The research on the effect on stock price of executives' selling behavior in Chinese GEM

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Abstract: This paper empirically analyzes the impact of executives' reduction on stock price by taking the listed companies on Chinese GEM as research samples. The results show that the behavior of senior executives reducing their holdings will significantly reduce the stock price, and the effect changes in an inverted U-shape with the proportion of stocks reduced. Further research shows that for the companies with higher earnings per share and absolute price, the behavior of executives reducing their stock holdings will do more harm to the stock price.

Keywords : stock price, executives' selling behavior, Chinese GEM, listed companies

1. Introduction

Gem, also known as the second board Market or the Second trading system, refers to a new capital market outside the traditional securities market, which is designed for financing the small and medium - sized enterprises or start-up company, and the operation and exit of venture capital. China GEM was initially listed in Shenzhen on October 23th, 2009, and it has three main features, high risk, the high earnings and full circulation. For the first feature, the GEM has a lower listing threshold compared to the motherboard market. And the investors lack the necessary knowledge and skills of investment. All of these make the GEM market have a high risk. For the second feature, the GEM requires that the listed companies must be high-growth enterprises and their products must have broad market prospects and excellent high-tech advantages. For the last feature, globalization forces China's GEM to be in line with the operation of the international capital market norms and have the property of full circulation.

There are many factors that affect the GEM. We divide them into three parts, company operating factors, market factors and trader behavior factors. The company operating factors include earnings per share, returns on equity and so on, These factors reflect the performance and development prospects of the GEM companies. The market factors include social situation, policy, exchange rate, price and so on. These factors

constitute a big background of the GEM and will influence the GEM surely. Trader behaviors include the buying and selling of stocks in the GEM.

Among these three kinds of factors, executives' selling behavior is very important. There are mainly two reason. One is that it will influence the supply-demand relationship. The other is that it reflects some important information that others don't know. For the first reason, one example is that the executives' selling behavior will increase the supply of stocks, which will decrease the stock price according to the Basic economics principle. For the second reason, as insiders, these executives have a better knowledge of the companies' actual information. So they can correctly position the company's stock price. Once they think that the company is overvalued, they will sell stocks. These selling behaviors are generally considered to be a performance of the company's overvalued or below the expected development prospects, which will lead the investors to follow to sell the companies' stocks, and the stock price will thus decrease.

However, the standard quantitative empirical research on the executives' selling behavior in Chinese GEM is rare. Most are based on event study or the theoretical analysis of the single effect of selling behavior on stock price (Liu, 2012; Zhao, 2012). Besides, most asset pricing models don't consider this behavior factor, which may result in inexact estimations.

In our paper, we mainly make two contributions. Firstly, we study the effect on stock price of executives' selling behavior in Chinese GEM using econometric method while controlling the effect of other factors on stock price. Secondly, we focus on the effect on stock price of executives' selling behavior in Chinese GEM among all important shareholders.

The rest of this paper is organized as follows. The second section elaborates the methodology. In section 3 we build the econometric model with data description. The fourth section demonstrates and analyses the empirical results. In section 5, we reach the conclusions.

2. Methodology

2.1. Method

We used the econometrics OLS regression method to run regression of several factors, including executives' selling behaviors, on stock price changes. By using this method, we can quantize the effect of executives' selling behavior on stock price, at the same time of controlling other factors.

2.2. Data resource

All the data except the GEM composite index data were obtained from the CSMAR database. And the GEM composite index historical data obtained from Sohu finance.

2.3. Data selection

The specific data selection methods are as follows. First of all, from all records of executives' stock transaction, we eliminated a transection record if there are other

executives' selling or buying behaviors before or after 5 days of the notification date. Then we removed all data related to executives buying behavior, which is beyond our focus. At last we deleted data with market value of sold stocks less than 200,000 RMB, because if the selling value is too small, the effect will be hard to detected, or even will have no effect on stock price. After all these selection steps, we got data of 80 companies, and then according to notification date of each selling, we matched the GEM composite index.

3. Model

$$\text{r} = \beta_0 + \beta_1 lnunderweight + \beta_2 underweightratio + \beta_3 underweightratiosq + \beta_4 self + \beta_5 eps + \beta_6 roe + \beta_7 price + \beta_8 indexratio$$

3.1. Dependent variable

We use the return in 5 days after the notification date as the dependent variable.

$$R_5 = \frac{p_5 - p_0}{p_0}$$

P_0 is the closing price on the notice date of reduction, and p_5 is the closing price on the fifth day after the notice date.

