Investor Sentiment as Conditioning Information in Asset Pricing

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Abstract

This paper assesses whether incorporating investor sentiment as conditioning information in asset pricing models can capture the impacts of the size, value, liquidity and momentum effects on risk-adjusted returns of individual stocks. We use survey sentiment measures and a composite index as proxies for investor sentiment. In our conditional framework, the size effect becomes less important in the conditional CAPM and is no longer significant in all the other models examined. Furthermore, the conditional models often capture the value, liquidity and momentum effects.

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1. Introduction

The Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) theoretically contends that systematic risk is measured by the exposure to the market portfolio. Prior literature has shown, however, that the CAPM cannot explain the returns on stocks with certain firm-characteristics or price histories such as the effects of firm size (Banz, 1981), value (e.g., Chan, Hamao, and Lakonishok, 1991) and momentum (Jegadeesh and Titman, 1993). Consequently, these effects have been termed as asset pricing anomalies. In the attempt to capture the dimensions of risk other than the exposure to the market factor, Fama and French (1993) further include size and value factors and Pastor and Stambaugh (2003) consider a liquidity factor. As opposed to the static nature of unconditional asset pricing models, Harvey (1989) shows that factor loadings of the CAPM and multifactor models change over time. Gibbons and Ferson (1985) and Ferson, Kandel, and Stambaugh (1987) argue that conditional models appropriately capture the dynamics of factor loadings and thus outperform unconditional models in explaining stock returns. In this paper, we ask an important question whether incorporating investor sentiment as conditioning information in asset pricing models improves model performance if investor sentiment influences stock prices.

Indeed, several studies suggest that investor sentiment and trading activities of noise traders influence stock prices because the smart-money investors trade quickly on the basis of fundamental information in an unbiased manner (Shleifer and Summers, 1990; De Long, Shleifer, Summers, and Waldman (DSSW), 1990;

Campbell and Kyle, 1993; and Kelly, 1997). Fisher and Statman (2000) find that the sentiments of both small and large investors are reliable contrarian indicators for future S&P500 index returns and that high consumer confidence is generally followed by low returns. Brown and Cliff (2004) document a relationship between institutional investors' sentiments and the returns on large size stocks. Charoenrook (2005) shows that changes in consumer sentiment are positively related to contemporaneously excess market returns. Baker and Wurgler (2006) find that investor sentiment has significant impact on the prices of stocks whose valuations are highly subjective and difficult to arbitrage.

Investor sentiment also affects trading volume and is related to the profits to the momentum strategies. Chan, Hameed, and Tong (2000) document that increases in trading volume strengthen return momentum. Baker and Stein (2004) argue that high market participation by irrational traders, which reflects a risk related to investor sentiment, increases trading volume. Liu (2006) finds that high investor sentiment induces high market turnover. In a similar vein, Glushkov (2006) shows that an increase in the proportion of irrationally sentimental traders on a stock increases the correlation of the stock with the common sentiment factors, and hence, leads to a higher sentiment beta.

In specifying time-varying betas many studies have considered macroeconomic variables such as the term premium, default spread, or consumption-wealth ratio as conditioning variables (e.g., Shanken, 1990; Ferson and Harvey, 1991; Braun, Nelson and Sunier, 1995; Ferson and Schadt, 1996; Jagannathan and Wang, 1996;

and Lettau and Ludvigson, 2001). Other studies scale factor loadings by firm-specific characteristics such as dividend-to-price ratio (D/P), book-to-market equity ratio (B/M), or market capitalization of equity (SIZE) (e.g., Cochrane, 1996; Lewellen, 1999; Gomes, Kogan, and Zhang, 2003; and Avramov and Chordia, 2006). We use investor sentiment as conditioning information in asset pricing models because this variable reflects investors' expectations about the current state and future prospects of financial markets or business-cycle conditions, consistent with the argument of Schrimpf, Schroder, and Stehle (2007).

We extend the conditional asset pricing framework of Avramov and Chordia (2006) by allowing factor loadings to vary with investor sentiment measures in addition to default spread and firm-specific characteristics – size and book-to-market ratio. We consider three different survey measures of investor sentiment: the Conference Board Consumer Confidence Index (CCI), the Investors' Intelligence Survey Index (II), and the University of Michigan Consumer Sentiment Index (MS). We further construct a composite sentiment measure (COMP) which extracts the principle component of these three sentiment measures.

