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Cash Flow Anomalies Associated with Business Conditions in Korean Stock Market*

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Abstract

Purpose – Many studies report that returns on hedge portfolios that eliminate particular risk types are abnormal from traditional asset pricing models' perspectives. This study examines the pervasiveness of anomalous returns conditioned on business cycle and group size.

Research design, data, and methodology – Using KOSPI and KOSDAQ market data from July 1991 to December 2013, we categorize stocks into appropriately sized groups, and dichotomize our sample periods into expansion and recession periods then, we construct hedge portfolios by sorting stocks by anomaly variables and calculate their returns.

Results – Four anomalies, including earnings yield, net stock issue, total asset growth, and liquidity appear pervasive across all groups for the entire sample period. However, only the hedge returns of net stock issues are significant across all group sizes during both expansion and recession.

Conclusions – A net stock issue can be an appropriate proxy for expected growth of book equity for all group sizes in recessions. This finding could provide insights to investment industry participants and to researchers interested in the relationship between expected growth of book equity and business cycle risk.

Keywords: Business Cycle, Net Stock Issue, Total Asset Growth, Liquidity, Earnings Yield.

JEL Classifications: G02, G11, G12, G32.

1. Introduction

The purpose of this study is to investigate whether the pervasive anomalous returns change with the business conditions in Korean stock market. The anomalous returns are defined as differences in returns between high-decile portfolios and low-decile portfolios which are obtained by sorting stocks upon the anomaly variables. The anomaly variables of our interest are accruals, net operating asset, profitability and earnings yield, net stock issues, total asset growth, momentum, and liquidity. Many of them can be used as the proxies of the expected earnings and the expected growth of book equity in the valuation equation of Fama and French (2006). In this article, we wantto find some characteristics of these anomalous returns associated with the market conditions. This will enable us to partly understand the cross-sections of expected stock returns.

This study uses the stock return data of the KOSPI and KOSDAQ market with the sample period from July 1991 to December 2013. We obtain our return and financial data from the financial information company, WISEfn. Stock returns are calculated using adjusted stock prices which prevent price severance from any capital change of firms. They are arithmetic returns and exclude dividends as KOSPI and KOSDAQ indices do. To examine whether the anomalous returns are pervasive, we divide all our stocks into three categories: big stocks, small stocks and micro-cap according to their relative market capitalization. Due to this categorization, we can separate the size effect from the anomaly effect in constructing value- and equally-weighted anomaly returns. To explore the influence of market conditions on anomalous returns, we dichotomize the-sample periods into expansion and recession periods. This partition enables us to figure out the influence of expanding and contracting periods, respectively, on the anomalous stock returns of each size group.

We find that the anomalous returns associated with the proxies of the expected growth of book equity such as net stock issue, total asset growth and the proxies of the expected earnings such as liquidity and earnings yield appear significant for the whole sample period. However, when we separately consider the expansion and recession period, these proxies exhibit different patterns. While net stock issue, total asset growth, liquidity and earnings yield are significant for the expansion period, the proxy of expected growth of book equity, net stock issue and the proxy of expected earnings, liquidity are significant for the recession period. Moreover, the strength of net stock issue as the proxy of expected growth of book equity is more sig-

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nificant than that of liquidity.

In this study, we find useful characteristics pertaining to the anomalous returns of the various sorted hedge portfolios. Net stock issue, which means increase of capital through new stock issuance, can be considered as the strong proxies for the expected growth of book equity of the companies included in micro-cap in recession period. Liquidity from Amihud(2002) is also significant for the small size group companies in expansion and recession period as well. Other anomalies are insignificant across the size-group associated with market conditions. These results are meaningful in the sense that the executors in investment industry might find practical implications from them. And they give insights to the researchers who are interested in relationship between the expected growth of book equity and business cycle risk.

2. Literature Review

The efficient market hypothesis implies that stock prices fully reflect all available information at any given time. This hypothesis suggests that the cross-sections of stock returns should be fully explained by the rational asset pricing model, representatively CAPM of Sharpe (1964) and Lintner (1965). However, empirical studies found several anomalies such as the book-to-market, accruals, net operating asset, profitability, earnings yield, stock issue, total asset growth, momentum, liquidity, and size all of which have not been explained by CAPM.

