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CORPORATE INVESTMENT AND EXPECTED STOCK RETURNS IN BORSA İSTANBUL

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ABSTRACT

In this paper, we try to investigate the relationship between the investments and the stock returns of the companies which are traded in Borsa Istanbul (BIST) during the period from July 2006 to December 2015. The results of the univariate portfolio analysis indicate that the corporate investment premium is economically large such as the value weighted (equally weighted) average monthly premium on the zero-investment portfolio of low corporate investment stocks is 0.57 (0.61) % however, it is not statistically significant. The intercept estimates from traditional factor models justify this conclusion. Therefore, we can conclude that the corporate investment effect cannot be used to predict the expected returns.

Keywords: Asset Growth, Expected Returns, Asset Pricing, Portfolio analysis, Borsa Istanbul

BORSA İSTANBUL'DA ŞİRKET YATIRIM VE BEKLENEN HİSSE GETİRİLERİ

ÖZ

Bu çalışmada, Temmuz 2006 - Aralık 2015 döneminde Borsa İstanbul'da işlem gören şirketlerin yatırımları ile hisse senedi getirileri arasındaki ilişki araştırılmaya çalışılmıştır. Tek değişkenli portföy analizi sonuçlarımız şirket yatırım priminin ekonomik açıdan büyük olduğunu göstermektedir, örneğin yatırımları düşük olan şirket hisselerinden oluşan sıfır-yatırım portföyünün değer ağırlıklı (eşit ağırlıklı) aylık ortalama primi % 0.57 (0.61) olarak gözlenmektedir. Buna karşılık, bu prim istatistiksel olarak anlamlı değildir. Geleneksel faktör modellerinin kaysayı tahminleri bu sonucu doğrulamaktadır. Bu nedenle, şirket yatırım etkisinin beklenen getiriyi tahminlemede kullanılamayacağı sonucuna ulaşılabilir.

Anahtar Sözcükler: Aktif Büyüme, Beklenen Getiri, Varlık fiyatlaması, Portföy analizi, Borsa İstanbul

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INTRODUCTION[1]

The empirical evidence suggests a negative relationship between average returns and investment growth. This pattern contradicts with the Capital Asset Pricing Model (CAPM) of Sharpe (1964). Fama and French (2006) reorganized the Dividend Discount Model (DDM) of Miller and Modigliani (1961) under clean surplus accounting to explain this negative relationship between investment growth and expected returns. The *DDM* is as follows;

$$M_t = \sum_{\tau=1}^{\infty} \frac{E(D_{t+\tau})}{(1+r)^{\tau}} \qquad \text{(eq.1)}$$

Where M_t is the market value of the stock at time t, D_t is expected dividends in period t + Ʈ, and r is the internal rate of return on expected dividends. According to equation 1 if *r* is held constant, M_t will increase with expected dividends.

Under clean surplus accounting, dividends can be represented by expected future earnings minus expected yearly change in the book value of equity. Hence, *DDM* can be reorganized as follows;

$$M_t = \sum_{\tau=1}^{\infty} \frac{E(Y_{t+\tau} - dB_{t+\tau})}{(1+r)^{\tau}} \qquad \text{(eq.2)}$$

Where M_t is market value of the stock at time t, Y_t is expected earnings in period t + Ʈ, *d*B is expected change in book value of equity in period t + Ʈ ($B_t - B_{t-1}$), and r is the internal rate of return. According to Fama and French (2006), the negative relationship between corporate investment and average returns can be explained by equation 2. If we divide both sides of this equation with book value of equity at time t, the equation will be;

$$\frac{M_t}{B_t} = \sum_{\tau=1}^{\infty} \frac{E(Y_{t+\tau} - dB_{t+\tau}) / (1+r)^{\tau}}{B_t} \qquad \text{(eq.3)}$$

Where, B_t is current book value of common equities. According to the Fama and French (2006), if everything, except r and investment are kept constant, high investment will provide low returns to shareholders and low market value.

