The Liquidity Effect in Taiwan’s Stock Market

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Abstract: - In Taiwan stock market, various concepts of stocks, or so-called investment styles, have been raised by fund managers to catch the attention of investors. Style investing is referred to as investing stocks with similar company characteristics to form a style portfolio in order to obtain excess returns. Since investors would use liquidity to make investment decisions, this study examines whether there is a liquidity effect in Taiwan stock market by applying the style portfolio approach to test the statistical significance of short-run and long-run excess returns among several liquidity-related style portfolios. With the data of Taiwan publicly-listed companies, three findings are concluded: First, the high liquid stocks are found to have a higher cumulative return of 193.40% relative to the benchmark portfolio, the market, for the period of 1999-2008. Second, when we integrate the stock liquidity into company characteristic and firm size to form two dimensional style portfolios, the returns of those are significantly higher than the returns of one dimensional style portfolios, such as liquidity, value, and small-cap stocks. Third, the returns of the liquidity-related portfolios are also significant in different market conditions. The study therefore concludes that liquidity is an effective investment style in Taiwan stock market.

Key-Words: - investment style, style investing, style portfolio approach, liquidity effect

1 Introduction
Since the concept of investment style was first put forth by Farrell (1974), style investing has been used by asset managers or fund managers to form investment portfolios in order to gain profits from the stock market. Investment style is referred to as gathering stocks with the same company characteristics to form style portfolios and make investments in the stock market. This concept is, 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 include value stocks, growth stocks, small-cap stocks, defensive stocks and so on. Style investing aims to target an investment at a group of stocks with specific characteristics so that the chosen stocks will outperform the overall market in bullish markets and decline slower compared with the market index in bearish markets; thus, investors can earn excess returns (ER) and maximize investment returns.

Style investing has not only been used by many professional investment corporations as a way of making investment decisions but it has also become the research focus in the financial literature. The style investing approach, which bases itself on modern portfolio theory, has injected a new way of thinking into traditional financial theory — the efficient market hypothesis. In an efficient capital market, the required returns of stocks theoretically should be equal to the expected returns, but more and more empirical research has found that an efficient market cannot be immediately realized and that the stock price may be thrown off balance as a result. In this case, the stock-picking rule of looking for stocks at lower prices furnishes the basis for the concept of style investing. In other words, the style investing approach aims to gather stocks with
similar company characteristics to form an investment portfolio and, by constantly rebalancing the portfolio, to ensure that constituent stocks are of the same style, thereby beating the market and gaining long-term accumulated returns (AR).

The concept of style investing is not a new one. Graham et al. (1934) introduced the concept of value investing in the 1930s in their famous book Security Analysis. Graham not only successfully regained more than 70% of his loss in the Great Depression by utilizing the value investing approach but also subsequently created enormous wealth with this method for which he was acclaimed as “the father of value investing” on Wall Street. On the other hand, Babson (1962) proposed the concept of growth investing. In accordance with this concept, he established a fund company that created tremendous wealth for its clients, and is currently managing an asset base of over 20 billion U.S. dollars.

Traditional research on style investing has tended to use company characteristics (value stocks and growth stocks), company size (big-cap stocks and small-cap stocks), and other factors as the major style determinants. This study utilizes stock liquidity within the market dimension to explore its effect on the returns of style portfolios. Research on liquidity’s influence on stock returns has received much attention in recent years but no consistent conclusions have been reached. For example, Amihud (2002) maintained that liquidity significantly affects stock returns, especially in the stock market where there is a so-called “illiquidity premium.” This means less liquid stocks, because of their higher liquidity risks, have positive abnormal returns. Bodie et al. (2005) shared a similar view, claiming that ignored companies, because of less attention from the market, have low trading volumes, but are more likely to generate abnormal returns because of price imbalances. By contrast, Chan et al. (2008) found that not only do less liquid stocks generate abnormal returns but that highly liquid stocks deliver abnormal returns as well.