Our study covers almost all of the anomalies that existing empirical studies have found until now. Recently, Fama and French (2006) classified these anomalies into roughly three categories. These categories are book-to-market, expected profitability, and expected investment. Using them, Fama and French (2006) constructed the following valuation equation.

$$\frac{M_t}{B_t}=\frac{\sum_{\tau=1}^{\infty} E(Y_{t+\tau}-dB_{t+\tau})/(1+r)^{\tau}}{B_t} \quad (1)$$

where M_t is the stock price at time t, r is the expected stock return, $E(Y_{t+\tau}-dB_{t+\tau})$ is the time $t+\tau$ equity earning per share, $Y_{t+\tau}$, minus the change in book value per share, $B_{t+\tau}-B_{t+\tau-1}$ and as long as the accounting does not leave any surplus, it should be equal to time $t+\tau$ dividend, $D_{t+\tau}$.

This is an encompassing perspective on several empirical researches on anomalies. Under this framework, average stock returns can be naturally linked to book-to-market equity, proxies for expected earnings and expected growth of book equity. Using this valuation equation, we can predict expected stock returns in three different ways.

First, controlling for expected dividend, $E(D_{t+\tau})$, a higher B_t/M_t ratio implies a higher expected stock return, r. Second, controlling for B_t/M_t ratio and expected growth in expected growth of book equity, $E(dB_{t+\tau})$ relative to book equity, the higher expected earnings, $E(Y_{t+\tau})$ implies a higher expected return. Third, controlling for B_t/M_t ratio and expected earning, $E(Y_{t+\tau})$ relative to book value, B_t a higher expected growth of book equity, $E(dB_{t+\tau})$ implies a lower expected return.

In this paper, we try to find pervasive anomalies to enhance investment performance. According to the equation (1), our analyses on anomalies are centering upon (1) explicit proxies of expected earnings: accrual, net operating asset, profitability, and earnings yield, (2) direct proxies of expected growth of book equity: net stock issue, total asset growth. In addition, we explore popular anomalies such as momentum and liquidity which is not included in these proxies.

The following literature introduces these anomalies. As to the book-to-market anomaly, Rosenberg et al. (1985) reports the significant abnormal performance of book-to-market strategy which buys stocks with a high book-to-market ratio and sells stocks with a low book-to-market ratio. It is possible to link this anomaly to the first way of prediction for expected stock returns by using the equation (1).

The anomalies such as accrual, net operating asset, earnings yield, and earning can be linked to the second way of prediction. Sloan (1996) documents that earnings performance attributable to the accrual is less persistent than that attributable to the cash flows. He also shows that investors do not distinguish the difference between accrual and cash flow component of earnings. As the accruals are negatively related to future profitability, this anomaly can be pertained to our second way of prediction. Fairfield et al. (2003) reports the existence of general market mispricing of growth in net operating assets. They consider accruals as growth in short-term net operating assets. Furthermore, they argue that diminishing marginal returns on new investment lead to the lower persistence of accruals. So this anomaly is also relevant to our second way of prediction of expected stock returns. Basu (1983) examines the empirical relationship among earnings yield, firm size and stock returns. He reports that high earnings yield stocks have, on average, higher risk-adjusted returns than the low earnings yield stocks even after controlling the firm size. Ball (1978) reveals the consistent relationship between the public earning announcement and excess returns which seem inconsistent with market efficiency. These studies also confirm our second way of prediction.

In addition, net stock issue and asset growth anomalies are in line with the third way of prediction. Pontiff and Woodgate (2008) reports the stock issuance anomaly. They show that post-1970, share issuance explains the cross-sections of stock returns well. They argue that the predictive power is more significant than that of size, book-to-market, or momentum. As the stock issuance is naturally followed by higher growth of book equity, it implies a lower expected return. Cooper et al. (2008) examines the cross-sections of stock returns through asset growth rates. They find that asset growth rates are strong predictors of future abnormal returns.

On the other hand, momentum and liquidity are not included in aforementioned proxies. Jegadeesh and Titman (1993)'s momentum strategies which buy stocks that have performed well

and sell stocks that have performed poorly in the past generate significant positive returns. They argue that the profitability of these strategies is not ascribed to their systemic risk. Amihud (2002) claims that liquidity premium is partly reflected in expected stock excess return. He shows that small stocks have relatively larger liquidity premium than big ones. His claims support our results that the anomalous return on liquidity is persistent across business conditions for small size group. Siddiqui and Majid (2013) reveals the leading role of the government in reducing the financing gap of small size firm through certain measures.

