

Measure Opinion Divergence with Obnormal Overturn and Build Investment Portfolios

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Abstract—The capital asset pricing model (CAPM) assumes that investors have homogenous expectation, which is obviously an idealized assumption of the real world. Behavioral finance expands the hypothesis of rational people, analyzes many bias of investors behaviors in the real world, and notices two of them: 1.information in the real world is not sufficient and asymmetrical; 2.investor's attention is limited and the prior belief are different among them. Many researches broaden the hypothesis of homogeneous expectation of capital asset pricing model and study the impact of investor heterogeneous beliefs on stock market equilibrium. Based on prior research, this paper uses the Chinese stock market(A-share) data from 2016 to 2017, modeling with daily frequency, calculates the daily abnormal turnover rate, and build portfolios with the abnormal turnover rate. The result of the portfolio is that the abnormal return of the day is significantly negatively correlated with the yield of the second trading day. This research introduce that abnormal overturn can be a efficient factor of asset pricing model.

Keywords—Behavioral Finance, Turnover decomposition, Heterogeneous beliefs, Opinion divergence, Investment portfolio

I. INTRODUCTION

This paper verify the validity of investor’s opinion divergence in predicting stock cross-sectional returns on Chinese stock market(A-share). The specific method is to build portfolios with opinion divergence and market size(market capitalization at the end of the previous year), hold these portfolios for one day and five days. When hold for one day, the results show that stocks with higher opinion divergence perform better in the day but underperform next day. The concrete empirical result is that the average return of the stock portfolio of high opinion divergence was significantly negative on the next day, and the average return of the low divergence divergence was significantly positive on the next day. But when hold for five days, all portfolios for all market size get negative return.This paper mainly follow these theories: heterogeneous beliefs of behavioral finance, CAPM model, turnover rate decomposition model, using daily turnover rate as the proxy for trading volume.The remainder of this paper is as follow. Section 2 introduces the data used in this paper; Section 3 describes the construction of the opinion divergence index, including the method used and the specific calculation process; Section 4 constructs two portfolios with the divergence index and analyzes the validity of the opinion divergence index; Section 5 gives conclusions and improvements.

II. DATA

A. Summary of the Data

Get A-share daily data from the beginning of 2016 to the end of 2017 from the Wind database, delete ST and *ST stocks(special treatment stocks). There are 3377 stocks, 487 trading days. Variables are as follow, close price(c), turnover rate(ot, calculated by circulation market value), circulation market value (sz), daily return of shanghai composite index(rmm), daily return of all stocks(sy).For the validity of the results, cleansing the data: exclude the data of first month of the IPO; calculate β_i and λ (Section 3), and then further exclude stocks with less than 400 trading days, and finally obtain valid 1988 stocks.

B. Descriptive Statistics

Based on data of 2.1, calculate the average return (sy, multiplied by 100), average turnover rate (ot), average market value (sz, market capitalization, the unit is 100 million yuan) for each stock for two years, and analyze cross-sectional correlation.

TABLE I CORRELATION ANALYSIS OF MARKET VAULE,TURNOVER RATE, RETURN:

	sz	ot	Sy
sz	1		
ot	-0.1171	1	
sy	-0.0113	0.4451	1

Table I shows that two years average turnover rata and return are positively related, two years average market value and return are negatively correlated in cross-section. The correlation is all not strong.

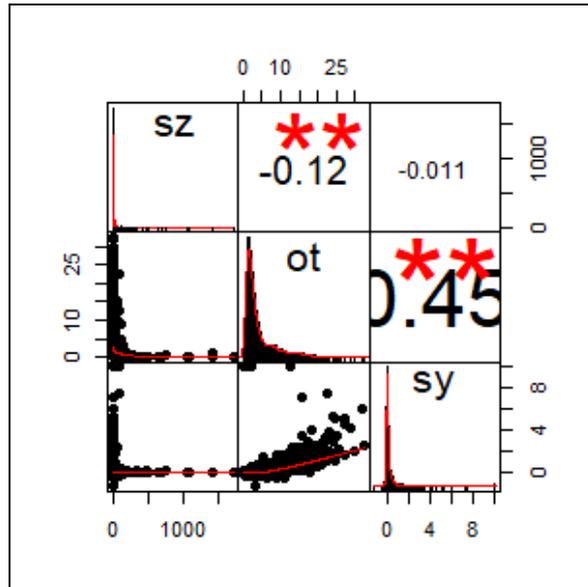


Figure 1. Distribution of market vaule,turnover rate, return

In Fig. 1, the left triangle is a scatter plot of three variables, the right triangle is the correlation coefficient, and the diagonal is the individual distribution of the three variables. The four sides of the diagonal rectangle represent variables. From the distribution of the variables on the intersection line, all three variables are right-biased. The scatter plots of sz and ot can be seen that the high turnover rate appears in low-cap stocks, and the turnover rate of high-cap stocks is relatively stable. Similarly, the yields of high-cap stocks are stable, and high yields are mostly low market values stocks; the scatter plot of turnover rate and yield can be seen that there is a significant positive correlation between turnover rate and yield.

