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Dependence of Investing Strategies on Expected Discounted Rate

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Abstract: The Discounted Cash Flow model is a cornerstone in the fields of corporate finance and investment valuation, serving as a crucial decision-making tool for stock valuation. Driven by the motivation of searching for the dependence of different investing strategies on expected discounted rates, the article compares the valuations of two types of hypothetical net free cash flows under the same fluctuation of discounted rates, representing the stable and aggressive growth of companies. Modeling studies are then supported by regressing different representative indexes on the yield-to-maturity of China's 10-year treasury bond. A larger dependence on treasury yield is shown in valuable stocks than in grow-up stocks. The work uses a hypothetical model to explain this phenomenon from the perspective of investors. Valuable stocks investments give greater weight to assessments of the macro environment because of lower sensitivity and predictable patterns, whereas grow-up stocks investors base their careful assessment of the volatile valuation of start-ups less on the standard rate, even though it implies a risk-free rate.

Keywords: DCF valuation, Discounted rate, Grow-up Stocks, Valuable stocks

1. Introduction

The key components of Discounted Cash Flow (DCF) are Free Cash Flow (FCF) and the discounted factor. Both comparative and empirical analyses were employed in this paper. This work first conducts the theory deduction that identical discounted rate changes could have various effects on the predicted valuations of different companies by using a hypothetical model. The model contains two hypothetical companies with totally different future free cash flows. One represents companies behind grow-up stocks, while the other represents companies behind valuable stocks. The hypothetically theoretical deduction indicates that valuable stocks are less sensitive to discounted rate changes because of different NPV structures. The deduction was then followed by realistic research into how SSE50 and SSE STAR50 react to the fluctuation of the yield to maturity of China's 10-year Treasury bonds.

This paper exposes how valuable stocks and grow-up stocks investing strategies depend on discounted rate projections based on regression analysis. With the purpose of providing investors with an explanation of differentiating investment methods, the analysis combines theoretical reasoning with real-world phenomena, as the stock market involves not only statistics but also human games.

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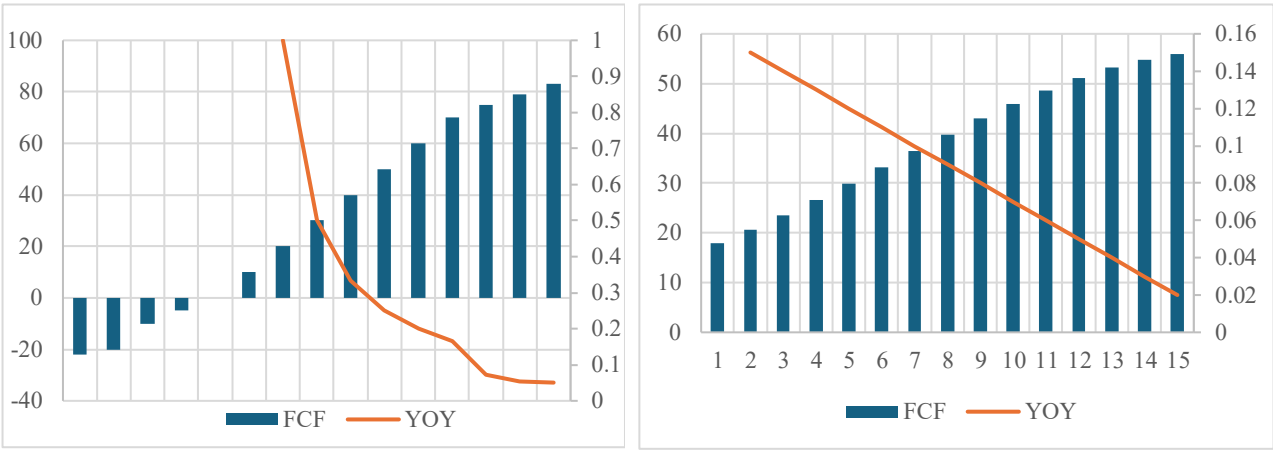
2. Theoretical Deduction

2.1. Data Explanation

Two hypothetical companies with different net free cash flow patterns in the next fifteen years are applied to the model. Company 1, as for grow-up stocks, is still working to turn its capital input into lucrative returns. Figure 1(a) indicates that there is an aggressive growth rate, starting with a negative net free cash flow. The gradual ascent of Company 2 represents the steady growth of an established enterprise. The restricted upward space also leads the growth rate of free cash flow to steadily decline (Figure 1(b)).



