

The Effect of Liquidity on Stock Returns: A Style Portfolio Approach

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Abstract: - In stock market, various concepts of stocks, or investment styles, have been raised by fund managers to catch the attention of investors. Style investing was referred to as investing stocks with similar company characteristics to form a style portfolio in order to obtain abnormal returns. Since liquidity in stock trading was important information for investors in investment decision-making, this study examined whether there existed the effect of liquidity, i.e., trading turnover, on stock returns by applying the style portfolio approach to test statistical significance of short-run abnormal returns and long-run cumulative returns of several liquidity-related style portfolios. With the data of Taiwan publicly-listed companies, three findings were concluded: First, the high liquid stocks were found to have higher cumulative returns relative to those of the benchmark portfolio, the market, for the period of 1999-2008. Second, when we integrated stock liquidity into company characteristic and firm size to form two-dimensional style portfolios, stock returns of those style portfolios were significantly higher than those of one-dimensional style portfolios, meaning that the liquidity effect could amplify conventional market anomalies, such as the value effect and the size effect. Third, the returns of the liquidity-related portfolios were also significant in different market conditions. The study therefore concluded that the liquidity effect was a significant investment style in stock market.

Key-Words: investment style, style investing, style portfolio, liquidity, value effect, size effect

1 Introduction

Since the concept of investment style was first raised by Farrell (1974), style investing had been used by mutual fund managers to form investment portfolios in order to gain profits from the stock market. Investment style was referred to as gathering stocks with the same company characteristics to form style portfolios and make investments in the stock market. This concept was, in essence, in agreement with the various stock concept groupings existing in the current Taiwanese market such as China-concept stocks and Apple-concept stocks. Common style portfolios could include value stocks, growth stocks, small-cap stocks, defensive stocks and so on. Style investing aimed to target an investment at a group of stocks with specific characteristics so that a portfolio including the chosen stocks would outperform the

overall market in bullish markets and decline relatively slower than the market in bearish markets; thus, investors could earn abnormal returns (AR) and maximize investment returns.

Style investing had not only been used by many professional investment corporations as a way of making investment decisions but it had also become the research focus in the financial literature. The style investing approach, which based itself on modern portfolio theory, had injected a new way of thinking into traditional financial theory, the efficient market hypothesis. In an efficient stock market, required returns of stocks theoretically should be equal to expected returns, but empirical evidence had revealed that an efficient market could not be immediately achieved and thus it left room for abnormal returns. Building on this idea, style investing had been a popular investment rule for some time now. In particular, the style investing

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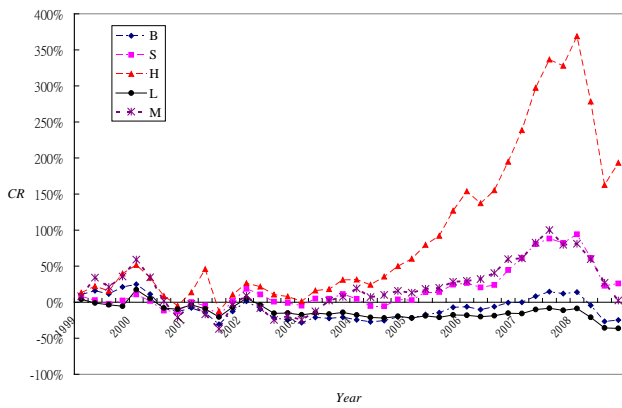


Figure 3 CRs of Single Style Portfolios (B, S, H, L, and M)

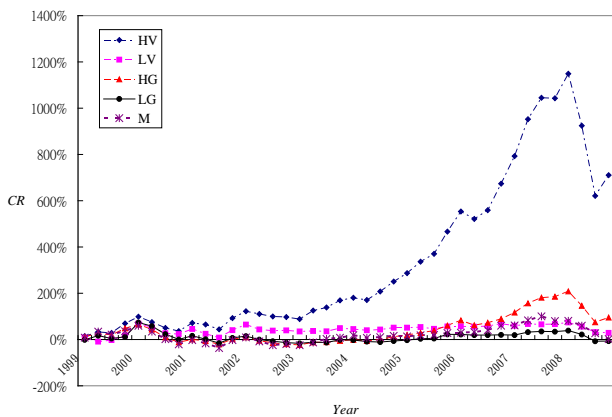


Figure 4 CRs of Two-Dimensional Style Portfolios (HV, LV, HG, LG and M)