TABLE II DESCRIPTIVE STATISTICS

	sz	ot	sy
Min. :	1.051	0.02313	-1.79106
1st Qu.:	4.877	1.37894	-0.073413
Median :	7.527	2.34285	-0.005031
Mean :	17.218	3.90728	0.134283
3rd Qu.:	13.600	4.52461	0.114849
Max. :	1725.160	32.47791	10.005815

The data used in this statistic is the average of two years. It can be seen that the two-year average of the circulate market value is from 105.1 million to 172.516 billion, and the market capitalization of 100 billion are the bank stocks; the average turnover rate of two years is 0.02313 to 32.4779, active stocks are mainly composed of new shares and sub-new shares; the two-year average range of income is -1.7911% to 10.0058%, the highest value are new shares, and the lowest two-year average daily income are -1.7911% by contrast. The overall average of circulate market value is 1721.8 million, the overall average for turnover rate is 3.9077%, and the overall average for daily earnings is 0.1343%.

III. MEASUREMENT OF INVESTOR'S OPINION DIVERGENCE

A. Method

Opinion divergence of Investors arise from their heterogeneous beliefs. In the prior literature[2], the commonly used proxies of opinion divergence includes bid-ask spread, stock return volatility and analysts' forecast dispersion.

The bid-ask spread also reflects the difference between information asymmetry and liquidity; the volatility is affected by information and risk, these two indicators contain too much noise when measuring the divergence of opinions. The analysts predict the distribution have these two problems: (1) investors do not completely trade according to analysts' forecasts; (2) and analysts' forecasts are related to their interests and their own attention, so the opinions divergence constructed by analysts predict distribution can be distorted.

Unexpected trading volume reflects the conversion of investors' views. This paper constructs opinion divergence from unanticipated trading volumes, using daily turnover rate as the proxy for trading volume.

The existing theoretical research hypothesise that stock trading is caused by three factors[4],[5]: (1) the investor's

exogenous liquidity demand; (2) information impact: public information, private information, macroeconomic information, company information; (3) investors' opinion divergence.

This article uses market information to represent information impact, and isolate the return of market information from CAPM model $R_m = \tilde{\beta}_i(R_{Mj} - R_{fj})$:

$$R_{ij} - R_{fj} = \alpha_i + \beta_i(R_{Mj} - R_{fj}) + \varepsilon_{ij} \quad (1)$$

R_{ij} : the return rate of the stock i on the day j;

R_{fj} : the risk-free rate on day j;

$R_m = \tilde{\beta}_i(R_{Mj} - R_{fj})$ represents the market information.

Previous literature^[5] has shown that the turnover rate can be used as a proxy variable for volume (Garfinkel and Sokobin). This paper follows this research and use turnover rate as proxy variable for volume. Establish a model for turnover rate OT based on the three factors above, the intercept is the return related to the investor's exogenous liquidity demand; $\beta_i(R_{Mj} - R_{fj})$ is the return related to the market information; residual is investors' opinion divergence. The positive and negative market returns have asymmetrical effects on turnover rate, so establish a specific mode:

$$OT_{i,j} = \theta_i + \lambda_1 |R_{mij}^+| + \lambda_2 |R_{mij}^-| + \varepsilon_{ij} \quad (2)$$

(1) $OT_{i,j}$: The turnover rate of the stock i on the day j;

(2) $|R_{mij}^+|$: when $R_{mij} > 0$, $|R_{mij}^+| = R_{mij}$; when $R_{mij} < 0$, $|R_{mij}^+| = 0$

(3) $|R_{mij}^-|$: when $R_{mij} > 0$, $|R_{mij}^-| = 0$; when $R_{mij} < 0$, $|R_{mij}^-| = R_{mij}$

B. Calculation Process

1) Calculate β

$$R_{ij} - R_{fj} = \alpha_i + \beta_i(R_{Mj} - R_{fj}) + \varepsilon_{ij} \quad (3)$$

Run model above for every stock. Run method: run regression using the data of the first 30 days (if the first 30 data shows zero, no running). The β of the previous 30 days' regression is the estimate beta of the 31st day, and each stock obtains about 400 predictions of the rolling prediction. And calculate the market return R_m for that day:

$$R_m = \tilde{\beta}_i(R_{Mj} - R_{fj}) \quad (4)$$

2) Calculate λ

OT is the dependent variable, and OT is interpreted by R_m . The effect of positive and negative R_m on OT is different. The positive and negative R_m are separated and divided into two absolute values. The meanings of the two λ are respectively: when R_m is positive, R_m rises by one unit, the value of OT changes; when R_m is negative, the absolute value of R_m rises by one unit, the value of OT changes. Calculation method: obtain β_i from the 31st data, calculate R_m , then move the window from the 31st data, calculate the two λ from the previous 30 data regression; Multiply λ and R_m to calculate the estimated OT, which is the OT that is interpreted by the market information. The residual(ε_{ij}) is the OD (opinion divergence).

$$OT_{i,j} = \theta_i + \lambda_1 |R_{mij}^+| + \lambda_2 |R_{mij}^-| + \varepsilon_{ij} \quad (5)$$

The tools used to batch calculate β and λ in this paper is R(a programming language).

