The Impact of BW Emotional Index on China's A - Share Market Returns

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Abstract: Investor sentiment has its characteristics of the inherent complexity and changing. In this paper, through the analysis of the "investor sentiment and cross-sectional data on the impact of stock returns"[1] published by Baker and others in 2006, combining with the specific situation of China's securities market, and basing on the BW model to select Shanghai and Shenzhen 300 index turnover rate and other 5 emotional indices, and using the principal component analysis to build a monthly investor sentiment index of China's securities market. The principal component analysis of residual that calculated by a regression of emotional indicators and macroeconomic data is carried out, to get macroscopical emotional indicators that removes macro factors. Finally, OLS regression analysis is carried out with the Shanghai Composite Index and Shenzhen Component Index to find that the constructed emotional index has a significant effect on the yield of China's stock market, thus verifying the validity of the emotional index.

Keywords: Emotional index; Sentiment indicators that removal of macro factors; Principal component analysis

1. Introduction

Classical financial theory, with rational human assumptions, thinks that the behavior of investors will comply with the expected utility maximization rules, thus ignoring the impact of investor sentiment and other subjective factors on asset pricing and market. Behavioral finance theory thinks that people are bounded rational, the investor's cognitive bias, emotions and preferences affect asset pricing, and that makes the asset prices deviate from the normal level. The study shows that investor sentiment not only affects investors' decision-making behavior, to make the asset prices deviate, but also in many stock market bubbles and financial crisis, investor sentiment undoubtedly playing the role of fueling in the asset securities market irrational prosperity and panic down. Behavioral finance called the investor' expectations on future securities market with a systematic bias investor sentiment, and that reflects the investor's willingness to invest or the prevailing market sentiment. In the past two decades, it has been recognized by domestic and foreign scholars whether investor sentiment affects asset pricing and market volatility. Moreover, China's securities market is an emerging market driven by government-led institutional innovation and market development. China's securities market investor sentiment has more significant volatility than the western mature market, and has bigger influence in the securities market. Therefore, the study of China's securities market investor sentiment on the market rate of return has not only become an important issue, but also guides investors to invest in rational and make the financial market stable.

2. Data and variables

This paper chooses the logarithm of monthly turnover rate in Shanghai and Shenzhen 300 Index, dividend premium, IPO Initial Return, IPO number, newly issued stock and closed-end fund discount rate as part of investor sentiment index; chooses manufacturing purchase managers' index

(PMI), consumer price index (CPI), industrial producer price index (PPI), consensus index, urban commodity retail price index, total imports increased year on year as macroeconomic data analysis.

And, Newly issued shares = Total number of issued shares / (Total number of issued shares + Total issued long-term bonds)　　　　　　　　　　　(1)

Dividend premium data and macroeconomic indicators data are from the Hang Seng Juyuan database, the Shanghai and Shenzhen 300 index turnover rate, IPO Initial Return, the IPO number and closed-end fund discount rate are from the CSMAR, the newly issued shares data is from WIND. Fama three-factor monthly data and the Shanghai Composite index, the Shenzhen Composite Index data are from the RESSET(see Table 1). The data for this paper is based on monthly data from 31 January 2005 to 31 March 2017.

3. Empirical Analysis

3.1 An Analysis of Investors' Emotions in Shanghai Stock Index

After the principal component analysis of the selected investor sentiment by using MATLAB software, the data of the first principal component is selected to form the new investor sentiment index (BW index). Taking the six macroeconomic variables as the independent variables, the regression analysis of six initial investor sentiment indicators is carried out, and the residuals are taken. The resulting six residuals form a macroscopic investor sentiment indicator. The principal component analysis is carried out to the macroscopic investor sentiment index, and the first principal component is selected to obtain the new macroscopic investor sentiment index (ABW index). The BW index, ABW index and fama three factors as the independent variable, and carry out the regression analysis on the Shanghai Composite Index monthly rate of return.

First of all, we use the BW indicator, Fama three-factors to carry out the regression analysis on Shanghai Composite Index monthly rate of return. And get the results are shown in Table 2 :

From Table 2, we can see that the effect of the Fama three-factors and the BW index on the yield of the Shanghai Composite Index is significant, and the effect of the BW index on the index yield is also significant. So we can get a simple regression equation:

Table 1. Data Sources

Data	Variate	Source
Shanghai and Shenzhen 300 Index turnover rate (monthly)	NYSE（nature logarithmic of turnover rate）	CSMAR
Closed-end fund discount rate	CEFD	CSMAR
IPO number	IPOS	CSMAR
IPO Initial Return	RIPO	CSMAR
Dividend premium	PD/ND	Hang Seng Juyuan database
New issues	NIPO（formula - calculation）	WIND
Macroeconomic data	CPI, etc.	Hang Seng Juyuan database
Fama three-factor (monthly)	Fama three	RESSET
Shanghai Composite Index Yield (Monthly)	Index	RESSET
Shenzhen Composite Index yield (monthly)	Index2	RESSET

Table 2. Regression Analysis of Monthly Yield of Shanghai Stock Index

Source	SS	df	MS	Number of obs = 147
				F(4, 141) = 563.01
Model	1.03293554	4	.258233884	Prob > F = 0.0000
Residual	.064672538	141	.00045867	
				R-squared = 0.9411
Total	1.09760807	145	.007569711	Adj R-squared = 0.9394
				Root MSE = .02142

index	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
fama1	.9286275	.020029	46.36	0.000	.8890316 .9682234
fama2	-.347538	.0438795	-7.92	0.000	-.4342848 -.2607912
fama3	-.0331174	.0598473	-0.55	0.581	-.1514314 .0851966
bw	.3358537	.020559	2.42	0.000	-.3532106 .4249181
_cons	.0105353	.0163932	0.64	0.521	-.0218728 .0429435

