



## Solution

### Assignment 7. Earnings management and executive compensation

- a) Report the top ten firms that seem to be managing earnings upwards, and the top ten firms that seem to be managing earnings downwards, based on Defond & Park (2001) and Modified Jones model measures.

Table 1. Companies with the highest and lowest values of DeFond & Park and Modified Jones residuals

| Downwards management        |                             | Downwards management                |                              |
|-----------------------------|-----------------------------|-------------------------------------|------------------------------|
| DeFond                      | Name                        | Modified Jones                      | Name                         |
| -.6646324                   | STEEL CONNECT INC           | -.2480051                           | TABULA RASA HEALTHCARE       |
| -.3106333                   | CITRIX SYSTEMS INC          | -.1642641                           | SERVICENOW INC               |
| -.278295                    | ADOBE INC                   | -.1554727                           | ASPEN TECHNOLOGY INC         |
| -.2138462                   | FACEBOOK INC                | -.1223996                           | INTUIT INC                   |
| -.1883905                   | VERISIGN INC                | -.1209234                           | SYNCHRONOSS TECHNOLOGIES     |
| -.1725336                   | STAMPS.COM INC              | -.1127324                           | COMMVAULT SYSTEMS INC        |
| -.1574118                   | ASPEN TECHNOLOGY INC        | -.0996117                           | ETSY INC                     |
| -.1555164                   | SYKES ENTERPRISES INC       | -.0880292                           | NEXTGEN HEALTHCARE INC       |
| -.1377975                   | DXC TECHNOLOGY CO           | -.0815662                           | TIVO CORP                    |
| -.130899                    | CSG SYSTEMS INTL            | -.0790104                           | STAMPS.COM INC               |
| Upwards management (DeFond) |                             | Upwards management (Modified Jones) |                              |
| .1029262                    | HEALTHSTREAM INC            | .0698337                            | DONNELLEY FINANCIAL SOLTNS   |
| .1145447                    | AWARE INC                   | .0738275                            | CERIDIAN HCM HOLDING         |
| .1172786                    | GLU MOBILE INC              | .0743606                            | AWARE INC                    |
| .1176513                    | NIC INC                     | .0791616                            | EBAY INC                     |
| .1604815                    | WEX INC                     | .0795456                            | EBIX INC                     |
| .1774067                    | ETSY INC                    | .0840649                            | SYNOPSIS INC                 |
| .2206042                    | INTUIT INC                  | .084101                             | ACTIVISION BLIZZARD INC      |
| .2400385                    | NTN BUZZTIME INC            | .0858173                            | MICROSTRATEGY INC            |
| .3321059                    | BOTTOMLINE TECHNOLOGIES INC | .1416676                            | ALLSCRIPTS HEALTHCARE SOLTNS |
| .9470915                    | SMITH MICRO SOFTWARE        | .1838569                            | STEEL CONNECT INC            |

- b) Analyze and report how the following measures correlate with the Park & Defond earnings management measure and the residual of Modified Jones model:
- The gender of the CEO (*Female*)
  - CEO age (*Executiveage*)

- The ratio of cash compensation to total compensation of the CEO (*cashcompensation\_share*).

Table 2. Correlation Matrix

| Variables              | (1)      | (2)   | (3)    | (4)   | (5)   |
|------------------------|----------|-------|--------|-------|-------|
| (1) DeFond & Park      | 1.000    |       |        |       |       |
| (2) Modified Jones r~l | -0.069   | 1.000 |        |       |       |
| (3) Executive age      | 0.168*   | 0.013 | 1.000  |       |       |
| (4) Female             | 0.056    | 0.019 | 0.075  | 1.000 |       |
| (5) Cash compensation  | 0.256*** | 0.053 | -0.117 | 0.117 | 1.000 |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Executive age (p-value < 0.1) and cash compensation (p-value < 0.001) are positively correlated with DeFond & Park measure of earnings management. Modified Jones residual is not significantly correlated with any of the measures.

- c) Run also a regression model where *Female*, *Executiveage* and *cashcompensation\_share* are the predictors and an earnings management measure (Defond and Modified Jones residual) is a dependent variable.

