

# The impacts of earnings per share, return on total assets and asset-liability ratio on the return ratio of listed companies in China: a quantitative model analysis based on Eviews

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**Abstract:** Generally, stock return is affected by the company's operating performance, distribution policy, macroeconomic conditions and other relevant factors. These financial indicators representing the operating performance of listed companies reflect the financial benefits, asset quality, debt repayment risk and development potential of companies from different aspects. Therefore, the operating performance of listed companies has become an important factor to evaluate and measure the company's return ratio. Inquiring from the annual reports of 30 financial companies which listed in Shanghai A-share market in 2020, the asset liability ratios of each listed company are integrated on the trading day before the 2020 annual report released. Subsequently, the earnings per share and return on total assets are calculated based on Excel. Then, the EVIEWS is utilized to carry out the correlation analysis and measure the optimal position cycle. The limitation of this study is that due to the length of trading daytime cycle, some unstable situation like positive or negative change on coefficient of some independent variable will appear, which indicates that the effects and appearances of some factors are different in the short-term and long-term. In the future, the length of position cycle and frequency can be increase to add other variables which can reflect the company's operating performance to accurate the final results. Besides, it is necessary to find a way to help listed companies prevent from affecting by the fluctuation of stock market and to search the optimal position cycle to obtain the optimal rate of return. These results shed light on helping investors find the optimal position cycle to obtain the most positive return ratio when the stock market fluctuates.

## 1. Introduction

Stock market in China has experienced 24-years development, improvement and maturity. Modern stock investment theory has also been popularized and improved in China. Scholars always make efforts to calculate the various reasons affecting the difference in returns by building models, and research the relationship between risk and return [1-4]. Investors are also looking for the optimal position cycle, which will help them gain the most profit in the stock market based on the impact degree of different factors on the return ratio. Besides, it helps to coordinate the relationship between various influencing factors to gain the optimal rate of return.

According to previous literature, researches empirically demonstrated that the simplified investment model with shareholding cycle as the observation index was effective in the Chinese stock market, and there was an optimal shareholding cycle for investors and financial companies [5]. Xiao discussed the relationship between risk and return in China's stock market by selecting sample data and using analysis of variance, regression analysis and panel data model [4]. Lei investigated the value of financial assets and made an in-depth discussion on the essence, source, formation process and influencing factors of the value of financial assets [6]. Wang et al. discussed the optimal position strategy of institutional investors and finally calculated the second order differential equation satisfied by the optimal position strategy [7]. Combining with the characteristics of China's A-share market, Song established the internal relationship between the company's accounting information data and stock price through the perspective of empirical analysis [8].

This paper mainly investigates the impact of three main factors of earnings per share, return on total assets and asset liability ratio of Listed Companies in 2020 on stock returns and the optimal position cycle. According to the analysis, the absolute value of earnings per share coefficient increased continuously with the growth of time, and reached the maximum on the 15th trading day after the release of the 2020 annual report which showed that the impact of earnings per share on stock returns was increasing. To be specific, the coefficient of asset liability ratio had always been positive and basically showed a gradual increasing trend, indicating that there was a significant positive correlation between asset liability ratio and stock return, and its influence on the latter gradually increased. As for the return on total assets, the absolute value of the coefficient generally showed a decreasing trend, and the coefficient symbol was unstable, which might be due to the unstable effect of the return on total assets on the stock return ratio in different date of trading day.

The rest part of the paper is organized as follow. The Sec. 2 will introduce data screening, analysis method as well as regression model. The Sec. 3 will present the results and demonstrate the discussions for the results accordingly. Eventually, the Sec. 4 will give a brief summary.