After comparing window period of 20 days, 15 days, and 5 days, we found that a window of 5 days has the best effectiveness, so we use 5 day as our window. This is because if the time range is too long other unexpected factors will also affect the price change, which will distort our regression results. In addition, we used a sample time span from January 1, 2014 to May 31, 2015.

3.2. Independent variables

3.2.1. Underweight part

Theoretically, the more the market value of sold shares, the larger the effect will be. To measure how big the magnitude of the reduction is on the company's stock price, not only the absolute value is needed, but also the ratio of numbers of changing shares to the total shares outstanding of the company. We also added the square of underweight ratio as an independent variable to measure the effect in two different situations: when the reduction account for little in total outstanding shares and when the reduction account for majority of total outstanding shares.

The dummy variable, self, is set to be 1 if the shares are sold by the executive him/herself, and will be 0 if it is sold by other people (including relatives of the executive). Investors care about this because the executive him/herself possesses more inside information, thus larger information asymmetry advantage.

3.2.2. Company part

The price change is also associated with the company itself, like it profitability or growth opportunity. EPS is one important ratio reflecting the profitability of a company. A higher EPS means the company is earning more profit, and the stock will be more attractive. A higher ROE means a higher probability that the company is using investors'

money efficiently. If the price is already too high, it will not increase as fast as those with a relatively lower price.

3.2.3. Market factor part

The big environment in the economy, like government policy, interest rate, and inflation rate, will absolutely influence the stock market. For example, when the government increase the money supply, the stock price will increase because the rising merchandise price will make the revenue number looks good. Also, with more money in pocket, investors will have a bigger demand for stock, pushing up the stock price. The composite effect of all these macro factors will be reflected in the market index specifically. In a bull market, the negative effect of executives' share reduction may be offset by the strong increase trend in the market. We use the GEM composite market index to represent the market factor.

$$M_5 = \frac{Y_5 - Y_0}{Y_0}$$

M_5 is the index return in 5 days after the notice date. Y_5 is the closing index price on the fifth day after the notice date, and Y_0 is the closing index price on the notice date.

Table 1：Variable explanation.

Variable	Explanation
r	Price percentage in 5 days
Lnunderweight	log form of the market value of executives' share reduction
Underweightratio	proportion of the reduction shares to the company's total shares
Underweightratiosq	Square of the underweight ratio
Self	=1 if it's reduced by himself/herself; =0 if not
EPS	Earnings per share of last year
ROE	Return on equity of last year
Price	The market price on notification date
Indexratio	The change ratio of GEM composite index

3.3. Descriptive Statistics

Table 1 shows the descriptive statistics of the variables. From the chart we can see the average change of stock's price is positive when selling behavior happens.It may be due to the bullish market. From the positive index change ratio, we think the market trend goes up on the whole. Graph 1 tells the same story, which shows the index increase with the form of exponent. However, with the bull trend, there are still near half of the prices decrease, which is seen from Graph 2. So we have the reason to doubt the price is affected by the selling behavior.
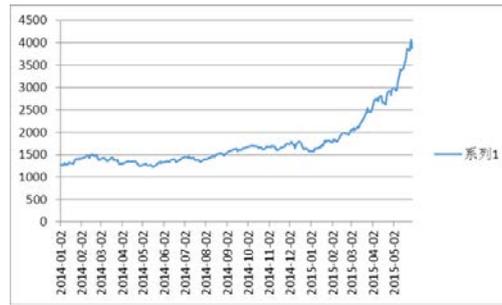
Figure 1: Index trend
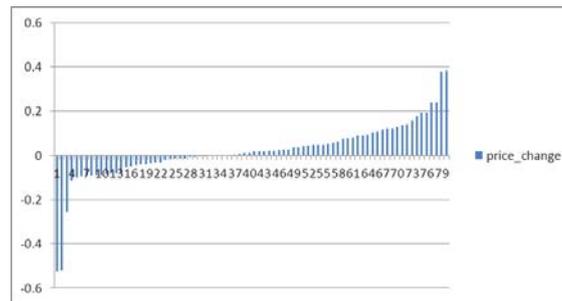
Figure 2: Price Change

Besides, we can know selling percentage of the whole stocks are different dramatically though all the magnitudes are large from Table 1. So the sample can divide the effect into the effect on supply and information well. And the absolute prices also have the large difference. So it is necessary to control this factor in our model.