(a) (b)

Figure 1: Net FCF: (a) Company 1; (b) Company 2

2.2. Processing

The valuation is then based on the above cash flows using a DCF model. The DCF model would seem to be a valid and appropriate method because it could evaluate different economic scenarios for a company's value [1]. Assuming a perpetual growth rate of 4%, the relative changes in the valuations of the two deviate significantly as the discounted rate moves within the 6%-16% range. The Financial Valuations of the two companies are indicated by Table 1-2 and Figure 2.

Table 1: Financial Valuation Change of Company 1

Years	6%	8%	10%	12%	14%	16%
1	-20.75	-20.37	-20.00	-19.64	-19.30	-18.97
2	-17.80	-17.15	-16.53	-15.94	-15.39	-14.86
3	-8.40	-7.94	-7.51	-7.12	-6.75	-6.41
4	-3.96	-3.68	-3.42	-3.18	-2.96	-2.76
5	0.00	0.00	0.00	0.00	0.00	0.00
6	7.05	6.30	5.64	5.07	4.56	4.10
7	13.30	11.67	10.26	9.05	7.99	7.08
8	18.82	16.21	14.00	12.12	10.52	9.15
9	23.68	20.01	16.96	14.42	12.30	10.52
10	27.92	23.16	19.28	16.10	13.49	11.33
11	31.61	25.73	21.03	17.25	14.20	11.73
12	34.79	27.80	22.30	17.97	14.53	11.79
13	35.16	27.58	21.72	17.19	13.66	10.89

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Table 1: (continued).

14	34.94	26.90	20.80	16.16	12.62	9.89
15	34.63	26.17	19.87	15.16	11.63	8.96
Continuation	1800.92	680.29	344.41	197.13	120.93	77.64
Total	2011.91	842.68	468.82	291.73	192.01	130.08

Table 2: Financial Valuation Change of Company 2

Years	6%	8%	10%	12%	14%	16%
1	16.98	16.67	16.36	16.07	15.79	15.52
2	18.42	17.75	17.11	16.50	15.93	15.38
3	19.81	18.73	17.73	16.80	15.93	15.12
4	21.12	19.60	18.21	16.95	15.79	14.73
5	22.32	20.33	18.54	16.95	15.51	14.22
6	23.37	20.89	18.71	16.80	15.10	13.61
7	24.25	21.28	18.71	16.50	14.57	12.90
8	24.94	21.47	18.54	16.05	13.93	12.12
9	25.41	21.47	18.21	15.48	13.20	11.29
10	25.65	21.28	17.71	14.79	12.39	10.41
11	25.65	20.88	17.07	14.00	11.52	9.51
12	25.41	20.30	16.29	13.12	10.61	8.61
13	24.93	19.55	15.40	12.18	9.68	7.72
14	24.22	18.64	14.42	11.21	8.75	6.86
15	23.31	17.61	13.37	10.21	7.83	6.03
Continuation	1212.00	457.83	231.78	132.67	81.39	52.25
Total	1557.79	754.28	488.17	356.26	277.92	226.28

