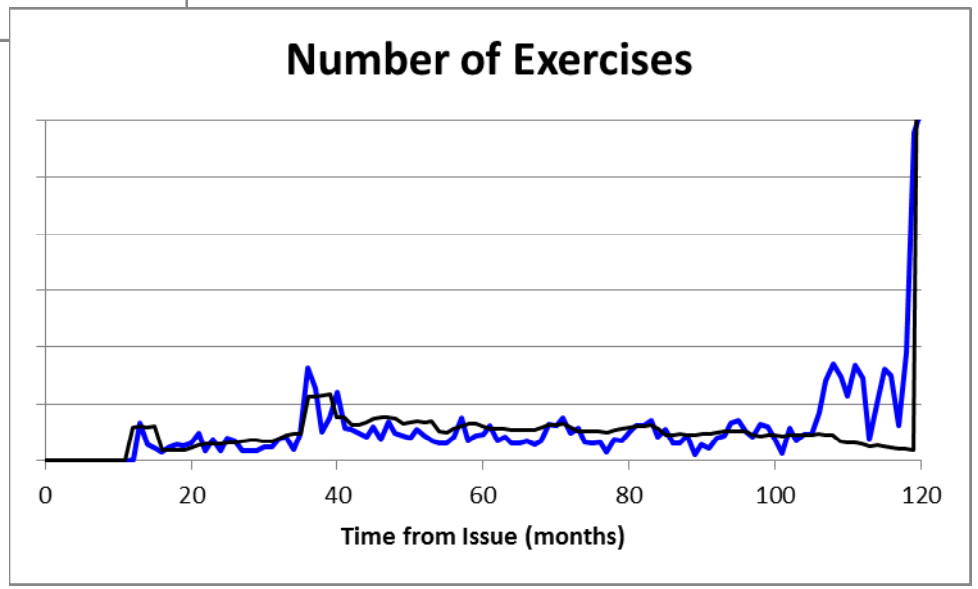
Empirical Data





Fitted Model





An Example of Group Differences

	US vs. non-US		Low vs. High Salary		Age 49- vs. 50+		Male vs. Female	
	Diff.	*t* Stat	Diff.	*t* Stat	Diff.	*t* Stat	Diff.	*t* Stat
a'	**0.00075**	**2.71**	**-0.00248**	**-3.26**	-0.00173	-1.72	0.00222	1.39
b'	**0.00326**	**2.39**	**-0.00799**	**-9.50**	**-0.00548**	**-6.79**	0.00434	1.96
d'	**0.00460**	**6.32**	0.00043	0.89	-0.00047	-1.33	-0.00145	-1.00

- Non-US employees tend to exercise earlier
- High salary employees tend to exercise later
- Older employees tend to exercise later

Market-Leveraged Stock Units (MSU)

- Receive n shares at the end of T-year vesting period
- The number of share receive, n, is S_T / S_0
- On the vesting date the value of the MSU is $(S_T / S_0) * S_T$
- An MSU is a power option with a zero strike
- An RSU is a regular option with a zero strike