We first exam whether conditional models completely explain conditional expected returns and also test whether conditional alphas are unrelated to the conditioning instruments as in Bauer, Cosemans, and Schotman (2008). Next, we evaluate the relative performance of various specifications of conditional asset pricing models in respect of how well they capture the size, value, liquidity, and momentum effects. We use the two-pass regression framework of Avramov and

Chordia (2006). In the first-pass time-series regressions, we regress monthly individual stock returns on the risk factors of asset pricing models in which factor loadings may vary with conditioning variables. In the second pass, we run cross-sectional regressions of the estimated risk-adjusted returns – the sums of the pricing error and the residual from the first-pass regressions – on firm characteristics of size, book-to-market ratio and variables representing the liquidity and momentum effects. The null hypothesis of exact pricing is that the conditional pricing models specified in the first-pass regressions successfully capture the anomalies, and thus, the size, value, liquidity, and momentum effects do not explain the cross-section of risk-adjusted stock returns in the second-pass regressions. We implement the corrections of Shanken (1992) and Jagannathan and Wang (1998) to account for the bias in the Fama-MacBeth (1973) standard errors.

This paper contributes to the literature in the following areas. First, we find that incorporating investor sentiment as conditioning information enhances the overall performance of the asset pricing models in depicting stock prices. In our conditional framework, the size effect becomes less important in the conditional CAPM and is no longer significant in all the other models examined. Furthermore, the conditional models in our study often capture the value, liquidity and momentum effects on individual stock returns. In contrast, Avramov and Chordia (2006) do not consider investor sentiment in their conditional specifications and find that the conditional models fail to capture the impacts of the liquidity and momentum effect. Our conditional specifications of models more appropriately capture the dynamics of factor loadings, and thus, outperform the unconditional ones, in line with the prediction of Hansen and Richard (1987), Ghysels (1998) and Bauer, Cosemans, and Schotman (2008). In our analysis, the conditional pricing models outperform unconditional models in terms of explaining conditional alphas, capturing the asset pricing anomalies and the magnitude of $\bar{R}^2$.

Second, previous studies have treated investor sentiment as an explanatory variable to explore its time-series or cross-sectional relationship with stock returns. Our use of investor sentiment as conditioning information in asset pricing models provides an alternative approach and sheds light on this line of research. Finally, our framework provides a platform for comparing various proxies for investor sentiment in terms of improving the performance of asset pricing models in explaining stock returns. Our results indicate that, in the conditional versions of the CAPM and FF-based models, the Conference Board Consumer Confidence Index and the composite sentiment index often yield better model performance than the other sentiment measures examined.

The rest of the paper proceeds as follows. The next section describes the two-pass methodology for examining various specifications of the asset pricing models. Section 3 details the sentiment indices and the stock trading data used in the analyses. Section 4 examines whether conditional models completely explain conditional expected returns and presents the results of models in capturing the anomalies. Section 5 concludes.

2. Methodology

2.1. The Two-Pass Framework

The exact pricing specification of a conditional version of a *K*-factor model is

$$E_{t-1}\left(R_{jt}\right)=R_{Ft}+\sum_{k=1}^{K}\lambda_{kt-1}\beta_{jkt-1} \tag{1}$$

where E_{t-1} is the conditional expectations operator, R_{jt} is the return on stock *j* at time *t* and R_{Ft} is the risk-free rate. λ_{kt-1} is the risk premium for factor *k* at *t – 1* and β_{ikt-1} is the conditional beta corresponding to factor *k*. This pricing specification imposes the theoretical restrictions ex ante that the zero-beta return equals the risk-free rate and that the factor premium is equal to the excess return on the factor, in line with Prescription 2 of Lewellen, Nagel and Shanken (2008, p. 2 and 17) and the discussion of Lewellen and Nagel (2006). In our framework we do not test, in the cross-section, the intercept and the factor premiums associated with risk factors from using an econometric model derived from (1). Instead, our goal is to understand whether asset-pricing anomalies might exert impacts on risk-adjusted returns – the parts of stock returns left unexplained by pricing models – as in Avramov and Chordia (2006) and Bauer, Cosemans, and Schotman (2008).