## 2. Data & Method

Primarily, 30 financial companies are selected in Shanghai A-share market from the official website of TongHuaShun [9, 10]. Then, in order to ensure the correlation between variables and the obvious significance of the results, 14 enterprises were rescreened under the new standard of  $Y > 0$  which are: Dongfeng Motor Corporation (600006), Beijing Capital Co., Ltd (600008), Inner Mongolia BaoTou Steel Union Co.,Ltd (600010), Rizahao Port Co.,Ltd (600017), Shanghai International Port (Group) Co., Ltd (600018), Baoshan Iron & Steel Co., Ltd. (600019), Shandong Iron And Steel Company Ltd (600022), COSCO SHIPPING Energy Transportation Co.,Ltd. (600026), Huadian Power International Corporation Limited (600027), Sinopec Group (600028), CITIC Securities (600030), China Unicom (600050), China Gezhouba Group Company Limited (600068), Shanghai Pudong Development Bank (600000). The annual report of each company in 2020 was queried from the website called DongFang Fortune [11] to record the earnings per share, return on total assets and return on net assets of each company.

Table I: Data of Three Independent Variables and Six Dependent Variables of 14 Listed Companies

company	x1	x2	x3	y1	y3	y5	y10	y15	y20
600006	0.28	7.27%	59.87%	0.16%	0.65%	2.59%	-0.49%	9.39%	3.07%
600008	0.24	6.45%	64.81%	1.97%	-0.99%	-0.33%	-2.96%	-4.93%	-5.59%
600010	0.0089	0.66%	57.28%	2.68%	4.03%	24.16%	10.74%	8.72%	7.38%
600017	0.21	5.23%	44.79%	0.71%	0.00%	0.71%	-0.71%	-1.41%	-3.53%
600018	0.36	9.80%	38.44%	0.65%	0.87%	2.16%	-2.81%	-4.11%	-5.63%
600019	0.57	7.03%	43.93%	1.67%	-0.36%	4.43%	-5.38%	-9.33%	-9.57%
600022	0.067	3.42%	54.96%	1.99%	1.99%	9.93%	13.25%	12.58%	11.92%
600026	0.52	7.27%	46.02%	1.75%	-0.64%	2.39%	-1.28%	-1.75%	-2.07%
600027	0.33	7.03%	60.37%	5.21%	3.37%	3.07%	-2.15%	-1.53%	-2.45%
600028	0.27	4.44%	49.02%	1.22%	1.46%	1.22%	2.19%	3.89%	-0.97%
600030	1.16	8.43%	78.10%	2.59%	2.12%	1.68%	2.51%	-1.08%	2.03%
600050	0.18	37.30%	43.09%	2.76%	1.84%	-1.15%	-3.91%	-3.91%	-3.22%

600068	0.73	10.31%	69.41%	3.37%	-0.28%	0.14%	0.98%	-0.84%	-0.42%
600000	1.88	10.81%	81.91%	3.85%	2.66%	0.79%	1.38%	-1.18%	-3.45%

Based on the relevant research results, further considering the difficulty of data collection, the authenticity of estimation results, the feasibility of estimation methods, the rationality of economic significance and other factors. Finally, it was decided to establish section data and use Eviews [12] software to analyze the EPS, return on total assets and asset liability ratio of these 14 listed companies to econometric regress the return ratio on different trading days after the release of the annual report. Afterward, one is able to observe the linear relationship between independent variables and dependent variables and verify the correlation between  $X_i$  and  $Y_i$ .

$X_1$  represents the earnings per share of the listed company in 2020, which means that an index to measure the ability of an enterprise to use the funds provided by creditors for business activities and to reflect the safety of creditors' loans.  $X_2$  represents the return on total assets, which indicates how well a company's investments generate value.  $X_3$  denotes the asset liability ratio, which is an index to measure the ability of an enterprise to use the funds provided by creditors for business activities and to reflect the safety of creditors' loans.  $Y$  is the rate of return, which is a subset of financial ratios that measure how effectively an investment is being managed. Specifically,  $Y_1$  represents (the share price on the first trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1;  $Y_3$  represents (the share price on the third trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1;  $Y_5$  represents (the share price on the fifth trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1;  $Y_{10}$  represents (the share price on the tenth trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1;  $Y_{15}$  represents (the share price on the fifteenth trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1;  $Y_{20}$  represents (the share price on the twentieth trading day after the annual report release date of the listed company / the share price on the trading day before the annual report release date) - 1. Table I lists the value of  $X_i$  and  $Y_i$ . for all the 14 selected companies.

After description of the variables, six regression models for the target  $Y_i$  are constructed with following descriptions.

