Unlevered EPS – a Supplementary Metric for Stock Valuation

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ABSTRACT

Using profitability ratios derived from the EPS computed by conventional accounting procedure as a metric for comparing firms' performance with different risk levels has the same pitfall as comparing the bond yield of a high-risk bond with that of a low-risk bond. Even when comparing firms in the same industry, comparing profitability ratios derived from accounting EPS is imperfect because different firms carry different levels of debt and thus have different levels of financial risk. An unlevering process is proposed in this paper for transforming the accounting EPS into an unlevered EPS, which would be the EPS of the firm if it becomes an all-equity firm. Comparing ratios derived from unlevered EPS might provide a more meaningful evaluation. Regression results of health care firms indicate that unlevered EPS has a stronger correlation with share price than accounting EPS, which indicates that unlevered EPS can serve as an invaluable supplementary metric for performance evaluation. Furthermore, the unlevering technique is a powerful tool for helping financial managers to make sound capital structure decisions and for assisting analysts in identifying overpriced stocks.

Keywords: EPS, Earnings Per Share, Supplementary Metric, Stock Valuation, Unlevered EPS

INTRODUCTION

Return on equity, which is a profitability ratio computed by dividing accounting earnings per share (EPS) by equity per share, is a popular financial metric for evaluating the performance of firms. Accounting EPS is a key performance measure used in many financial ratios used by financial analysts to evaluate stock value. However, accounting EPS is an imperfect measure of performance in many ways. One of the serious flaws of using accounting EPS is that it does not account for financial risk created by debt or financial leverage. Comparing accounting earnings of firms can mislead investors into the wrong conclusion if the firms have different risks. For example, when two similar firms in the industry are being compared, the firm with the higher EPS or return on equity is generally viewed as the firm with superior performance. However, the profitability ratio ROE (return on equity) can actually mislead investors and hinder them from making sound evaluation.

First, it is important to note that firms with identical operation performances can have different ROEs. That is because, in a normal year when firms are earning a normal profit, the firm with more debt or higher financial leverage will have higher ROE than a similar firm with lower leverage, even though the two firms have identical operation metrics such as basic earnings power (Operating Income/Asset) and asset turnover. This is due to the magnification effect of debt on ROE, which this paper will demonstrate. The magnification effect would make firms with high leverage appear to outperform their peers with lower leverage. Thus, comparing ROEs with actual reported accounting earnings of firms, as often done by analysts, is less meaningful when firms have different levels of debt and financial risks because the comparison under such conditions is neither fair nor sound.

LITERATURE REVIEW

There is a plethora of articles regarding the effect of debt on the magnitude and volatility of reported earnings. Many of these articles proposed some sort of evaluation technique or adjustments for financial leverage to arrive at a more accurate evaluation of the companies' reported earnings.

Palkar and Wilcox (2009) proposed to adjust the debt of the firms for inflation, given that inflation tends to reduce the real value of debt. They found that such adjustment tends to produce a statistically significant result in predicting the real return of the firm. Their result supports the idea that debt utilization might be viewed in a more favorable light by investors because the real value of debt might be less than the reported nominal amount due to inflation over time.

An, Li, and Yu (2016) conducted research on a large panel of over 25,000 firms spanning over a 20-year period. They found that firms with high earnings management activities tend to have heavier utilization of debt, which implies that reported earnings from firms with high leverage might be more subject to management. Thus, their reported earnings might be less straightforward and thus require more in-depth analysis and investigation to arrive at a fair evaluation of the firms' performance.

James and Mohamed (2010) found that EPS is impacted by financial leverage in the software industry, which is consistent with the corporate financial theory that debt produces interest expense and related tax savings, which can affect earnings.