Table 3. Descriptive Statistics

| Variable     | Obs | Mean    | Std.Dev. | Min     | Max    |
|--------------|-----|---------|----------|---------|--------|
| TACC         | 113 | -.0757  | .0636    | -.3393  | .0887  |
| assets_1     | 113 | .0027   | .0092    | 0       | .0721  |
| PPE          | 113 | .0381   | .1223    | 0       | 1.1901 |
| revenue_ch~e | 113 | -.2043  | .251     | -1.2698 | 1.0843 |
| pred_modif~s | 113 | -.0757  | .0197    | -.1809  | -.0156 |
| resid_modi~s | 113 | 0       | .0605    | -.248   | .1839  |
| defond       | 113 | -.0145  | .1434    | -.6646  | .9471  |
| executives~e | 115 | 55.1391 | 6.4846   | 35      | 74     |
| female       | 116 | .0431   | .204     | 0       | 1      |
| cashcompen~e | 115 | .1684   | .2157    | 0       | 1      |

Table 4. CEO characteristics predicting Modified Jones - measure of earnings management

| Modif.Jones Res.   | Coef.  | St.Err.  | t-value              | p-value | [95% Conf | Interval] | Sig |
|--------------------|--------|----------|----------------------|---------|-----------|-----------|-----|
| Executive age      | 0.000  | 0.001    | 0.18                 | 0.858   | -0.002    | 0.002     |     |
| Female             | 0.003  | 0.028    | 0.12                 | 0.906   | -0.053    | 0.060     |     |
| Cash compens.      | 0.015  | 0.027    | 0.55                 | 0.581   | -0.039    | 0.069     |     |
| Constant           | -0.012 | 0.051    | -0.23                | 0.817   | -0.114    | 0.090     |     |
| Mean dependent var |        | -0.000   | SD dependent var     |         |           | 0.061     |     |
| R-squared          |        | 0.003    | Number of obs        |         |           | 112.000   |     |
| F-test             |        | 0.120    | Prob > F             |         |           | 0.948     |     |
| Akaike crit. (AIC) |        | -302.891 | Bayesian crit. (BIC) |         |           | -292.017  |     |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 5. CEO characteristics predicting DeFond &amp; Park - measure of earnings management

| Defond&Park        | Coef.  | St.Err.  | t-value              | p-value | [95% Conf | Interval] | Sig |
|--------------------|--------|----------|----------------------|---------|-----------|-----------|-----|
| Executive age      | 0.004  | 0.002    | 2.15                 | 0.034   | 0.000     | 0.009     | **  |
| Female             | 0.005  | 0.064    | 0.08                 | 0.934   | -0.121    | 0.132     |     |
| Cash compens.      | 0.183  | 0.061    | 3.00                 | 0.003   | 0.062     | 0.303     | *** |
| Constant           | -0.290 | 0.116    | -2.51                | 0.014   | -0.520    | -0.061    | **  |
| Mean dependent var |        | -0.015   | SD dependent var     |         |           | 0.144     |     |
| R-squared          |        | 0.105    | Number of obs        |         |           | 112.000   |     |
| F-test             |        | 4.207    | Prob > F             |         |           | 0.007     |     |
| Akaike crit. (AIC) |        | -121.671 | Bayesian crit. (BIC) |         |           | -110.797  |     |

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### Explain & discuss all your empirical findings.

From the Table 4 we can see that Modified Jones Residual does not seem to work at all with the set of companies used in the analysis. It can be seen from the very low  $R^2$  (of 0.003) of the model and insignificant predictors. Table 5 shows that DeFond & Park measure of earnings management works better. The  $R^2$  (of 0.105) of the model is better and the model is significant (p-value is 0.007).

The regression coefficient of *Cash compensation* is positive and highly significant (p-value is 0.003). Also, the regression coefficient of *Executive age* is positively correlated (p-value is 0.034).

Managers have incentives to maximize their bonuses, consistent with contract and agency theories. Cash compensation measure used in the analysis includes both fixed salary and cash bonuses. This measure might have only a limited power to capture earnings management incentives as the main driver might be the bonus element of the cash compensation. Also, the measure captures only the realized pay, not the initial incentive structure (including the bogey and the cap of the bonus).

Explanation for these results might be that in software industry managers may choose accounting policies to achieve their bonus targets that are related to net working capital rather than long term assets. Such aspects are better captured by DeFond & Park earnings management measure.

As we do not know (concerning the current sample) whether the accruals of previous year were managed or not, and therefore can not control for it, the previous year brings noise into our examination.

Overall, Modified Jones Model may work worse when we examine short term earnings management that is driven by bonus targets, because there is more limited room to affect depreciation and amortization of long term assets as their useful lives fixed by longer term policy. (However, managers may have some discretion to change policy on occasion).

The components of networking capital may be the easiest accruals to manage in the short term (compared to the longer term accruals): changes in accounts receivable, the discretion over allowance for doubtful accounts, there is some discretion over revenue recognition, decrease in inventories, prepaid expenses and other short term payables.