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (1)$$

$$Y_3 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (2)$$

$$Y_5 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (3)$$

$$Y_{10} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (4)$$

$$Y_{15} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (5)$$

$$Y_{20} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u_{it} \quad (6)$$

Here, the  $\beta_0$ - $\beta_3$  are the regression coefficients while  $u_{it}$  denotes the error term of the regression.

Table II: The Pearson correlation Coefficients between x and y

Correlation		X1	X2	X3	Y1	Y3	Y5	Y10	Y15	Y20
X1	1.000	0.055 7	0.688	0.374	0.0847	-0.341	-0.142	-0.303	-0.249	
X2	0.055 7	1.000	-0.170	0.171	0.0107	-0.436	-0.432	-0.365	-0.287	
X3	0.688	-0.170	1.000	0.528	0.278	-0.0406	0.250	0.147	0.237	

Y1	0.374	0.171	0.528	1.000	0.524	0.0594	0.0711	-0.148	0.023
Y3	0.084 7	0.010 7	0.278	0.524	1.000	0.548	0.528	0.441	0.494
Y5	- 0.341	-0.436	-0.0406	0.0594	0.548	1.000	0.723	0.564	0.614
Y10	- 0.142	-0.432	0.250	0.0711	0.528	0.723	1.000	0.837	0.920
Y15	- 0.303	-0.365	0.147	-0.148	0.441	0.564	0.837	1.000	0.927
Y20	- 0.249	-0.287	0.237	0.0228	0.494	0.614	0.920	0.927	1.000

Table III: The regression analysis

	Y1	Y3	Y5	Y10	Y15	Y20
<b>EPS-X1</b>						
<b>Coefficient</b>	<b>-0.00199</b>	<b>-0.00738</b>	<b>-0.0613</b>	<b>-0.0525</b>	<b>-0.0856</b>	<b>-0.0825</b>
(p)	0.845	0.590	0.232	0.204	0.0781	0.0604
<t>	-0.201	-0.557	-1.271	-1.356	-1.962	-2.116
<b>RTA-X2</b>						
<b>Coefficient</b>	<b>-0.0446</b>	<b>0.0184</b>	<b>-0.280</b>	<b>-0.192</b>	<b>-0.162</b>	<b>-0.0792</b>
(p)	0.315	0.752	0.203	0.271	0.403	0.644
<t>	1.0577	0.326	-1.361	-1.166	-0.872	-0.476
<b>ALR-X3</b>						
<b>Coefficient</b>	<b>0.0635</b>	<b>0.0531</b>	<b>0.107</b>	<b>0.212</b>	<b>0.268</b>	<b>0.300</b>
(p)	0.119	0.311	0.570	0.177	0.133	0.0681
<t>	1.707	1.0667	0.588	1.454	1.635	2.04502
<b>R-quared</b>	<b>0.352</b>	<b>0.109</b>	<b>0.315</b>	<b>0.340</b>	<b>0.380</b>	<b>0.391</b>
<b>Adjusted R-quared</b>	<b>0.157</b>	<b>-0.159</b>	<b>0.109</b>	<b>0.142</b>	<b>0.194</b>	<b>0.209</b>
F	1.807	0.406	1.531	1.717	2.0405	2.143
DW	0.210	0.752	0.266	0.226	0.172	0.158

### 3. Results & Discussion

Table II presents the Pearson correlation coefficients, where one sees the correlation is rather significant for some of the  $Y_i$  and  $X_i$ . Table III summarizes the regression results, where one notices the  $R^2$  is significant for some of the  $Y_i$  (close to 0.4). The regression expressions (adding with coefficients) are given in Eqs. (7)-(12):

$$Y_1 = -0.0171 - 0.00199X_1 - 0.0446X_2 + 0.0635X_3 \quad (7)$$

$$Y_3 = -0.0161 - 0.00738X_1 + 0.0184X_2 + 0.0531X_3 \quad (8)$$

$$Y_5 = 0.0315 - 0.0613X_1 - 0.280X_2 + 0.107X_3 \quad (9)$$

$$Y_{10} = -0.0689 - 0.0525X_1 - 0.192X_2 + 0.212X_3 \quad (10)$$

$$Y_{15} = -0.0923 - 0.0856X_1 - 0.162X_2 + 0.268X_3 \quad (11)$$

$$Y_{20} = -0.131 - 0.0825X_1 - 0.0792X_2 + 0.300X_3 \quad (12)$$

On the first trading day after the release of the annual report, if the earnings per share increases by one unit, the company's rate of return decreases by 0.002 unit. When the rate of return on total assets increases by one unit, the rate of return of the company increases by 0.045 unit. When the asset liability ratio increases by one unit, the company's yield increases by 0.064 unit.