Table 3. Regression Analysis Result of Monthly Yield of Shanghai Stock Index with ABW Index

Source	SS	df	MS	Number of obs = 147
				F(5, 140) = 447.27
Model	1.03294347	5	.206588694	Prob > F = 0.0000
Residual	.064664602	140	.00046189	
				R-squared = 0.9411
Total	1.09760807	145	.007569711	Adj R-squared = 0.9390
				Root MSE = .02149

index	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
fama1	.9279121	.0232087	44.55	0.000	.886736 .9690882
fama2	-.3472132	.0441029	-7.87	0.000	-.434407 -.2600194
fama3	-.0323957	.0603088	-0.54	0.592	-.1516295 .086838
abw	.4827663	.0605061	4.13	0.000	-.4393542 .5710668
bw	.3388484	.0206353	3.41	0.000	-.3632312 .4149281
_cons	.0110379	.0168915	0.65	0.515	-.0223574 .0444332

Table 4. Regression Analysis Result of Monthly Yield of Shenzhen Stock Index with BW Index

Source	SS	df	MS	
Model	1.29360612	4	.323401529	Number of obs = 147
				F(4, 141) = 654.00
Residual	.069723716	141	.000494494	Prob > F = 0.0000
				R-squared = 0.9489
Total	1.36332983	145	.009402275	Adj R-squared = 0.9474
				Root MSE = .02224

index2	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
fama1	1.055535	.0207964	50.76	0.000	1.014422 1.096648
fama2	-.4758982	.0455609	-10.45	0.000	-.565969 -.3858275
fama3	-.3315923	.0621405	-5.34	0.000	-.4544398 -.2087447
bw	.4627644	.0721347	5.62	0.000	-.3969845 .4614556
_cons	-.0152221	.0170213	-0.89	0.373	-.0488721 .0184278

Table 5. Regression Analysis Result of Monthly Yield of Shenzhen Stock Index with ABW Index

Source	SS	df	MS	
Model	1.29362909	5	.258725817	Number of obs = 147
				F(5, 140) = 519.67
Residual	.069700745	140	.000497862	Prob > F = 0.0000
				R-squared = 0.9489
Total	1.36332983	145	.009402275	Adj R-squared = 0.9470
				Root MSE = .02231

index2	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
fama1	1.056752	.0216228	48.87	0.000	1.014003 1.099502
fama2	-.4764508	.0457881	-10.41	0.000	-.5669763 -.3859252
fama3	-.3328201	.0626132	-5.32	0.000	-.4566099 -.2090304
bw	.5127554	.0731423	5.29	0.000	-.4269909 .4314801
abw	.3961129	.0005254	4.21	0.000	-.5711516 .5279259
_cons	-.0160771	.0175369	-0.92	0.361	-.0507485 .0185943

Y-szzs = 0.0105353 + .9286275fama1 - 0.347538fama2 - 0.0331174fama3 + 0.3358537bw   (2)

Define Y-szzs as the Shanghai Composite Index Monthly Yield

Then we put the ABW indicators in, other factors are unchanged, get the results are shown in Table 3;

It can be seen from Table 3 that the effect of ABW and BW on the monthly rate of return of the Shanghai Composite Index is huge after the ABW is added to the regression. And it is positively related. So we can get a simple equation:

Y-szzs = 0.0110379 + 0.9279121fama1 + 0.3472132fama2 - .0323957fama3 + 0.4827663bw + 0.3388484abw   (3)

3.2 An Analysis of Investor's Emotional Index of Shenzhen Stock Index

We take the analysis method that is same with the Shanghai Composite Index, instead of the Shanghai Composite Index monthly rate of return with the Shenzhen Composite Index monthly rate of return.

First, we examined the regression results of the BW index only (see Table 4).

From Table 4 we can see that the impact of the BW index on Shenzhen Composite Index monthly rate of return is significant and positively related. So we can get a simple equation:

Y-szcz = -0.0152221 + 1.055535fama1 - 0.4758982fama2 - .3315923fama3 + 0.4627644bw   (4)

We will put ABW indicators into the regression model for analysis, the results are shown in Table 5. Define Y-szcz as the Shenzhen Composite Index

monthly yield index.

It can be seen from Table 5 that the effect of ABW and BW on the monthly rate of return of ASW is important after ABW is added to the regression. And it is positively related. We can get a simple equation:

Y-szcz = -.0160771 + 1.056752fama1 - 0.4764508fama2 - 0.3328201fama3 + 0.5127554bw + 0.3961129abw   (5)

4. Conclusion

By using the market data of Shanghai and Shenzhen A shares and the principal component analysis method, a composite investor sentiment index is constructed, which has measured indirectly sentiment and the tested the overall effect of sentiment on stock yield. It confirms that sentiment have an effect on asset prices. It can be deemed that the 6 investor sentiment indices, including dividend premium and other 5 index, and the investor sentiment indicators that removes macro factors have a important positive impact on the Shanghai market and the Shenzhen market yield. Investors' positive sentiment will be likely to lead to positive market yields, and the investors' negative sentiment will be likely to lead to negative market yields. But this paper does not research the influence extent and whether there is a significant impact on individual share and I will further study it for other work.

References

[1] Malcolm Baker, Jeffery Wurgler. Investor sentiment and the Cross-Section of stock Returns[J]. The Journal of Finance, 2006(4):1645-1680.