Customer Satisfaction and Equity Mispricing

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This paper analyzes the relationship between customer satisfaction and long run stock returns. An equally-weighted portfolio of 230 customer satisfaction score documented companies in American customer satisfaction index (ACSI) delivers a five factor alpha of 3.16% per year. The major economic explanation for this portfolio's continuous outperformance is that the companies with high customer satisfaction exhibit a high future sale growth. These findings are consistent with word of mouth theory stating that positive word of mouth from highly satisfied customers would help firms penetrate new and existing markets and thus lead to high future sales.

INTRODUCTION

This paper examines the relationship between customer satisfaction and long term equity returns. An equal weighted portfolio of 230 customer satisfaction score documented companies delivered a four factor alpha of 6.91% per year and a five factor alpha of 3.16% per year. These results are robust to controlling for different weighting methodologies under the Carhart (1997) four factor model. However, the alpha does not survive in the value weighted scheme or a fundamentally scheme under the Fama French(2014) five factor model. It is interesting to find out that a fundamentally weighting scheme delivers a higher four factor alpha than an equal or a value weighted scheme.

In an efficient market, market usually reacts to change of beneficial tangible variable immediately. A great example will be earning surprise many times leads equity price to have a dramatic change on the earning announcement date. However, the market takes a long time to react to change of intangible variable due to the fact that a change of intangible variable is not instantly but slowly reflected in the change of the beneficial tangible variable. A broad literature has documented excessive returns earned by the intangible variables over the long term. For example, Edmans(2011) finds a 3.5% annual abnormal return could be earned from portfolios formed based on employee satisfaction from 1984 to year 2009. Lev and Sougiannis (1996) discovered that a 4.6% annual abnormal return resulted from forming portfolios.

Based on research and development capital spending over a similar long-term period. This paper not only examines the long-term excess return that can be achieve based on information about customer satisfaction, but also examines how these returns are established by linking high customer satisfaction levels to future sales growth.

Does customer satisfaction have a significant impact on the equity pricing over the long term, and if it does, how does customer satisfaction influence equity valuation? This is the key research question we are addressing in this paper. According to Anderson (1998)'s Word of mouth theory, positive word of mouth from highly satisfied customers would help firms penetrate new and existing markets and thus lead to

high future sales. These high future sales will be translated into accelerated cash inflows which will have an ultimate positive impact on the company's shareholder value.

Besides the word of mouth theory, many scholars have documented the relationship between customer satisfaction and shareholder value. For instance, Drew (1991) shows that high customer satisfaction is more likely to lead high customer retention and Fornell (1992) suggests that increasing customer retention resulted from high customer satisfaction help secure firm's future sales. In addition, Reichheld and Sasser (1996) a high customer retention due to the high customer satisfaction will help firm to decrease the costs of communication, sales and services. Those Empirical findings indicate that a high customer satisfaction will lead to a high customer retention which will be ultimately translated into higher sales and lower costs or a higher net cash inflow for the firm. This indicates that a customer satisfaction has a positive impact on the shareholder value through its impact on the customer retention.

Both word of mouth theory and customer retention has indicated that the customer satisfaction has an indirect positive impact on the firms' future sales. Our first contribution to the prior literature lies in that we employ an unbalanced panel Vector autoregressive analysis to examine the relationship between company's customer satisfaction and firm's future sales growth. Our null hypothesis is that a high customer satisfaction score in previous year is able to drive up the current sales growth. We find that a company with high customer satisfaction in the previous period has positive predictive power on the firm's current period sales growth. The positive magnitude of prior customer satisfaction in the VAR model helps us to understand how much the firm's future sales growth will boost up responded to a company's customer satisfaction score's additional one unit increase.

Because customer satisfaction enables a business to produce future earnings on the tangible asset, our second null hypothesis is that an increase of customer satisfaction does not lead to an increase of risk excessive return. Our second contribution lies in that we are the first one to exam the difference of excessive risk adjusted return from an equal weighted methodology and a fundamentally weighted methodology. We have seen alpha is very significant in the high customer satisfaction ranking companies and not significant in the medium and low customer satisfaction companies. However, the same portfolio stated above delivers a higher alpha in the context of Carhart(1997) four factor model. This is consistent with the fact that customer satisfaction is related to future sales and future profitability and after controlling profitability and investment factors, the alpha will tend to decrease.