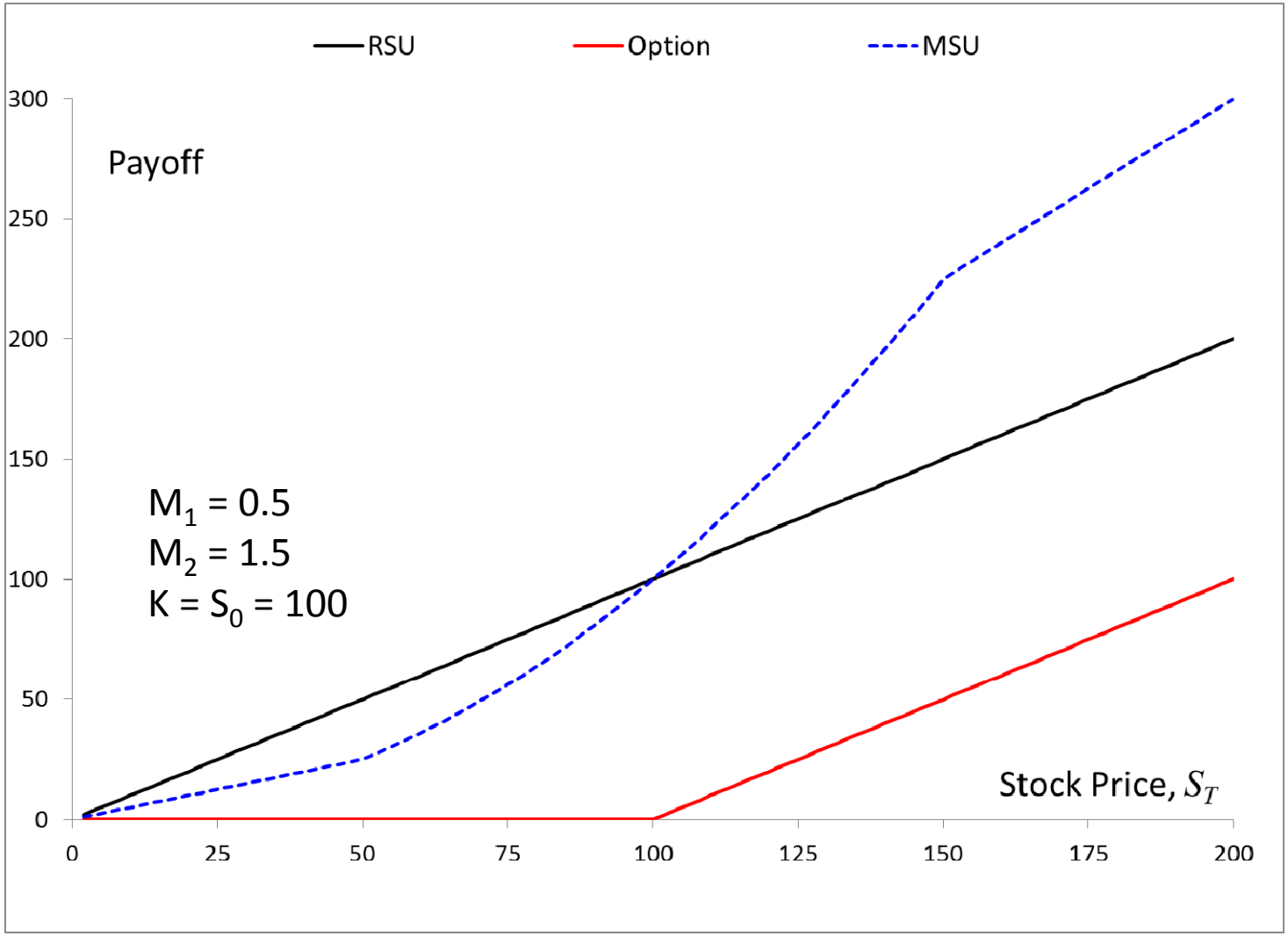
Caps and Floors

- Often the number of shares received is subject to a cap and or floor
- Let M_1 be the lower bound on the number of shares issued and M_2 be the upper bound
- Payoff is:

$$\begin{array}{ll} M_1 S_T & \text{if} \quad S_T < M_1 S_0 \\ (S_T / S_0) S_T & \text{if} \quad M_1 S_0 \le S_T \le M_2 S_0 \\ M_2 S_T & \text{if} \quad S_T > M_2 S_0 \end{array}$$

- MSU is portfolio of asset-or-nothing power options

Payoffs


RSU
Option
MSU
Payoff
300
250
200
150
100
50
0
0
25
50
75
100
125
150
175
200
$M_1 = 0.5$
$M_2 = 1.5$
$K = S_0 = 100$
Stock Price, S_T

Objectives of Long-Term Compensation

- Usual arguments are:
  - To provide an incentive to increase the stock price, the delta effect
  - To provide an incentive to increase the stock volatility, the vega effect
- RSUs satisfy the first
- ESOs satisfy both as long as the are not too far out-of-the-money
- MSUs satisfy both

Generalized MSU

- Number of shares received is $m(S_T)$
- For an RSU $m(S_T) = 1$
- For an MSU $m(S_T) = S_T/S_0$
- For an ESO $$m(S_T) = \begin{cases} 0 & S_T \le K \\ 1 - K/S_T & S_T > K \end{cases}$$
- Which of these is ‘best’?

Work in Progress

- A state preference world in which each state has a different stock price
- Utility maximizing manager who can generate a positive alpha and/or modify the variance of future state stock prices
- Manager is offered a contract in which he receives a number of shares that depends on the stock price
- Wealth maximizing investor who pays for the contract by ceding some of his equity