With the concept of style investing as the starting point and based on Taiwan’s stock market, this study explores whether unitary style portfolios composed of stocks with different liquidity levels deliver ER over market returns. In addition, this study intends to explore whether the ER of traditional style portfolios (such as value stocks, growth stocks, big-cap stocks, and small-cap stocks) are affected after the liquidity factor is introduced into the portfolios. In short, this study aims to investigate whether the liquidity effect operates in Taiwan’s stock market in the long-term. To be specific, this study analyzes the unitary style portfolios based on the traditional dimensions of company characteristics and company size, and explores whether stock liquidity can also be used as a reference for investors. Moreover, this study conducts a further analysis on the effect of the liquidity factor on traditional unitary style portfolios.

Different from the literature, apart from testing the stock liquidity effect using empirical studies, this study launches a pair-wise t-test of significance to compare the short-term performances and long-term performances of style portfolios and the benchmark portfolio. Moreover, the author conducts a test of the significance of ER after removing systemic risks in order to improve the robustness of the abovementioned results, which differ from most previous research using regression analysis. The advantages of the style portfolio approach can directly reflect fund managers’ stock-picking rules; moreover, how to combine different investment styles demonstrates fund managers’ stock-picking capabilities to create long-term profits for investors.

2 Methodology

This study focuses on exploring whether the liquidity effect is present in Taiwan’s stock market and whether it is an illiquidity premium or high liquidity premium. Hence, this study aims to form style portfolios based on clear operational definitions and test the statistical significances of short-term and long-term returns after the liquidity factor is introduced into style portfolios. Furthermore, it aims to observe the performances of style portfolios under different market conditions to provide investors with a basis for developing investment strategies.

This study considered various style portfolios (n=14) formed by company size, stock liquidity, or both. Six single style portfolios were discussed: value stocks (denoted by V), growth stocks (G), big-cap stocks (B), small-cap stocks (S), highly liquid stocks (H), and less liquid stocks (L). Eight two-dimensional style portfolios were analyzed: highly liquid value stocks (HV), less liquid value stocks (LV), highly liquid growth stocks (HG), less liquid growth stocks (LG), highly liquid big-cap stocks (HB), less liquid big-cap stocks (LB), highly liquid small-cap stocks (HS), and less liquid small-cap stocks (LS). This study used the market
portfolio (M) as the benchmark portfolio to test statistical significance.

2.1 Data
The observation period of this study was from 1999 to 2008 during which time Taiwan’s stock market experienced all three market conditions, namely bullish markets, bearish markets, and corrections. It was assumed that we had made an investment into 15 style portfolios (i.e., six one-dimensional style portfolios, eight two-dimensional style portfolios, and the market portfolio) on January 1, 1999 in Taiwan’s stock market and re-balanced the investment portfolios once a quarter in accordance with the adjustment mechanism for the constituent stocks of style portfolios until the end of December 2008. Then, we observed the differences in single-quarter returns and accumulated returns during the entire sample period, and made a comparison with those of the market portfolio.

This study followed the style portfolio approach, which can be divided into the following stages: collecting sample data, establishing the style portfolios, defining the market conditions and the sample period, calculating returns, developing hypotheses, and testing statistical significance.

2.2 Style Portfolios
The adjustment mechanism for the style portfolios used in this study should ensure that each is held for the same length of time. This to ensure that there is sufficient time to reflect the returns and to consider the availability of financial data to make sure that the portfolio is in line with its original style features. In other words, if we adjust the constituent stocks at too long intervals, the preset style properties may be damaged; if they are adjusted at too short intervals, then companies’ financial data may be incomplete, thus rendering the adjustment useless. Therefore, this study chose to adjust the constituent stocks of the portfolios every quarter. To be specific, we made adjustments at the end of March, June, September, and December each year, and after each adjustment, the constituent stocks of the portfolios remained unchanged in the ensuing three months. This study conducted 40 adjustments of the constituent stocks of the portfolios during the research period altogether.

To form the value portfolio, we choose the stocks with three criteria, i.e., price-to-book ratio (PBR), price-to-earnings ratio (PER), and price-to-sales ratio (PSR). The portfolio is selected from the top 30 stocks of lowest sum of percentile of the three ratios. Extending the same approach, the growth portfolio is formed from the highest sum of percentile of asset growth (AG), equity growth (EG), and sales growth (SG). In addition, the large and small capitalization stocks are classified from the size of capitals, assets, and employees.