Cheng, Fitzpatrick, and Seyedian (2010) developed a technique for comparing the EPS of firms with different financial leverage. The comparison of earnings among firms with different financial leverage requires proper adjustments since firms with higher leverage have higher risks. In a period of positive earnings, firms with higher financial leverage also tend to have higher return on equity due to the magnification of return by debt. Thus, higher return on equity for such firms does not automatically indicate superior performance. The technique developed in the paper helps a firm to decide whether to finance a project with debt or equity in such a risk-earnings tradeoff scenario. The difference in incremental risk added by the debt financing is compared with its incremental required return to determine whether the additional risk of leverage is worthwhile.

Koutmos and Saidi (1995) showed a negative correlation between current stock returns and future volatility. They hypothesized that a decline in the value of equity would automatically increase the debt-to-equity ratio, which consequently leads to higher risk for the stock. This would not be an issue for an all-equity firm because the debt-to-equity ratio will always be zero regardless of stock value. However, for firms with higher debt, this phenomenon where changes in stock value can lead to changes in the debt ratio is more pronounced. This means that analysts would have more factors to consider if the firms being evaluated have debt. All these results strongly suggest that earnings from firms with debt need to be more thoroughly evaluated and adjusted to arrive at more meaningful results.

EFFECT OF DEBT ON EARNINGS

To illustrate the magnification effect of debt on the key profitability ratio – the return of equity (ROE) – the classic DuPont Equation is used. The DuPont Equation breaks the return on equity into three separate components for detailed analysis:

ROE = profit margin* x asset turnover x equity multiplier

Profit margin in the above DuPont Equation is net profit divided by sales. Asset turnover is sales divided by asset, and equity multiplier is asset divided by equity. The latter ratio, which is the equity multiplier, is actually the leverage or debt ratio. There is a direct relationship between debt ratio and equity multiplier, which means that firms with high debt will have a high equity multiplier. Moreover, the minimum value for the equity multiplier is 1 when there is no debt.

From the DuPont equation, the equity multiplier can be interpreted as the magnification factor of debt for return on equity. This can be seen by comparing two hypothetical firms with 2M assets: Firm A with debt and Firm U with no debt. Assume both firms have 2M assets, but Firm A has 1M debt, and Firm U has no debt. Firm U with zero debt would have the same amount of asset as equity, which would yield an equity multiplier value or leverage of 1. A leverage of 1 means there is no magnification effect. On the other hand, Firm A has 2M asset with 1 M debt, and thus 1M equity, which yields an equity multiplier of 2/1 or 2.

Assume that these two firms have the same profit margin and asset turnover. That means the two have equal operating performance. As seen in the DuPont Equation, although the firms have the same operating performance, Firm A would have higher ROE than Firm U. This shows that firms with a higher equity multiplier (higher debt) would generally have a higher return on equity, with other factors being the same. However, such a higher return on equity resulting from the magnification of earnings by debt does not necessarily imply better performance since the mere magnification effect of leverage artificially boosts such profit ratio. This can create an exaggerated or even illusionary effect on the firm's performance, which can cause many non-sophisticated investors to misjudge the firm's true performance.

Thus, to enable analysts to evaluate the firm's true performance without distortion, it is necessary to eliminate the magnification effect of leverage on the EPS and ROE. In view of the drawback of comparing conventional accounting EPS, an alternative earnings metric is devised, and the metric entails adjusting the accounting EPS for debt, which will be referred to as the unlevered EPS (EPS_U). This unlevered EPS is the basic EPS the firm would have earned if the firm carried zero debt.

The transformation of the firms' actual earnings into hypothetical unlevered earnings with zero debt and interest will allow analysts to compare firms on a more objective basis because firms are now being compared under the same criteria with the same financial risk.

The unlevered EPS (EPS_U) is the most basic form of EPS with no leverage. The transformation from the actual ROE to the unlevered ROE cannot be done by simply subtracting the debt or setting the equity multiplier to one in the DuPont Equation. That is because if the debt is reduced to zero, it would have a repercussion effect on several other financial variables as interest expense, which would become zero and thus, in turn, would affect other variables such as profit margin because interest expense is subtracted to arrive at the profit margin.