On the third trading day after the release of the annual report, when the earnings per share increases by one unit, the company's rate of return decreases by 0.0074 unit. If the rate of return on total assets increases by one unit, the rate of return of the company increases by 0.018 unit. If the asset liability ratio increases by one unit, the company's yield increases by 0.053 unit

On the fifth trading day after the release of the annual report, when the earnings per share increases by one unit, the company's rate of return decreases by 0.061 unit. When the rate of return on total assets increases by one unit, the rate of return of the company decreases by 0.28 unit. When the asset liability ratio increases by one unit, the company's yield increases by 0.11 unit

On the tenth trading day after the release of the annual report, when the earnings per share increases by one unit, the company's rate of return decreases by 0.053 unit. When the rate of return on total assets increases by one unit, the rate of return of the company decreases by 0.19 unit. When the asset liability ratio increases by one unit, the company's yield increases by 0.21 unit

On the 15th trading day after the release of the annual report, when the earnings per share increases by one unit, the company's rate of return decreases by 0.086 unit. If the rate of return on total assets increases by one unit, the rate of return of the company decreases by 0.16 unit. When the asset liability ratio increases by one unit, the company's yield increases by 0.27 unit

On the 20th trading day after the release of the annual report, when the earnings per share increases by one unit, the company's rate of return decreases by 0.083 unit. If the rate of return on total assets increases by one unit, the rate of return of the company decreases by 0.079 unit. When the asset liability ratio increases by one unit, the company's yield increases by 0.30 unit

On the 20th trading day, R-squared is 0.39 which is the best among these six subjects, and the correlation between X and Y is also the strongest. With the progression of the transaction date, the promotion of the asset liability ratio to company's return ration is increasing.

Nevertheless, the investigations here have some limitation. Because R-squared of the econometric regression of y of the original 30 listed companies with the independent variables was too low, y was rescreened with an appropriately selected standard:  $Y > 0$ . Then get X and y with strong correlation, and the goodness of fit has been significantly improved. However, due to the length of time period, there will be positive and negative changes in some independent variable coefficients, indicating that the effects of some factors are different in the short run and the long run. X2 has a positive correlation with return ratio in the short term and a negative correlation in the medium & long term; X3 is positively correlated with return ratio and X1 is negatively correlated with return ratio.

#### 4. Conclusion

In summary, a series of regression models are constructed for return ratio in terms of earnings per share, return on total assets and asset-liability ratio. According to the estimation results, the final three independent variables and the selected six dependent variables show a beautiful goodness of fit, indicating a good significance between the two. The absolute value of the coefficient of earnings per share increases with time, and reaches the maximum value on the 15th trading day after the release of the annual report, indicating that the impact of earnings per share on the stock yield is increasing; The coefficient of asset liability ratio has always been positive and basically shows a gradual increasing trend, indicating that there is a significant positive correlation between asset liability ratio and stock return, and the influence of asset liability ratio to the later gradually increases; For the return on total assets, the absolute value of the coefficient decreases gradually, and the coefficient symbol is unstable,

which may be caused by the unstable effect of the return on total assets on the stock return in different trading cycles.

In the future research, the number of cycles should be expanded to explore what will happen to the return rate of listed companies and the optimal position cycle when affected by the external macroeconomic environment (considering the stock risk). Based on the analysis, the investors are able to select the optimal position cycle and gain the highest return ratio when meeting the fluctuated condition in stock market. These results offer a guideline for investors decision making during the phase after annual report.

## 5. Conflict of Interest

The authors declare no conflict of interest.

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