The paper will proceed as following four parts. In part 2, we will discuss our data and our null hypothesis. In part 3, we will continue with three different weighting schemes and discover the alpha for each scheme. In part 4, we have conducted a sensitivity analysis by separating firms into three various customer satisfaction ranking groups. We have carried out the three different weighting schemes for each group of firms. In part 5, we will have our conclusion

DATA AND VARIABLE DESCRIPTION

My main data resource is customer satisfaction score which is available from American Customer Satisfaction Index(ACSI) website: www.theacsi.org. The National Quality Research center at the University of Michigan is responsible for developing this ACSI on an annual basis. According to Fornell (2006), ACSI sent and collected over 50,000 customer surveys to gain the overall consumption experience of goods or services on a specific company's brand. According to the science of customer satisfaction described on www.theacsi.org/about-acsi/the-science-of- customer-satisfaction, the customer satisfaction score is calculated as a weighted average of three customer survey questions and those questions respectively measure various perspectives of satisfaction with a specific company's product or service. The final customer satisfaction score is reported on a 0 to 100 scale. The ACSI index database covers annual customer satisfaction score for 230 companies from over 10 economic sectors and 47 industries. I hand collected the customer satisfaction score over those 230 companies from year 1995 to year 2014. Scores are then matched by Cusip codes to the Morningstar Direct and Factset databases. This process results in 2,040 firm-year observations.

Figure 1 displays the mean, minimum and maximum values for the CS values over time.