Furthermore, debt cannot simply be deleted from the financial equations to arrive at EPS_U. Debts can only be canceled after they are paid off. It cannot simply be written off to zero. Thus, the elimination of debt needs to be done in a comprehensive manner across the entire income statement and balance sheet. In this paper, debts are assumed to be paid off by issuing equity. This would increase the number of shares outstanding, which would dilute the EPS. This process is similar to estimating fully diluted EPS by adjusting the number of shares needed to be issued if the convertible debts are to be converted into stocks. In the unlevering process, this is done more extensively since all debts are retired to turn the firm into an all-equity firm. The process of eliminating all debts would also eliminate the interest expense associated with these debts. Consequently, it also eliminates the tax deduction benefits associated with interest expense. Moreover, it increases the number of shares which dilutes the EPS. Thus, unlevering generates three very different impacts on earnings:

(1) the elimination of interest expense, which increases EPS

(2) the eliminating of the tax shield of interest deduction that can decrease EPS

(3) the increase of shares outstanding, which also decreases EPS

Whether the unlevering increase or reduce EPS will depend on which of these three forces dominate the others.

A fundamental concept in finance postulates that investments with higher risks should entail higher required returns or expected returns. Thus, in general, the EPS without debt or unlevered EPS should be lower than the original EPS because the unlevered EPS with zero debt entails less financial risk. However, this is generally the case but not always the case, especially in cases where a stock is overpriced to the extent that significantly fewer new shares are needed to be issued to retire the debt of the company. Fewer shares needed to be issued for debt retirement means less dilution of earnings. If the overpricing of stock is sufficiently severe, it can create a situation where the adjusted EPS is not sufficiently diluted to be brought down below the original EPS. This implies that the after-tax interest savings due to the retirement of debt with new shares outweigh the cost of weaker dilution from the new shares, which are overpriced. In such cases, the unlevered EPS can be equal to or even higher than the original EPS. If this occurs, then the firm can improve its risk-return profile by issuing stocks to retire the debt, which would reduce risk and increase return at the same time. If the firm does not do this, then arbitrage opportunities exist for the outsider to sell or even short the stock and buy the bond of the company. Such action by the arbitrageur would be similar to unlevering by the firm, which entails selling stock and buying bonds to retire the debt. Thus, this unlevering technique is uniquely enlightening for guiding financial managers in making capital structure decisions and for guiding investors in identifying overvalued stocks.

THE PROCESS FOR UNLEVERING THE FIRM'S EARNINGS

Firms in the same industry manufacturing similar products or providing similar services should have the similar beta value of firms. However, their risks can still differ due to firms carrying different levels of debt. Thus, in order to place the firms at the same level of financial risk, it is necessary to deleverage the debt before making a comparison. At the zero level of debt, the beta of the stock (or beta of equity) would be the same as the beta for the firm. Since firms in the same industry should have similar firm beta, their beta value for stock (equity) should also be similar if they are all unlevered. With similar beta values and risk of stocks, the EPS for these firms can then be compared more objectively.

In this paper, the unlevering procedure is applied to about 100 companies in the health care industry. Because of the effect of debt elimination has on several other variables, the process of adjusting the accounting EPS to become the unlevered EPS is illustrated in detail, taking into account of the changes in all the variables that can affect EPS. After deriving the unlevered EPS, regression on the both measures of EPS for these health care companies are then performed and compared.

In the following section, the accounting adjustments for all variables which are affected by debt is illustrated. The unlevered earnings of the firms are derived after all relevant adjustments are made. The adjustment technique provides a comprehensive transformation of the firm's accounting earnings into the basic unlevered earnings with zero debt and interest expense, with the debt distortion removed and readily being used for more objective comparison.

The first variable to be adjusted is tax expense. This is because if the debt is eliminated by repayment, then interest expense would be reduced accordingly. Assume that the firm pays off all debts at the beginning of the year with funds raised from issuing new shares. Then interest expense should be zero for the year.