The high and low liquidity portfolios are formed by using the turnover ratio of trading volume scaled by shares outstanding. Moreover, Concerning the definition of the market portfolio, this study adopted the TAIEX Total Return Index (TAIEX-TRI) issued by the Taiwan Stock Exchange. Compared with the traditional TAIEX Index, its main merit is that it considers not only the returns on capital investment but also the cash dividend factor of the overall market.

2.3 Style Portfolios
All returns used in this study are calculated by formulas as follows:

(1) Stock returns
\[ R_{i,t} = \left( P_{i,t} - P_{i,t-1} \right) + \frac{Div_{i,t}}{P_{i,t-1}} \]

where \( R_{i,t} \) stands for the stock returns of the \( i \)-th stock in the \( t \)-th period; \( Div_{i,t} \) stands for the cash dividend of the \( i \)-th stock in the \( t \)-th period.

(2) Portfolio returns
\[ R_{p,t} = \sum_{i=1}^{n} W_{i,t} R_{i,t} \]

where \( R_{p,t} \) stands for the returns of the investment portfolio \( p \) in the \( t \)-th period; \( n \) stands for the number of constituent stocks in the style portfolios.

As mentioned above, in order to highlight company characteristics in style portfolios, this study weighted the proportion that each stock accounts for in an investment in sequence. Companies that ranked closer to the top after sorting by the style characteristic have a higher investment weight. Suppose there are \( n \) stocks in a style portfolio, then after the sorting according to the style characteristic, the weight of the \( i \)-th company is as follows:
\[ W_{i} = \frac{n-i+1}{\sum_{j=1}^{n} j} \]

(3) Excess Returns
In order to measure the short-term performance of style portfolios and take into consideration the systemic risk factors of them, this study used the
concept of the ER of style portfolios as the $\alpha$ value of the CAPM.

$$ER_{p,t} = R_{p,t} - \left[ R_{f,t} + \hat{\beta}_p (R_{m,t} - R_{f,t}) \right]$$

(4)

where $\hat{\beta}_p$ stands for the estimated value of the $\beta$ coefficient of investment portfolio $p$ in the research period. (4) Accumulated returns

Accumulated returns represent returns generated on the initial $1 investment in a style portfolio after the empirical period. It is the reflection of the long-term returns on investment. The AR in the $t$-th period are calculated by the following formula:

$$AR_{p,t} = \prod_{i=1}^{t} (1 + R_{p,i}) - 1$$

(5)

2.4 Hypothesis Testing

Short-term returns are based on ER and are used to test the existence of significant positive returns of value effect. Its null and alternative hypotheses are illustrated as below.

H1A0 : $ER_V \leq 0$

H1A1 : $ER_V > 0$

Long-term returns are based on accumulated returns and are used to access whether the AR of value stocks remarkably outperform that of the benchmark portfolio (the market portfolio). Its null and alternative hypotheses are shown as follows:

H1B0 : $AR_V \leq AR_M$

H1B1 : $AR_V > AR_M$

Since there are 14 style portfolios, there are 14 hypotheses, each of which includes two sub-hypotheses.

3 Empirical Results

3.1 Descriptive Statistics

The descriptive statistics of these portfolios are shown in Table 1. Figures 1 to 4 demonstrate the performances of the style portfolios and the market portfolio during the research period. Figure 1 shows a comparison of the AR of value stocks, growth stocks, highly liquid stocks, less liquid stocks, and the market portfolio. Figure 2 compares the AR of big-cap stocks, small-cap stocks, highly liquid stocks, less liquid stocks, and the market portfolio. Figure 3 compares the AR of binary style portfolios (the combination of stock liquidity and company characteristics) and the market portfolio. Figure 4 makes a comparison between binary style portfolios (the combination of stock liquidity and company size combined) and the market portfolio in terms of AR.

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Note: V denotes value stocks, G growth stocks, B big-cap stocks, S small-cap stocks, H highly liquid stocks, L less liquid stocks, and M market portfolio.