The two-pass conditional framework can be summarized in a generic form as

$$R_{jt}^{*}\equiv R_{jt}-[R_{Ft}+\beta(\theta;S_{t-1},z_{t-1},X_{jt-1})'F_{t}]=c_{0t}+c_{t}Z_{jt-1}+e_{jt} \tag{2}$$

where R_{jt}^{*} is the estimated risk-adjusted return on stock *j* for time *t* and is equal to the sum of the intercept and the residual obtained from a first-pass time-series regression as per the specification given in Section 2.2. θ denotes the parameters that capture the dependence of β on investor sentiment (S_{t-1}), default spread (z_{t-1}), and firm characteristics (X_{jt-1}). F_t is the vector of risk factors specified in the asset pricing models. The vector of the conditional beta is estimated by the first-pass time-series regression over the entire sample period. Z_{jt-1} is the vector of the asset-pricing anomalies – the size, value, liquidity, and momentum effects – that we intend to capture. c_t is the vector of characteristics rewards.

Equation (2) is a cross-sectional regression by which we run, in each month, the estimated risk-adjusted returns of individual stocks on the variables of size, B/M, liquidity, and prior returns. We test the null that the second-pass cross-sectional slopes on the asset pricing anomalies are zero and statistically insignificant, that is, $\hat{c}_t = (Z'_{t-1}Z_{t-1})^{-1}Z'_{t-1}R^*_{jt} = 0$. The adjusted R squared ($\bar{R}^2$) of each model in the second-pass regression serves as an indicator for comparing the relative overall performance of the conditional specifications of the asset pricing model. A *smaller* cross-sectional $\bar{R}^2$ indicates a higher overall explanatory power of the asset pricing model specified in the first-pass regression for stock returns.

Following Brennan, Chordia, and Subrahmanyam (1998) and Avramov and Chordia (2006), we use the deviations of the firm-specific characteristics from the cross-sectional means in a given month rather than the raw values of the firm characteristics as the regressors in the second-pass cross-sectional regression. This implies that the average stock will have a value of zero for each of the non-risk firm characteristics, so only the risk factors can determine its expected return. The variables of firm characteristics are also lagged one more period to get around the possibility that the estimate of the risk-adjusted return may be biased due to bid-ask effects and thin tradings.

2.2. Conditional Asset Pricing Models

The asset pricing models we considered are: (i) the CAPM, (ii) the Fama-French (1993) three-factor model (FF, hereafter), (iii) the FF model augmented by the Pastor-Stambaugh (2003) liquidity factor (FFP, hereafter), (iv) the FF model augmented by the winners-minus-losers portfolio (WML) which proxies for the momentum factor (FFW, hereafter), and (v) the FF model augmented by both the liquidity and the momentum factors (FFPW, hereafter). The most comprehensive model in our study that contains all the risk factors considered is the FFPW model

$$r_{jt} = \alpha_j + \beta_{jm} r_{mt} + \beta_{jSMB} SMB_t + \beta_{jHML} HML_t + \beta_{jPS} PS_t + \beta_{jWML} WML_t + u_{jt} \tag{3}$$

where $r_{jt} = R_{jt} - R_{Ft}$ and r_{mt} is the excess return on the (CRSP value-weighted) market index at time *t*. u_{jt} is the error term. *SMB* denotes the monthly return difference between the average return on the three small size portfolios minus the average return on the three big size portfolios. *HML* denotes the monthly return difference between the average return on the two value portfolios minus the average return on the two growth portfolios. *PS* is the Pastor-Stambaugh (2003) liquidity factor constructed by the difference between the value-weighted return on the high liquidity sensitive portfolios and the value-weighted return on the low liquidity sensitive portfolios. *WML* is the momentum factor that represents the difference between the returns on the winner and the loser portfolios of the momentum strategies depicted by Jegadeesh and Titman (1993). We obtain all the risk factors from Kenneth French's website.[1] The most parsimonious asset pricing model examined in our study is the CAPM that contains the single risk factor – the excess market return.