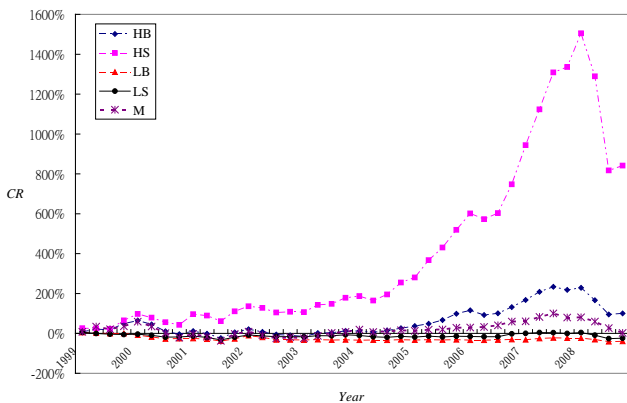


Figure 5 CRs of Two-Dimensional Style Portfolios (HB, LB, HS, LS and M)

Summarized from Figure 2-5, both the one and two dimensional style portfolios connected with high liquidity outperformed the market portfolio in terms of CRs. However, the liquidity effect was yet to be confirmed until statistical tests were conducted.

4.2 Hypothesis Testing

To test statistical significance of long-run and short-run performance of style portfolios, a pair-wise *t*-test was conducted with *AR* and *CR* as proxy variables, respectively. In order to examine whether style portfolios significantly outperformed the market portfolio, the *t* statistic must be positive and the testing must be one-tailed. The results of the hypothesis testing were displayed in Table 3.

Table 3 The Results of Hypothesis Testing

Style	Portfolio	Hypothesis	Pairwise <i>t</i>	Results	
Single Style	V	H1	H1A	2.3349**	Supported
			H1B	7.8562**	
	G	H2	H2A	0.1694	
			H2B	-3.3784	
	B	H3	H3A	-0.3905	
			H3B	-4.5554	
	S	H4	H4A	0.4255	Partially supported
			H4B	4.5393**	
	H	H5	H5A	2.9151**	Supported
			H5B	6.0365**	
	L	H6	H6A	-0.6630	
			H6B	-4.1138	
2-D Style	HV	H7	H7A	4.0041**	Supported
			H7B	6.4564**	
	LV	H8	H8A	0.4979	Partially supported
			H8B	10.671**	
	HG	H9	H9A	1.4695*	Supported
			H9B	5.4924**	
	LG	H10	H10A	0.1637	Partially supported
			H10B	3.9215**	
	HB	H11	H11A	1.7439**	Supported
			H11B	6.2282**	
	LG	H12	H12A	-0.6811	
			H12B	-8.3771	
	HS	H13	H13A	3.7293**	Supported
			H13B	5.9649**	
LS	H14	H14A	-0.4106		
		H14B	-4.4485		

Note: * $p < 0.10$; ** $p < 0.05$

According to Table 3, of all the one-dimensional style portfolios, Portfolios V and H showed a positive significance on both sub-hypotheses, with

the t statistics of 2.3349 ($p < 0.05$), 7.8862 ($p < 0.05$), 2.9151 ($p < 0.05$), and 2.0151 ($p < 0.05$), respectively. This meant that Portfolios V and H not only outperformed the market portfolio in the short run, but also outperformed the market in the long run. It then followed that both the value effect and the liquidity effect were significant in the stock market. Also, portfolio S only indicated a significant cumulative return over the market with a t statistic of 4.5393 ($p < 0.05$), meaning that the small-cap stocks only beat the market in the long run while the small-cap stocks did not indicate an abnormal return.

In regard to the two-dimensional portfolios, the result indicated that the liquidity effect became more significant when the characteristic of liquidity was added into other style portfolios. For instance, both ARs and CRs were significant in Portfolios HV, HG, HB, and HS. It could be inferred that liquidity amplified not only the value effect, but also the growth effect. Furthermore, both the size effect and the inverse size effect were reinforced by the characteristic of high liquidity, revealing that the liquidity effect was significant not only in the one-dimensional style portfolios, but also in liquidity-related two-dimensional style portfolios.

One finding could be derived was that the value effect was especially significant for single investment style, V, and also for two-dimensional investment styles, HV and LV. On the other hand, the characteristic of low liquidity was less significant as only Portfolios LV and LG were significant in the long run with t statistics of 10.6710 ($p < 0.05$) and 3.9215 ($p < 0.05$), respectively.