Recently, many studies are trying to associate the expected earnings proxies with the business cycle risk. Qian(2009) investigates the effect of operating cycle on the differential persistence of accruals and cash flow, and the market reaction to the different components of earnings across firms with various operating cycles. These operating cycles can be related to depreciation, change in accounts receivable, change in raw materials, and change in finished goods which can be the drivers of cyclical differential accrual persistence. Asgari et al. (2014) examines the incremental information content of cash flow from operation and earnings. Paricheh et al. (2013) also studies the relation between earnings per share and accruals. The co-integration between capital markets of several countries as Ahmed (2014) showed may be resulted from these intrinsic operating cycles.

While there are relatively little studies over the relation between the proxies of expected growth of book equity and the business cycle risk, instead, there are several studies that link momentum and liquidity to the business cycle risk. Scheurle and Spremann (2010) reports SMB and HML reflect the business cycle risk whereas momentum does not.

Naes et al. (2011) finds a strong relation between stock market liquidity and business cycle. They show that investors' portfolio compositions change with the business cycle and that investor participation on portfolio rebalancing is relevant to market liquidity, which is suggest a plausibility of "flight to quality".

In addition, Banz (1981) documents the size anomaly. He finds, on average, that the risk adjusted returns of smaller firms have been larger than that of larger firms. He considers the' size effect' as the capital market anomaly. Along this line, Yun et al. (2013), reports medium and small enterprises in Korea have not developed qualitatively but only towards quantitative growth. Based on Banz (1981)'s idea, Fama and French (2008) exercises experimental control over the firm size and reports that the anomalous returns associated with net stock issues, accruals and momentum are pervasive. We will develop Fama and French (2008) approach by controlling the particular phases of business cycle.

There were already some studies on the relationship between anomalies and business cycle in Korea. Lee (2010) examined whether the differential accruals persistence and accruals vary with the business cycle. Park and Son (2013) investigated the relationship between momentum and business conditions and Kim (2013) analyzed the relationship between stock price index and housing price indices. However, we comprehensively consider the relationship between anomalies and business cycle in Korea.

3. Methodology and Summary Statistics

We use the return data of the stocks that are listed on the KOSPI and KOSDAQ market and the sample period ranges from July 1991 to December 2013 (270 months). We obtain return and financial data from the financial information company, WISEfn. <Table 1> shows the average of the number of firms and average of monthly returns on stocks.

In this table, we divide all stocks in consideration into three categories: big stocks (above 20%), small stocks (between 20% and 50%) and micro-cap (below the median) based on their market capitalization, following the methodology of Fama and French (2008) at each June of the year. Although the average number of micro-cap is up to 551 (60% of all sample stocks), the relative portion in market capitalization of micro-cap is only 5.25%. The average number of small group is 234 and they take up 8.99% of the market capitalization. The average number of big group is 123 and they have a 85.76% market capitalization.

<Table 1> Average number of firms and average monthly returns : whole sample

	Firms			Percent of Total Market Cap	VW Average Return (%)		EW Average Return (%)		Cross-Sectional STDV (%)
	Market	KOSPI	KOSDAQ		Ave	STDV	Ave	STDV	
Market	908	489	419	100.00	0.98	8.75	1.47	10.04	18.88
Micro	551	222	328	5.25	1.17	10.31	2.22	11.43	21.19
Small	234	155	78	8.99	0.53	9.51	0.69	9.85	14.90
Big	123	111	12	85.76	1.06	9.03	0.86	9.56	12.18
All but Micro	357	267	90	94.75	0.98	8.82	0.73	9.50	14.21

As micro-cap consists of a relatively large number of firms, their returns have strong impacts on the equally weighted returns. Due to their size effect, the equally weighted monthly return of micro-cap is 2.22% while that of small and big group are 0.69% and 0.86%, respectively. So micro-cap pushes the equally weighted monthly market returns up to 1.47% per month. The volatility of the market returns increases up to 10.04%due to the volatility of equally weighted returns of micro-cap. As the portion in total market capitalization of big group is 85.76%, however, the value weighted monthly return of big group (1.06%) plays a central role in calculating the value weighted market return (0.98%). The volatility of value weighted

returns of big group also pulls that of market returns down to 8.75% in the sense that the volatility of value weighted returns of big group is smaller than that of micro-cap group. The last column shows the cross-sectional standard deviations of the monthly returns of the firms in each size group.