Table 2：Descriptive Statistics.

	Mean	Std. Dev.	Min	Max
price_change_ratio	0.016895	0.13419	-0.52583	0.384167
Underweight (million)	-85.1328	86.20447	-428.24	-1.57493
self	0.6875	0.466437	0	1
underweight_ratio	0.142653	0.134137	0.002578	0.499403
eps	0.309568	0.398167	-1.99	1.48
roe	0.062742	0.097153	-0.60639	0.260181
price	25.23425	20.33392	4.67	136.85
index_change_ratio	0.0335844	0.0427561	-0.0608632	0.1326401

3.4. VIF test

Because the multicollinearity is usually a serious problem for multi-factor regression model, we do the VIF test on all of independent variables see whether multicollinearity exist. The outcome is shown by Table 3. It shows there isn't multicollinearity because no VIF value is bigger than 10. Besides, in order to avoid the heteroskedasticity, robust standard errors are used for our estimation.

Table 3：VIF test.

Variable	VIF	1/VIF
eps	6.35	0.157523
roe	6.12	0.163309
lnchange	2.24	0.447179
percentage	2.11	0.4749
price5	1.37	0.728489
index_change	1.1	0.9067
own	1.08	0.924498
index_change_ratio	0.0335844	0.0427561
Mean VIF	2.91	

4. IV. Result

4.1. Benchmark model result

Table 4 shows the result of our regression.

Table 4：Benchmark model result.

VARIABLES	price_change_ratio
ln_underweight	-0.026*
	(0.014)
self	-0.005
	(0.024)
underweight_ratio	0.161*
	(0.075)
underweight_ratio _sq	-0.244*
	(0.124)
eps	-0.136*
	(0.064)
roe	0.322
	(0.346)
price	0.002*
	(0.001)
index_change_ratio	0.672**
	(0.310)
Constant	0.421*
	(0.228)
Observations	80
R-squared	0.172

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

From the table, we find the selling behavior of executives leads the price's change into negative direction. That's because people may think the selling behavior is a bad signal which means the company can't operate well. However, whether the executives sell by themselves or their relatives have no significant effect on the price change. The effect of underweight ratio is significant while the coefficient of the first order is positive and the second order is negative, which means a U shape effect. It is easy to understand when we realize it is the bull market. When the supply increases by a little mount, people may prefer to buy because the price is increasing. And the action will increase the price more. However, when the supply increases beyond a level, the supply is more than the demand. So the price will decrease.

The effect of underweight on stock price

Moreover, EPS is another factor to have negative effect on change of the price. That's because of the general high EPS of the companies in GEM. When EPS increase more, people will think the price is more overvalued. So the price may fall. Besides, high absolute price has the positive effect on the price change. The reason we think is because the high price may have resistance on decrease of the price. For macro aspect, the stock's price follows the market trend closely. That's why the index change can explains the individual stock's price change more significantly.

4.2. Further research

To see how the stock price and EPS ratio influence the effect of the selling behavior on the change, we add the interactions between them and underweight separately into our function. The outcomes are as follow.

From the chart, we can see the coefficients of *ln_underweight* and its interactions are all negative but only with price are jointly significant.

The sign of the interactions are negative, which means the selling behavior on stocks with high EPS and absolute price will decrease the price more. When EPS is high, the selling behavior of the executives will be more likely to confirm the stock overvalued. And with the high price, people will have more stress in the mind and be more afraid about the bad news. So the price is more elastic. This effect is different with the direct effect of the absolute price.

Table5：Effect of the selling behavior with interactions.

VARIABLES			
ln_underweight	-0.023	ln_underweight	-0.0001
	(-0.004)		(-0.011)
Underwe*eps	-0.004	Underwe*price	-0.0004
	（0.038）		(-0.0002)
Jointly Significant		Jointly Significant	
Chi2（2）	1.92	Chi2（2）	2.43
P-value	0.15	P-value	0.09

Note: Other variables' estimates are not listed in Table

5. Conclusion

In this paper, we empirically study the effect on stock price of executives' selling behavior in Chinese GEM. Through the regression with the data of 80 stocks from GEM, we find the market value of executives' share reduction will significantly decrease the stock price while the underweight ratio will have an inverted U shape effect----decrease first and then increase the price. The Further research shows the selling behavior on stocks with high EPS and high absolute price will decrease the price more.

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