In this study, we try to investigate the relationship between the investment and stock returns of the firms listed in Borsa Istanbul (BIST) for the period from July 2006 to December 2015. Therefore, we perform univariate

[1] A part of this work was presented at 3rd International Conference on Applied Economics and Finance (ICOAEF) on 6-7 December, 2017 in Kyrenia, North Cyprus.

portfolio sorts based on three different corporate investment proxies namely asset growth 2, asset growth 3 and investment growth. According to our results, zero-investment portfolios consisting of stocks with low asset growth have positive premiums. However, these premiums are insignificant therefore, asset growth measures cannot predict returns significantly. On the other hand, the relationship between the investment growth variable and expected stock returns is contrary to the predictions of equation 1 such as the zero-investment portfolio consisting of stocks with of low investment growth has a negative premium. Additionally, the traditional asset pricing models such as the CAPM and the three-factor model of Fama and French (1993) justify these results.

The paper is organized as follows; following the introduction, section two summarizes the existing literature. Section three provides information data and methodology. Section four presents the empirical results of the univariate portfolio analysis. Section five concludes the paper.

LITERATURE REVIEW

There is a plethora of studies examining the relationship between corporate investment and expected stock returns (such as, Ammann et al., 2012; Chiah et al., 2016; Cooper et al., 2008; Fairfield et al., 2003; Fama and French 2006 and 2015; Gray and Johnson, 2011; Lakonishok et al., 1994; Papanastasuopoulos, 2017 and Titman et al., 2004).

The results of the studies analyzing the relationship between the expected returns and investment for the U.S. market are almost the same. For example, as suggested by their rational valuation equation (equation 2 and 3) Fama and French (2006) found that the percentage change in the total book value of assets[2] can predict the expected returns by applying the cross-sectional regression analysis. Additionally, Xing (2008) argued that after the common stocks were sorted into ten deciles of portfolios according to the capital expenditure growth factor, taking long and short positions on extreme decile portfolios provided an average monthly premium of 0.58% from 1964 to 2003. The results of the studies of Fama and French (2015 and 2016) on the profitability of asset growth investment strategy are similar, they found

[2] Authors used total book value of assets instead of total book value of equity since they argue that total book value of assets is more comprehensive measure of the investment activities.

that their investment factors provided an average monthly premium of about 0.32% from 1963 to 2014. Additionally, according to Cooper et al. (2008) constructing zero-investment portfolios consisting of stocks with low asset growth provided monthly premium of about 0.70% from 1963 to 2003. Finally, according to Hou et al. (2016), the asset growth premium was 0.42 from 1972 to 2012.

There are only a few studies examining the relationship between the investment factor and average returns for the developed markets other than the U.S. Among these studies, Chiah et al. (2016) investigated Australian market and used the investment factor of Fama and French (2015). They found that the investment factor provided an average monthly premium of 0.42% from 1982 to 2013. In a comprehensive study, Fama and French (2017) revealed that the asset growth was negatively related with expected stock returns in twenty-two markets located in Asia Pacific, EU and North America for the period from 1990 to 2015. However, premium on the investment factor in Japan was only 0.08% per month which was not statistically significant. Consistently, Nicol and Dowling (2014) did not observe any significant premium on total asset growth and fixed asset growth investment strategies in the U.K. from 2002 to 2013. Whereas, Gray and Johnson (2011) revealed a strong asset growth effect in Australian market from 1983 to 2007. The results of Titman et al. (2013) on the asset growth effect for twenty-six developed markets were mostly similar. Finally, Papanastasuopoulos (2017) investigated the asset growth effect for sixteen developed European markets and showed that it was stronger among the firms those made loss.