The effects were especially significant when liquidity was combined with the small-cap stocks and the value stocks. Hence, if the characteristic of liquidity was integrated into the value stocks and the small-cap stocks, their portfolio returns would be amplified in the long run. As indicated in Table 2, the CRs for Portfolio H and S were 92.91% and 17.72%, respectively. When high liquidity was added into stock selection, the CRs for Portfolio HV and HS became 336.14% and 397.95%, respectively. As indicated in Table 3, the four style portfolios, V, S, HV, and HS were significant in both the short run and the long run, but the magnitude of the CRs were much greater in two-dimensional portfolios, HV and HS, than those in one-dimensional portfolios, V and S.

4.3 Robustness Check

To further check the robustness of statistical significance of the liquidity effect, this study

adopted the idea of quantile portfolios proposed by Fama and French (1992). Specifically, stocks in the data pool were classified into quantiles according to the liquidity score and ten style portfolios of liquidity were then constructed within each quantile. The CRs were computed for a pairwise t testing. The results for significance testing were listed in Table 5.

As shown in Table 5, the mean CR of the first three liquidity-related portfolios were 0.0356, 0.0216, and 0.0133, respectively; those of the other portfolios decreased gradually. It was also obvious that the t statistics decreased with quantiles of liquidity. Of the 10 liquidity portfolios, only the first three quantile portfolios showed positive statistical significance, suggesting that the liquidity effect did exist in the stock market.

Table 5 The t -Test Results of the Liquidity-Style Portfolios

Style portfolio	Quantiles	Mean returns	Standard deviation	t Statistic
Liquidity From high to low	90%-100%	0.0356	0.1284	2.9151**
	80%-90%	0.0216	0.1249	2.0764**
	70%-80%	0.0133	0.1201	1.8490*
	60%-70%	0.0109	0.1163	1.1273
	50%-60%	0.0093	0.1086	0.8865
	40%-50%	0.0090	0.1151	0.7693
	30%-40%	0.0092	0.1087	0.7997
	20%-30%	0.0056	0.0907	0.6774
	10%-20%	-0.0026	0.0916	-0.7221
	0-10%	-0.0080	0.0808	-0.6630

In summary, both the liquidity effect and the value effect were significant in Taiwan's stock market. Secondly, both abnormal return and cumulative return reached a higher level when liquidity was combined into single investment style, such as the size effect and the value effect. In short, this study found that liquidity could be significant and thus become a new investment style for stock selection.

5 Conclusion

This study investigated whether the liquidity effect existed in Taiwan's stock market by involving publicly listed companies in Taiwan from 1999 to 2008 as the study sample. One-dimensional style portfolios with stock liquidity as the core and binary style portfolios combining stock liquidity with company characteristics and company size were then established before a comparison of returns

among these style portfolios was conducted to ascertain whether there were anomalies regarding *CR* occurring in the market.

The results showed that the liquidity effect occurred in Taiwan's stock market both in the short-term and in the long-term when no distinction was made between bullish markets and bearish markets. In the 10-year research period, highly liquid stocks produced significant *CR* compared with the market portfolio. When the liquidity effect was integrated into the size effect and the value effect, the liquidity-related two-dimensional style portfolios performed much higher than the one-dimensional style portfolios. This finding implied that the liquidity effect could amplify the conventional size and value effects. Of all the style portfolios, highly liquid small-cap stocks and highly liquid value stocks generated the highest cumulative returns of 869.94% and 738.97%, respectively.

In comparison to the literature on liquidity, this study found that the stock-picking rule favoring stocks with high trading turnover had more significant *AR* than did stocks with low trading turnover. It can thus be inferred that highly liquid stocks are likely to show better performances, a finding corresponding to Lee and Swaminathan's (2000) findings, which claimed that stocks with high trading turnover might reflect the characteristics of glamour stocks, which have a stronger momentum or energy in the short-term and show more persistence in returns in the long-term, and thus produce significant *AR* and *CR*. This point coincides with the well-known securities analyst, Granville Joe's viewpoint, "trading volume may precede price", i.e., trading volume provided an insight into observing price momentum.

Much of the literature on style investing had studied the style investing effect using regression analysis. In contrast, an analysis of investment performance returns by adopting the style investing approach was conducted in the study. The style investment approach was shown to be consistent with the concept of style analysis adopted by professional investment corporations. Furthermore, we contributed to establish a set of simple and clear-cut stock selecting rules based on style classifications, based on which investors and professionals might conveniently formulate easy-to-follow investment strategies.

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