In addition to the division of size group, we dichotomize our sample periods into expansion and recession. To specify the business cycle, we adopt statistical methods to de-trend the log output and derive a cyclical component. Hodrick and Prescott (1997) de-trends the time series while penalizing the roughness of the estimated series. The HP filter solves the following standard-penalty program:

$$Min_{\tau_t}\sum_{t=1}^{T}(y_t-\tau_t)^2+\lambda\sum_{t=1}^{T-1}[(\tau_{t+1}-\tau_t)-(\tau_t-\tau_{t-1})]^2 \quad (2)$$

The first term captures the goodness-of-fit of the filter while the second term penalizes the roughness. This penalty program controls the adjusted trend series smoothly. The value of λ for monthly data is usually set as 14400. The estimated cycle component is $\Phi_t = y_t - \tau_t$. We extract the monthly cycle of log Industrial Production from January 1990 to December 2013. We decompose the cyclical component estimated by the HP filter into 4 stages.

i) trough (t-1, t, t+1) $\phi_t \le c_l, \quad \Delta\phi_{t-1}<0, \Delta\phi_{t+1}>0, \phi_t < \min\{\phi_s\}_{s=t-4}^{t+4}$

ii) expansion (t) $c_l < \phi_t \le c_h, \quad \max\{t_-^{\min}, t_-^{trough}\} > \max\{t_-^{\max}, t_-^{peak}\}$

iii) peak (t-1, t, t+1) $\phi_t > c_h, \quad \Delta\phi_{t-1}>0, \Delta\phi_{t+1}<0, \phi_t > \max\{\phi_s\}_{s=t-4}^{t+4}$

iv) recession (t) $c_l < \phi_t \le c_h, \quad \max\{t_-^{\min}, t_-^{trough}\} < \max\{t_-^{\max}, t_-^{peak}\}$

where c_l, c_h are the critical values for judging troughs and peaks respectively. `Trough' and `Peak' are defined as local minima and maxima of the cyclical component based on the critical values, which are $c_l = -2.0$, $c_h = 2.0$ in our case. We treat trough and expansion as expansion stage and peak and recession as recession stage. As such, the average market returns were 2.0% in the expansion stage and -0.9% in the recession stage, respectively.

<Table 2> shows the average number of firms and average monthly returns of stocks by each phase of business cycle. In this table, we assign stocks to size groups such as microcap (below the median), small stock (between 20% and 50%), and big stock (above the 20%) at the end of June of each year. In each cell, the number appears in the left represents the value corresponding to the expansion period and the number in the right is to the recession period.

For the expansion period, the equally weighted monthly return of micro-cap is 3.11% while that of small and big are 1.50% and 2.00%, respectively. For the recession period, the equally weighted monthly return of micro-cap is 1.46%while that of small and big are -0.01 and -0.13, respectively. The differences in the equally weighted returns of big between the expansion and recession are larger than that of micro-cap. The former is 2.13% and the latter is 1.65%. Furthermore, the difference widens in the case of the value weighted returns. Specifically, the difference in the value weighted returns of big between the two phases is 2.95% while that of micro-cap is 1.05%.

The difference between value weighted returns and equal weighted returns imply that the monthly returns of the biggest-firms in big group are more sensitive to the market state risk factor than returns from micro-cap, which is conflicting with the general expectations. In Korean stock market, the gap of average returns associated with business cycle of big growth stocks exceeds those of micro-cap. However the risk measured by the standard deviation of the returns of micro-cap is larger than that by the big stocks in both expansion and recession period.

4. Results and Discussion

4.1. Portfolio Sorts

<Table 3> presents average of equally weighted monthly returns of micro-cap, small and big stocks by anomalies such as earnings yield (EY), net stock issue (NS), total asset growth (dA/A) and liquidity (Liq) for our sample period from July 1991 to December 2013. At the end of June of each year, we sort all the stock according to their anomaly value and calculate the equally weighted monthly returns from July through June of the next year. The monthly return on stock is measured net of the value-weight return on a matching portfolio formed on size and book-to-market ratio. We construct Fama-French 25 portfolios

<Table 2> average number of firms and average monthly returns at each phase of business cycle

	Firms			Percent of Total Market Cap	VW Average Return(%)		EW Average Return (%)		Cross-Sectional STDV(%)
	Market	KOSPI	KOSDAQ		Ave	STDV	Ave	STDV	
Market	(872, 940)	(485, 494)	(386, 446)	100.00	(2.43, -0.28)	(7.88, 9.28)	(2.30,0.76)	(9.19,10.70)	(19.8,18.0)
Micro	(517, 579)	(217, 227)	(300, 351)	(5.49, 5.08)	(1.73, 0.68)	(9.71,10.82)	(3.11, 1.46)	(11.52,11.33)	(22.72,19.86)
Small	(232, 236)	(156, 155)	(75, 80)	(9.41, 8.70)	(1.30, -0.13)	(8.93, 9.96)	(1.50,-0.01)	(8.79,10.67)	(15.71,14.20)
Big	(122, 124)	(111, 110)	(11, 13)	(85.10, 86.22)	(2.64, -0.31)	(8.23, 9.48)	(2.00,-0.13)	(8.43,10.36)	(12.83,11.61)
All but Micro	(354, 360)	(267, 266)	(86, 94)	(94.51, 94.92)	(2.48, -0.32)	(7.99, 9.32)	(1.63, -0.06)	(8.37, 10.35)	(14.95, 13.58)