Since interest expense is tax-deductible, this would reduce the tax savings proportionately. Thus, to derive the unlevered tax (tax expense if there is no debt), the tax shield should be added back from interest deduction, which is the corporate tax rate times the amount of interest expense, to the actual taxes in order to arrive at the unlevered tax if there is no interest expense. Unlevered tax can be calculated as:

$$\begin{aligned} TAX_U &= TAX_A + \text{tax shield for interest expense} \\ &= TAX_A + t \times I \qquad (1) \end{aligned}$$

Where TAX_A = actual accounting income tax expense,
t = corporate tax rate
I = interest expense (which would be eliminated by debt repayment)

Since it is assumed that all existing debt is paid off by issuing new shares, the number of shares after unlevering (SH_U) is equal to the current number of shares outstanding (SH_A) plus shares needed to be issued for paying off the debt (SH_I).

$$SH_U = SH_A + SH_I \qquad (2)$$

The new shares are assumed to be issued at the beginning of the year at a price prevailing during that time. Thus, the number of shares needed to be issued to pay off the debt can be calculated as:

$$SH_I = \frac{\text{Total Debt to be paid off}}{\text{Price per share at the beginning of the year}} \qquad (3)$$

The next step is to derive unlevered EPS (EPS_U), which is the EPS of the firm if the firm had paid off all its debt. Since there will be no more interest expense after the debt is eliminated, earnings before taxes (EBT) is the same as earnings before interest and taxes (EBIT). In such cases, EPS_U can be calculated by dividing earnings after taxes (which is $EBIT - TAX_U$) by shares outstanding after unlevering (SH_U):

$$EPS_U = \frac{EBIT - TAX_U}{SH_U} \qquad (4a)$$

Substituting (1) for TAX_U and (2) for SH_U in (4a):

$$= \frac{EBIT - (TAX_A + t \times I)}{SH_A + SH_I} \qquad (4b)$$

or simply

$$= \frac{EBIT - TAX_A - t \times I}{SH_A + SH_I} \qquad (4c)$$

Equation (4c) will be the key equation for estimating the unlevered EPS for firms.

In the following section, the use of (4c) is illustrated in a numerical example for calculating the EPS_U:

Firm A has financial data for the year as follows:
EBIT = 100M
Interest Expense = 20M
Tax Expense = 16M
Marginal Tax rate = .25
Total Debt = 400M
Shares outstanding = 10M
Price on date of stock issuance = $100

First, the accounting EPS (EPS_A) is calculated by dividing the income after taxes by current shares outstanding:

$$EPS_A = \frac{EBIT - I - TAX_A}{SH_A} \quad (5)$$

With the above corresponding figures entered in (5), (5) becomes:

$$= \frac{100M - 20M - 16M}{10M} = \$6.40$$

$6.40 represents the EPS_A for the firm.

Next, EPS_U is calculated by utilizing Equation (4c), which divides the unlevered after-tax income by SH_U, which is $SH_A + SH_I$:

$$= \frac{EBIT - TAX_A - t \times Int}{SH_A + SH_I} \quad (4c)$$

With the corresponding figures entered into (4c), (4c) becomes:

$$EPS_U = \$\frac{100M - \$16M - .25 \times \$20M}{10M + SH_I} \quad (6a)$$

SH_I, which is the number of shares to be issued in order to pay off the debt, can be derived by dividing the amount of debt by stock price per share, as expressed in (3):

$$SH_I = \frac{\$400M}{\$100} \quad (7)$$

$$= 4M \text{ Shares}$$

Based on the calculation in (7), the firm needs to issue 4M new shares in order to retire the existing debt. With this new information, EPS_U can now be calculated with (6a), which in numerical terms can be expressed as:

$$EPS_U = \$\frac{100M - \$16M - .25 \times \$20M}{10M + 4M} \quad (6b)$$

Thus, EPS_U is $5.64, which is the earnings had the firm retired all its debts.