To further illustrate the conditional models, we use the single-factor CAPM as an example to describe the empirical specifications. The beta of the excess market return, β_{jt-1}, can be expressed as a function of investor sentiment (S_{t-1}), default spread (z_{t-1}), and firm characteristics ($SIZE_{jt-1}$ and B/M_{jt-1}) as

$$\begin{aligned}\beta_{jt-1} &= \beta_{j1} + \beta_{j2}z_{t-1} + \beta_{j3}S_{t-1} + \beta_{j4}z_{t-1}S_{t-1} \\ &+ (\beta_{j5} + \beta_{j6}S_{t-1} + \beta_{j7}z_{t-1})SIZE_{jt-1} \\ &+ (\beta_{j8} + \beta_{j9}S_{t-1} + \beta_{j10}z_{t-1})(B/M)_{jt-1} \end{aligned} \tag{4}$$

We model eight specifications for beta. In the unconditional case, all βs except for β_{j1} are set to be zero. The seven conditional specifications can be derived by allowing the beta in (4) to be a function of conditioning variables as

Specification A: function of $(SIZE + B/M)$ and S (i.e., $\beta_{j2} = \beta_{j4} = \beta_{j7} = \beta_{j10} = 0$)
Specification B: function of $(SIZE + B/M)$ and z (i.e., $\beta_{j3} = \beta_{j4} = \beta_{j6} = \beta_{j9} = 0$)
Specification C: function of z *and* S (i.e., $\beta_{j5} = \beta_{j6} = \beta_{j7} = \beta_{j8} = \beta_{j9} = \beta_{j10} = 0$)
Specification D: function of $(SIZE + B/M)$ (i.e., $\beta_{j2} = \beta_{j3} = \beta_{j4} = \beta_{j6} = \beta_{j7} = \beta_{j9} = \beta_{j10} = 0$)
Specification E: function of S (i.e., $\beta_{j2} = \beta_{j4} = \beta_{j5} = \beta_{j6} = \beta_{j7} = \beta_{j8} = \beta_{j9} = \beta_{j10} = 0$)
Specification F: function of z (i.e., $\beta_{j3} = \beta_{j4} = \beta_{j5} = \beta_{j6} = \beta_{j7} = \beta_{j8} = \beta_{j9} = \beta_{j10} = 0$)
Specification G: function of all variables z, S, $SIZE$ *and* B/M (i.e., all $\beta s \neq 0$) (5)

The first pass time-series regression for the conditional specification G of the

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[1] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

CAPM that incorporates all conditioning information is

$$\begin{aligned} r_{jt} = \alpha_j + \beta_{j1} r_{mt} + \beta_{j2} z_{t-1} r_{mt} + \beta_{j3} S_{t-1} r_{mt} + \beta_{j4} z_{t-1} S_{t-1} r_{mt} \\ + \beta_{j5} SIZE_{jt-1} r_{mt} + \beta_{j6} S_{t-1} SIZE_{jt-1} r_{mt} + \beta_{j7} z_{t-1} SIZE_{jt-1} r_{mt} \\ + \beta_{j8} B/M_{jt-1} r_{mt} + \beta_{j9} S_{t-1} B/M_{jt-1} r_{mt} + \beta_{j10} z_{t-1} B/M_{jt-1} r_{mt} + u_{jt} \end{aligned} \quad (6)$$

where the firm characteristics, investor sentiment and default spread are all lagged one period to stock returns and risk factors in the asset pricing models. The estimated risk-adjusted return on stock *j* at time *t* to be used in the cross-sectional regression (2) is $R^*_{jt} = \alpha_j + u_{jt}$.

3. Data

3.1. Sentiment Indices

A number of studies have documented that the sentiment indices compiled by various institutions are associated with stock returns and liquidity. The literature, however, has not yet reached a conclusion on which of these indices to be the most direct proxy for investor sentiment. To circumvent this problem, we use three survey sentiment indices, CCI, II and MS as well as the composite sentiment index extracted from these three indices to proxy for investor sentiment in our framework[2]. The Investors' Intelligence reads, each weekend, about 150 newsletters and classifies the opinions of newsletter writers into one of the three groups – bullish, bearish, or neutral – based on their transaction advices. The II Index is considered as a direct sentiment measure of the stock market investors because it reflects the opinions of

[2] These three indices have been available since the 1960s or earlier and have longer history than those compiled by the American Association of Individual Investors (AAII) or UBS/Gallup. The details of II, MS, and CCI are available from the authors upon request.

the market professionals about the future movements of stock prices. In contrast, both the MS and CCI concern consumers' expectations about the overall prospects of the economy rather than the stock market per se. Nevertheless, many studies use these two indices as proxies for investor sentiment and show that these indices predict stock returns (e.g., Fisher and Statman, 2002; Lee, Jiang and Indro, 2002; Brown and Cliff, 2004 and 2005; Lemmon and Portniagunia, 2006; and Liu, 2006). Fisher and Statman (2002) further demonstrate that consumer confidence moves stock prices.

Earlier parts of the MS and CCI indices were not released at the monthly frequency. The MS was released every quarter prior to January 1978 and the CCI was released every two months prior to January 1977. For these non-monthly data, we use the most recently available observations for the current month to align the time-series frequency of the sentiment indices with monthly stock returns (see also, Lemmon and Portniaguina, 2006). For example, the MS index published in February is used for the following March and April until the new index observation became available in May. For II, we obtain the monthly index values from the averages of the weekly data available in the same month.

Panel A of Table 1 shows the descriptive statistics of the sentiment indices. Since the sentiment indices were compiled using different formulae, the coefficient of variation is a more appropriate measure for dispersion than standard deviation. CCI and II have similar coefficients of variation of 23.45% and 22.81%, respectively. The coefficient of variation of MS of 13.97% is relatively lower comparing with those of

CCI and II, indicating that the time-series of MS is more stable than CCI and II.

Panel B of Table 1 shows the correlation coefficients between the sentiment indices. The correlation coefficient between the two consumer confidence measures, MS and CCI, is 0.76 and statistically significant, reflecting their common nature inherent in representing the opinions of general households. MS and II are significantly correlated with a coefficient of 0.27. The correlation coefficient between CCI and II is as low as 0.04 and insignificant. Apparently, these three indices may measure different aspects of the expectations of certain groups of investors or consumers about the economy or stock markets. An individual index may not completely reflect the common views of investors and is likely to have its own idiosyncratic nature. Thus, we construct a composite sentiment index using principal component analysis to extract the common component contained in the three sentiment indices. The selected first principal component gives a composite index

$$COMP_t = 0.521MS_t + 0.493CCI_t + 0.192II_t,$$

where each of the index components has been standardized. The $COMP_t$ represents the composite sentiment index which captures high common variation in the components of the three indices because it explains 60.53% of the total (standardized) sample variance. The composite sentiment extracts essential information from the three sentiment indices and may represent a useful investor sentiment measure (see also, Brown and Cliff, 2004; and Baker and Wurgler, 2006).

3.2. Trading Data

We use the monthly equity data of the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX) from the Center for Research in Security Price (CRSP) and COMPUSTAT datasets for the period from July 1964 through December 2005. A stock must meet the following criteria in order to be included for analysis: First, the return in the current month, t, and over the past 36 months must be available. Second, observations on stock prices and shares outstanding for calculating firm size and the month $t - 2$ trading volume for calculating turnover must be available. Third, the B/M as of December of the previous calendar year must be available from the COMPUSTAT dataset. We only include stocks with positive B/M as in Fama and French (1992). We drop the first two years of COMPUSTAT data for every firm to control for the COMPUSTAT survival bias as in Fama and French (1992) and Kothari, Shanken, and Sloan (1995). The total number of common stocks in our sample is 3,918. As in Fama and French (1992), the value of B/M for July of year t to June of year $t + 1$ is computed using accounting data as of the end of year $t - 1$. Following Avramov and Chordia (2006), B/M values greater than the 0.995 fractile or less than the 0.005 fractile are set to be the values of the 0.995 and 0.005 fractiles, respectively. We use the CRSP value-weighted returns to proxy for the market returns. We calculate the following variables every month:

MS: the level of the Consumer Confidence Index of the Michigan Survey,

CCI: the level of the Consumer Confidence Index of the Conference Board[3],

II: the percentage of newsletters classified as optimism by Investors' Intelligence,

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[3] We thank Lynn Franco, the director of the Consumer Research Center of the Conference Board, for providing the data.

SIZE: the natural logarithm of the market capitalization of a firm measured in billions of dollars,

B/M: the natural logarithm of the book-to-market ratio of a firm,

TURNOVER: the ratio of trading volume to the number of shares outstanding of a firm,

RET2-3 (%): the cumulative return over the past second through the past third months,

RET4-6 (%): the cumulative return over the past fourth through the past sixth months,

RET7-12 (%): the cumulative return over the past seventh through the past twelfth months, and

z: default spread, the return difference between Baa and Aaa rated bonds.

In addition to using the firm characteristics as conditioning information in our models, we also consider market-wide macroeconomic variables of default spread and investor sentiment that the literature has shown to predict stock returns. Panel B of Table 1 shows the correlation coefficients of default spread with each of the survey sentiment indices. Default spread is negatively correlated with MS and CCI with both correlation coefficients of around -0.5, but is weakly and insignificantly correlated with II with a coefficient of -0.02. Default spread also exhibits a higher coefficient of variation of 39.62% than those of the sentiment indices.

3.3. Descriptive Statistics

Table 2 summarizes the time-series averages of the cross-sectional means, medians, and standard deviations of the firm characteristics as well as the Fama-MacBeth coefficients from the regressions of the excess stock returns on the firm characteristics. Consistent with Brennan, Chordia, and Subrahmanyam (1998), Chordia, Subrahmanyam, and Anshuman (2001), and Avramov and Chordia (2006), small firms and those with high B/M ratios earn higher excess returns. The negative coefficient on turnover shows that stocks with lower liquidity have higher excess returns, consistent with Amihud and Mendelson (1986). Also, short-term prior returns are positively related to excess returns. Finally, the average $\bar{R}^2$ of 5.76 for all stocks in our sample period is close to the result in Avramov and Chordia (2006).

4. Empirical Results

4.1. Do Conditional Models Explain Conditional Expected Returns?

Previous studies document that conditional asset pricing models outperform the unconditional models in explaining stock returns. We examine whether conditional models completely explain conditional expected returns[4]. We specify the conditional alpha as a linear function of a set of conditioning instruments as in Shanken (1990) and Bauer, Cosemans, and Schotman (2008),

$$\alpha_{jt} = \alpha_{j0} + \alpha_{j1} W_{jt} . \tag{7}$$

where α_{j0} is a scalar, α_{j1} a vector of parameters and W_{jt} a vector of conditioning variables considered in the paper for the conditional alpha. Specifically, we first

[4] We thank the anonymous referee for valuable comments on this analysis.

perform an F-test for the hypothesis that the conditional alpha in the first-pass time-series regression is zero, i.e., whether α_{j0} and α_{j1} in (7) are all equal to zero.

Panel A of Table 3 presents the Bonferroni adjusted p-values for a joint test across firms and the proportions of firms having p-values lower than 0.05[5]. The results indicate that the conditional models perform better than the unconditional ones in explaining conditional expected returns. The hypothesis of a zero conditional alpha is rejected at the 5% level for 22.1% of firms in the unconditional CAPM and between 18.4% and 21.7% of firms in the conditional versions of the CAPM. There are similar patterns in the FF-based models, i.e., FF, FFP, FFW, and FFPW. For each asset pricing model, specification G which allows factor loadings to vary with all the conditioning variables outperforms all the other conditional specifications in explaining conditional expected returns. In each asset pricing model, the Bonferroni adjusted p-value for a joint test across firms is less than 0.05 in all specifications of beta.

We next test the weaker hypothesis that the conditional alpha is unrelated to the instrumentals ($\alpha_{j1} = 0$), i.e., that the alpha is constant in the asset pricing model. The results in Panel B of Table 3 show that the weaker hypothesis is rejected at the 5% level for 24.7% of firms in the unconditional CAPM and between 20.5% and 24.1% of firms in the conditional versions of the CAPM. Generally in the FF-based models, the proportion of firms to which the weaker hypothesis is rejected at the 5% level in

[5] We perform the tests using all the four measures of investor sentiment and the results (available upon request) are qualitatively similar. For brevity, Table 3 only reports the results from using the composite sentiment index as the proxy for investor sentiment.

conditional beta specifications is lower than that in the unconditional beta case. Nevertheless, the Bonferroni adjusted *p*-value for a joint test across firms is close to zero in most of the beta specifications of models.

