Downside Risk – What the Consumer Sentiment Index Reveals

Examining the impact of consumer sentiment on equity returns: Does the negative sentiment matter?

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Abstract

This paper examines the ability of consumer sentiment to forecast short-term as well as long-term equity returns and whether or not negative sentiment has a larger effect on the returns than positive sentiment for three different age groups. By using a long-horizon asymmetric response regression format, we show that negative changes in sentiment have a greater influence on stock returns than positive changes in sentiment. Sentiment is more effective forecasting short-term holding period returns than long-term holding period returns, and these results are consistent across all ages. Our findings are supportive of the notion of the prospect theory, where gains and losses are not viewed equally, with downside risk mattering more than upside potential. However, we observe that younger individuals appear to be less risk-averse than older individuals, and this finding is agreeable with the concept of the life cycle investment hypothesis. Further, we document that smaller market cap stocks are more impacted by changes in consumer sentiment, and the results support the noise trader hypothesis.

Keywords: Consumer sentiment; downside risk; asymmetric response; long-horizon regression

JEL Classifications: G10, D03, D12

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Abstract

This paper examines the ability of consumer sentiment to forecast short-term as well as long-term equity returns and whether or not negative sentiment has a larger effect on the returns than positive sentiment for three different age groups. By using a long-horizon asymmetric response regression format, we show that negative changes in sentiment have a greater influence on stock returns than positive changes in sentiment. Sentiment is more effective forecasting short-term holding period returns than long-term holding period returns, and these results are consistent across all ages. Our findings are supportive of the notion of the prospect theory, where gains and losses are not viewed equally, with downside risk mattering more than upside potential. However, we observe that younger individuals appear to be less risk-averse than older individuals, and this finding is agreeable with the concept of the life cycle investment hypothesis. Further, we document that smaller market cap stocks are more impacted by changes in consumer sentiment, and the results support the noise trader hypothesis.

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I. Introduction

Consumer sentiment is based on factors such as unemployment rates, wages, expected inflation, interest rates, and other prevailing market circumstances. Research indicates that consumer sentiment concerning current and future economic conditions can affect the outcomes of financial assets.[1] Further clarification of the dynamics of this relationship will improve the understanding of how the sentiment affects equity returns. Consumer sentiment surveys generally ask individuals how they feel about their current economic situation and how they perceive their future economic situation.[2] By incorporating such data into economic models, we ask the following questions: Assuming consumer sentiment affects equity returns, how long of a holding period can be predicted? Does negative sentiment have a larger effect on equity returns than positive sentiment? Do the sentiments of different age groups have the same or similar effects on equity returns? Do different sizes of firms react to the sentiment equally? By answering these questions, we can deepen our understanding of the relationships between consumer behavior and stock returns in the U.S.

In order to address these questions, we utilize the asymmetric response model with long-horizon regressions. To test asymmetric responses with respect to consumer sentiment, the consumer sentiment index compiled by the University of Michigan is divided into positive changes and negative changes, where negative consumer sentiment indicates pessimistic feelings about future economic prospects, or aggravation of losing wealth and positive sentiment indicates the opposite. According to the prospect theory developed by Kahneman and Tversky (1979), losses matter more to individuals than gains due to the risk averse nature of investors, and is closely related to the concept of downside risk.

[1] For example, these studies include Fisher and Statman (2003), Baker and Wurgler (2006), Lemmon and Portniaguina (2006), Baker and Wurgler (2007), Schmeling (2009) and Akhtar et al. (2011).
[2] Appendix presents the detailed survey method.

We look at one, three, six, twelve and twenty-four month holding period horizons to investigate whether changes in consumer sentiment have the ability to forecast equity returns. The sentiments of three different age groups are investigated to address the idea of life cycle investment hypothesis. [3] Existing research has shown that an aging population results in higher average risk aversion and subsequently, higher risk premiums. The current paper contributes to the literature by presenting comprehensive analysis of the effects of consumer sentiment on the U.S. stock returns that includes data from the recent financial crisis.

Fisher and Statman (2003) successfully show that there is a relationship between consumer sentiment and stock returns. Specifically, they find evidence that changes in consumer sentiment and contemporaneous stock returns have a positive, statistically significant relationship. Additionally, they present that the relationship between changes in consumer sentiment and the returns of small-cap stocks is stronger than the relationship between sentiment and a broad market index such as the S&P 500. [4] Baker and Wurgler (2006) study the relationship between cross-sectional differences of stock returns and investor sentiment by constructing the investor sentiment index based on six market variables, and categorizing sentiment as either optimism or pessimism about stocks markets. [5] They show that investor sentiment has a larger effect on hard-to-price securities such as small stocks, young stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, growth stocks and distressed stocks. Qui and Welch (2006) and Akhtar et al. (2011) show that consumer sentiment is a good proxy for investor sentiment.

[3] Reilly and Brown (2008) identify four life cycle phases: the accumulation phase, consolidation phase, spending phase and gifting phase.

[4] Fisher and Statman (2003) define small-cap stocks as the average of the returns on the bottom three deciles of CRSP decile 1 to decile 10 portfolios formed based on market capitalization.

[5] The market variables used are the closed-end fund discount, NYSE share turnover, the number of initial public offerings (IPOs), the average first day return of IPOs, the dividend premium, and the equity share in new issues.

Lemmon and Portniaguina (2006) present a way of capturing pessimism and optimism by using a consumer sentiment index (CSI) as a function of a large number of macroeconomic variables such as inflation, the default spread, changes in personal consumption expenditures, Gross Domestic Product and the unemployment rate. They argue that any consumer sentiment based on fundamental economic conditions is reasonable, justifiable and rational. On the other hand, consumer sentiment based on factors other than economic conditions is interpreted as unjustifiable and irrational, where they define the residual from the regression as a proxy for unjustifiable sentiment. Their results support the noise trader hypothesis that sentiment will have a greater effect on asset returns held by individuals. Ho and Hung (2009) examine the performance of asset pricing models by using sentiment as conditioning information as it reflects investors' expectations about future forecasts of financial markets. By including various sentiment measures, they show that the capital asset pricing models perform better when sentiment is included, and conclude that sentiment helps explain market anomalies such as momentum, liquidity, size, and book-to-market effects.

Schmeling (2009) utilizes consumer confidence as a proxy for individual investor sentiment to investigate whether lagged sentiment explains stock returns for eighteen industrialized countries as examined through a long-run horizon regression model. The author shows that international investor sentiment predicts future aggregate market returns, and the impact of sentiment on returns is stronger for countries that have less developed markets since they are more prone to investor overreaction. The results indicate a statistically significant coefficient for the sentiment variable, and this significance holds for various forecast horizons. Schmeling finds that lagged sentiment has a stronger effect on stock returns in countries such as Germany, Japan, Italy and the U.S., but little or no evidence of such a relationship in countries

such as the United Kingdom, Australia, and New Zealand. Further, Akhtar et al. (2011) study the reaction of the Australian stock market by employing the asymmetric response model, and show that negative changes in the Australian CSI have statistically significant effects on market returns, whereas positive changes do not.