Note that the estimated amount of EPS_U ($5.64) is less than EPS_A ($6.40), which is expected because unlevering reduces debt and thus reduces financial risk for the firm. This is consistent with the theory of risk, which states that a firm with lower risk is expected to earn a lower return. Thus, in an efficient market where assets are priced rationally, EPS_U should be less than EPS_A for the same firm, given that the former entails a lower risk than the latter. However, in certain circumstances where the stock price is extraordinarily high, it is possible for the EPS_U of a firm to be higher than its EPS_A. Suppose the share price for Firm A in the above example is

\$170 instead of \$100, then its EPS_U would have been higher than its EPS_A. This is because fewer shares are needed to be issued at a higher price. In such cases where EPS_U is higher than EPS_A, the stock would be clearly overvalued, and the firm can take advantage of this and enhance its value by issuing more of such highly priced shares to raise funds to retire its debt. This would be a win-win situation for the firm because it can increase the return for shareholders while reducing its risk at the same time.

In fact, it is possible to solve for the share price that would cause EPS_U to equal EPS_A, which will be referred to as the crossover price because that is the point where EPS_U crossover EPS_A. The crossover price is clearly in the overvalued territory, given that EPS_U should be lower than EPS_A in an efficiently priced market. The crossover price can be derived by setting EPS_U (4c) to equal EPS_A (5), then the share price can be solved as follows:

$$\text{Crossover Price} = \frac{\text{LT Debt} + \text{Current Port. of LT Debt} + \text{Short-term Borrowing}}{(\text{EBIT} - \text{TAX}_A - 0.25 \times \text{Interest Expense}) / \text{EPS}_A - \text{Share Outstanding}} \quad (8)$$

For the above numerical example, crossover price for Firm A is solved to be \$170, which is compared to the current share price in Table 1 in the Appendix.

As seen in Table 1, the current price is below the crossover price, which should be the norm in an efficient market. However, should the share price rises and approaches the crossover price, this could be a sign that the share price is approaching the overvaluation territory. This unlevering procedure can be performed for any firm to identify possible overvalued stocks as well as to identify overleveraged firms. If a firm's EPS_U is greater than its EPS_A, then this means the firm can increase earnings and decrease risk at the same time by reducing its debt. In such cases, the firm might be considered overleveraged, and managers can enhance value for shareholders by reducing its debt. In addition, if a firm's share price is higher than the crossover price, then the share is likely to be overvalued. In sum, if $EPS_U > EPS_A$, then the firm is over-leveraged. And if share price > crossover price, then share price is clearly overvalued. These two phenomena go hand in hand with each other.

Calculations for EPS_A and EPS_U for almost 100 firms in the health care industry have been performed in this paper. Based on the projected financial data for firms in the health care industry for April 2021 gathered from Capital IQ, the estimated EPS_U is summarized in Table 2 in the Appendix.

REGRESSION OF STROCK RETURNS

In the following section, financial data for 100 health care firms have been utilized to estimate EPS_U and see how it compares to EPS_A in terms of their correlations with share prices. If the market pays more attention to EPS_U than EPS_A, then share price or stock return should have a stronger correlation with EPS_U than EPS_A.

Firms in the same industry are chosen to minimize the differentials in risk and other factors that can affect share prices. This way, much of the stock return differential among firms within the same industry should be attributed more to earnings differentials. In this case, the health care industry is chosen for the study.

To evaluate the correlation between share price and the two EPS metrics (EPS_A and EPS_U), the following two equations are regressed:

$$R_i = \alpha_A + \beta \ CEPS_{A\,i} \quad (9)$$

$$R_i = \alpha_U + \beta \ CEPS_{U\,i} \quad (10)$$

Where R represents the monthly returns for the health care stock i, which is calculated by the change in share price divided by the share price at the beginning of the period. Monthly returns (R) are used as the dependent variable in both regressions.