<Table 3> Average abnormal hedge returns and t-statistics formed using sorts on anomaly variables: Whole sample

	Equally Weighted Returns for Sample Period (Market)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	0.16 (0.73)	0.46 (2.82)	0.58 (4.33)	0.66 (4.92)	1.07 (4.77)	0.91 (2.92)
NS	0.30 (1.53)	0.33 (1.47)	0.15 (0.70)	-0.42 (-1.80)	-1.04 (-3.78)	-1.34 (-4.84)
dA/A	0.66 (4.90)	0.54 (3.52)	0.54 (3.86)	0.54 (3.42)	-0.03 (-0.14)	-0.69 (-3.03)
Liq	-0.26 (-0.94)	-0.48 (-2.38)	-0.21(-1.27)	0.09 (0.57)	1.19 (6.18)	1.45 (4.75)

	Equally Weighted Returns for Sample Period (Micro-Cap)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	0.69 (2.84)	1.01 (3.03)	0.97 (3.77)	1.12 (4.56)	1.54 (4.36)	0.84 (2.37)
NS	0.42 (1.13)	1.06 (2.58)	1.15 (2.20)	0.23 (0.71)	-0.88 (-2.20)	-1.31 (-2.79)
dA/A	0.92 (4.10)	1.02 (3.67)	0.85 (3.77)	1.12 (3.62)	0.52 (1.90)	-0.40 (-1.38)
Liq	6.80 (1.65)	-0.26 (-0.31)	-0.80 (-2.26)	-0.04 (-0.16)	1.27 (6.01)	-5.22 (-1.27)

	Equally Weighted Returns for Sample Period (Small)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	-0.34 (-1.36)	0.16 (0.87)	0.46 (2.53)	0.40 (2.36)	0.56 (2.96)	0.90 (2.53)
NS	0.42 (1.99)	-0.08 (-0.28)	-0.33 (-1.28)	-1.22 (-3.88)	-0.95 (-2.40)	-1.38 (-3.12)
dA/A	0.42 (2.75)	0.19 (1.08)	0.32 (1.73)	0.45 (2.42)	-0.20 (-0.88)	-0.62 (-2.16)
Liq	-1.17(-2.61)	-0.71 (-2.85)	-0.03 (-0.14)	0.33 (2.30)	0.91 (3.97)	2.07 (3.88)

	Equally Weighted Returns for Sample Period (Big)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	-0.56 (-1.73)	-0.16 (-0.71)	-0.03 (-0.13)	0.22 (1.05)	0.54 (1.89)	1.10 (2.58)
NS	-0.01 (-0.03)	0.02 (0.06)	0.24 (0.69)	-1.03 (-2.35)	-1.25 (-2.92)	-1.24 (-2.74)
dA/A	0.12 (0.53)	-0.08 (-0.34)	0.12 (0.51)	-0.28 (-1.01)	-0.58 (-1.41)	-0.69 (-1.67)
Liq	-0.30 (-1.31)	-0.14 (-0.62)	0.51 (2.03)	-0.11 (-0.28)	0.07 (0.15)	0.37 (0.69)

based on independent sorts of stocks into size and book-to-market ratio quartiles.

To test the significance of the returns of these hedge portfolios (high group – low group) based on anomaly variables, we follow the methodology suggested in Fama and French (2008). We construct Fama-French 25 matching portfolios at the end of June of each year, based on independent sorts of stocks into size and book-to-market ratio quartiles. Then, we measure the monthly return on a stock net of the value-weight return on a matching portfolio formed on size and book-to-market ratio and calculate portfolio equal weighted returns with these net returns. These portfolio adjusted average returns from the sorts represent the fraction of the anomalous average returns, left unexplained by the size and book-to-market ratio. The portfolio adjusted returns are similar to the risk adjusted alphas from the 3 factor regression model.<Table 3> shows the abnormal average returns.