Our benchmark model provides evidence that sentiment matters more in forecasting near-term market risk premiums versus farther out time horizons. By including various time horizons of equity holding-period returns into consideration, we find that sentiment has a greater ability to explain market risk premiums and forecast equity returns in the short-run than in the long-run. We show that negative changes in sentiment matters more in explaining market risk premiums than positive changes in sentiment based on asymmetric response models that account for unequal responses to negative events and positive events. This finding supports the prospect theory developed by Kahneman and Tversky (1979) as to possible losses mattering more to individuals than possible gains. However, we observe that younger individuals appear to be less risk-averse than older individuals. Finally, the current paper examines the noise trader hypothesis by using ten size-sorted portfolio returns, and finds that smaller market cap stocks are more impacted by changes in consumer sentiment, a result consistent with the previous literature.

II. Methodology and Data

A. Empirical Models

To test if consumer sentiment has a near-term or long-term impact on the stock market, we utilize long-horizon regressions. By testing different future time periods (horizons), we

investigate whether or not changes in CSI have such future explanatory power. Our benchmark long-horizon regression model is given as:[6]

$$r_{i,t+1} + ... + r_{i,t+K} = \alpha(K) + \beta(K)\Delta CSI_t + \varepsilon_{t+K}, \; k=1, 3, 6, 12, 24, \tag{1}$$

where $r_{i,t+K}$ is the excess return of equity index i over K month periods, and excess returns are defined as the equity returns minus the risk free rate. The risk free rate is the monthly yield on a 30 day Treasury bill. ΔCSI_t is the monthly percent change in the consumer sentiment index (CSI), i.e., $\Delta CSI_t = (CSI_{t+1} - CSI_t)/CSI_t$ and ε_{t+K} is the residual term for horizon k.

A direct test of downside risk within the context of the prospect theory would be to observe how negative or positive changes in consumer sentiment alter the stock returns. Harlow and Rao (1989) provide a simple way of measuring asymmetric responses to account for individuals exhibiting downside risk. In the context of this paper, the asymmetric response model is one way of blending the prospect theory and downside risk based on the documented fact that responses to losses and gains are not the same. By using an asymmetric response model, we isolate improvements and deteriorations in sentiment and allow for interpretations of how changes in CSI identify downside risk for different holding period returns. The following long-horizon asymmetric response regression model is estimated:

$$r_{i,t+1} + ... + r_{i,t+K} = \alpha(K) + \beta^{-}(K)\Delta CSI_t^{-} + \beta^{+}(K)\Delta CSI_t^{+} + \varepsilon_{t+K}, \; k=1, 3, 6, 12, 24, \tag{2}$$

where ΔCSI_t^{-} is the negative change in CSI ($\Delta CSI_t < 0$) or zero otherwise, and ΔCSI_t^{+} is the positive change in CSI ($\Delta CSI_t > 0$) or zero otherwise.[7] The coefficients β^{-} and β^{+} indicate the downsize beta and upside beta, respectively.

[6] We follow the description of the long-horizon regression model presented by Campbell, et al. (1997).
[7] Note that they are not dummy variables, and provide the magnitude of sentiments' negative and positive effects.

If stock returns respond similarly to positive changes in consumer sentiment as they do to negative changes in consumer sentiment, β^- would be equal to β^+. But if investors are averse to downside risk, β^- will be positive, representing a positive risk premium (e.g., the higher the downside risk, the higher the stock returns). This effect is a type of risk that investors tend to be more sensitive towards when discussing the potential for loss in the value of an asset even though many investors may anticipate a particular asset's value to increase over a long time. The estimates of β^+ will also be smaller in magnitude and positive if individuals prefer upside potential (e.g., the higher the upside potential, the lower the stock returns).

B. Data Description

The primary sources of consumer sentiment data in the U.S. are the University of Michigan's Surveys of Consumers (CSI) and the Conference Board's Consumer Confidence Index. Fisher and Statman (2003) and Lemmon and Portniaguina (2006) confirm that the indices are highly correlated and provide similar empirical results, despite survey design differences. Ludvigson (2004) recognizes that many studies employ CSI. Studies that utilize CSI in relation to stock returns include Fisher and Statman (2003), Lemmon and Portniaguina (2006), Ho and Hung (2009) and Schmeling (2009).

In this study, we use monthly CSI data from January 1978 to December 2010, encompassing more than 30 years of sentiment observations. We segment the data into the widely cited composite index as well as indices for three age groups respectively: persons 18 to 34 years old; persons 35 to 54 years old; and persons 55 years old and older. This partition of age groups within the CSI allows for a demographic investigation which has previously been unexplored regarding how stock markets can be understood in relation to the sentiment of

persons of different ages. The Center for Research in Security Prices (CRSP) equally-weighted returns (CRSP EW) and CRSP value-weighted returns (CRSP VW) are employed to capture the overall stock market performance. We use 30 day U.S Treasury bill yields to represent risk-free rates in order to estimate the risk free returns. These data sets are obtained from Wharton Research Data Services (WRDS).

[Table 1 here]

Table 1 presents the summary statistics of the variables employed in this study. Panel A shows all of the CSI data for the composite index as well as for the three age groups. The mean sentiment value for the youngest age group, 18 to 34 years old, is the highest amongst all age groups (95.169) and the mean value for the oldest age group, persons 55 years old and older, is the lowest amongst all age groups (78.297). The results suggest that over the sample period, younger consumers tend to be more optimistic than older consumers and this is consistent with the life cycle investment hypothesis. One behavioral explanation for this would be that younger individuals have more years of their life to participate in the labor force and earn money, resulting in hopeful current/future saving and consumption whereas older individuals have fewer years of their life to participate in the labor force. At the same time, families with children see their children enter adulthood and as a result, they may not foresee increased consumption.

With respect to volatility of the CSI index for the age groups, the 35 to 54 years old age group has the largest standard deviation (14.413) and the oldest age group has the lowest volatility (11.791). And although the percentage changes of CSI are similar across different groups and close to zero on average, there is a large range between the minimum and the maximum of percentage changes of CSI.[8] The corresponding standard deviations are relatively

[8] We note that the CSI composite is not the average of three different age groups due to slightly different survey methods.

large and are somewhat similar to those for the stock returns. According to Ando and Modigliani (1963), the desire or propensity to consume and invest is higher in the lives of younger people, whereas middle to older-aged individuals tends to have higher incomes with lower propensities to consume. Those in the younger age group are more likely to be in the early professional years of their careers, attempting to acquire more permanent assets, possibly preparing to start a family.