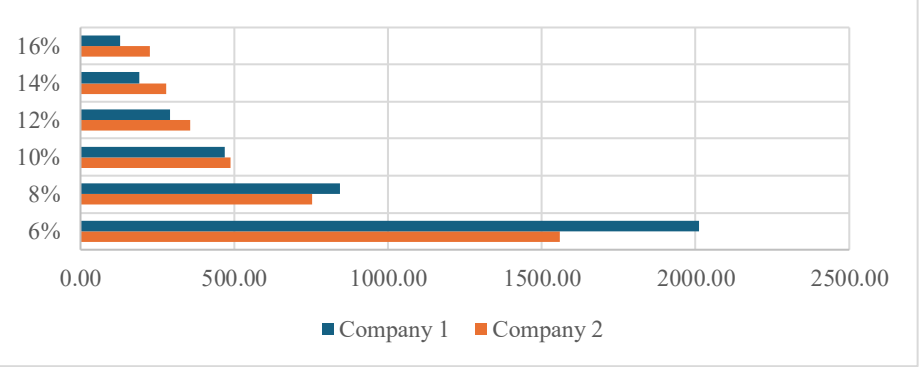

Figure 2: Financial Valuation of Companies

Figure 2 illustrates how Company 1's value expansion is striking at lower discounted rates, while Company 2's valuation resistance is remarkable at higher discounted rates. To better examine the factors that contribute to the disparity in valuations, this paper classifies the cash flows into three categories: near-term (Y1-Y5), mid-to-long-term (Y6-Y15), and long-term (after Y15), specifying the NPV structure of companies. The visualization results are presented in Table 3-4 and Figure 3-4.

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Table 3: NPV Struture of Company 1

Years	6%	8%	10%	12%	14%	16%
Y1—Y5	-50.91	-49.13	-47.46	-45.88	-44.40	-43.00
Y6—Y15	261.90	211.52	171.88	140.49	115.48	95.44
After Y15	1800.92	680.29	344.41	197.13	120.93	77.64
Total	2011.91	842.68	468.82	291.73	192.01	130.08

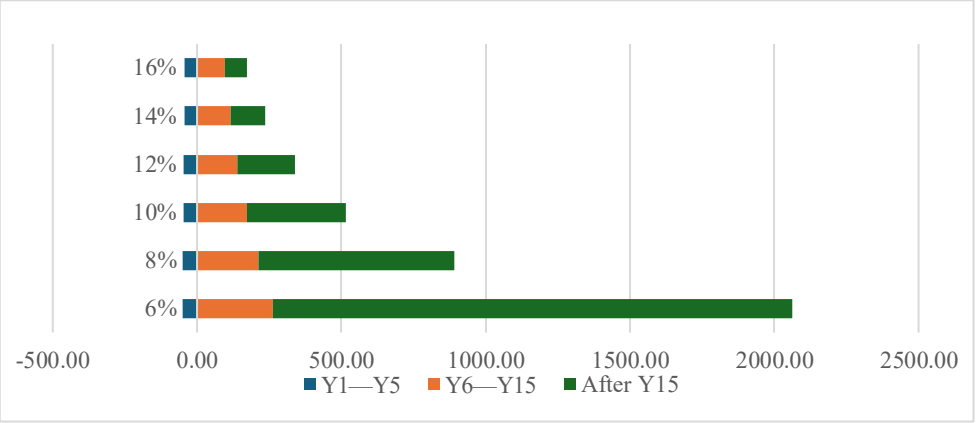

Figure 3: NPV Struture of Company 1

Table 4: NPV Struture of Company 2

Years	6%	8%	10%	12%	14%	16%
Y1—Y5	98.66	93.07	87.96	83.26	78.94	74.97
Y6—Y15	247.13	203.38	168.43	140.33	117.58	99.07
After Y15	1212.00	457.83	231.78	132.67	81.39	52.25
Total	1557.79	754.28	488.17	356.26	277.92	226.28

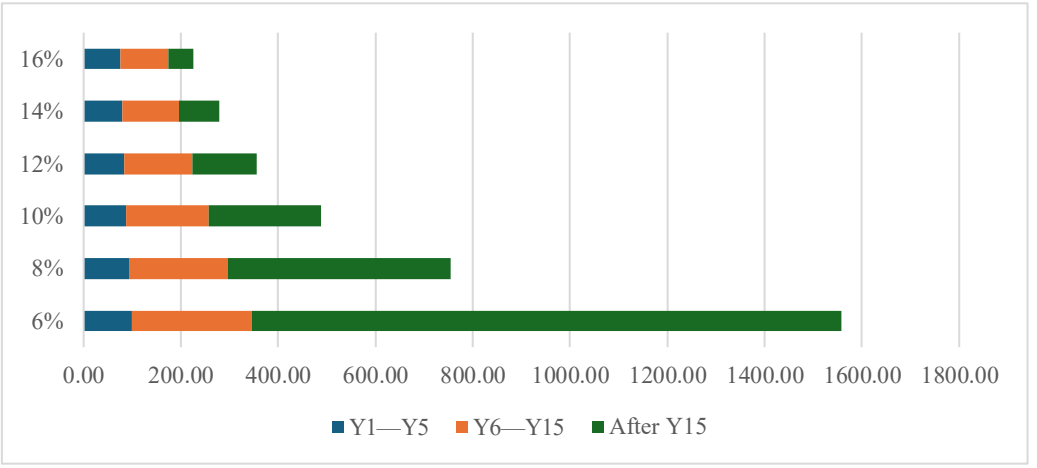

Figure 4: NPV Struture of Company 2

2.3. Results

It turns out the differences arise from NPV structures. To begin with, according to knowledge of the DCF application, the shorter the cash flow, the less it exposes to interest risk, which is here the change in the discounted rate, and vice versa.

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The early need to invest large sums of money for R&D costs, infrastructure construction, or else means that Company 1's short-term free cash flow is frequently negative. Instead, enterprise value is growing thanks to profits generated in the far-off future. Consequently, investors are under more pressure to produce accurate estimates because this share of the profit is now unknown.

By contract, Company 2 already generates sizable net cash inflows in the near term due to its relatively well-developed production chain and company building, and its overall business value is comparatively less dependent on forward cash flows. Company 2 exhibits relatively minimal enterprise value variations as a result of its low sensitivity to changes in the discounted rates.

Despite of the absolute value fluctuations of the two companies, the findings show that businesses such as Company 1 are more susceptible to the subjective opinions of investors regarding the discounted rate, since even a slight variance can result in a distinctly different assessment of the investment's net present value. Investing in companies like Company 2 could be more straightforward because the projections on discounted rates have a relatively small impact on the final valuation.

3. Quantitative Analysis

3.1. Related Work

In the DCF model, the discounted rate is often determined by WACC, which is impacted by the risk-free rate, capital structure, expected market premium, and the required rate of return for bond and equity holders. As numerous factors can impact the discounted rate, the yield to maturity of China's 10-year Treasury bond alone is not a reliable indicator of the absolute discounted rate. However, the connection between it and investment indexes can be utilized to uncover investor references to macroeconomic factors.

3.2. Data Collection

The SSE STAR 50 and SSE 50 indexes would be used to represent two types of companies. For company 1 type, the SSE STAR 50 Index focuses on tracking outstanding companies in the SSE STAR Market, emphasizing those involved in technological innovation and exhibiting high growth potential. It provides investors with an index that is more innovative and growth-oriented. They are the grow-up stocks. For company 2 type, the SSE 50 Index comprises 50 stocks selected by the SSE from listed companies with large market capitalization and good liquidity. These companies are typically blue-chip enterprises listed on the SSE, characterized by substantial market capitalization and stable performance. They are valuable stocks.

It is noteworthy to state that grow-up stocks are defined in this study as follows: (1) featuring a high rate of net profit growth and dynamic growth; (2) having a strong ability to expand equity and a posture that readily draws the attention of investors; (3) seeing a promising industry prospect and clear market expansion trend [2-3].

China's 10-year treasury rate is used as a proxy of the standard or risk-free rate under the context of analyzing China's stock markets. Because the Chinese government is typically perceived as having a low default risk, it provides the highest level of safety. The liquidity and market pricing of these bonds make them a practical choice for use as a benchmark because the policy influences are displayed by the changes.

The above explained data used in this work are summarized in Table 5.

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Table 5: Descriptive statistics

Variable	N	Mean	SD	Min	Max	p25	p50
Treasury Yield	959	2.87	0.198	2.482	3.349	2.713	2.835
SSE50	959	2987.073	387.256	2249.94	4028.53	2672.9	2903.62
SSE SATR50	959	1197.753	209.021	840.14	1721.976	1014.36	1169.44

3.3. Regression processing

Following descriptive statistics, the paper conducts a regression of the SSE STAR 50 and SSE 50 on the yield-to-the-maturity rate of China's 10-year treasury bond (Table 6-7). The data used are all disclosures on CEIC from December 31, 2019 to December 14, 2023.

Table 6: Regress SSE STAR 50 on the yield to the maturity rate of China's 10-year treasury bond.

Regress STAR50 on Treasury Yield	
Multiple R	0.622753
R-squared	0.3878214
Adj R-squared	0.3871817
Root MSE	163.62711
Observed Values	959

SSE STAR50	Coefficients	Std. err.	t	P>|t|	Lower 95%	Upper 95%
Intercept	-686.5682	76.71049907	-8.95012	1.809E-18***	-837.1084	-536.0279
Treasury Yield	656.6608	26.66909928	24.622534	4.34E-104***	604.32414	708.99747

t statistics in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

Table 7: Regress SSE50 on the yield to the maturity rate of China's 10-year treasury bond.

Regress SSE50 on Treasury Yield	
Multiple R	0.8304478
R-squared	0.6896436
Adj R-squared	0.6893192
Root MSE	215.85136
N	959

SSE50	Coefficients	Std. err.	t	P>|t|	Lower 95%	Upper 95%
Intercept	-1668.355	101.1938999	-16.48671	6.096E-54***	-1866.942	-1469.767
Treasury Yield	1622.3546	35.18097517	46.114544	2.22E-245***	1553.3139	1691.3954

t statistics in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001

The results of regressions (Table 6-7), especially the coefficient of determination, R-squared, show how much of the fluctuation of the valuation change is explained by the change in yield-to-maturity of China's 10-year treasury bond. It turns out that the STAR 50 fluctuation can barely be explained.

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3.4. Results

The theoretical model's conclusion should be a sensitivity analysis of the discounted rate shadow in valuation judgment rather than the absolute value impact of higher and lower discounted rates on enterprise value. The explanations should be given to identify the real patterns of investment behavior exhibited in the market and appraise the rationality of patterns in order to apply the knowledge to practical situations [4]. As the model has proved, investments in valuable stocks are less susceptible to fluctuations in the discounted rate than investments in grow-up stocks are. Therefore, investors' challenges in projecting grow-up companies' future cash flows result in increased uncertainty and a reduced link between changes in the STAR50 index and treasury yields throughout a market-uniform cycle of interest rate raises or cuts. In contrast, valuable stocks exhibit greater predictability in terms of discounted rate movements and may partially forecast SSE50 fluctuations based on changes in treasury bond yields.

The above empirical analysis proves the movements of the index for growth-oriented enterprises are not well explained by changes in treasury yields, whereas the movements of the index for value-oriented enterprises are better explained. This implies that, in reality, valuable stocks investments give greater weight to assessments of the macroenvironment because of lower sensitivity and predictable patterns, whereas grow-up stocks investors base their careful assessment of the volatile valuation of start-ups less on the standard rate, even though it represents a risk-free rate. Additionally, the grow-up investment strategy places more emphasis on potential rate changes in the future than it does on the present. It also supports the findings that heterogeneous beliefs affect the market value of companies with strong growth potential, particularly those in high-tech, high-R&D-intensive, and high-patent-licensing industries [5-7].

4. Conclusion

This paper uses a theoretical deductive model to show how different company types' valuations fluctuate within the same range of discounted rate changes. Based on these differences, the following conclusions can be drawn: Firstly, grow-up companies with significant cash flow changes are more sensitive to changes in the discounted rate, primarily due to their greater reliance on forward cash flows. Blue-chip companies, on the other hand, are less susceptible to fluctuations in the discounted rate and have less fluctuations overall. Secondly, by digging inferences from general market price index movements, this work confronts with the real-world evidence about existing investing strategies in order to apply the knowledge to practice.

It can be deduced that the grow-up stocks investing strategy is more heavily influenced by the accuracy of the discount rate judgment than the valuable stocks investing strategy. Because the grow-up ones are more sensitive, regression then proves they have a relatively lower correlation with changes in treasury rates than valuable ones because of investor risk aversion and valuation pressure. This is also due to the fact that valuable stocks investing is primarily concerned with the present, whereas grow-up stocks investing should be more concerned with future cash flows by projections of future rates. Nevertheless, limited disclosure of the data and the simplified model assumption of the same perpetual growth rate still need to be subsequently improved in the near future.

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