On the other hand, the results of related studies considering the developing markets are mixed. For example, Zaremba and Czapkiewicz (2017) examined investment effect in five developing markets. They used seven investment metrics in portfolio sorts and revealed that only one of them provide premiums on an extreme decile investment strategy from 1997 to 2015[3]. Wang et al. (2015) found a significant negative relationship between the percentage change in total book value of asset growth and average returns for the Chinese market from 1996 to 2010. Whereas, Guo et al. (2017) did not observe any premium on book value of an asset growth and book value of an equity growth for the Chinese market from 1995 to 2015. The Yao et al. (2011) investigated nine developing markets from Asia and concluded that asset

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[3] Authors investigated Czech Republic, Hungary, Poland, Russia, and Turkey.

growth effect was mostly significant. Finally, Titman et al. (2013) showed the asset growth effect that is not statistically significant for fourteen developing markets. To the best of our knowledge, the asset growth effect for the BIST has never been examined before.

DATA AND METHODOLOGY

Sample and Data Sources

Following the studies of Cooper et al. (2008) and Fama and French (2015), our sample consists of the non-financial companies with positive book value of equity, which are traded in BIST. Additionally, we eliminate firms with missing data and following the study of Xing (2008), we omit the firms reporting in a month other than December as fiscal year ending. We obtain financial statements data from the web page of the Public Disclosure Platform of Turkey (www.kap.gov.tr) and the stock prices are obtained from BIST (www.datastore.borsaistanbul.com.tr). Following the study of Fama and French (2015), the stock returns are lagged by six months and matched with financial statement data. Accordingly, our portfolio analysis starts in July 2006 and ends in December 2015, covering 114 months of observations. Finally, we use monthly government domestic debt instrument rate that is obtained from the web page of the Turkish Government Statistical Institute (www.tuik.gov.tr) as the risk-free rate.

Variables

We use three different variables to proxy the investment effect. According to Cooper et al. (2008) total book value of assets is the most informative investment measure since it is a collection of all the sub-components related to all investment and financing activities. Hence, we follow the study of Cooper et al. (2008) and use the percentage change in total assets from December t-3 to t-2 (AG3) and the percentage change in total assets from December t-2 to December t-1 (AG2) to proxy the investment effect. Additionally, we follow the study of Xing (2008) and use the percentage change in property, plant and equipment from December t-2 to December t-1 as a proxy for the investment growth (IG) measure. We follow the study of Fama and French (1993) to calculate market value of equity (ME, shares outstanding times market price at the end of each June) and Book-to-market equity (B-to-M, ratio of book value of equity at fiscal year ending in t-1 to market value of equity at December t-1).

Panel A of Table 1 reports variable characteristics such as mean, median, standard deviation (SD) and 25th and 75th percentiles. Our results indicate that the mean of AG2 (0.131) is lower than that of AG3 (0.156) and of IG (0.228). The medians of AG2 and AG3 are equal (0.087) and higher than that of IG (0.027). On the other hand, the SD of AG2 is lower than those of AG3 and IG. Compared with developing European markets, the mean of IG of the companies listed in the BIST is much higher (See Ammann et al. 2012). The same is also true for B-to-M ratio indicating that the BIST shares provide more book value of assets for the given market price.

Table 1: Variable Descriptive Statistics

Panel A: Variable Characteristics					
			Standard	*Percentile*	
Variables	*Mean*	*Median*	*Deviation*	*25th*	*75th*
AG2	0.131	0.087	0.270	0.003	0.206
AG3	0.156	0.087	0.658	-0.000	0.216
IG	0.228	0.027	1.944	-0.043	0.166
ME	613,873	94,870	1,744,396	30,820	341,109
B-to-M	0.913	0.749	0.709	0.463	1.138
Panel B: Correlations					
	AG2	AG3	IG	ME	B-to-M
AG2	1.00				
AG3	0.01	1.00			
IG	0.13***	0.00	1.00		
ME	0.05**	0.00	-0.01	1.00	
B-to-M	-0.08***	-0.02	-0.01	-0.18***	1.00

Sampling period is from July 2006 to December 2015. ***, **, * indicates statistical significance at 1percent, 5%and 10%levels, respectively.