To make meaningful comparison of returns across size groups, we exclude the stocks that have negative or zero values of earnings yield, total asset growth and net stock issues. In <Table 3>, we report the anomalies that result in significant risk adjusted hedge portfolio returns by conducting the market-wide anomaly test. In this table, we found that earnings yields and net stock issue are pervasive across size groups. The risk adjusted average hedge returns of earnings yields for the market and three size groups range from 0.84% to 1.10% per month and their t-statisticsare above 2.37. Also, the risk adjusted average hedge returns of the net stock issues for the size groups range from -1.38% to -1.24% and their t-statistics exceed 2.74. Therefore, in the whole sample period, earnings yield and net stock issue can serve as a proxy of expected earnings and expected growth of book equity of firms of all size groups, respectively.

But total asset growth and liquidity are not pervasive across all size groups. Total asset growth and liquidity are significant for the market and small group, but not significant for micro-cap

<Table 4> Average abnormal hedge returns and t-statistics formed using sorts on anomaly variables: Expansion periods

	Equally Weighted Returns for Expansion Period (Market)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	0.21 (0.81)	0.55 (2.07)	0.79 (3.54)	0.82 (3.53)	1.40 (3.40)	1.19 (2.84)
NS	0.27 (0.97)	0.16 (0.47)	0.47 (1.38)	-0.75 (-2.23)	-1.05 (-2.49)	-1.33 (-3.02)
dA/A	0.78 (3.39)	0.72 (2.47)	0.59 (2.38)	075 (3.20)	-0.07 (-0.24)	-0.85 (-2.61)
Liq	-0.27 (-0.62)	-0.41 (-1.39)	-0.33(-1.33)	-0.15 (-0.58)	1.58 (4.08)	1.85 (3.94)

	Equally Weighted Returns for Expansion Period (Micro-Cap)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	1.02 (2.54)	1.49 (2.30)	1.46 (2.99)	1.46 (3.15)	2.24 (3.22)	1.22 (2.05)
NS	0.08 (0.16)	1.58 (2.25)	1.77 (1.85)	-0.36 (-0.73)	-0.74 (-1.04)	-0.83 (-1.10)
dA/A	1.16 (2.85)	1.46 (2.66)	0.91 (2.23)	1.77 (3.23)	0.76 (1.61)	-0.40 (-0.79)
Liq	14.18 (1.60)	0.09 (0.07)	-0.91 (-1.57)	-0.40 (-1.00)	1.70 (4.00)	-11.60 (-1.31)

	Equally Weighted Returns for Expansion Period (Small)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	-0.28 (-0.87)	0.08 (0.31)	0.67 (2.20)	0.55 (1.86)	0.51 (1.72)	0.78 (1.74)
NS	0.48 (1.60)	-0.42 (-0.92)	0.04 (0.12)	-0.86 (-1.87)	-0.99 (-1.73)	-1.47 (-2.46)
dA/A	0.51 (2.22)	0.16 (0.58)	0.42 (1.33)	0.60 (1.83)	-0.19 (-0.44)	-0.70 (-1.40)
Liq	-1.55 (-2.20)	-0.60 (-1.80)	-0.16 (-0.56)	0.37 (1.61)	1.25 (2.89)	2.80 (3.21)

	Equally Weighted Returns for Expansion Period (Big)					High - Low
	Low	2	3	4	High	
Average Equal-Weight Returns (t-statistics)						
EY	-0.88 (-2.24)	-0.31 (-0.94)	-0.20 (-0.61)	0.03 (0.10)	0.56 (1.29)	1.45 (2.76)
NS	0.35 (0.75)	-0.59 (-1.47)	0.32 (0.55)	-1.07 (-1.72)	-0.98 (-1.53)	-1.33 (-1.82)
dA/A	-0.07 (-0.18)	-0.20 (-0.53)	-0.09 (-0.26)	-0.56 (-1.60)	-1.15 (-2.39)	-1.09 (-2.33)
Liq	-0.46 (-1.76)	-0.25 (-0.65)	0.43 (1.13)	-0.85 (-1.41)	-0.06 (-0.08)	0.40 (0.47)

and big group. The average monthly hedge returns by total asset growth for micro-cap, small, and big group are -0.40%, -0.62%, and -0.69% (t-value= -1.38, -2.16, and -1.67), respectively. Therefore, total asset growth can be considered as a proxy of expected earnings for the firms in small size group in the whole sample period. The average monthly hedge returns by liquidity across the size groups are -5.22%, 2.07%, and 0.37% (t-value = -1.27, 3.88, and 0.69), respectively. It is an unexpected result that hedge returns by liquidity for micro-cap group are in the negative territory while those for the other size groups are positive. Based on the results, we assess that liquidity is not a proxy of expected earnings or expected growth of book equity of firms.