Panel B presents the excess returns of the CRSP EW and CRSP VW indices over five horizons. For both indices, as the number of horizons increases, the mean returns increase as well as the standard deviations. Panel C presents the returns data for the CRSP market capitalization of 10 size-sorted portfolios. A brief look at Panel C provides data on the well-documented fact that small cap stocks have higher returns than large cap stocks but are also riskier, as evident by the standard deviations of the two portfolios. We use this data to see if the size of the firm matters in terms of the short-run/long-run effects of sentiment. Baker and Wurgler (2006), Lemmon and Portniaguina (2006), Schmeling (2009), Akhtar et al. (2011) and others find that sentiment does impact firms of various sizes differently.

[Figure 1 here]

Figure 1 displays the time series movements of CSI for different groups over the sample period. The major declines in CSI over the sample period occur in the late 1970s, the early 1990s, the early 2000s and in 2007 and 2008 during the recent financial crisis. Interestingly, these periods correspond closely with the dates of recessions in the U.S. as defined by the National Bureau of Economic Research (NBER). For example, recessionary periods in the U.S. occurred from July 1990 until March 1991, March 2001 until November 2001 and December 2007 until

June 2009.[9] The most recent decline in CSI corresponds with the widely regarded "Great Recession," which was sparked by the abrupt contraction in home prices and spike in home foreclosures due to the subprime crisis and other banking problems. The financial crisis ultimately resulted in the sharp increase in the unemployment rate and a rise in the number of non-performing loans on the balance sheets of financial institutions among other sudden negative economic conditions.

Consistent with Panel A of Table 1, Figure 1 shows that the younger consumers (18 to 34 years old) tend to be more optimistic than the older consumers, and this gap is persistent for much of the sample period. The 55 years old and older age group tends to record the lowest sentiment reading throughout the sample period. Further, we observe substantial movements of these indices over time, resulting in large standard deviations. This figure also shows how the sentiment of individuals, regardless of age, tends to move in tandem.

III. Empirical Results

A. Benchmark Case

Table 2 reports the results of the benchmark regression model from equation (1). The coefficients for ΔCSI_t are positive as well as statistically significant at the 1% level for both stock market indices employed for six month horizons or less. For 12 month horizons they are significant at the 5% level and the 10% level for CRSP EW and CRSP VW, respectively.[10] The results are also economically significant. For example, for the 3 month horizon for the CRSP EW (VW) index, a 10% change in overall consumer sentiment (consumers of all ages) results in a

[9] U.S. Business Cycle Expansions and Contractions According to the National Bureau of Economic Research (http://www.nber.org/cycles.html)

[10] Newey-West methods are used to obtain robust parameter estimates by correcting the possible autocorrelation and heterocedasticity.

market risk premium change of 7.36% (5.34%). It can be interpreted from these findings that a positive change in CSI results in positive future excess stock returns for subsequent holding period returns. However, for the 24 month horizon, changes in consumer sentiment are no longer statistically significant in forecasting stock returns. The results indicate that sentiment is more important in the nearer term instead of the distant future. The long-horizon regressions used by Schmeling (2009) also show that the impact of sentiment on average future returns declines as the forecast horizon increases. And given that CSI data is released monthly, recent data points provide better insights pertaining to consumers and their outlooks regarding the stock returns.

[Table 2 here]

Another immediate observation present in Table 2 is that the values of the slope coefficients are much larger for the CRSP EW excess returns compared to the CRSP VW excess returns. We attribute the lower excess returns of the VW index β coefficients to the documented findings of Lemmon and Portniaguina (2006) and Schmeling (2009). They show that sentiment affects the stocks of firms of various sizes differently. In the VW index, large firm stock returns are inherently weighted more heavily than those returns of smaller firms. Thus, the effect of changes in sentiment becomes harder to disentangle due to this size effect. The EW index β coefficients shows that holding firm size constant, changes in CSI are still important.

We also observe that the values of R^2 are the largest for the 1 month and 3 month horizons, and they gradually decrease as the horizon increases. As we found in Table 2, nearer term economic data impacts sentiment more, this in turn, is then priced into the stock market shortly thereafter. Campbell et al. (1997) presents long-horizon regression results with increasing R^2's for longer horizons. However, Valkanov (2003) shows that the interpretation of the R^2's for

long-horizon regressions is not straightforward and can be misleading for comparisons of regression results.

B. Asymmetric Response Model

Table 3 presents the findings of the asymmetric response models in equation (2) for the overall CSI composite. We observe that all of these coefficients of the downside betas (β^-) are positive and statistically significant, with most at the 1% level of significance, and two coefficients at the 5% level of significance (EW index, 12 and 24 month horizons). The results support that the ideas of a positive risk premium since investors are averse to downside risk and the higher the downside risk, the higher the stock returns. These results are consistent with studies such as Ang, Chen and Xing (2006) and Akhtar et al. (2011), and capture the essence of the prospect theory of Kahneman and Tversky (1979). Referring to the estimates of downside betas, as the forecast horizon increases, so does the magnitude of β^-. For example, the values are 0.428 (EW return) and 0.338 (VW return) for the one month horizon but 1.319 (EW) and 1.463 (VW) for the 24 month horizon. This implies that risk premiums that can compensate for downside risk become increasingly important as the time horizon increases. Ang et al. (2006) show that cross-sectional stock returns indicate evidence of reflecting a premium for downside risk as measured by negative market returns because individuals place greater emphasis on downside risk and less emphasis on potential gains. Further, they find that past downside beta has forecasting ability for future stock returns for most of their cross-sectional sample.

[Table 3 here]

Turning our attention to upside betas (β^+), the coefficients are not equal in magnitude and are consistently smaller compared to the downside betas for all horizons studied. For the 5

different horizons estimated, many of the β^+ coefficients are statistically insignificant, and in fact, only three are significant at the 5% level. Akhtar et al. (2011) also report the statistical insignificance of the upside beta. An interesting observation regarding the β^+ coefficients is their declining nature over the forecasting horizons. The one month forecast horizon magnitudes are 0.303 (EW) and 0.084 (VW) respectively, and when compared to the 24 month forecast horizon, the upside beta coefficients are -0.493 (EW) and -1.070 (VW). Thus, the upside beta magnitudes decrease and even turn negative as the time horizons increase. The results imply that as forecast horizons increase, upside potential becomes of less importance, and even more so when compared to downside risk. Individuals thus start to exhibit behavior that is consistent with focusing less on increasing wealth and more on not losing wealth.

When we test the null hypothesis of $\beta^- = \beta^+$ for all horizons, we do not reject the null hypothesis for the majority of these tests. The results are due to the statistical insignificance of the estimates of β^+ and the fact that the denominators of the t-statistics tend be large relative to the numerator. However, this should not undermine the results of our long-horizon asymmetric regressions that show statistically significant downside betas for all cases, and provides support to the concepts of the prospect theory. Akhtar et al. (2011) state that negative (positive) consumer sentiment news will induce a negative (zero) stock market reaction. As a result, they hypothesize that the coefficient for the negative change in sentiment would be negative, and their baseline regression results support this hypothesis. Since their estimated coefficient on the positive change in sentiment variable is not significant, they argue that the result provides more support for the negativity effect hypothesis. However, if investors are averse to downside risk, the coefficient for downside beta would be positive because of the idea that a higher downside risk would correspond to higher returns. We further find that as the forecast horizon increases,

the magnitudes of the downside betas increase while the magnitudes of the upside betas decrease. This divergence between the general trends of these coefficients shows an increasing importance of downside risk to investors over time.

[Table 4 here]

We now turn our attention to shedding light on the life cycle investment hypothesis by incorporating the changes in sentiment of different age groups. Table 4 presents the empirical results of equation (2) for the CSI index of individuals 18 to 34 years old. Focusing on the downside beta for this youngest age group that we study, we observe that β^- has the expected positive sign and is statistically significant in the majority of forecast horizons. However, we do not observe in Table 4 an increasing tendency of the downside beta coefficients as we presented in Table 3 when the forecast horizon increases, implying that aversion to losses amongst younger individuals does not necessarily increase over longer periods with respect to excess market returns. The magnitudes of the estimated coefficients β^- are in general greater than those of β^+ for long-horizon models estimated except for two cases (both estimates are not significant).

The upside beta for this age group is statistically significant in only 3 out of the 10 long-horizon models estimated, whereas the downside beta is statistically significant in 7 out of the 10 long-horizon models estimated. We conjecture that the focus on avoiding loses is present amongst younger individuals, especially given that they are in the accumulation phase that Reilly and Brown (2008) describe and possibly cannot afford to lose what assets they do have at this particular point in their lives.

[Table 5 here]

Table 5 presents results that pertain to changes in consumer sentiment amongst individuals 35 to 54 years old and their relationship to excess market returns. We observe that all

downside betas are greater than the upside betas in all long-horizon models estimated for this age group. Additionally, all of the β^- coefficients are positive and statistically significant, and mostly increase in magnitude as the forecast horizons increase. For the forecast horizons of 3, 6, 12 and 24 months, the downside betas for individuals 35 to 54 years old are greater than the corresponding downside betas for individuals 18 to 34 years old. The results support Bakshi and Chen (1994) who show that risk aversion increases with age and conclude that demographic changes will cause price fluctuations in the capital markets as they affect macroeconomic variables. Furthermore, the consolidation phase described by Reilly and Brown (2008) involves the time when it is most likely that an individual's earnings exceed their expenses and as a result, they can invest this difference in additional assets such as stocks. Reilly and Brown state that "because individuals in this phase are concerned about capital preservation, they do not want to take very large risks that may put their current nest egg in jeopardy." As their careers and age advance, individuals typically begin investing their wealth more conservatively as they near retirement.

[Table 6 here]

Our asymmetric response model results for individuals 55 years of age and older are presented in Table 6. They indicate that 9 of the 10 downside betas estimated are statistically significant. Additionally, β^- for the oldest age group exhibits a mostly increasing trend which is consistent with the other asymmetric response models, as well as all downside betas being greater than the upside betas in all long-run horizons. The upside betas exhibit a mostly decreasing trend as the forecast horizon increases, but only 3 out of the 10 β^+ coefficients are statistically significant. It should be noted that the β^- coefficients for this age group are all smaller than the corresponding horizon β^- coefficients for the 35 to 54 age group. This implies

that individuals 35 to 54 years old exhibit more aversion towards downside risks than individuals 55 and older. Given that stock market excess returns are used as the dependent variable in our asymmetric models, we conjecture that older individuals are less likely to have significant stock market exposure due to their nearer-term focus upon retirement and inclination to possibly hold a larger portion of fixed income securities.

In sum, we observe that the magnitudes of the downside beta coefficients are greater than those of the upside betas since downside risk matters more. This finding holds true in the majority of our results for the composite CSI, as well as the CSI for each respective age group. Further, our results show that the sizes of the downside betas are generally greater for consumers 35 to 54 years old and 55 years and older, than those of the downside beta coefficients for the youngest age group, consumers 18 to 34 years old. The results confirm that the older we get, the more risk averse we become. Our findings are also consistent with Riley and Chow (1992) and Halek and Eisenhauer (2001) who show how risk aversion can be explained by demographic attributes.

C. Size Effects

Baker and Wurgler (2006) and Lemmon and Portniaguina (2006) find that sentiment has more of an impact on small-firm stocks versus large-firm stocks. But does this noise trader argument hold amongst changes in consumer sentiment for all ages? In order to empirically test this question, we estimate equation (1) but use a one month forecast horizon (K = 1) and employ CRSP market capitalization portfolios. The dependent variable in the modified equation (1) is the stock return of the decile i portfolio minus the risk-free rate, and the independent variable is used and defined in the same manner as in equation (1). CRSP segments these sized-sorted decile

portfolios into deciles based on a firm's market capitalization, whereby small firms will appear in lower decile portfolios and larger firms appear in higher decile portfolios.

[Table 7 here]

Table 7 presents the results of the size effects. Our findings are consistent with Lemmon and Portniaguina (2006) and Baker and Wurgler (2006) for all age groups; smaller firms' market risk premiums are affected more by changes in sentiment than those of larger firms. For example, the coefficient for ΔCSI_t for the CSI composite (Panel A) is 0.430 for the decile 1 portfolio and 0.185 for the decile 10 portfolio. The implication of this is important, both statistically and economically; a 10% change in overall consumer sentiment (consumers of all ages) results in a market risk premium change of 4.30% in the following month for the smallest firms versus a market risk premium change of 1.85% for the largest firms. Lee, Shleifer and Thaler (1991) suggest that small-cap stocks are more closely followed by individual investors. This size effect is, for the most part, linear in that the smallest firms are affected the most and this effect gradually decreases as firm size increases. This pattern is true for changes in consumer sentiment for all age groups.

IV. Concluding Remarks

In this paper, we examine the ability of consumer sentiment to forecast short-term as well as long-term equity returns and whether or not negative sentiment has a larger effect on the returns than positive sentiment for three different age groups. We observe that negative changes in sentiment have a greater influence on stock returns than positive changes in sentiment. Further, sentiment is more effective forecasting short-term holding period returns than long-term holding period returns, and these results are consistent across all ages. These empirical findings are

consistent with the documented behavior that agents place greater weight on downside risk than they place on upside gains, and are agreeable with the notion of the prospect theory proposed by Kahneman and Tversky (1979).

Our results also document a difference in age groups' sentiment, and that younger individuals appear to be less risk-averse than older individuals. The finding supports the existing literature and the concept of the life cycle investment hypothesis. Finally, we present additional evidence for the notion that the risk premiums of smaller firms are more affected by sentiment than larger firms; a result that is in line with the noise trader hypothesis. This paper applies well-known concepts in behavioral economics and finance, and deepens our understanding of the relationship and importance of consumer sentiment in evaluating the equity returns.

References

Akhtar, Shumi, Faff, Robert, Oliver, Barry and Avanidhar Subrahmanyam, 2011, "The power of bad: The negativity bias in Australian consumer sentiment announcements on stock returns," *Journal of Banking and Finance*, Vol. 35(5), pages 1239-1249.

Ando, Albert and Franco Modigliani, 1963, "The "Life Cycle" Hypothesis of Saving: Aggregate Implications and Tests, *American Economic Review*, Vol. 53(1), pages 55-84.

Ang, Andrew, Chen, Joseph and Yuhang Xing, 2006, "Downside Risk," *Review of Financial Studies*, Vol. 19(4), pages 1191-1239.

Baker, Malcolm and Jeffrey Wurgler, 2006, "Investor Sentiment and the Cross-Section of Stock Returns," *Journal of Finance*, Vol. 61(4), pages 1645-1680.

Baker, Malcolm and Jeffrey Wurgler, 2007, "Investor Sentiment in the Stock Market," *Journal of Economic Perspectives*, Vol. 21(2), pages 129-152.

Bakshi, Gurdip S. and Zhiwu Chen, 1994, "Baby Boom, Population Aging, and Capital Markets," *Journal of Business*, Vol. 67(2), pages 165-202.

Ben-Porath, Yoram, 1967, "The Production of Human Capital and the Life Cycle of Earnings," *Journal of Political Economy*, Vol. 75(4), pages 352-365.

Campbell, John Y., Lo, Andrew W. and A. Craig MacKinlay, 1997, "The Econometrics of Financial Markets," Princeton University Press.

Fisher, Kenneth L. and Meir Statman, 2003, "Consumer Confidence and Stock Returns," *Journal of Portfolio Management*, Vol. 30(1), pages 115-128.

Halek, Martin and Joseph G. Eisenhauer, 2001, "Demography of Risk Aversion," *Journal of Risk and Insurance*, Vol. 68(1) pages 1-24.

Harlow, W. V. and Ramesh K. S. Rao, 1989, "Asset pricing in a Generalized Mean-Lower Partial Moment Framework: Theory and Evidence," *Journal of Financial and Quantitative Analysis*, Vol. 24(3), pages 285-311.

Ho, Chienwei and Chi-Hsiou Hung, 2009, "Investor sentiment as conditioning information in asset pricing," *Journal of Banking and Finance*, Vol. 33(5), pages 892-903.

Kahneman, Daniel and Amos Tversky, 1979, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, Vol. 47(2), pages 263-291.

Lee, Charles M. C., Shleifer, Andrei and Richard H. Thaler, 1991, "Investor Sentiment and the Closed-End Fund Puzzle," *Journal of Finance*, Vol. 46(1), pages 75-109.

Lemmon, Michael and Evgenia Portniaguina, 2006, "Consumer Confidence and Asset Prices: Some Empirical Evidence," *Review of Financial Studies*, Vol. 19(4), pages 1499-1529.

Ludvigson, Sydney C., 2004, "Consumer Confidence and Consumer Spending," *Journal of Economic Perspectives*, Vol. 18(2), pages 29-50, Spring.

Qiu, Lily Xiaoli and Ivo Welch, 2006, "Investor Sentiment Measures," Working Paper, Brown University.

Reilly, Frank K. and Keith C. Brown, 2008, "Investment Analysis and Portfolio Management," Ninth edition, South-Western Publishing.

Riley, William B., Jr., and K. Victor Chow, 1992, "Asset Allocation and Individual Risk Aversion," *Financial Analysts Journal*, Vol. 48(6), pages 32-37.

Schmeling, Maik, 2009, "Investor sentiment and stock returns: Some international evidence," *Journal of Empirical Finance*, Vol. 16(3), pages 394-408.

Valkanov, Rossen, 2003, "Long-horizon regressions: Theoretical results and application," *Journal of Financial Economics*, Vol. 68(2), 201-232.

Table 1: Summary Statistics

All data is monthly and is from January 1978 until December 2010. Panel A consumer sentiment data was obtained from the University of Michigan Surveys of Consumers (http://www.sca.isr.umich.edu). Panel B and Panel C stock index returns and equity size-sorted portfolio returns data were obtained from Center for Research in Security Prices (CRSP). K stands for monthly cumulated K horizon returns.

Panel A: CSI and Percent Changes	Mean	Standard Deviation	Minimum	Maximum
CSI Composite	86.120	13.096	51.700	112.000
CSI - Age Group 18 – 34	95.169	13.456	60.400	120.000
CSI - Age Group 35 – 54	86.409	14.413	43.600	113.300
CSI - Age Group 55 and older	78.297	11.791	43.400	105.300
$\Delta CSI_{Composite}$	0.001	0.050	-0.181	0.246
$\Delta CSI_{18-34\ Age\ Group}$	0.002	0.061	-0.174	0.287
$\Delta CSI_{35-54\ Age\ Group}$	0.002	0.066	-0.231	0.241
$\Delta CSI_{55\ and\ older\ Age\ Group}$	0.002	0.069	-0.196	0.339
$\Delta CSI_{Composite}<0$	-0.018	0.029	-0.181	0.000
$\Delta CSI_{Composite}>0$	0.019	0.031	0.000	0.246
$\Delta CSI_{18-34\ Age\ Group}<0$	-0.022	0.033	-0.174	0.000
$\Delta CSI_{18-34\ Age\ Group}>0$	0.023	0.040	0.000	0.287
$\Delta CSI_{35-54\ Age\ Group}<0$	-0.024	0.037	-0.231	0.000
$\Delta CSI_{35-54\ Age\ Group}>0$	0.026	0.042	0.000	0.294
$\Delta CSI_{55\ and\ older\ Age\ Group}<0$	-0.025	0.039	-0.196	0.000
$\Delta CSI_{55\ and\ older\ Age\ Group}>0$	0.027	0.043	0.000	0.339
Panel B: Stock Index Returns for Different Horizons				
CRSP EW Index Returns				
K=1	0.011	0.056	-0.273	0.224
K=3	0.033	0.111	-0.470	0.417
K=6	0.065	0.158	-0.565	0.588
K=12	0.128	0.212	-0.613	0.736
K=24	0.245	0.242	-0.751	0.796
CRSP VW Index Returns				
K=1	0.008	0.046	-0.227	0.127
K=3	0.024	0.083	-0.374	0.258
K=6	0.046	0.118	-0.539	0.364
K=12	0.092	0.168	-0.565	0.485
K=24	0.179	0.222	-0.599	0.542
Risk-free Rate (30 day T-Bill)	0.004	0.003	0.000	0.014

Panel C: Returns of Equity Size Portfolios

Capitalization Decile 1	0.014	0.064	-0.277	0.329
Capitalization Decile 2	0.011	0.065	-0.303	0.285
Capitalization Decile 3	0.012	0.063	-0.289	0.261
Capitalization Decile 4	0.012	0.061	-0.294	0.226
Capitalization Decile 5	0.012	0.061	-0.281	0.255
Capitalization Decile 6	0.012	0.056	-0.259	0.222
Capitalization Decile 7	0.012	0.055	-0.259	0.224
Capitalization Decile 8	0.012	0.054	-0.241	0.188
Capitalization Decile 9	0.011	0.051	-0.225	0.225
Capitalization Decile 10	0.010	0.048	-0.204	0.136

Table 2: Benchmark Model

This table represents long-horizon ordinary least square regressions of one month excess returns ($r_{i,t}$) of various indices on changes in the Consumer Sentiment Index (CSI). The dependent variable is the excess return of either the CRSP equally weighted portfolio or the CRSP value weighted portfolio. K stands for monthly cumulated K horizon returns and when K is greater than one, the regressions use overlapping monthly data. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

	Forecast Horizon (K)									
	1		3		6		12		24	
Dependent Variable	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns
Intercept α	0.006	0.003	0.019	0.010	0.038	0.019	0.073	0.037	0.135	0.069
Standard error	(0.003)	(0.002)	(0.009)	(0.006)	(0.016)	(0.012)	(0.024)	(0.019)	(0.029)	(0.026)
p-value	[0.032]	[0.151]	[0.025]	[0.131]	[0.017]	[0.113]	[0.003]	[0.053]	[0.000]	[0.008]
Slope β	0.362	0.204	0.736	0.534	0.635	0.425	0.487	0.287	0.338	0.092
Standard error	(0.064)	(0.054)	(0.107)	(0.081)	(0.142)	(0.098)	(0.214)	(0.161)	(0.256)	(0.188)
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.023]	[0.076]	[0.187]	[0.626]
R^2	0.104	0.049	0.109	0.103	0.040	0.033	0.013	0.008	0.005	0.000

Table 3: Asymmetric Response Model - CSI Composite

This table represents long-horizon ordinary least square regressions of asymmetric response model incorporating changes in consumer sentiment. K stands for monthly cumulated K horizon returns and when K is greater than one, the regressions use overlapping monthly data. The dependent variable is the excess return of either the CRSP equally weighted portfolio or the CRSP value weighted portfolio. The independent variables are defined in the following manner: β^- is the change in CSI if sentiment decreases (i.e., $\Delta CSI < 0$) and zero otherwise, and β^+ is the change in CSI if sentiment increases (i.e., $\Delta CSI > 0$) and zero otherwise. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

	Forecast Horizon (K)									
	1		3		6		12		24	
Dependent Variable	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns
Intercept α_i	0.009	0.008	0.025	0.021	0.048	0.035	0.099	0.073	0.168	0.115
Standard error	(0.004)	(0.003)	(0.009)	(0.007)	(0.015)	(0.012)	(0.024)	(0.019)	(0.027)	(0.028)
p-value	[0.041]	[0.018]	[0.006]	[0.001]	[0.002]	[0.004]	[0.000]	[0.000]	[0.000]	[0.000]
Slope β^-	0.428	0.338	0.907	0.862	0.937	0.892	1.216	1.324	1.319	1.463
Standard error	(0.150)	(0.129)	(0.239)	(0.190)	(0.357)	(0.286)	(0.552)	(0.401)	(0.658)	(0.461)
p-value	[0.005]	[0.009]	[0.000]	[0.000]	[0.009]	[0.002]	[0.028]	[0.001]	[0.046]	[0.002]
Slope β^+	0.303	0.084	0.584	0.243	0.370	0.014	-0.152	-0.621	-0.493	-1.070
Standard error	(0.106)	(0.082)	(0.212)	(0.151)	(0.295)	(0.229)	(0.445)	(0.355)	(0.560)	(0.442)
p-value	[0.004]	[0.303]	[0.006]	[0.109]	[0.210]	[0.950]	[0.733]	[0.081]	[0.380]	[0.016]
R^2	0.105	0.058	0.111	0.118	0.043	0.048	0.025	0.046	0.021	0.040

Table 4: Asymmetric Response Model - CSI for Individuals 18 – 34 years old

This table represents long-horizon ordinary least square regressions of asymmetric response model incorporating changes in consumer sentiment for individuals 18 to 34 years old. K stands for monthly cumulated K horizon returns and when K is greater than one, the regressions use overlapping monthly data. The dependent variable is the excess return of either the CRSP equally weighted portfolio or the CRSP value weighted portfolio. The independent variables are defined in the following manner: β^- is the change in CSI if sentiment decreases (i.e., $\Delta CSI < 0$) and zero otherwise, and β^+ is the change in CSI if sentiment increases (i.e., $\Delta CSI > 0$) and zero otherwise. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

	Forecast Horizon (K)									
	1		3		6		12		24	
Dependent Variable	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns
Intercept α_i	0.011	0.009	0.020	0.017	0.040	0.029	0.069	0.050	0.134	0.093
Standard error	(0.004)	(0.003)	(0.010)	(0.007)	(0.017)	(0.013)	(0.024)	(0.019)	(0.029)	(0.028)
p-value	[0.006]	[0.003]	[0.038]	[0.015]	[0.024]	[0.020]	[0.004]	[0.010]	[0.000]	[0.001]
Slope β^-	0.336	0.283	0.441	0.459	0.394	0.492	0.217	0.525	0.137	0.633
Standard error	(0.128)	(0.105)	(0.184)	(0.142)	(0.266)	(0.190)	(0.456)	(0.301)	(0.480)	(0.326)
p-value	[0.009]	[0.007]	[0.017]	[0.001]	[0.139]	[0.010]	[0.635]	[0.082]	[0.775]	[0.053]
Slope β^+	0.120	0.007	0.389	0.147	0.303	0.025	0.412	-0.047	0.187	-0.452
Standard error	(0.058)	(0.047)	(0.159)	(0.096)	(0.186)	(0.135)	(0.332)	(0.190)	(0.317)	(0.245)
p-value	[0.041]	[0.886]	[0.015]	[0.126]	[0.104]	[0.852]	[0.215]	[0.805]	[0.555]	[0.066]
R^2	0.060	0.043	0.050	0.048	0.017	0.020	0.009	0.010	0.002	0.011

Table 5: Asymmetric Response Model - CSI for Individuals 35 – 54 years old

This table represents long-horizon ordinary least square regressions of asymmetric response model incorporating changes in consumer sentiment for individuals 35 to 54 years old. K stands for monthly cumulated K horizon returns and when K is greater than one, the regressions use overlapping monthly data. The dependent variable is the excess return of either the CRSP equally weighted portfolio or the CRSP value weighted portfolio. The independent variables are defined in the following manner: β^- is the change in CSI if sentiment decreases (i.e., $\Delta CSI < 0$) and zero otherwise, and β^+ is the change in CSI if sentiment increases (i.e., $\Delta CSI > 0$) and zero otherwise. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

	Forecast Horizon (K)									
	1		3		6		12		24	
Dependent Variable	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns
Intercept α_i	0.008	0.006	0.031	0.024	0.050	0.036	0.103	0.073	0.177	0.116
Standard error	(0.004)	(0.004)	(0.011)	(0.008)	(0.017)	(0.013)	(0.025)	(0.020)	(0.027)	(0.030)
p-value	[0.062]	[0.071]	[0.003]	[0.002]	[0.004]	[0.006]	[0.000]	[0.000]	[0.000]	[0.000]
Slope β^-	0.273	0.195	0.740	0.667	0.738	0.695	0.982	0.980	1.151	1.104
Standard error	(0.110)	(0.093)	(0.220)	(0.177)	(0.341)	(0.272)	(0.481)	(0.369)	(0.614)	(0.424)
p-value	[0.014]	[0.038]	[0.001]	[0.000]	[0.031]	[0.011]	[0.042]	[0.008]	[0.061]	[0.010]
Slope β^+	0.191	0.066	0.248	0.070	0.206	-0.020	-0.248	-0.494	-0.557	-0.807
Standard error	(0.083)	(0.063)	(0.175)	(0.128)	(0.244)	(0.186)	(0.362)	(0.293)	(0.472)	(0.330)
p-value	[0.023]	[0.302]	[0.156]	[0.586]	[0.398]	[0.916]	[0.493]	[0.093]	[0.239]	[0.015]
R^2	0.072	0.035	0.086	0.097	0.040	0.046	0.025	0.042	0.026	0.038

Table 6: Asymmetric Response Model - CSI for Individuals 55 years old and older

This table represents long-horizon ordinary least square regressions of asymmetric response model incorporating changes in consumer sentiment for individuals 55 years old and older. K stands for monthly cumulated K horizon returns and when K is greater than one, the regressions use overlapping monthly data. The dependent variable is the excess return of either the CRSP equally weighted portfolio or the CRSP value weighted portfolio. The independent variables are defined in the following manner: β^- is the change in CSI if sentiment decreases (i.e., $\Delta CSI < 0$) and zero otherwise, and β^+ is the change in CSI if sentiment increases (i.e., $\Delta CSI > 0$) and zero otherwise. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

	Forecast Horizon (K)									
	1		3		6		12		24	
Dependent Variable	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns	CRSP EW Portfolio Returns	CRSP VW Portfolio Returns
Intercept α_i	0.008	0.007	0.027	0.019	0.044	0.027	0.090	0.061	0.162	0.106
Standard error	(0.004)	(0.003)	(0.010)	(0.008)	(0.016)	(0.013)	(0.027)	(0.021)	(0.030)	(0.028)
p-value	[0.062]	[0.049]	[0.007]	[0.011]	[0.005]	[0.041]	[0.001]	[0.005]	[0.000]	[0.000]
Slope β^-	0.238	0.178	0.547	0.495	0.443	0.370	0.560	0.602	0.733	0.806
Standard error	(0.102)	(0.083)	(0.164)	(0.134)	(0.236)	(0.188)	(0.348)	(0.255)	(0.396)	(0.317)
p-value	[0.020]	[0.033]	[0.001]	[0.000]	[0.061]	[0.050]	[0.109]	[0.019]	[0.065]	[0.011]
Slope β^+	0.169	0.049	0.264	0.119	0.195	0.047	-0.074	-0.295	-0.307	-0.611
Standard error	(0.075)	(0.061)	(0.137)	(0.101)	(0.182)	(0.135)	(0.285)	(0.210)	(0.338)	(0.258)
p-value	[0.025]	[0.426]	[0.055]	[0.239]	[0.284]	[0.728]	[0.795]	[0.160]	[0.364]	[0.018]
R^2	0.061	0.030	0.062	0.069	0.019	0.017	0.009	0.017	0.011	0.022