$CEPS_A$ in (9) represents the change in EPS_A during the period divided by the share price at the beginning of the period.

$$CEPS_A = \frac{(EPS_A \text{ on the last day of the sample period} - EPS_A \text{ on the first day of the sample period})}{\text{Share Price on the first day of the sample period}} \quad (11)$$

Similarly, $CEPS_U$ in (10) represents the change in EPS_U during the period divided by the share price at the beginning of the period.

$$CEPS_U = \frac{(EPS_U \text{ on the last day of the sample period} - EPS_U \text{ on the first day of the sample period})}{\text{Share Price on the first day of the sample period}} \quad (12)$$

$CEPS_A$ and $CEPS_U$ can be interpreted as the changes in earnings yield during the period. These two independent variables represent the change in EPS during the period in dollar amounts transformed into earnings yield or percentage by being divided by share price so that they can be properly regressed with stock returns which are also in terms of percentage.

The correlations between the return of the stocks (R) and $CEPS_A$ or $CEPS_U$ are captured in the values of coefficient β. And the statistical significance of such correlation is reflected in the t-Statistics and the p-value. The stock returns for 100 firms are utilized in the health care industry in recent periods listed in Capital IQ for regression.

For these firms, data on EPS, debt, interest expenses, and shares outstanding were compiled from Capital IQ for six sample periods: Fourth Quarter in 2020, February 2021, March 2021, April 2020, May 2021, and June 2021. Regression with (9) and (10) are performed for these periods. Using p-values (below 5%) for determining statistical significance for the coefficient β_A and for the coefficient β_U, β_A was statistically significant in none of the six periods, whereas β_U was statistically significant in two of the six periods. The regression results for all six sample periods are summarized in Table 4 in the appendix. The regression results for the period April 2021 are used as an example for illustration purposes:

As indicated in Table 3 (Appendix)

The regression result for (9), which is the regression of stock return R on $CEPS_A$ (changes in EPS_A during the period), is shown on the top two rows in Table 1. Note that the coefficient β_A was not statistically significant in this sample period. However, the regression result for (10), which is the same regression as (9), except that EPS_U is used instead of EPS_A, reveals a different story. Regression of R on $CEPS_U$ based on EPS_U yields a statistically significant β_U coefficient (with the p-value below .05) for this period. The estimated value for β_U is positive 13.92, which can be interpreted as follows: if earnings yield rises by 1%, then the share price on average rises by 13.92%. This is similar to the effect of a firm announcing a higher dividend yield on its share price.

While the regression with EPS_U does not yield statistically significant β_U coefficients for all sample periods, it seems that EPS_U has a more significant correlation with share price than EPS_A in general, given that EPS_A did not yield a statistically significant coefficient β_A in any of the sample periods that have evaluated.

Relative to the popular metric EPS_A, EPS_U exhibits respectable explanatory power for stock returns. While no metric is perfect, the results suggest that EPS_U is a worthy metric to be added to the portfolio of tools used for financial analysis. EPS_U can certainly be used as a supplementary metric to EPS_A for equity valuation and for a more comprehensive and fair comparison of firms' performance.

CONCLUSION

In this paper, a method for deleveraging the earnings by estimating the EPS with zero debt has been developed. This method allows analysts to compare firms without distortions generated from the differentials in financial risk. This unlevering adjustment of the earnings of the firm is essential for a fair comparison of firms' profitability. In addition, this is a powerful tool for analysts to identify stocks that are overpriced and for financial managers to make sound capital structure decisions.

A regression for estimating the correlation between the share prices of health care firms and the two EPSs measures was conducted. The results suggest that EPS_U has better explanatory power in valuation than EPS_A in general. It is certain that EPS_U will add value to the process of analyzing and pricing stocks. Hence, it would be prudent for analysts to use EPS_U for financial analysis and stock valuation in conjunction with EPS_A, rather than relying solely on EPS_A.

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APPENDIX

Table 1: Comparison of Crossover Price and Current Share Price for Firm A

Share Price	EPS_A	EPS_U
$150 (current)	$6.40	$6.24
$170 (crossover) ($170.94 to be exact)	$6.40	$6.40 ($EPS_U = EPS_A$ at this level of share price)

Table 2: EPS_A and EPS_U for 96 Firms in the Health Care Industry

Company Name	EPS_A (Projected)	EPS_U
Johnson & Johnson	2.04	2.09
UnitedHealth Group Incorporated	4.20	4.10
Pfizer Inc	0.69	0.77
Merck&Co.,Inc	1.36	1.35
Novartis AG	1.13	1.01
Abbott Laboratories	0.94	1.20
Thermo Fiher Scientific Inc.	4.41	5.11
Novo Nordisk A/S	4.88	4.77
Danaher Corporation	1.63	1.58
AbbVie Inc.	1.35	2.36
Eli Lilly and Company	1.91	1.90
AstraZeneca PLC	1.53	0.58
Amgen Inc.	2.92	2.47
Bristol-Myers Squibb Company	0.78	1.50
Sanofi	0.86	0.71
GlaxoSmithKline Plc	0.13	0.15
Intuitive Surgical, Inc	2.35	2.55
Stryker Corporation	1.74	1.72
Gilead Sciences, Inc.	1.38	1.12
CVS Health Corporation	1.33	1.16
Zoetis Inc.	0.86	0.81
Anthem, Inc.	6.11	5.58
Vertex Pharmaceuticals Incorporated	0.15	0.36
Becton, Dickinson and Company	1.73	1.44
Cigna Corporation	3.86	3.23
Regeneron Pharmaceuticals, Inc.	15.91	14.58
Boston Scientific Corporation	0.20	0.20
Humana Inc.	6.93	6.36
Edwards Lifesciences Corporation	0.50	0.50
Illumina, Inc.	1.25	1.27
Biogen Inc.	4.47	3.53
HCA Healthcare, Inc.	3.06	2.75
Koninklijke Philips N.V.	0.34	0.31
Baxter International Inc.	0.75	0.69
Centene Corporation	1.29	1.06
DexCom, Inc.	0.36	0.50
Seagen Inc.	(0.61)	(0.61)
IDEXX Laboratories, Inc.	2.02	2.09
IQVIA Holdings Inc.	0.94	1.07
Zimmer Biomet Holdings, Inc.	1.07	1.02
Alcon Inc.	0.13	0.12
Moderna, Inc.	5.51	6.10
BeiGene, Ltd.	(3.60)	(4.02)

Alexion Pharmaceuticals, Inc.	2.39	2.34
Royalty Pharma plc	0.71	0.81
Fresenius Medical Care AG & Co. KGaA	0.98	0.78
Align Technology, Inc.	2.22	2.27
ResMed Inc.	1.18	1.19
McKesson Corporation	3.59	3.44
Mettler-Toledo International Inc.	6.46	6.50
Genmab A/S	4.32	3.66
Cerner Corporation	0.57	0.55
West Pharmaceutical Services, Inc.	1.74	1.78
BioNTech SE	4.66	4.85
Incyte Corporation	0.55	0.57
AmerisourceBergen Corporation	1.73	1.60
Laboratory Corporation of America Holdings	4.76	4.14
Horizen Therapeutics Public Limited Company	0.65	0.38
Teladoc Health, Inc.	(0.52)	(0.41)
Hologic, Inc.	0.88	0.42
Alnylam Pharmaceuticals, Inc.	(1.64)	(1.49)
Bio-Rad Laboratories, Inc.	3.10	2.58
Insulet Corporation	0.23	0.36
Teleflex Incorporated	1.70	2.82
STERIS plc	1.43	1.30
10x Genomics, Inc.	(0.30)	(0.37)
Quest Diagnostics Incorporated	3.21	2.66
Catalent, Inc.	0.56	0.88
Elanco Animal Health Incorporated	0.01	0.08
BioMarin Pharmaceutical Inc.	(0.14)	(0.08)
Cardinal Health, Inc.	0.83	0.73
PerkinElmer, Inc.	1.89	1.79
Masimo Corporation	0.90	0.95
NovoCure Limited	0.03	0.04
argenx SE	(3.39)	(3.60)
PPD, Inc.	0.25	0.25
Oak Street Health, Inc.	(0.23)	(0.25)
Waters Corporation	2.17	2.05
QIAGEN N.V.	0.49	0.47
Abiomed, Inc.	1.01	1.05
Molina Healthcare, Inc.	3.19	3.07
Charles River Laboratories International, Inc.	1.71	1.84
Quidel Corporation	5.31	5.56
Sarepta Therapeutics, Inc.	(1.79)	(1.42)
ICON Public Limited Company	2.05	2.04
DaVita Inc.	2.03	0.47
Teva Pharmaceutical Industries Limited	0.32	0.15
Guardant Health, Inc.	(0.75)	(0.75)