IV. BULID PORTFOLIOS

Delete stocks with less than 400 OD data, leaving 1988 stocks; For every trading day, sort by OD, divide stocks into five equal parts, calculate the equal weighted yields for the largest and smallest portfolios; It is found that the OD of the day is

negatively correlated with the income of the next day, and is positively correlated with the income of that day. Further, the previous five-day OD average is used as a screening indicator, sort the data into five value part by market value, then for every part sort by OD and divide stock into five OD parts, calculate the equal weighted yields for the largest and smallest OD portfolios; hold portfolios for five days, result show OD indicator is invalid.

A. Portfolios Hold for One Day

TABLE III AVERAGE RETURN OF PORTFOLIOS HOLD FOR ONE DAY(%)

In the day				Next day							
High OD	High OD	High minus low	Low OD	High OD	High minus low	Low OD	Low OD				
-0.133	**	0.4157	***	0.5487	***	0.0537	**	-0.11908	***	-0.1728	***

***, ** Represent significant level of 1%, 5% respectively

The data in Table III is the average return for the portfolio hold for day. The average yield of the market during this period is 0.02%. The daily income of the highest OD portfolio is significantly positive, and the daily income of the lowest OD portfolio is significantly negative. Conversely, the next day gain for the highest OD portfolio is significantly negative, and the minimum OD portfolio's current day earnings are significantly positive and double the market average.

B. Portfolios Hold for Five Days

TABLE IV AVERAGE RETURN OF PORTFOLIOS HOLD FOR FIVE DAY(%)

OD	Small market value		To		Big market value	All stocks
	s1	s2	s3	s4	s5	
OD1(low)	-0.0270	-0.2464	-0.2227	-0.2158	-0.2127	0.0778
OD2(high)	-0.6261	-0.1617	-0.1822	-0.2037	-0.2044	-0.3221
OD2-OD1	-0.5992	0.0847	0.0405	0.0121	0.0083	-0.4001

From s1 to s5, hold stocks of high OD, portfolios got significant negative return. For all market value, portfolios got negative return, reasons are: the theory assumes that transactions are caused by liquidity requirements, information and heterogeneous beliefs. The information includes market information, company information, and private information. The information used in this combination contains only market information. The opinion divergence calculated this paper contains information about the company, causing indicator is invalid for the company's market value.

Note that for the full sample, the low OD group gets a positive return; Except for the lowest market value combination, the high OD yields are higher than the low OD combination (although negative) in different market value portfolios. However, the abnormal return of the lowest market value portfolio(low OD with high return and high OD with low return), averages the income of the entire portfolio, resulting in low OD yield high return and high OD yield low return.

V. CONCLUSION AND IMPROVMENT

This paper uses the two-year data of A-shares to construct portfolio hold for one-day and five-day. When the holding period is one day, the conclusion is that the stocks with high opinion have higher return compared to low opinion divergence on the day. The result of portfolio held for five days is invalid: for all market capitalizations, the average return is significantly negative.

Trading is based on information. This paper only adds market information without adding other information. Future research can add other factors, such as the classic Fama–French three-factor, momentum factor. These factors can get more proxy variables of other information, add them to the regression equation of turnover rate, the divergence of opinion (OD) can be more representative.

REFERENCES

- [1] Lin Chen, Lu Qin, Hongquan Zhu.(2015) .Opinion divergence, unexpected trading volume and stock returns: Evidence from China. *International Review of Economics and Finance*119–127410.
- [2] Amihud, Y., & Mendelson, H. (1989). The effects of beta, bid–ask spread, residual risk, and size on stock returns. 9
- [3] Basak, S. (2005). Asset pricing with heterogeneous beliefs. *Journal of Banking & Finance*, 29, 2849–2881.
- [4] Bessembinder, H., Chan, K., & Seguin, P. J. (1996). An empirical examination of information, differences of opinion, and trading activity. *Journal of Financial Economics*,40, 105–134.
- [5] Garfinkel, J. A., & Sokobin, J. (2006). Volume, opinion divergence, and returns: A study of post-earnings announcement drift. *Journal of Accounting Research*, 44, 85–112.

- [6] He, W. P., Lepone, A., & Leung, H. (2013). Information asymmetry and the cost of equity capital. *International Review of Economics & Finance*, 27, 611–620.
- [7] Martínez, M. A., Nieto, B., Rubio, G., & Tapia, M. (2005). Asset pricing and systematic liquidity risk: An empirical investigation of the Spanish stock market. *International Review of Economics & Finance*, 14(1), 81–103.
- [8] Miller, E. M. (1977). Risk, uncertainty, and divergence of opinion. *Journal of Finance*, 32, 1151–1168.
- [9] Opie, W., & Zhang, H. F. (2013). Investor heterogeneity and the cross-sectional stock returns in China. *Pacific-Basin Finance Journal*, 25, 1–20.
- [10] Verardo, M. (2009). Heterogeneous beliefs and momentum profits. *Journal of Financial and Quantitative Analysis*, 44, 795–822.