Figure 1 ARs of V, G, H, L, and M portfolios
3.2 Hypothesis Testing

This study went a step further to conduct a test of significance of the AR of the style portfolios. Meanwhile, a pair-wise t-test on long-term performance was conducted with the market portfolio as the benchmark portfolio. In order to examine whether style portfolios significantly outperform the market portfolio, the statistical test must be one-tailed and the t value positive. The results of the statistical test of this study are revealed in Table 2.

Table 2 suggests that, in respect of the single style portfolios, V stocks and H stocks showed positive significance, with the ER being 4.51% and 3.56% and the t values being 22.3349 (p < 0.05) and 20.151 (p < 0.05), respectively. The AR of these two types of stocks were 122.36% and 92.91% with their t values being 7.8562 (p < 0.05) and 6.0365 (p < 0.05), respectively, meaning their AR significantly outperformed those of the market portfolio (1.04%). The above results suggest that value stocks and highly liquid stocks showed positive significance both in the short-term and in the long-term and the value effect and high liquidity effect were present in Taiwan’s stock market as expected. Meanwhile, small-cap stocks beat the market portfolio in terms of AR (17.72%) and t value (4.5393, p < 0.05), which demonstrated that size effect was significant only in the long-term.

Among the single style portfolios, the ER of high liquidity-related stocks, namely HS stocks, HV stocks, HB stocks, and HG stocks, were 6.85%, 6.28%, 2.74%, and 2.61%, with their t values 3.7293 (p < 0.05), 4.0041 (p < 0.05), 1.7439 (p < 0.05), and 1.4695 (p < 0.05), respectively, all showing positive significance. In terms of AR, those of the four stocks came to 397.95%, 336.13%, 59.83%, and 43.16%, respectively, with their respective t values being 5.9649 (p < 0.05), 6.4564 (p < 0.05), 6.2282 (p < 0.05), and 5.4924 (p < 0.05).
All these results outperformed the AR of the market portfolio (1.04%), which proved that the liquidity effect existed not only in the unitary style portfolios; liquidity-related two dimensional style portfolios also delivered highly significant ER. The ARs were significant, especially when liquidity was combined with small-cap stocks and value stocks. Hence, if the liquidity effect was integrated into size effect and value effect, ER would show greater significance. For instance, the ER of the market portfolio was 1.04% and those of highly liquid small-cap stocks and highly liquid value stocks were 397.95% and 336.13%. This meant that investing $100 in the market only generated a return of $1.04 after 10 years, while highly liquid small-cap stocks and highly liquid value stocks garnered profits of $397.95 and $336.13, respectively when the same amount of money was invested 10 years ago.

In conclusion, the liquidity effect and value effect existed in Taiwan’s stock market both in the short-term and in the long-term. The ER reached a higher level when the liquidity effect was integrated into size effect and value effect. Compared with the literature on liquidity, this study found that high liquidity was a better stock-picking rule with a higher ER than that of low liquidity.

4 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. Unitary 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 AR 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 AR compared with the market portfolio. When the liquidity effect was integrated with size effect and value effect, those high liquidity-related style portfolios mentioned in this study, i.e. highly liquid value stocks, highly liquid growth stocks, highly liquid small-cap stocks, and highly liquid big-cap stocks, showed more significant ERs both in the short-term and in the long-term. Among them, highly liquid small-cap stocks and highly liquid value stocks produced the highest accumulated ER of 869.94% and 738.97%, respectively.

In comparison to the literature on liquidity, this study found that the stock-picking rule favoring highly liquid stocks with high stock TRs had more significant ER than did stocks with low TRs. It can thus be inferred that highly liquid stocks are likely to show performances corresponding to Lee and Swaminathan’s (2000) findings, which claimed that stocks with high TRs 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 deliver significant single-quarter returns and AR. This point coincides with the well-known securities analyst Granville Joe’s viewpoint, “volume precedes price”, i.e., trading volume provides the basis for price momentum.

Much of the literature on style investing has studied the style investing effect using regression analysis. In contrast, this study conducted an analysis of investment performance returns by adopting the style investing approach. This research method better agrees with the concept of style analysis adopted by professional investment corporations. In addition, this study established a set of simple and clear-cut stock selecting rules based on style classifications so that investors and professional organizations may easily follow them; therefore, this study is of unique reference value.

References: