Price to Earnings Ratio and Holding Period Return Strategy Analysis in China A-Share Market

Abstract:

Stocks with lower PE ratios are considered to be undervalued; hence, they are expected to generate higher returns than high PE ratio stocks. This behaviour, however, does not correspond to the CAPM and efficient market hypothesis, since growth(High PE ratio) stocks would have huge upside potential while value stocks(Low PE ratio) are considered to be lower risk hence smaller returns. This trend of value stocks outperforming growth stocks has been widely accepted in the US Markets, but the Chinese A-Share Markets could be outliers for this trading strategy. This research analysis attempts to analyse the Chinese A-share Markets holding period returns relationship with Low and High PE ratio stocks by the use of linear regressions, two sample t-test and ANOVA analysis for validation the same US trends applies in the A-share China Market.

I. Introduction

The price to earnings ratio(PE-Ratio) is an investment tool to analyse and evaluate securities in the market, due to its easy interpretation among financial investors. Some investors believe securities with Low PE ratio are perceived having a cheaper price hence expected to generate high returns; while, others believe Higher PE ratio signals a potential growth and expected return in the future. This evaluation trend has been researched by many scholars for example: Ball (1978) and Fama French(1992) argues that a Higher E/P(Low PE) ratio correlates with a higher risk and expected return, which went against the conventional CAPM models and market efficiency hypothesis. This study will concentrate on an analysis of whether Low PE ratio stocks yield higher expected returns than High PE ratio stocks: to study the predictability of stock returns based on historical data.

There are multiple methods for calculating the PE ratio: the most common being the stock price per share divided by earnings per share; other methods include dividing the result with the growth rate yielding PEG ratio. Just like the various methods of PE ratio calculations, there are also two types of PE ratio, trailing and leading, for the purpose of this research the trailing PE ratio will be used: trailing PE ratios use the most recent quarter EPS, while leading uses the predicted EPS for next year. The calculation for the PE ratio in this paper will follow the company's standard financial statement EPS report followed by the use of the gordon growth dividend discount model:

PE-Ratio:

$$\frac{P_0}{E_0} = \frac{\frac{D_0(1+g)}{r-g}}{E_0}$$

From the equation above it can be concluded that the dividend payout ratio and growth have a significant positive relationship in the PE-ratio while the required rate of return is the

opposite; therefore, a higher dividend ratio or growth rate will yield a higher PE ratio, while a high required rate of return yields a lower PE ratio. Due to this relationship, Low PE ratio stocks are categorized as value stocks while High PE ratio stocks as growth stocks.

In relative evaluation, PE ratios are one the price multiples for comparison among a benchmark of companies in the particular industry; the comparison gives an indication of whether the stock is undervalued, overvalued or fairly priced. Portfolio managers use this relative evalution when recommending stock purchases with the belief that low PE stocks are undervalued: this belief has been proposed by Basu (1983) in his research on companies listed in NYSE from 1956 to 1971, where portfolios with lower PE ratio reported higher returns even after accounting for the size factor. Fama French (1992) also found similar results as Basu(1983) where low PE ratios reported higher abnormal returns.

Although there have been various academic papers proving that Lower PE ratios provide higher returns in the US Markets, the Chinese A-share Market can prove to be the opposite, since historically the Chinese Markets have proven to be outliers from US Market trends(e.g. Momentum): Wu (2004) has proven that although momentum strategies might work in the US market, the chinese A-share markets experience price contrarian, where contrarian strategies yielded higher excess returns for Chinese Market stocks. Therefore, the focus of this research paper lies with Chinese listed companies in both the Shenzhen and Shanghai Stock Exchange and their effect on the returns of low and high PE ratio.

II. Methods

This research paper examines 40 stocks in the Chinese A-share markets, which were selected based on the highest turnover-ratio in order to avoid illiquidity issues: where the higher

turnover ratio indicates a lower level of difficulty to buy and sell. The time horizon for the analysis is 6-months, 1 year, 2 years and 3 years, where three separate tests were conducted: a linear regression, two sample t-tests and ANOVA(Analysis of variance).

The linear regressions model takes the holding period return(HPR) as the dependent variable while the price to earnings ratio(PE-Ratio) as the independent variable. While the two sample t-test and ANOVA use the portfolio category as the independent variable and the HPR as the dependent . The HPR equation was calculated as follows:

Holding Period Return:

$$HPR = \frac{P_1 - P_0 + D_1}{P_0}$$

while the trailing PE-Ratio was acquired from yahoo finance. Due to the 40 selected stocks ranging in an array of industries, this ratio has to be compared between companies in each respected industry sectors as one industry might have a higher average PE ratio: to solve this issue the adoption of previous NYU stern research by professor Aswath Damodaran on the PE ratio benchmark of each Asia-Emerging markets**[Exhibit 1]** will be used as a comparison for categorization between High and Low PE-Ratios stocks.

In order to examine the relationship between the PE-ratio and the HPR, the linear regression equation was set up as follows:

Linear Regression:

$$Y_i = \alpha_i + \beta_i PER_i + \varepsilon rror_i$$

$Y_i = HPR\ (6 - Months,\ 1\ Year,\ 2\ Year,\ 3 Year)$
$\alpha_i =\ Regression\ y - intercept$
$PER_i = PE\ Ratio$
$\beta_i = PE\ Ratio\ Slope$
$\varepsilon rror_i = Error$

The two samples t-test was also used to find any significant relationship between the HPR for both Low and High PE-ratio portfolios. For null hypothesis the belief is that High PE-Ratios yield higher returns than Lower PE ratios, while for the alternative hypothesis the Lower PE-Ratio yields higher returns than higher PE-ratios.

T-stats:(Equation):

$$t = \frac{\overline{Adj.R^{Low\ PER}} - \overline{Adj.R^{High\ PER}}}{\sqrt{\frac{\sigma^2_{low\ PER\ sample}}{n_{lowPER}} + \frac{\sigma^2_{high\ PER\ sample}}{n_{highPER}}}}$$

$\overline{Adj.R^{low\ PER}}$: *Mean Adjusted Returns from Low PE ratio*

$\overline{Adj.R^{high\ PER}}$: *Mean Adjusted Returns from High PE ratio*

$\sigma^2_{low\ PER\ sample}$ = *Variance of Low PE ratio*

$\sigma^2_{high\ PER\ sample}$ = *Variance of High PE ratio*

$n_{low\ PER}$ = *sample size of Low PE ratio*

$n_{high\ PER}$ = *sample size of High PE ratio*

Hypothesis:

$H_0 : \mu_{high\ PE-ratio\ Portfolio} - \mu_{Low\ PE-ratio\ Portfolio} > 0$

$H_1 : \mu_{high\ PE-ratio\ Portfolio} - \mu_{Low\ PE-ratio\ Portfolio} < 0$

$\mu_{high\ PE-ratio\ Portfolio} - \mu_{Low\ PE-ratio\ Portfolio}$ = *Mean difference*

ANOVA statistics was the last model used to differentiate any significant differences in stock returns between Low and High PE-ratios and their respective variances.

ANOVA: Analysis

$$[S^{Low,\ High}]^2 * [n_{low\ PER} + n_{high\ PER} - 1] \geq [S^{Low}]^2 * [n_{low\ PER} - 1] + [S^{High}]^2 * [n_{High\ PER} - 1]$$

$$SS^{Total} - SS^{Total} = SS^{Treatment}$$

SS : *Sum of Squares*

$MS^{Error} = \frac{SS^{Error}}{[n_{low\ PER} + n_{high\ PER} - 2]}$

$MS^{Treatment} = \frac{SS^{Treatment}}{[n_{Group} - 1]}$

F-Ratio: (Two- Variance)

$$F = \frac{MS^{Treatment}}{MS^{Error}}$$

The two sample t-stats analysis and ANOVA analysis should present the same information if there is only two data comparison;therefore the results for the ANOVA and two sample t-stats would be equal in respect to the following equation:

T-Stats = ANOVA Test:

$$F \sim t^2 \rightarrow same\ p\ value$$

Lastly if the p-value is less than 0.05 then reject the null hypothesis; however, if p-value is high the null hypothesis stands and reject the alternative hypothesis, due to type one error.

III. Data

The data turnover and PE ratio from this research was acquired by the caibaoshao website while the historical prices for the portfolio analysis were acquired by yahoo finance**[Exhibit 2]**: each stock has been equally weighted in their respective portfolios. The analysis for the research was done with IBM SPSS(Statistical Package for the Social Sciences). The investigation period is between December 30th, 2016 to December, 1st 2019, while the portfolio did not re-adjust monthly on the subsequent PE ratio. Each portfolio's holding period return was based on the initial investment date; hence, the buy and hold method of purchasing and holding the investment until the expiration dates.

IV. Results & Analysis

A simple analysis was originally done, a comparison from each portfolio's HPR between 6 months, 1 year, 2 years, and 3 years, resulting in different conclusions.**[Exhibit 3]** Based on this analysis, the 6 months portfolio rejected the null hypothesis, that Higher PE ratio yields a higher HPR, since the 6 months portfolio presented to yield higher HPR on the Lower PE ratio stocks. On the other hand, the long-term portfolio rejected the alternative hypothesis due to the higher HPR on the High PE ratio stocks over the Lower PE ratio portfolio. Although this proves

to contradict the US Markets study based on Fama French(1992) and Basu(1983), there is still a possibility of a type one error; therefore a further analysis needs to be done with the linear regression, two sample t-stats and ANOVA.

The linear regression was analysed on each portfolio stocks in each time range: 6 months, 1 year, 2 year and 3 year.**[Exhibit 4]** The major interpreters for linear regression are the unstandardized coefficient(beta), the t-value, and the p-value. Based on the data for the linear regression among all the time periods and portfolios: it is concluded that for the 6 months period the unstandardized coefficient, for the High PE ratio stocks, was negative, while remaining positive for the Low PE ratio stocks, meaning the larger PE ratio works against the HPR. For the remaining time periods the unstandardized coefficient was opposite that of the 6 months regression. This finding also supports the previous simple analysis hypothesis conclusion, which Lower PE ratio favors larger HPR in the short-term but not the long-term. Unfortunately, the t-value for all the regressions made was not above 2 and the p-value was not below 0.05; therefore, this study cannot confidently accept these results with a 95% confidence interval due to potential type one error and lack of supporting evidence making the null hypothesis true both short and long term stocks in the China Markets.

Lastly, the two sample t-test and ANOVA analysis **[Exhibit 5]**, which yields the same results with different methods one with the sample mean analysis and other with the variance, yields similar conclusions as the linear regression and the simple analysis. The 6 months two sample test provided a negative t-value while the 1 year, 2 years and 3 years all provided a positive number with a p value above 0.05; therefore, the rejection of the null hypothesis can

only be concluded in the 6 months time range, while it would be generally accepted that for longer than 6 months Higher PE ratios yields higher HPR.

V. Conclusion

From the aforementioned study by Wu(2004) and the current results concluded from the three analyses on the PE ratios and their respected HPR values, it can be concluded that the Chinese A-share market shares opposite trends than that of the US markets. Although the alternative hypothesis showed promise in the short-term, due to the large p-value, it cannot be concluded with a 95% certainty whether short-term investments on Low PE ratio stocks yields higher HPR; however, the null hypothesis appears to be justified for long term investment while the alternative hypothesis is rejected.

Exhibit 1 - Asia Market PE-ratio benchmark

Date updated:	5-Jan-17
Created by:	Aswath Damodaran, adamodar@stern.nyu.edu
What is this data?	Price Earnings multiples
Home Page:	http://www.damodaran.com
Data website:	http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html
Companies in each industry:	http://www.stern.nyu.edu/~adamodar/pc/datasets/indname.xls
Variable definitions:	http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/variable.htm

Industry Name	Number of firms	Trailing PE
Advertising	70	35.09
Aerospace/Defense	61	51.04
Air Transport	81	19.38
Apparel	899	58.02
Auto & Truck	78	63.16
Auto Parts	395	71.52
Bank (Money Center)	465	14.64
Banks (Regional)	87	18.38
Beverage (Alcoholic)	121	110.07
Beverage (Soft)	36	36.98
Broadcasting	60	102.90
Brokerage & Investment Banking	392	47.53
Building Materials	225	67.58
Business & Consumer Services	194	58.44
Cable TV	30	34.90
Chemical (Basic)	585	50.45
Chemical (Diversified)	41	19.58
Chemical (Specialty)	440	79.93
Coal & Related Energy	108	117.95
Computer Services	411	74.26
Computers/Peripherals	203	43.22
Construction Supplies	529	82.83
Diversified	238	30.04
Drugs (Biotechnology)	156	275.13
Drugs (Pharmaceutical)	576	53.21
Education	85	27.07
Electrical Equipment	529	112.85
Electronics (Consumer & Office)	92	52.36
Electronics (General)	735	72.58
Engineering/Construction	694	76.26
Entertainment	164	144.08
Environmental & Waste Services	98	40.16
Farming/Agriculture	270	97.89
Financial Svcs. (Non-bank & Insurance)	536	187.96
Food Processing	854	43.05
Food Wholesalers	59	70.48
Furn/Home Furnishings	202	79.29
Green & Renewable Energy	77	67.87
Healthcare Products	164	188.75
Healthcare Support Services	109	57.82
Heathcare Information and Technology	56	55.48
Homebuilding	36	21.12
Hospitals/Healthcare Facilities	90	40.99
Hotel/Gaming	411	124.40
Household Products	235	47.52
Information Services	53	41.12
Insurance (General)	154	21.36
Insurance (Life)	63	64.10
Insurance (Prop/Cas.)	141	19.88
Investments & Asset Management	333	166.27
Machinery	674	74.50
Metals & Mining	290	120.45
Office Equipment & Services	67	65.35
Oil/Gas (Integrated)	23	48.94
Oil/Gas (Production and Exploration)	135	47.24
Oil/Gas Distribution	86	22.35
Oilfield Svcs/Equip.	243	142.54
Packaging & Container	279	32.88
Paper/Forest Products	191	74.06
Power	370	23.20
Precious Metals	100	55.53
Publishing & Newspapers	162	118.77
R.E.I.T.	81	18.88
Real Estate (Development)	638	49.59
Real Estate (General/Diversified)	280	179.46
Real Estate (Operations & Services)	279	41.40
Recreation	121	106.76
Reinsurance	30	14.72
Restaurant/Dining	98	54.70
Retail (Automotive)	78	34.11
Retail (Building Supply)	13	24.43
Retail (Distributors)	523	228.18
Retail (General)	137	92.50
Retail (Grocery and Food)	60	48.22
Retail (Online)	28	62.68
Retail (Special Lines)	158	197.91
Rubber& Tires	69	24.90
Semiconductor	389	47.63
Semiconductor Equip	151	39.85
Shipbuilding & Marine	219	64.21
Shoe	63	30.41
Software (Entertainment)	54	173.85
Software (Internet)	150	54.50
Software (System & Application)	309	887.26
Steel	518	48.13
Telecom (Wireless)	62	26.84
Telecom. Equipment	268	260.34
Telecom. Services	116	25.96
Tobacco	29	19.90
Transportation	141	32.79
Transportation (Railroads)	11	44.10
Trucking	95	24.66
Utility (General)	13	60.12
Utility (Water)	56	32.40
Total Market	**20578**	**88.24**
Total Market (without financials)	**18286**	**88.73**

Source: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/dataarchived.html#multiples

Exhibit 2 - China A-share Market Highest Turnover ratio companies 2016

Stock	Code	Stock	Code
Shanghai Ganglian E-Commerce Holdings Co., Ltd.	300226.SZ	Xiamen ITG Group Corp., Ltd.	600755.SS
Wanbangde Pharmaceutical Holding Group Co., Ltd.	002082.SZ	Minmetals Development Co., Ltd.	600058.SS
Shenzhen Aisidi CO.,LTD.	002416.SZ	KAISA Jiayun Technology Inc.	300242.SZ
Zheshang Development Group Co.,Ltd	000906.SZ	Daqing Huake Company Limited	000985.SZ
Fujian Oriental Silver Star Investment Co., Ltd.	600753.SS	Zhejiang Huatong Meat Products Co., Ltd.	002840.SZ
Hengtong Logistics Co., Ltd.	603223.SS	Shandong Longda Meat Foodstuff Co.,Ltd	002726.SZ
Xiamen Xiangyu Co., Ltd.	600057.SS	HY Energy Group Co.,Ltd	600387.SS
Xiamen Xindeco Ltd.	000701.SZ	Chongqing Department Store Co.,Ltd.	600729.SS
Wuchan Zhongda Group Co.,Ltd.	600704.SS	Guangdong Haid Group Co., Limited	002311.SZ
Telling Telecommunication Holding Co.,Ltd	000829.SZ	SINOPEC Shandong Taishan Petroleum Co.,Ltd.	000554.SZ
Maoming Petro-Chemical Shihua Co., Ltd	000637.SZ	Shenzhen Cereals Holdings Co.,Ltd.	000019.SZ
Digital China Group Co., Ltd.	000034.SZ	Tangrenshen Group Co., Ltd	002567.SZ
Guangdong Sky Dragon Printing Ink Group Co., Ltd.	300063.SZ	Guangzhou Shiyuan Electronic Technology Company Limited	002841.SZ
Sino-Platinum Metals Co.,Ltd	600459.SS	Shanghai Lonyer Fuels Co., Ltd.	603003.SS
Shanghai Material Trading Co., Ltd.	600822.SS	Shenzhen Desay Battery Technology Co., Ltd.	000049.SZ
Zibo Qixiang Tengda Chemical Co., Ltd	002408.SZ	Foxconn Industrial Internet Co., Ltd.	601138.SS
Anhui Zhongyuan New Materials Co., Ltd.	603527.SS	Shenzhen Yitoa Intelligent Control Co.,Ltd.	300131.SZ
Lao Feng Xiang Co., Ltd.	600612.SS	Beijing Career International Co., Ltd.	300662.SZ
HNA Technology Co.,Ltd.	600751.SS	Liaoning Wellhope Agri-Tech Joint Stock Co., Ltd.	603609.SS
Guangdong Jingyi Metal Co., Ltd.	002295.SZ	Sinopec Shanghai Petrochemical Company Limited	600688.SS
Zhejiang Int'l Group Co.,Ltd.	000411.SZ	**Source:** https://caibaoshuo.com/markets/A/ranks/assets_turnover_ratio?page=1	

Exhibit 3 - Holding Period Return Portfolio

High P-E ratio Portfolio			
6 Months	**1 Year**	**2 Year**	**3 Year**
- 0.076	0.036	- 0.228	- 0.034
Low P-E ratio Portfolio			
6 Months	**1 Year**	**2 Year**	**3 Year**
- 0.05658	- 0.07416	- 0.39977	- 0.27231

Exhibit 4 - Linear Regressions Results

High PE Ratio Regression:	**Low PE Ratio Regression:**
6-Months	
Regression [DataSet1] **Variables Entered/Removed[a]** Model: 1 — Variables Entered: High_PER[b] — Variables Removed: . — Method: Enter a. Dependent Variable: HPR_6_Month b. All requested variables entered. **Model Summary** Model: 1 — R: .245[a] — R Square: .060 — Adjusted R Square: .015 — Std. Error of the Estimate: .20228 a. Predictors: (Constant), High_PER **ANOVA[a]** Model: 1 — Regression: Sum of Squares .055, df 1, Mean Square .055, F 1.336, Sig. .261[b] — Residual: .859, 21, .041 — Total: .914, 22 a. Dependent Variable: HPR_6_Month b. Predictors: (Constant), High_PER **Coefficients[a]** Model: 1 — (Constant): B .029, Std. Error .085, Beta, t .333, Sig. .742 — High_PER: B -.003, Std. Error .003, Beta -.245, t -1.156, Sig. .261 a. Dependent Variable: HPR_6_Month	**Regression** **Variables Entered/Removed[a]** Model: 1 — Variables Entered: Low_PER[b] — Variables Removed: . — Method: Enter a. Dependent Variable: HPR_6_Month b. All requested variables entered. **Model Summary** Model: 1 — R: .292[a] — R Square: .085 — Adjusted R Square: .015 — Std. Error of the Estimate: .23306 a. Predictors: (Constant), Low_PER **ANOVA[a]** Model: 1 — Regression: Sum of Squares .066, df 1, Mean Square .066, F 1.209, Sig. .291[b] — Residual: .706, 13, .054 — Total: .772, 14 a. Dependent Variable: HPR_6_Month b. Predictors: (Constant), Low_PER **Coefficients[a]** Model: 1 — (Constant): B -.039, Std. Error .069, Beta, t -.576, Sig. .575 — Low_PER: B .000, Std. Error .000, Beta -.292, t -1.100, Sig. .291 a. Dependent Variable: HPR_6_Month
1-Year	

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	High_PER[b]	.	Enter

a. Dependent Variable: HPR_1_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.250[a]	.062	-.010	.54781

a. Predictors: (Constant), High_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.260	1	.260	.865	.369[b]
	Residual	3.901	13	.300		
	Total	4.161	14			

a. Dependent Variable: HPR_1_Year
b. Predictors: (Constant), High_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.108	.161		.670	.515
	High_PER	.000	.000	-.250	-.930	.369

a. Dependent Variable: HPR_1_Year

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Low_PER[b]	.	Enter

a. Dependent Variable: HPR_1_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.049[a]	.002	-.045	.28179

a. Predictors: (Constant), Low_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.004	1	.004	.050	.825[b]
	Residual	1.668	21	.079		
	Total	1.672	22			

a. Dependent Variable: HPR_1_Year
b. Predictors: (Constant), Low_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.051	.118		-.435	.668
	Low_PER	-.001	.004	-.049	-.224	.825

a. Dependent Variable: HPR_1_Year

2 Year

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	High_PER[b]	.	Enter

a. Dependent Variable: HPR_2_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.241[a]	.058	-.015	.59506

a. Predictors: (Constant), High_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.283	1	.283	.800	.387[b]
	Residual	4.603	13	.354		
	Total	4.886	14			

a. Dependent Variable: HPR_2_Year
b. Predictors: (Constant), High_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.153	.175		-.874	.398
	High_PER	.000	.000	-.241	-.894	.387

a. Dependent Variable: HPR_2_Year

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Low_PER[b]	.	Enter

a. Dependent Variable: HPR_2_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.351[a]	.123	.082	.22184

a. Predictors: (Constant), Low_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.146	1	.146	2.957	.100[b]
	Residual	1.034	21	.049		
	Total	1.179	22			

a. Dependent Variable: HPR_2_Year
b. Predictors: (Constant), Low_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.261	.093		-2.818	.010
	Low_PER	-.005	.003	-.351	-1.720	.100

a. Dependent Variable: HPR_2_Year

3 Year

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	High_PER[b]	.	Enter

a. Dependent Variable: HPR_3_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.239[a]	.057	-.022	.91646

a. Predictors: (Constant), High_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.609	1	.609	.725	.411[b]
	Residual	10.079	12	.840		
	Total	10.688	13			

a. Dependent Variable: HPR_3_Year
b. Predictors: (Constant), High_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.082	.280		.292	.776
	High_PER	-.001	.001	-.239	-.852	.411

a. Dependent Variable: HPR_3_Year

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Low_PER[b]	.	Enter

a. Dependent Variable: HPR_3_Year
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.281[a]	.079	.033	.25982

a. Predictors: (Constant), Low_PER

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.116	1	.116	1.721	.204[b]
	Residual	1.350	20	.068		
	Total	1.466	21			

a. Dependent Variable: HPR_3_Year
b. Predictors: (Constant), Low_PER

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.149	.109		-1.366	.187
	Low_PER	-.005	.004	-.281	-1.312	.204

a. Dependent Variable: HPR_3_Year

Exhibit 5 - Two Sample t-test & ANOVA results

6-Months

T-Test

Group Statistics

	PE Ratio	N	Mean	Std. Deviation	Std. Error Mean
HPR	High PE Ratio	15	-.0756667	.23478122	.06062283
	Low PE Ratio	23	-.0565817	.20381214	.04249777