The other anomalies which are not significant for the entire market are not reported in <Table3>, but we provide a brief description on each of them. The equally weighted hedge returns by accruals for the market and three size groups are -0.44%, -0.09%, -0.67% and -1.10% (t-value = -1.76, -0.24, -1.60, and -1.89), respectively. The risk adjusted equally weighted average monthly returns of hedge portfolio by accruals for the big firms are -1.10% (t-value = -1.89), which means that the accruals have relatively more explanatory power for the expected earnings of big stocks as reported by Son and Yoon (2011).

The equally weighted hedge returns by net operating asset for the market and three size groups are -0.22%, -0.20%, 0.19% and 0.22% (t-value = -1.12, -0.58, 0.81, and 0.72), respectively, which are insignificant. In addition, the equally weighted hedge returns by profitability for the market and three size groups are 0.21%, 0.47%, 0.40% and -0.02% (t-value = 0.78, 1.38, 1.15, and -0.06), respectively. Also, the equally weighted hedge returns by momentum for the market and three size groups are -0.04%, -0.48%, 0.38% and 1.04% (t -value= -0.08, -0.75, 0.75, and 1.80).

The same procedure is conducted for expansion and recession periods, respectively and <table 4> and <table 5> report the results from each period. <Table 4> shows average equally

<Table 5> Average abnormal hedge returns and t-statistics formed using sorts on anomaly variables: Recession periods

	Equally Weighted Returns for Recession Period (Market)					High - Low
	Low	2	3	4	High	
	Average Equal-Weight Returns (t-statistics)					
EY	0.11 (0.33)	0.39 (1.91)	0.39 (2.51)	0.52 (3.49)	0.78 (3.56)	0.67 (1.47)
NS	0.33 (1.18)	0.47 (1.60)	-0.12 (-0.47)	-0.14 (-0.43)	-1.02 (-2.83)	-1.35 (-3.83)
dA/A	0.55 (3.61)	0.38 (2.81)	0.50 (3.28)	0.36 (1.68)	0.00 (0.01)	-0.55 (-1.73)
Liq	-0.25 (-0.70)	-0.54 (-1.93)	-0.11 (-0.48)	0.30 (1.53)	0.86 (6.59)	1.10 (2.77)

	Equally Weighted Returns for Recession Period (Micro-Cap)					High - Low
	Low	2	3	4	High	
	Average Equal-Weight Returns (t-statistics)					
EY	0.41 (1.40)	0.59 (2.22)	0.55 (2.41)	0.82 (3.71)	0.93 (3.54)	0.52 (1.23)
NS	0.72 (1.35)	0.62 (1.31)	0.61 (1.20)	0.75 (1.70)	-1.00 (-2.37)	-1.72 (-2.94)
dA/A	0.70 (3.14)	0.64 (3.07)	0.79 (3.46)	0.55 (1.70)	0.30 (1.00)	-0.40 (-1.24)
Liq	1.24 (0.57)	-0.50 (-0.45)	-0.72 (-1.61)	0.27 (0.91)	0.90 (6.39)	-0.41 (-0.19)

	Equally Weighted Returns for Recession Period (Small)					High - Low
	Low	2	3	4	High	
	Average Equal-Weight Returns (t-statistics)					
EY	-0.40 (-1.04)	0.24 (0.86)	0.27 (1.30)	0.27 (1.45)	0.61 (2.46)	1.00 (1.85)
NS	0.38 (1.24)	0.21 (0.58)	-0.66 (-1.77)	-1.53 (-3.54)	-0.92 (-1.66)	-1.30 (-2.02)
dA/A	0.34 (1.67)	0.21 (0.98)	0.23 (1.10)	0.33 (1.58)	-0.21 (-0.95)	-0.55 (-1.73)
Liq	-0.84 (-1.47)	-0.81 (-2.20)	0.09 (0.39)	0.29 (1.64)	0.61 (3.02)	1.45 (2.21)

	Equally Weighted Returns for Recession Period (Big)					High - Low
	Low	2	3	4	High	
	Average Equal-Weight Returns (t-statistics)					
EY	-0.28 (-0.57)	-0.03 (-0.09)	0.12 (0.46)	0.39 (1.28)	0.52 (1.38)	0.80 (1.23)
NS	-0.32 (-0.87)	0.54 (1.34)	0.17 (0.41)	-0.99 (-1.60)	-1.49 (-2.56)	-1.17 (-2.05)
dA/A	0.27 (1.04)	0.03 (0.09)	0.30 (0.97)	-0.03 (-0.08)	-0.08 (-0.12)	-0.35 (-0.53)
Liq	-0.16 (-0.45)	-0.05 (-0.19)	0.58 (1.72)	0.53 (1.01)	0.19 (0.29)	0.35 (0.50)

weighted monthly returns from the portfolios sorted by earnings yield, net stock issue, total asset growth, and liquidity for the expansion period.