Panel B of Table 1 provides cross-correlations. The results are interesting such as only AG2 is positively and significantly correlated with IG (coef. = 0.13; $p < 0.01$). Whereas, AG2 is positively correlated with ME (coef. = 0.05; $p < 0.05$) and negatively correlated with B-to-M (coef. = 0.08; $p < 0.01$). These relationships between AG2 and market proxies are inconsistent with equation 3 since, the equation predicts higher market value for lower investment. However, it is important to mention that the coefficients are low. On the other hand, there is not a correlation between the AG3 and IG; AG and

ME; IG and ME; AG and B-to-M and IG and B-to-M. In the remainder of the text we investigate these relationships in more detail.

Methodology

We perform univariate portfolio analysis for three different investment proxies to examine whether corporate investment can predict expected returns for the stocks traded in the BIST. To proxy the corporate investment, we use two asset growth measures, AG2 and AG3, and an investment growth measure, IG. We prefer portfolio analysis over cross-sectional regression since the data are highly skewed and significant portion of the data will be lost due to the data trimming within the cross-sections. To construct univariate portfolios, we independently rank all the stocks based on their AG2, AG3 and IG values at the end of each June and allocate them into ten investment portfolios based on the sample breakpoints. Starting from the beginning of July 2006, we calculate monthly value weighted (VW) and equally weighted (EW) returns till the next June and rebalance portfolios annually. Our hedge portfolios represent monthly difference between portfolios of low investment and high investment stocks.

Additionally, we regress portfolio returns against traditional CAPM and three-factor model of Fama and French (1993). Following Fama and French (1993), we construct VW and EW factors of small minus big (SMB) and high minus low (HML). Initially, we divide all the stocks into two groups as big (B) and small (S) by using the median market capitalization of the sample stocks. Then, we identify three B-to-M breakpoints using the sample stocks as low (L, bottom 30 percent), medium (N, neutral 40 percent) and high (H, top 30 percent). We then construct six intersection portfolios at the end of each June from two ME, S and B, and three B-to-M, L, N and H, groups. This approach to factor construction is called a 2x3 sorts by the Fama and French (1993, 2015). We held the portfolios until next June and calculate their monthly VW and EW returns. We rebalance the variables and the portfolios annually.

Following Fama and French (1993), we represent the size mimicking factor of SMB (small minus big) by the monthly difference between simple averages of three S and three B portfolios. In a consistent manner, we represent HML by the monthly difference between simple averages of two high and two low B-to-M portfolios. Finally, we represent market portfolio by monthly excess returns on the portfolio of sample stocks that is rebalanced annually.

The CAPM equation states that the expected excess return (expected return over the risk-free rate) on any asset is linearly related to expected market risk premium (market return over the risk-free rate) with intercept at risk free interest rate. This linear relationship measured with the slope of the equation, the beta (β). The CAPM is as follows;

$$E(r_i) - r_f = r_f + \beta_i \left[E(r_m) - r_f\right] \quad \text{(eq.4)}$$

Where r_i is return on stock *i,* r_f is return on risk free asset, r_m is return on the market portfolio and β is the slope. In the time series regressions;

$$r_i - r_f = \alpha_i + b_i(r_m - r_f) + e_i \quad \text{(eq.5)}$$

Where, α_i is the intercept and the final term is residuals with expected mean of zero. If the exposure to factor loading provides complete description of expected returns the α_i should also be zero.

On the other hand, accordingly, Fama and French (1993) stipulates that excess expected return on a particular portfolio or stock, *i*, can be explained by its exposure to three factors; market excess return, average return on a portfolio composed of small stocks minus average return on a portfolio composed of big stocks (SMB, small minus big)[4], and average return on a portfolio composed of stocks with high B-to-M ratio minus average return on a portfolio composed of stocks with low B-to-M ratio (HML, high minus low). Formally, according to the Fama and French (1993) three-factor model expected excess return on *i* is;

$$E(r_i) - r_f = b_i\left[E(r_m) - r_f\right] + s_i E(SMB) + h_i E(HML) \quad \text{(eq.6)}$$

Where, $r_m - r_f$, SMB and HML are expected premiums, b_i, s_i, and h_i are factor loadings (i.e. slopes). In the time series regression;

$$r_i - r_f = \alpha_i + b_i(r_m - r_f) + s_i SMB + h_i HML + e_i \quad \text{(eq.7)}$$

Where, α_i is intercept and the final term is residuals with expected mean of zero. If the exposure to factor loadings provides complete description of expected returns the α_i should also be zero.

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[4] The SMB factor can also be described as zero cost investment portfolio strategy based on market capitalization. Similar explanation also applies for other factors that will be discussed.

We assess the excess returns on VW univariate portfolios sorted by corporate investment variables using VW factors and excess returns on EW univariate portfolios sorted by corporate investment variables using EW factors. Finally, we report t-statistics by using the Newey and West (1987) approach.

EMPIRICAL RESULTS

Factor Characteristics

Table 2 reports descriptive characteristics of factors for both VW and EW strategies and their cross correlations. According to the Panel A of Table 2, the statistics for all the VW factors are insignificant. The monthly equity premium is 0.15% which is statistically insignificant ($t = 0.16$) and highly volatile (8.75). The SMB premium is slightly lower than the equity premium whereas, it is far less volatile with a SD of 5.26. The average monthly HML premium is 0.56%, however it is also insignificant ($t = 0.96$) partly due to the high variability of the factor return (SD = 6.98).

When we consider the EW factor construction strategy the equity premium considerably increased and the HML premium becomes significant at 10% level. According to the Panel B of Table 2 the average monthly equity premium on EW strategy is 0.38% ($t = 0.37$) whereas, still insignificant due to the high level of the variability of returns (SD = 9.47). The monthly premium on the EW SMB factor meets that of VW SMB factor. However, when we construct EW SMB the variability of returns reduced at least 1.58 points. On the other hand, our HML factor constructed based on EW investment strategy offers 0.74% of the monthly premium which is significant at 10% level. Additionally, the EW HML factor has far less volatile returns compared to the VW HML Factor.

The Panel C of Table 2 provides cross correlations for the VW factors. According to the results, the relationships between market returns and other factors are negligible. Whereas, there is a strong negative relationship between SMB and HML (coef. = -0.61; $p < 0.01$) indicating that the returns on the small firms act like those of the growth firms.

Finally, the Panel D of Table 2 presents cross correlations for the EW factors. According to the results, market returns are positively and significantly related with SMB returns (coef. = 0.27; $p < 0.01$). Therefore, returns on small stocks tend to increase while the market is going up. On the other hand, SMB and HML are negatively related. This result is consistent with the results in the Panel C. Albeit, the correlation coefficient between EW SMB and EW HML is lower than that of VW SMB and VW HML.

Table 2: Factor Descriptive Statistics and Correlations

Panel A: Descriptive Statistics for VW factors			
	$r_m - r_f$ (percent)	*SMB (%)*	*HML (%)*
Mean	0.15	0.24	0.56
t-statistics	0.16	0.46	0.96
SD	8.75	5.26	6.98
Panel B: Descriptive Statistics for EW factors			
Mean	0.38	0.25	0.74
t-statistics	0.37	0.70	1.69*
SD	9.47	3.68	4.73
Panel C: Correlations for VW factors			
$r_m - r_f$	1.00		
SMB	0.04	1.00	
HML	-0.02	-0.61***	1.00
Panel D: Correlations for EW factors			
$r_m - r_f$	1.00		
SMB	0.27***	1.00	
HML	-0.05	-0.30**	1.00

Description of factors provided in section 3. Sampling period is from July 2006 to December 2015. We report t-statistics by using the Newey and West (1987) approach. ***, ** and * indicates statistical significance at 1%, 5% and 10% levels, respectively.

Asset Growth and Expected Returns

The Panel A of Table 3 presents VW excess returns and SD on portfolios sorted by AG2. According to the results, excess return on the portfolio of the lowest AG2 stocks (p1) is high (1.05) however, only 0.95 standard errors away from zero. Consistent with the equation 2 and 3, the return on the highest AG2 portfolio is considerably lower (0.47; t = 0.37) than that of the lowest AG2 portfolio. This difference provides 0.59% of premium on zero-investment portfolio of low AG2 stocks. This asset growth premium is comparable with that of the U.S. market (see, Cooper et al. 2008; Hou et al. 2016) and the developing European markets (see, Ammann et al. 2012). However, it is higher than those of other developing markets (see, Zaremba and Czapkiewicz, 2017; Wang et al. 2015). On the other hand, the equity premium on zero-investment low AG2 portfolio is not significant (t = 0.67) partly due to high portfolio SD.

Additionally, the intercept estimates from models incorporating VW factors support this conclusion. According to the CAPM, AG2 premium is slightly lower whereas, according to the Fama and French (1993) three-factor model, it is slightly higher. However, in both cases the intercept estimates are insignificant.

Table 3: Characteristics of portfolios sorted by asset growth 2

Panel A: Value weighted strategy				
Asset Growth 2				
			α	
Portfolio	SD	Excess Return	CAPM	FF3M
1 (low)	10.3	1.05(0.95)	0.89(1.99)**	0.66(1.70)*
2	11.3	0.47(0.40)	0.31(0.65)	0.05(0.10)
3	9.28	0.28(0.30)	0.15(0.33)	0.11(0.24)
4	11.5	0.52(0.44)	0.36(0.67)	0.29(0.63)
5	9.72	0.41(0.36)	0.27(0.56)	0.12(0.24)
6	9.82	-0.16(-0.15)	-0.31(-1.05)	-0.33(-1.08)
7	10.3	0.43(0.41)	0.28(0.77)	0.41(1.08)
8	9.51	-0.01(-0.02)	-0.16(-0.51)	-0.16(-0.54)
9	9.64	0.67(0.63)	0.53(0.98)	0.55(1.00)
10	11.7	0.47 (0.37)	0.32(0.47)	0.05(0.07)
Hedge (1-10)	8.21	0.57(0.67)	0.57(0.66)	0.61(0.72)
Panel B: Equally weighted strategy				
1 (low)	9.61	0.85(0.85)	0.50(1.42)	0.32(1.00)
2	10.2	0.31(0.29)	-0.08(-0.41)	-0.18(-0.81)
3	9.53	0.14(0.14)	-0.21(-0.98)	-0.18(-0.84)
4	12.5	1.01(0.80)	0.59(1.08)	0.90(1.64)
5	9.76	0.30(0.28)	-0.06(-0.23)	-0.08(-0.27)
6	9.79	0.07(0.07)	-0.30(-1.60)	-0.33(-1.76)*
7	9.65	0.25(0.26)	-0.11(-0.44)	-0.05(-0.19)
8	9.76	0.25(0.24)	-0.13(-050)	-0.10(-0.45)
9	9.78	0.33(0.34)	-0.03(-0.11)	0.11(0.41)
10	10.9	0.24(0.20)	-0.16(-0.42)	-0.37(-1.25)
Hedge (1-10)	5.83	0.65(0.98)	0.65(1.10)	0.69(1.27)

Description of variables and factors is provided in the section 3. Table provides results from portfolios sorted by asset growth 2 (AG2). Sampling period is from July 2006 to December 2015. We report t-statistics by using the Newey and West (1987) approach. ** and * indicates statistical significance at 5% and 10% levels, respectively.

When we evaluate the same investment strategy with EW portfolios, we reach similar findings. This time premium on zero-investment low AG2 portfolio is at least four basis points higher yet still insignificant (t = 0.98). However, the EW hedge portfolio has considerably lower SD compared to the VW hedge portfolio leading to much better return-to-volatility characteristic. When we regress Fama and French (1993) three-factor model with EW factors against EW portfolio returns, the AG2 hedge premium slightly inflated however, the premiums are still insignificant.

We replicate the same investment strategy for the asset growth 3 (% change in total book assets from t-3 to t-2) variable. The Panel A of Table 4 presents SD, excess returns, and model intercepts related with the VW portfolios. Our results are consistent with equation 2 and 3 and prior findings. For example, zero-investment portfolio of low AG3 stocks has a monthly premium of 0.51 % from July 2006 to December 2015. However, consistent with prior studies investigating developing markets, this premium is not significant. The alpha estimates from CAPM and Fama and French (1993) three-factor model almost meet the AG3 premium. According to the CAPM, AG3 premium is 1 basis points lower than that of zero-investment portfolio premium however, according to Fama and French (1993) three-factor model it is 1 basis point higher.

The Panel B of Table 4 provides results for the EW portfolios. Consistent with equation 2 and 3 average excess returns on the portfolio of the lowest AG3 stocks are higher than that of portfolio of the highest AG3 stocks. This difference yields positive premium on zero-investment low AG3 portfolio as much as 0.51 percent, equal to that of VW strategy. However, this premium is not significant either. According to the CAPM with EW market factor IG premium is 2 basis points lower. On the other hand, Fama and French (1993) three-factor model with EW factors deflate these returns at least 36 basis point to 15 % per month. Interestingly, CAPM and Fama and French (1993) three-factor model cannot explain the returns for p2, p3, p4, p7 and p8. For these portfolios, returns become significant.

Table 4: Characteristics of portfolios sorted by asset growth 3

Portfolio	SD	Excess Return	α CAPM	α FF3M
Panel A: Value weighted strategy				
Asset Growth 3				
1 (low)	10.4	0.65(0.59)	0.50(1.06)	0.41(0.86)
2	10.5	1.02(0.88)	0.87(1.66)	0.91(1.79)*
3	9.77	-0.18(-0.18)	-0.32(-0.73)	-0.51(-1.18)
4	10.09	0.12(0.10)	-0.04(-0.10)	-0.23(-0.55)
5	10.5	-0.04(0.04)	-0.20(-0.41)	-0.41(-0.90)
6	9.57	0.38(0.40)	0.24(0.58)	0.15(0.37)
7	9.75	0.37(0.37)	0.23(0.51)	0.17(0.37)
8	9.34	-0.23(-0.24)	-0.37(-1.10)	-0.42(-1.23)
9	10.6	0.08(0.08)	-0.06(-0.12)	0.01(0.01)
10	10.2	0.13(0.13)	-0.00(-0.01)	-0.11(-0.22)
Hedge (1 - 10)	7.89	0.51(0.74)	0.50(0.67)	0.52(0.70)
Panel B: Equally weighted strategy				
1 (low)	11.0	0.65(0.54)	0.25(0.40)	-0.09(-0.24)
2	10.3	1.21(1.09)	0.83(2.10)**	0.79(2.09)**
3	9.40	-0.05(-0.05)	-0.40(-1.68)*	-0.41(-1.59)
4	10.2	-0.05(0.05)	-0.44(-1.96)*	-0.49(-2.14)**
5	9.89	0.11(0.11)	-0.27(-0.93)	-0.30(-0.99)
6	9.45	0.32(0.33)	-0.04(-0.18)	0.04(0.19)
7	9.66	-0.06(-0.07)	-0.44(-1.66)*	-0.48(-2.09)**
8	11.6	1.40(1.09)	1.00(1.93)*	1.46(2.40)**
9	9.59	0.14(0.14)	-0.22(-0.77)	-0.21(-0.73)
10	9.91	0.14(0.13)	-0.24(-0.90)	-0.24(-0.92)
Hedge (1 - 10)	6.20	0.51(0.91)	0.49(0.89)	0.15(0.29)

Description of variables and factors is provided in the section 3. Table provides results from portfolios sorted by asset growth 3 (AG3). Sampling period is from July 2006 to December 2015. We report t-statistics by using the Newey and West (1987) approach. ** and * indicates statistical significance at 5% and 10% levels.

Table 5: Characteristics of portfolios sorted by investment growth (IG)

Portfolio	SD	Excess Return	α CAPM	α FF3M
Panel A: Value weighted strategy				
		Investment Growth		
1 (low)	10.2	-0.09(-0.08)	-0.24(-0.49)	-0.53(-1.20)
2	10.4	0.86(0.74)	0.70(1.40)	0.58(1.12)
3	10.3	0.00(0.00)	-0.15(-0.36)	-0.38(-0.92)
4	10.5	0.09(0.08)	-0.07(-0.17)	-0.12(-0.32)
5	9.73	0.88(0.95)	0.74(1.32)	0.76(1.34)
6	9.77	0.03(0.03)	-0.11(-0.29)	0.01(0.03)
7	10.5	0.69(0.67)	0.53(1.65)	0.45(1.36)
8	9.87	-0.12(-0.11)	-0.27(-0.69)	-0.27(-0.72)
9	9.24	-0.05(-0.04)	-0.18(-0.45)	-0.22(-0.54)
10	9.80	0.30(0.30)	0.11(0.35)	-0.01(-0.03)
Hedge (1 - 10)	6.25	-0.39(-0.55)	-0.40(-0.58)	-0.52(-0.73)
Panel B: Equally weighted strategy				
1 (low)	9.94	0.21(0.20)	-0.17(-0.63)	-0.33(-1.31)
2	9.78	0.16(0.16)	-0.21(-0.78)	-0.23(-0.81)
3	10.4	0.44(0.41)	0.05(0.15)	-0.05(-0.18)
4	10.4	0.96(0.89)	0.56(2.09)**	0.59(2.25)**
5	9.81	0.74(0.72)	0.37(1.31)	0.37(1.42)
6	11.8	0.80(0.65)	0.39(0.76)	0.85(1.49)
7	9.48	0.12(0.12)	-0.24(-0.87)	-0.25(-0.88)
8	9.45	0.06(0.05)	-0.30(-0.98)	-0.24(-0.77)
9	9.30	0.28(0.29)	-0.07(-0.28)	-0.04(-0.19)
10	10.4	0.05(0.05)	-0.33(-0.96)	-0.58(-2.06)**
Hedge (1 - 10)	4.92	0.16(0.39)	0.17(0.41)	0.25(0.58)

Description of variables and factors provided in section 2. Sampling period is from July 2006 to December 2015. We report t-statistics by using the Newey and West (1987) approach. ***, **, * indicates statistical significance at 1%, 5% and 10% levels, respectively.

Investment Growth and Expected Returns

We also perform univariate portfolio analysis for the IG variable. Panel A of Table 5 provides the results for V-W investment strategy. Excess return on the portfolio of lowest IG stocks (p1) is negative (-0.09). However, high IG stock provides higher excess return (0.30; t = 0.30) than that or low IG stocks.

Therefore, zero-investment low IG portfolio has negative premium. The intercept estimates in the models justify this conclusion. This result contradicts with the suggestions of equation 2 and 3.

We evaluate EW investment strategy for the portfolios sorted by IG and report the results in Panel B. This time hedge premium becomes positive but still low (0.16) compared to those of AG2 and of AG3 premiums and highly insignificant (t = 0.39). According to EW CAPM the hedge premium is almost the same whereas, three-factor model with EW factors inflate this monthly premium at least 9 basis points.

CONCLUSION

According to Fama and French (2006) corporate investment can predict expected returns. Cooper et al. (2008) provide support for their proposition and document a negative relationship between total assets and expected returns. We test these predictions for the BIST using univariate portfolio analysis for three different corporate investment variables from July 2006 to December 2015. Our result indicates that the AG2 variable produces larger variations in expected returns compared to AG3 and IG variables. The AG2 premium in the BIST is economically large, such as average monthly premium on VW (EW) zero-investment low AG2 portfolio is 0.57 (0.61) % whereas, this premium is not significant and only 0.67 (0.98) standard errors away from zero. Our finding is consistent with the findings of Zaremba and Czapkiewicz (2017) considering other developing markets. The Intercept estimates from the traditional factor models justify the insignificance of the asset growth premium. Therefore, we cannot conclude that the corporate investment can be used to predict the expected returns in the BIST. However, the asset growth premium is economically comparable to that of the U.S. market (see, for instance Cooper et al. 2008; Hou et al. 2016). Our findings are important for the investors and portfolio managers wishing to construct actively managed portfolios in the BIST.

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