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
HPR	Equal variances assumed	.033	.857	-.266	36	.792	-.01908499	.07181478	-.16473212	.12656214
	Equal variances not assumed			-.258	26.993	.799	-.01908499	.07403505	-.17099428	.13282430

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ONEWAY HPR BY PE_Ratio
  /MISSING ANALYSIS.
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Oneway

ANOVA

HPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.003	1	.003	.071	.792
Within Groups	1.686	36	.047		
Total	1.689	37			

1-Year

T-Test

Group Statistics

	PE Ratio	N	Mean	Std. Deviation	Std. Error Mean
HPR	High PE Ratio	15	.0360352	.54516351	.14076061
	Low PE Ratio	23	-.0741608	.27564412	.05747577

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
HPR	Equal variances assumed	4.198	.048	.825	36	.415	.11019600	.13358405	-.16072501	.38111700
	Equal variances not assumed			.725	18.726	.478	.11019600	.15204280	-.20834837	.42874036

```
ONEWAY HPR BY PE_Ratio
  /MISSING ANALYSIS.
```

Oneway

ANOVA

HPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.110	1	.110	.680	.415
Within Groups	5.832	36	.162		
Total	5.943	37			

2 Year

T-Test

Group Statistics

	PE Ratio	N	Mean	Std. Deviation	Std. Error Mean
HPR	High PE Ratio	15	-.2281180	.59078154	.15253914
	Low PE Ratio	23	-.3997734	.23150212	.04827153

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
HPR	Equal variances assumed	13.909	.001	1.260	36	.216	.17165547	.13622590	-.10462345	.44793440
	Equal variances not assumed			1.073	16.837	.298	.17165547	.15999478	-.16615320	.50946414

```
ONEWAY HPR BY PE_Ratio
  /MISSING ANALYSIS.
```

Oneway

ANOVA

HPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.268	1	.268	1.588	.216
Within Groups	6.065	36	.168		
Total	6.333	37			

3 Year

T-Test

Group Statistics

	PE Ratio	N	Mean	Std. Deviation	Std. Error Mean
HPR	High PE Ratio	14	-.0344281	.90671904	.24233086
	Low PE Ratio	22	-.2723054	.26424373	.05633695

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
HPR	Equal variances assumed	14.023	.001	1.164	34	.253	.23787723	.20440825	-.17753030	.65328477
	Equal variances not assumed			.966	14.417	.355	.23787723	.24879328	-.29428653	.77004100

```
ONEWAY HPR BY PE_Ratio
  /MISSING ANALYSIS.
```

Oneway

ANOVA

HPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.484	1	.484	1.354	.253
Within Groups	12.154	34	.357		
Total	12.638	35			

References:

Ball, Ray, 1978, Anomalies in relationships between securities' yields and yield-surrogates, Journal of Financial Economics 6, 103-126

Basu, Sanjoy, 1983, The relationship between earnings yield, market value, and return for NYSE common stocks: Further evidence, Journal of Financial Economics 12, 129-156.

Fama, Eugene F., and Kenneth R. French. "The Cross-Section of Expected Stock Returns." *The Journal of Finance*, vol. 47, no. 2, 1992, pp. 427–465. *JSTOR*, www.jstor.org/stable/2329112. Accessed 12 May 2020.

Wu, Yangru. (2004). Momentum trading, mean reversal and overreaction in Chinese stock market. Review of Quantitative Finance and Accounting. 37. 301-323. 10.1007/s11156-010-0206-z.