During the expansion, the risk adjusted average hedge returns by earnings yield for the market and three size groups are 1.19%, 1.22%, 0.78%, and 1.45% (t-value = 2.84, 2.05, 1.74, and 2.76), respectively, which implies that earnings yield is a statistically significant proxy of firms except small group during the expansion period.

The risk adjusted average hedge returns by net stock issue are -1.33%, -0.83%, -1.47%, and -1.33% (t -value= -3.02, -1.10, -2.46, and -1.82), respectively. So the net stock can serve as a proxy for the expected growth of book equity for the small group while total asset growth is a proper proxy of the expected growth of book equity for the big group during the expansion. In addition, liquidity is significant for the small group during this period.

<Table 5> shows average equally weighted monthly returns from the portfolios sorted by earnings yield, net stock issue, total asset growth and liquidity for the recession period.

During the recession, the risk adjusted average hedge returns by both earnings yield and total asset growth are insignificant for any size groups. In contrast, the risk adjusted hedge returns by net stock issue for the market and three size groups are -1.35%, -1.72%, -1.30% and -1.17% (t -value= -3.83, -2.94, -2.02, and -2.05), respectively, which indicates that net stock issues is a statistically significant proxy of the expected growth of book equity for the whole groups during the recession. Additionally, it is noteworthy that liquidity is significant only for the small group during the recession just as it was during the expansion.

5. Conclusion

This study examines the pervasiveness of anomalous returns conditioned on business cycle and size groups. Because of the size effect, the returns of micro-cap stocks dominate the equally weighted hedge returns while the returns of big stocks serve as a main driver for the value weighted hedge returns. Thus, there is a need to separate the size effect from anomaly effect in investigating whether the anomalies are pervasive across all the size groups. Some extant literature suggests which sorts of anomalies are pervasive across the size groups. By applying the traditional methodology to the data of which sample period ranges from July 1991 to December 2013, we found four anomalies, each of which is earnings yield, net stock issues, total asset growth and liquidity, are pervasive across the micro-cap, small and big size groups in Korean stock market. Based on the results, we examine whether the changes anomalous returns have a systematic persistency with the business cycle. For this, we dichotomize the sample period into expansion and recession period and scrutinize whether the behavior the market-widely significant anomalous returns varies with the business cycle. As a result, we find some interesting characteristics on behavior of the hedge returns by net stock issue and liquidity.

The empirical results of our study uncover two important implications. As for net stock issue, we found that relevant hedge returns are significant across all size groups mainly during recession rather than in expansion. It is interesting that net stock issue can serve as a proxy for the expected growth of book equity during recession period rather than expansion. Firms that expect insufficient future cash flows will strive to issue stocks to enhance their financial stability especially during the recession when they are in need of money in spite of the low stock prices. In contrast, for the firms with robust future cash flow, there is no particular reason to issue stocks during the recession. They will prefer to issue stocks during the expansion. So the net stock issue in recession period can be considered as a strong proxy for the expected growth of book equity which results in negative hedge returns. Concerning the liquidity, we find that hedge returns are significant for the firms in the small group during not only recession but also expansion. Considering the persistent deficiency of liquidity for firms in micro-caps and the relatively abundant liquidity for the firms in big groups, liquidity may be a proper proxy for the cash flow of the firms in small groups. Our empirical result implies that the change in portfolio compositions due to the liquidity problems may occur within small group.

The findings suggested in this article are expected to provide an insight for the executors in investment industry. In the aspect of practical implications, our study supports that to enhance performance, the anomaly trading strategies should be based not only size group but also the business conditions. While lots of studies have been trying to link the proxies of expected earnings to the risks associated with the macroeconomic environment, the relation between the proxies of expected growth of book equity and the risks associated with business cycle has not been actively investigated. In this sense, our empirical finding that the hedge returns by net stock issue varies with the business cycle is a good starting point for the further academic research.

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