DENTSPLY SIRONA Inc.	0.32	0.31
Bio-Techne Corporation	0.97	1.07
Neurocrine Biosciences, Inc.	0.71	0.77
Galapagos NV	(0.97)	(1.12)
Invitae Corporation	(0.61)	(0.54)
Universal Health Services, Inc.	2.74	2.24
Repligen Corporation	0.32	0.37

Table 3: Regression Results for Regressions of Equation (9) and (10) for April 2021

Sample Period		Coefficient (t-statistics)	p-Value	R^2
April 2021 (From end of Mar to end of Apr)	α_A	0.07 (5.12)	1.57942E-06*	0.02
	β_A	-0.06 (-1.47)	0.14	0.02
	α_U	0.07 (5.48)	3.46914E-07*	0.16
	β_U	13.92 (4.21)	5.85877E-05*	0.16

Table 4: Summary of Regression Results for Six Sample Periods

Sample Period		Coefficient (t-statistics)	p-Value	R^2
4th Quarter 2020	α_A	0.08 (3.51)	0.00069*	0.0042
	β_A	-0.22 (-0.62)	0.54	0.0042
	α_U	0.05 (2.55)	0.01*	0.06
	β_U	6.77 (2.48)	0.02*	0.06
February 2021 (from end of Jan of end of Feb)	α_A	-0.02 (-2.03)	0.05*	8.3014E-07
	β_A	-0.00037 (-0.0087)	0.99	8.3014E-07
	α_U	-0.02 (-1.99)	0.05*	0.00018
	β_U	0.05 (0.13)	0.90	0.00018
March 2021 (from end of Feb to end of Mar)	α_A	0.01 (1.10)	0.27	0.02
	β_A	0.11(1.49)	0.14	0.02
	α_U	0.01 (1.13)	0.26	0.00075
	β_U	-0.09 (-0.27)	0.79	0.00075
April 2021 (from end of Mar to end of Apr)	α_A	0.07 (5.12)	1.57942E-06*	0.02
	β_A	-0.06 (-1.47)	0.14	0.02
	α_U	0.07 (5.48)	3.46914E-07*	0.16
	β_U	13.92 (4.21)	5.85877E-05*	0.16
May 2021 (from end of Apr to end of May)	α_A	0.01 (1.20)	0.23	0.00021
	β_A	-0.03 (-0.14)	0.89	0.00021
	α_U	0.01 (1.22)	0.23	0.00048
	β_U	-0.25 (-0.21)	0.83	0.00048
June 2021 (from end of May to end of Jun)	α_A	0.02 (1.51)	0.14	0.00054
	β_A	0.22 (0.23)	0.82	0.00054
	α_U	0.03 (1.60)	0.11	0.0053
	β_U	2.44 (3.42)	0.48	0.0053