FIGURE 1
CUSTOMER SATISFACTION OVER TIME

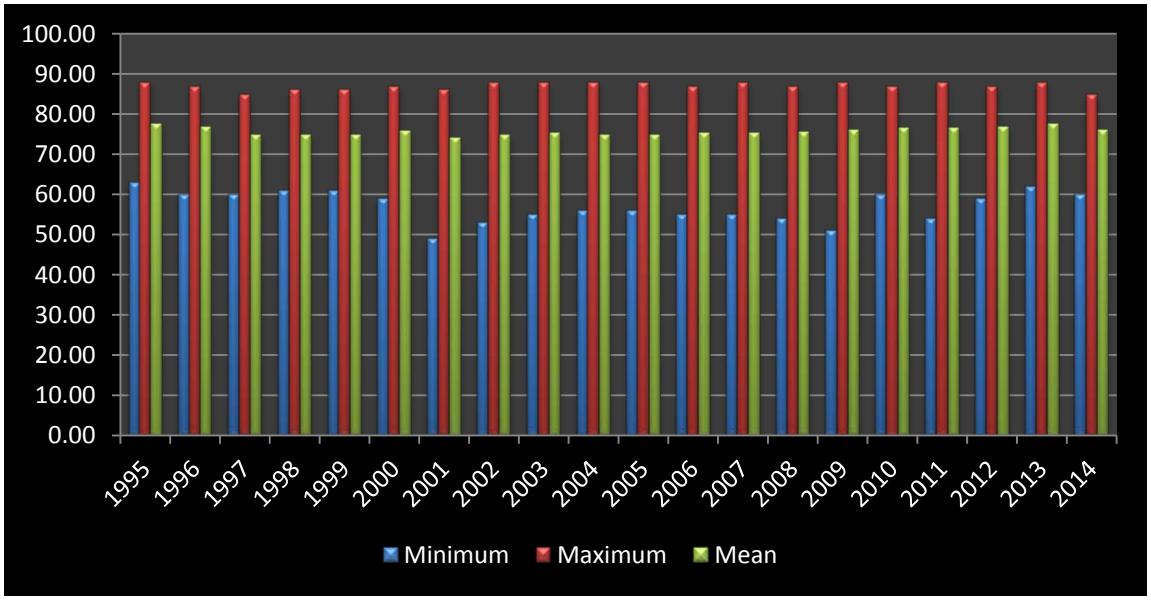

Table 1 summarizes the statistics of customer satisfaction

TABLE 1
CUSTOMER SATISFACTION DESCRIPTIVE STATISTICS

Year	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
1995	77.00	77.55	5.55	63.00	88.00
1996	71.00	76.96	5.87	60.00	87.00
1997	74.00	75.04	6.16	60.00	85.00
1998	73.00	75.12	6.13	61.00	86.00
1999	74.00	74.97	5.97	61.00	86.00
2000	78.00	75.94	6.28	59.00	87.00
2001	95.00	74.01	7.16	49.00	86.00
2002	96.00	75.06	6.67	53.00	88.00
2003	99.00	75.60	6.03	55.00	88.00
2004	99.00	75.02	5.78	56.00	88.00
2005	109.00	75.00	6.25	56.00	88.00
2006	113.00	75.45	6.18	55.00	87.00
2007	127.00	75.50	6.55	55.00	88.00
2008	129.00	75.70	6.59	54.00	87.00
2009	129.00	76.09	6.53	51.00	88.00
2010	131.00	76.66	5.79	60.00	87.00
2011	129.00	76.84	6.10	54.00	88.00
2012	131.00	77.00	5.99	59.00	87.00
2013	126.00	77.67	5.77	62.00	88.00
2014	80.00	76.34	5.48	60.00	85.00

Table 2 summarizes the descriptive statistics for the sample firms' sales data over the year 1995 to year 2014.

TABLE 2
FIRM SALES DESCRIPTIVE STATISTICS

Year	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
1995	77	17336.56	23051.34	21.60	137137.00
1996	71	18631.55	24691.48	26.01	146991.00
1997	74	20053.77	25973.66	24.98	153627.00
1998	73	20771.46	26702.11	0.58	144416.00
1999	74	24464.13	33719.27	20.09	162558.00
2000	78	26892.45	38764.64	20.96	206083.00
2001	95	22933.70	31852.11	25.99	193295.00
2002	96	21128.43	32816.42	19.43	219812.00
2003	99	21868.27	34493.64	20.76	246525.00
2004	99	852066.72	8235220.00	24.36	81963000.00
2005	109	765077.88	7720597.00	31.98	80630000.00
2006	113	960052.10	8230120.00	31.49	85425626.00
2007	127	965753.01	8907947.00	22.03	98507817.00
2008	129	1142748.60	10838973.00	26.58	121294319.00
2009	129	1335750.00	12486398.00	12.43	138993671.00
2010	131	1534200.90	13975553.00	10.21	154630328.00
2011	129	1647134.10	14984763.00	8.36	165001771.00
2012	131	2368225.30	18517058.00	5.34	201103613.00
2013	126	2738286.60	21360837.00	6.42	228692667.00
2014	80	4020498.10	24384641.00	748.71	0620598.00

We can see the firms' average sales time series data are non-stationary because its mean is time dependent. Figure 2 shows the movement of mean firms' sales and mean customer satisfaction over year 1995 to year 2014. It is clear to see that mean customer satisfaction movement pre-leads the mean sales movement during the period early 2000s till early 2010s.

FIGURE 2
MEAN SALES AND MEAN CUSTOMER SATISFACTION SCORE

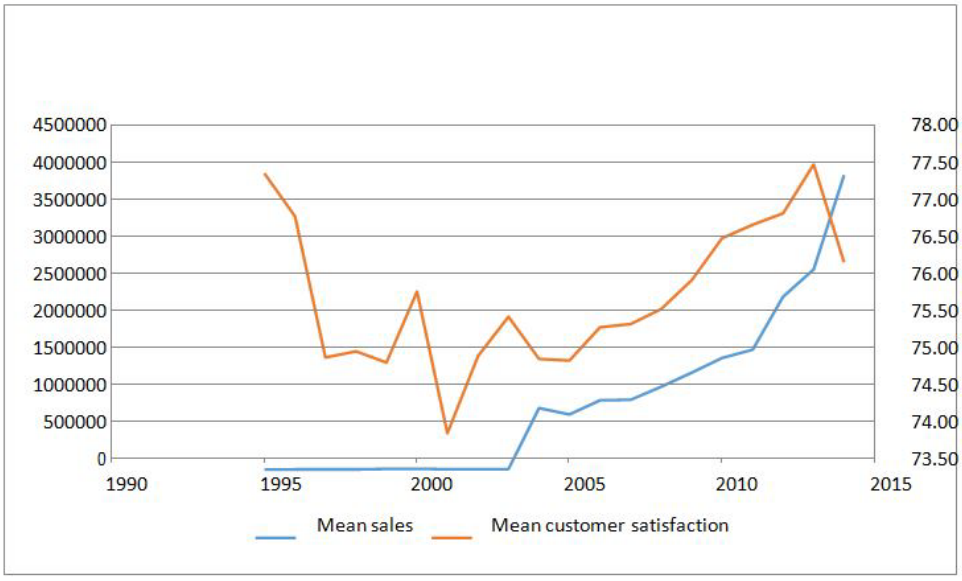

Table 3 exhibits the annual Factor data from French library.

TABLE 3
FAMA FRENCH ANNUAL FACTOR

Year	Mkt-RF	SMB	HML	RMW	CMA	RF	MOM
1995	31.21	-7.56	1.88	4.62	1.13	5.60	17.75
1996	15.97	-1.02	10.13	13.76	2.80	5.21	6.64
1997	25.97	-3.66	16.28	13.11	-0.77	5.26	11.85
1998	19.46	-25.92	-11.33	-3.43	0.46	4.86	23.38
1999	20.56	9.33	-32.65	-20.39	-0.55	4.68	34.61
2000	-17.59	5.76	23.52	8.00	13.17	5.89	15.01
2001	-15.20	22.76	16.92	15.04	8.02	3.83	4.77
2002	-22.76	4.84	11.67	16.08	8.55	1.65	25.68
2003	30.75	19.87	-0.84	-10.95	4.13	1.02	-24.53
2004	10.72	8.40	8.53	7.53	-4.92	1.20	-0.39
2005	3.09	-2.65	7.47	1.48	-9.73	2.98	14.87
2006	10.60	3.38	10.29	3.85	6.62	4.80	-7.66
2007	1.04	-10.88	-10.01	-5.23	-6.40	4.66	21.56
2008	-38.34	8.55	3.49	11.37	4.33	1.60	13.26
2009	28.26	5.61	-7.28	1.58	2.46	0.10	-83.02
2010	17.37	10.78	-6.34	-4.87	7.49	0.12	6.07
2011	0.44	-3.31	0.47	7.54	-2.32	0.04	7.34
2012	16.28	1.04	0.59	-1.10	6.53	0.06	1.22
2013	35.19	8.47	-1.29	1.32	2.24	0.02	8.63
2014	11.70	-6.83	-1.89	-1.13	0.17	0.02	1.54

ANALYSIS AND RESULT

To ensure that any abnormal return of our sample of firms with customer satisfaction data does not result from risk factors, I use Fama French (1992) three factor, Cahart(1997) four factor and Fama French (2014) five factor to examine the abnormal return.

$$R_{i,t} - rf_t = \alpha + \beta_{MKT} MKT_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \varepsilon_{i,t} \quad (1)$$

$$R_{i,t} - rf_t = \alpha + \beta_{MKT} MKT_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{MOM} MOM_t + \varepsilon_{i,t} \quad (2)$$

$$R_{i,t} - rf_t = \alpha + \beta_{MKT} MKT_t + \beta_{SMB} SMB_t + \beta_{HML} HML_t + \beta_{RMW} RMW_t + \beta_{CMA} CMA_t + \varepsilon_{i,t} \quad (3)$$

Where $R_{i,t}$ is the return on the portfolio i in year t and rf_t is the risk free rate in year t. α is an intercept that captures the excessive risk-adjusted return. MKT_t is the market risk premium, SMB_t is the size risk premium, HML_t is the value risk premium, MOM_t is the momentum risk premium, RMW_t is the profitability risk premium and CMA_t is the investment risk premium. Those annual factors are obtained from Ken French's website.

We are interesting in examining whether the excessive risk adjusted return alpha for a particular firm can be explained by average of customer satisfaction score over time. Therefore, we conduct a cross-

sectional analysis. To complete the analysis, our first step is to run the regression in model 3 and extract alphas for each firm.

Our second step is to calculate the average of customer satisfaction score for each firm. Our third step is to merge our alphas table with our average of customer satisfaction score table by each company's cusip. Then we complete we simply regress our alphas against our average of customer satisfaction score with use of clustered errors.

Our key null hypothesis for those three models is that an increase of customer satisfaction does not lead to an increase of excessive risk-adjusted return.

TABLE 4
PANEL ALPHA VS AVERAGE CUSTOMER SATISFACTION

	Dependent Variable: Alpha(i)
Intercept	-0.156
	(0.336)
CRmean	0.0084
	(0.0044)*

As we can see from the table 4, for each unit of average score of customer satisfaction increase, the excessive adjusted risk for each firm will increase by 0.84% over examination period 1995 to 2014. Therefore, customer satisfaction helps deliver persistent long term equity outperformance.

We are also interesting in examining what would annual alpha would be in three models above. Table 5,6 exhibits the equal weighted value weighted alpha.

TABLE 5
EQUAL WEIGHTED ALPHA

	F.F.(1993) 3factor	Carhart (1997)4factor	F.F. (2014) 5factor
α	3.59	6.91	3
	(1.67)**	(1.20)***	.
β_{MKT}	1.04	0.90	1.05
	(0.08)***	(0.08)***	(0.14)***
β_{SMB}	-0.03	-0.23	-0.08
	(0.14)	(0.12)*	(0.16)
β_{HML}	0.61	0.54	0.60
	(0.23)**	(0.12)***	(0.38)
β_{MOM}		-0.28	
		(0.03)***	
β_{RMW}			-0.03
			(0.54)
β_{CMA}			0.28
			(0.17)

Table 5 presents the core results of the paper, for the entire 1995-2014 period. Portfolio i generates significant abnormal returns under equal weighting scheme for all three models above. Fama French (2014) 5 factor model obtains an annual alpha of 3.59% while Carhart (1997) 4 factor model predicts an annual alpha of 6.91%. This indicates customer satisfaction is an indicator of future profitability and after controlling profitability and investment factors, the alpha will tend to decrease.

TABLE 6
VALUE WEIGHTED ALPHA

	F.F.(1993) 3factor	Carhart (1997)4factor	F.F. (2014) 5factor
α	8.14	15.99	7.27
	(4.56)*	(5.58)***	(8.30)
β_{MKT}	0.97	0.63	1
	(0.30)***	(0.29)**	.
β_{SMB}	-0.09	-0.57	-0.04
	(0.36)	(0.34)	(0.44)
β_{HML}	0.14	-0.02	-0.04
	(0.30)	(0.27)	(1.13)
β_{MOM}		-0.66	
		(0.17)***	
β_{RMW}			0.33
			(1.50)
β_{CMA}			-0.05
			(1.34)

Table 6 presents the abnormal return of Portfolio i generated under equal weighting scheme for all three models above. Fama French (2014) 5 factor model obtains an annual alpha of 8.80% while Carhart (1997) 4 factor model predicts an annual alpha of 18.14%. However, the 5 factor alpha is not significant; this shows the value weighted portfolio for the customer satisfied companies' abnormal return does not survive profitability factor and investment factor. This sends a strong signal that customer satisfaction may be a strong indicator of future profitability and it may have a high correlation with RMWt .Compared to equal weighted method, value weighted method tends to deliver a larger excessive return.

From results of table 5 and table 6, we can generally indicate that intangible variable customer satisfaction delivers a consistent long term outperformance from an efficient market hypothesis perspective, but this long term outperformance is subject to the detriment of the profitability factor.

However, would customer satisfaction deliver a similar consistent long term outperformance from an inefficient market hypothesis? According to Siegel (2014)'s noisy market hypothesis, when other factors unrelated to fundamental changes in firm value cause stock price move, market prices are noisy and value weighted scheme in this situation may seem inappropriate. Siegel (2014) suggests a fundamentally weighted index, in which each stock is weighted by some measure of fundamental data, instead of value weighted index to capture the unbiased estimate of true value under the noisy market hypothesis.

To discover the answer to the research question above, we have designed a fundamentally weighted index in which each stock is weighed by some measure of its customer satisfaction related to cumulative customer satisfaction at a specific year and we then use this fundamentally weighted portfolio return to examine the alpha in the Fama French(1993) 3 factor, Carhart(1997) 4 factor and Fama French(2014) 5 factor model.

To have a clear picture of how this fundamentally weighted portfolio form, firstly we first assign each stock a weight defined by its individual customer satisfaction divide by the sum of all customer satisfaction at a specific year. Therefore, the weight for each stock in year t, is $W_{it} = \frac{c_{it}}{\sum_{i=1}^{i} c_{it}}$. Whereas $c_{it}$is the individual firm's customer satisfaction in year t. $\sum_{i=1}^{i} c_{it}$ is the sum of customer satisfaction for all the firms in year t and W_{it} is the portfolio weight assigned to each stock in year t. Secondly, we form our fundamentally portfolio return by calculating the sum weighted portfolio return $Rp_t = \sum_{i=1}^{i} W_{it} \times r_{it}$. Whereas r_{it} is the individual firm's stock return in year t and $Rp_t$is the fundamentally weighted portfolio return in year t

Table 6 presents the abnormal return of Portfolio i generated under equal weighting scheme for all three models above.

TABLE 7
FUNDAMENTALLY WEIGHTED ALPHA

	F.F.(1993) 3factor	Carhart (1997)4factor	F.F. (2014) 5factor
α	3.15	6.64	2.50
	(1.72)*	(1.29)***	(1.96)
β_{MKT}	0.96	0.81	0
	(0.09)***	(0.09)***	.
β_{SMB}	0.03	-0.19	-0.02
	(0.14)	(0.12)	(0.16)
β_{HML}	0.53	0.46	0.47
	(0.24)**	(0.12)***	(0.39)
β_{MOM}		-0.29	
		(0.04)***	
β_{RMW}			0.05
			(0.55)
β_{CMA}			0.28
			(0.17)

Table 7 shows customer satisfaction delivers a positive consistent long term outperformance even under the noisy market hypothesis. This shows that customer satisfaction delivers a outperformance over the long term under both efficient market hypothesis and under noisy market hypothesis. In addition, the magnitudes of coefficients under fundamentally weighted method are similar to those under equal weighted scheme. It strongly indicates that average annual alpha created by the customer satisfaction will stay around 3% level per year.

Next we are interesting to examine why there exists this long term outperformance, according to Anderson (1998)'s Word of mouth theory, positive word of mouth from highly satisfied customers would help firms penetrate new and existing markets and thus lead to high future sales. Fornell (1992) suggests that increasing customer retention resulted from high customer satisfaction help secure firm's future sales. In addition, we have seen from figure 2 that mean customer satisfaction score pre- leads the mean firm's sales. Therefore, our second null hypothesis is that high customer satisfaction does not granger cause the future sales growth.

It is logical that a satisfied customer may repurchase the firm's products and boost firms' future sales and a good firm's sales record may also render products more popular and increases the positive impact of word of mouth and therefore increase the customer satisfaction. Therefore, customer satisfaction and firms' sales are highly likely to be endogenous to each other. A good way to examine their relationship is to use a panel Vector autoregressive model.

To conduct a panel vector autoregressive model, we firstly conduct a unit root test to examine whether sales and customer satisfaction is stationary over time.

Our null hypothesis is that sales or customer satisfaction is non stationary or has a unit root over time. Table 8 shows the unit root test for sales and customer satisfaction.

TABLE 8
UNIT ROOT TEST FOR SALES AND CUSTOMER SATISFACTION

Panel A: Unit root test for sales		t-statistics
Augumented Dickey Fuller Test statistics		2.76
Test Critical Values	1% level	-3.44
	5% level	-2.86
	10% level	-2.57
Panel B: Unit root test for customer satisfaction		**t-statistics**
Augumented Dickey Fuller Test statistics		-9.24
Test Critical Values	1% level	-3.43
	5% level	-2.86
	10% level	2.57

As we can see we fail to reject null hypothesis for sales at 5% and sales is not stationary over time. However, we can reject null hypothesis for customer satisfaction at all three levels and customer satisfaction is stationary over time. To convert sales to stationary time series, we take the first order natural log difference. Our lag length selection indicates the VAR(1) model is most appropriate because it has smallest SIC value.

Therefore, we have conducted our panel VAR (1) model in the table 9.

TABLE 9
PANEL VAR

	Dependent Variable: $\Delta lnsales$	**Dependent Variable:** CR
CR(-1)	0.0009	0.99928
	(0.00032)***	(0.00097)***
$\Delta lnsales(-1)$	-0.07988	-0.01334
	(0.0237)***	(0.06998)

As table 9 shows that prior year customer satisfaction will have positive power prediction on the current year sales growth, in other words, if the customer satisfaction increases by one unit, the sales growth will be likely to increase by 0.09%. However, the prior sales growth does not have explanatory power over the current customer satisfaction. This table indicates that the prior customer satisfaction can have significant impact on the current sales growth. The small magnitude of prior customer satisfaction coefficient of estimate indicates that customer satisfaction did not immediately have large influence in the beneficial fundamental variable sales but it takes a long time for customer satisfaction to accumulate its impact on the sales, which will ultimately be translated into the long term excessive risk-adjusted return.

SENSITIVITY ANALYSIS

We are interesting to examine the subgroup analysis of alpha. Therefore, we rank customer satisfaction score into three groups and group stocks according to their customer satisfaction score ranking each year. We will continue to use equal weighted, value weighted, fundamentally weighted method to examine each subgroup's alpha and also examine whether high customer satisfaction group will deliver a higher return spread over low customer satisfaction group. Table 10 shows the subgroup analysis

TABLE 10
EQUAL WEIGHTED ALPHA

	α	β_{MKT}	β_{SMB}	β_{HML}	β_{MOM}	β_{RMW}	β_{CMA}
Panel A: F.F. (1993) 3 factor							
High ranking	5.41	0.98	0.02	0.55			
	(2.43)**	(0.14)***	(0.20)	(0.31)*			
Medium Ranking	1.78	1.12	0.01	0.73			
	(2.76)	(0.14)***	(0.27)	(0.34)**			
Low Ranking	3.46	1.01	-0.13	0.61			
	(1.76)**	(0.07)***	(0.12)	(0.13)***			
High-Low	-0.84	-0.03	0.23	-0.10			
	(3.33)	(0.18)	(0.26)	(0.35)			
Panel B: Carhart (1997) 4 factor							
High Ranking	11.29	0.72	-0.34	0.43	-0.49		
	(1.92)***	(0.12)***	(.14)***	(0.14)***	(0.04)***		
Medium Ranking	5.33	0.96	-0.21	0.66	-0.30		
	(2.53)**	(0.17)***	(0.29)	(0.23)***	(0.08)***		
Low Ranking	3.69	1.00	-0.15	0.60	-0.02		
	(1.95)*	(0.08)***	(0.12)	(0.14)***	(0.06)		
High-Low	5.28	-0.30	-0.15	-0.23	-0.51		
	(3.22)	(0.17)	(0.23)	(0.22)	(0.07)***		
Panel C: F.F. (2014)5 factor							
High Ranking	3.98	1.02	0.06	0.28		0.45	0.07
	(3.04)	(0.23)***	(0.24)	(0.62)		(0.86)	(0.34)
Medium Ranking	0.85	1.14	-0.01	0.60		0.19	0.21
	(3.16)	(0.20)***	(0.31)	(0.50)		(0.73)	(0.38)
Low Ranking	4.60	0.96	-0.35	1.01		-0.81	0.67
	(1.86)**	(0.08)***	(0.09)***	(0.14)***		(0.21)***	(0.19)***
High-Low	-3.58	0.07	0.51	-0.81		1.34	-0.64
	(3.91)	(0.25)	(0.26)*	(0.64)		(0.86)	(0.43)

Table 10 shows us generally that when the customer satisfaction scores increases, the group alpha increases. However, there is no significance in explaining the difference of alpha between high customer satisfaction ranking group and low customer satisfaction ranking group.

TABLE 11
VALUE WEIGHTED ALPHA

	α	β_{MKT}	β_{SMB}	β_{HML}	β_{MOM}	β_{RMW}	β_{CMA}
Panel A: F.F. (1993) 3 factor							
High ranking	16.20	1.20	0.62	-0.60			
	(8.54) *	(0.52)**	(0.91)	(0.98)			
Medium Ranking	2.08	0.68	-0.53	0.10			
	(4.79)	(0.19)***	(0.48)	(0.31)			
Low Ranking	6.63	0.97	0.09	0.31			
	(4.31)	(0.27)***	(0.33)	(0.24)			
High-Low	9.57	0.22	0.53	-0.92			
	(8.77)	(0.33)	(0.83)	(0.93)			
Panel B: Carhart (1997) 4 factor							
High Ranking	34.32	0.41	-0.50	-0.99	-1.52		
	(8.42)***	(0.46)	(0.92)	(0.53)*	(0.34)***		
Medium Ranking	2.05	0.68	-0.53	0.10	0.002		
	(5.37)	(0.22)***	(0.52)	(0.32)	(0.12)		
Low Ranking	13.71	0.67	-0.35	0.16	-0.59		
	(5.30)**	(0.26)**	(0.36)	(0.34)	(0.17)***		
High-Low	20.62	-0.26	-0.15	-1.15	-0.93		
	(7.28)**	(0.30)	(0.90)	(0.59)*	(0.24)***		
Panel C: F.F. (2014)5 factor							
High Ranking	7.08	1.46	0.61	-2.06		2.24	1.41
	(10.71)	(0.79)*	(0.93)	(2.18)		(2.81)	(1.92)
Medium Ranking	1.06	0.71	-0.50	-0.10		0.32	0.05
	(6.49)	(0.24)***	(0.59)	(0.58)		(0.81)	(0.87)
Low Ranking	6.59	0.99	0.21	0.18		0.31	-0.47
	(7.49)	(0.40)**	(0.42)	(1.02)		(1.36)	(1.26)
High-Low	0.50	0.47	0.40	-2.24		1.93	1.89
	(10.49)	(0.49)	(0.78)	(1.42)		(1.79)	(1.94)

Table 11 presents the value weighted sensitivity analysis and shows us generally that when the customer satisfaction scores increases, the group alpha increases. However, difference of alpha between high customer satisfaction ranking group and low customer satisfaction ranking group is only significant under Carhart(1997) 4 factor model. Table 12 presents the fundamentally weighted sensitivity analysis and has a similar pattern as table 11.

TABLE 12
FUNDAMENTALLY WEIGHTED ALPHA

	α	β_{MKT}	β_{SMB}	β_{HML}	β_{MOM}	β_{RMW}	β_{CMA}
Panel A: F.F. (1993) 3 factor							
High ranking	4.89	0.89	0.06	0.45			
	(2.44)*	(0.13)***	(0.20)	(0.32)			
Medium Ranking	1.34	1.06	0.09	0.67			
	(2.58)	(0.14)***	(0.24)	(0.33)			
Low Ranking	2.93	0.90	-0.10	0.52			
	(1.55)*	(0.06)***	(0.10)	(0.13)***			
High-Low	1.97	-0.01	0.17	-0.07			
	(2.86)	(0.15)	(0.23)	(0.27)			
Panel B: Carhart (1997) 4 factor							
High Ranking	10.64	0.64	-0.29	0.33	-0.48		
	(1.97)***	(0.12)***	(0.14)*	(0.12)**	(0.04)***		
Medium Ranking	4.85	0.91	-0.13	0.60	-0.30		
	(2.32)***	(0.17)***	(0.25)	(0.22)**	(0.08)***		
Low Ranking	3.43	0.88	-0.13	0.51	-0.04		
	(1.74)*	(0.06)***	(0.11)	(0.12)***	(0.05)		
High-Low	7.20	-0.24	-0.15	-0.18	-0.44		
	(2.99)**	(0.14)	(0.21)	(0.17)	(0.07)***		
Panel C: F.F. (2014)5 factor							
High Ranking	3.41	0.94	0.09	0.19		0.42	0.14
	(3.05)	(0.22)***	(0.23)	(0.61)		(0.82)	(0.32)
Medium Ranking	0.30	1.09	0.08	0.51		0.24	0.18
	(3.05)	(0.20)***	(0.26)	(0.50)		(0.73)	(0.34)
Low Ranking	3.71	0.86	-0.29	0.83		-0.65	0.61
	(1.76)**	(0.07)***	(0.09)***	(0.14)***		(0.21)***	(0.19)***
High-Low	-0.30	0.07	0.38	-0.64		1.07	-0.47
	(3.65)	(0.22)	(0.23)	(0.56)		(0.76)	(0.40)

CONCLUSION

This paper mainly examines the long run drift of customer satisfaction on stock return. By conducting a cross sectional analysis, we find that average customer satisfaction has a significant positive impact on the excessive risk adjusted return for each firm. Customer satisfaction delivers a consistent positive 3 factor and 4 factor alphas. However, the 5 factor alpha is only significant under equal weighted methodology. The major difference between the 4 factor alpha and 5 factor alpha is that customer satisfaction is tied to future profitability, after controlling the profitability factor in the 5 factor model, the alpha decreases a lot compared to 4 factor. The paper uses the panel VAR model to examine the relationship between sales and customer satisfaction. The result of this model gives the economic explanation for customer satisfied firms' continuous outperformance, which shows the companies with high customer satisfaction exhibit a high future sale growth.

In addition, the paper uses the fundamentally weighted method to discuss whether customer satisfied firms still deliver a consistent long term positive alpha under the noisy market hypothesis. The result shows us that even under noisy market hypothesis or an inefficient hypothesis, the customer satisfaction can still create a consistent outperformance over its benchmark.

Finally, the paper has conducted a sensitivity analysis. By breaking stocks into three customer satisfaction ranking groups, we have observed a general pattern that when the customer satisfaction ranking rises, the alpha also rises. Therefore, a high customer satisfaction leads to a high outperformance.

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