Table 7: Size Effects Approach

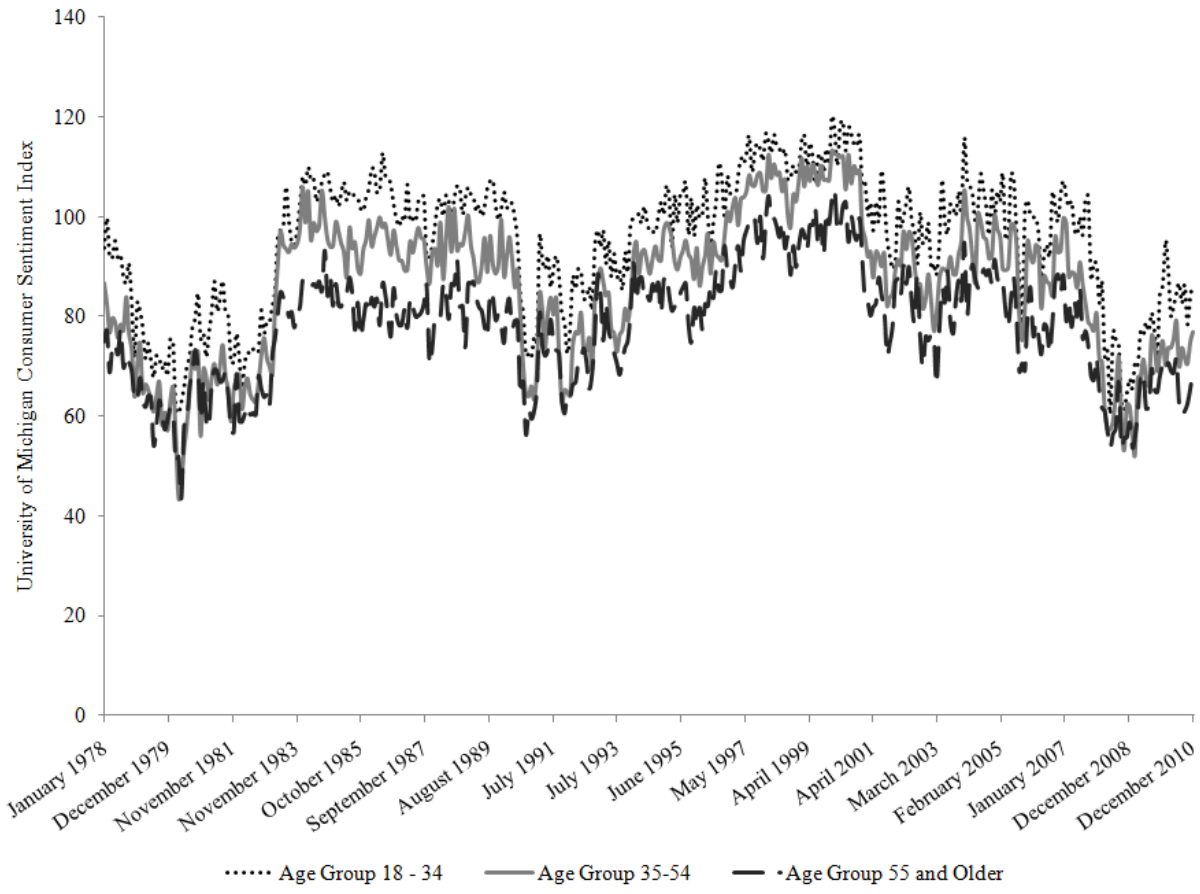
This table represents ordinary least square regressions of one month excess returns of various size-sorted decile portfolios on lagged one month changes in the Consumer Sentiment Index (CSI). The indices used are the CRSP annual rebalanced indices based on individual stock market capitalization values. The market capitalization portfolios are formed from stocks listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and the National Association of Securities Dealers Automated Quotations (NASDAQ) and are rebalanced each year and separated based on deciles. Decile 1 represents firms which have smaller market capitalizations versus the firms with higher market capitalizations (higher decile indices). Decile 10 represents firms which have some of the largest market capitalizations of listed firms. All data is monthly and is from January 1978 until December 2010. Statistical significance is determined by the Newey-West p-values.

Panel A All Age Groups – CSI Composite										
	Decile 1	**Decile 2**	**Decile 3**	**Decile 4**	**Decile 5**	**Decile 6**	**Decile 7**	**Decile 8**	**Decile 9**	**Decile 10**
Intercept α	0.009	0.007	0.008	0.007	0.008	0.008	0.008	0.007	0.007	0.006
Standard error	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
p-value	[0.008]	[0.032]	[0.009]	[0.011]	[0.007]	[0.004]	[0.004]	[0.008]	[0.007]	[0.015]
Slope β	0.430	0.417	0.383	0.346	0.323	0.283	0.270	0.245	0.225	0.185
Standard error	(0.064)	(0.073)	(0.077)	(0.075)	(0.076)	(0.068)	(0.070)	(0.066)	(0.066)	(0.055)
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Panel B Age Group 18 – 34 years old										
Intercept α	0.009	0.007	0.008	0.007	0.008	0.008	0.008	0.007	0.007	0.006
Standard error	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
p-value	[0.012]	[0.041]	[0.013]	[0.014]	[0.010]	[0.006]	[0.005]	[0.011]	[0.009]	[0.017]
Slope β	0.252	0.247	0.219	0.202	0.186	0.165	0.153	0.145	0.139	0.121
Standard error	(0.060)	(0.061)	(0.060)	(0.058)	(0.057)	(0.053)	(0.053)	(0.051)	(0.047)	(0.042)
p-value	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]	[0.002]	[0.004]	[0.004]	[0.004]	[0.004]

Panel C Age Group 35 – 54 years old										
	Decile 1	**Decile 2**	**Decile 3**	**Decile 4**	**Decile 5**	**Decile 6**	**Decile 7**	**Decile 8**	**Decile 9**	**Decile 10**
Intercept α	0.009	0.007	0.007	0.007	0.008	0.008	0.008	0.007	0.007	0.006
Standard error	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
p-value	[0.011]	[0.042]	[0.013]	[0.014]	[0.010]	[0.006]	[0.005]	[0.010]	[0.009]	[0.017]
Slope β	0.266	0.264	0.253	0.226	0.208	0.186	0.183	0.155	0.147	0.109
Standard error	(0.045)	(0.057)	(0.061)	(0.056)	(0.059)	(0.052)	(0.053)	(0.050)	(0.051)	(0.040)
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.002]	[0.004]	[0.006]
Panel D Age Group 55 years old and older										
Intercept α	0.009	0.007	0.007	0.007	0.008	0.008	0.008	0.007	0.007	0.006
Standard error	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
p-value	[0.012]	[0.043]	[0.013]	[0.015]	[0.010]	[0.006]	[0.006]	[0.011]	[0.009]	[0.018]
Slope β	0.245	0.231	0.207	0.190	0.177	0.148	0.138	0.129	0.112	0.096
Standard error	(0.043)	(0.044)	(0.046)	(0.046)	(0.044)	(0.041)	(0.041)	(0.040)	(0.037)	(0.034)
p-value	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.002]	[0.003]	[0.005]

Figure 1: Time-Series Plot of Consumer Sentiment Based on Age Groups

This figure plots the consumer sentiment indexes of three age groups: between 18 to 34 years old; between 35 and 54 years old; and 55 years old and older.



Appendix: Construction of Consumer Sentiment Index (CSI)

To calculate CSI, the following formula is used:

$$\text{Index of Consumer Sentiment} = \frac{\sum_{i=1}^{5} x_i}{\text{Base Period Total}} + 2.0$$

Base Period Total = 6.7558 and the constant 2.0 is added to correct for sample design changes.

Each x_i represents the relative score which is the percent of respondents giving favorable responses minus the percent of respondents giving unfavorable for a particular question regarding current and future economic conditions. Then 100 is added to $x_{i,}$ and it is rounded to the nearest whole number.

More specifically,

x_1 = We are interested in how people are getting along financially these days. Would you say that you (and your family) are better off or worse off financially than you were a year ago?

x_2 = Now looking ahead - do you think that a year from now you (and your family) will be better off financially, or worse off, or just about the same as now?

x_3 = Now turning to business conditions in the country as a whole - do you think that during the next twelve months we'll have good times financially, or bad times, or what?

x_4 = Looking ahead, which would you say is more likely - that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?

x_5 = About the big things people buy for their homes - such as furniture, a refrigerator, stove, television, and things like that. Generally speaking, do you think now is a good or a bad time for people to buy major household items?