Overall, our findings show that conditional asset pricing models outperform the unconditional counterparts in explaining the dynamics of conditional expected returns, consistent with Bauer, Cosemans, and Schotman (2008). When betas are allowed to vary with investor sentiment, default spread and firm characteristics, the ability of the instruments to predict mispricing is much reduced in all the asset pricing models. This is consistent with the finding of Baker and Wurgler (2006) that investor sentiment is conditionally influencing stock returns.

4.2. The CAPM

Next, we examine the extent to which the unconditional and conditional versions of the CAPM explain the asset-pricing anomalies. Table 4 presents the Fama-MacBeth coefficient estimates from the OLS cross-sectional regressions of monthly risk-adjusted returns of individual stocks on the anomaly variables. The first column lists the unconditional model and the various time-varying beta specifications as in (5). For the conditional models that investor sentiment enters into the time-varying beta specification, we report the results from using each of the four proxies for investor sentiment. The last four columns present, for each beta specification, the average $\bar{R}^2$ of the cross-sectional regressions.

For the unconditional CAPM, the first row of Table 4 shows that all the coefficient estimates on the anomaly variables are all highly significant[6] and that firms with small market value, high B/M, low turnover, and high past returns earn higher risk-adjusted returns. Clearly, the CAPM with a constant beta fails to capture any of the anomalies. In the conditional versions of the CAPM, the *t*-statistic for SIZE is reduced in Specification C where the beta is allowed to vary with investor sentiment (using either CCI or COMP as the proxy) and default spread. In Specification G which uses CCI and all the other instruments in the conditional beta specification, the *t*-statistics for SIZE after using the corrections of Shanken (1992) and Jagannathan and Wang (1998) are reduced to -1.82 and -1.90, respectively. Moreover, all the conditional models have lower $\bar{R}^2$s than that of the unconditional CAPM. Overall, the impact of firm size on the cross-section of risk-adjusted returns becomes less important when either CCI or COMP enters into the conditional beta specifications of the CAPM as in Specifications C and G.

Lewellen, Nagel, and Shanken (2008) argue that the point estimate of cross-sectional R^2 can be biased and suggest reporting confidence intervals for the $\bar{R}^2$ in order to provide more transparent information. We thus report, for each model, a confidence interval for $\bar{R}^2$. For example, in Table 4 the 5th percentile of the $\bar{R}^2$ in the unconditional CAPM is 4.39% and the 95th percentile is 5.30%. Lewellen et al. (2008) also propose the uses of GLS cross-sectional regressions for asset-pricing

[6] We have calculated the *t*-statistics from the OLS and used the corrections of Shanken (1992) and Jagannathan and Wang (1998). We only report the corrected *t*-statistics here since the differences between the unadjusted and the corrected *t*-statistics are very minor and do not affect our inferences and conclusions. In general, the Jagannathan and Wang (1998) corrected *t*-statistics are higher than those based on Shanken (1992). In the later sections, we include unadjusted *t*-statistics for the FF model for the purpose of illustration, but only report the corrected *t*-statistics for all the FF based models, i.e., FFP, FFW, and FFPW, for brevity.

tests and the GLS R^2 to gauge model performance. Table 5 shows the results from using GLS regressions. Compared with the OLS results in Table 4, the magnitudes of the adjusted *t*-statistics for SIZE are dramatically decreased in all models and thus the SIZE effect is no longer significant, although all the other anomaly variables remain significant. Noticeably, the model $\bar{R}^2$ increases to around 30% in the GLS regressions because the GLS uses transformed variables, and hence, reduces the noise caused by the variability of the observations.

4.3. The Fama-French Three-Factor Model (FF)

Table 6 presents the results of the FF model. Compared with the unconditional CAPM, the unconditional FF model has a reduced (Shanken) adjusted *t*-statistic of -1.87 on SIZE as well as a lower $\bar{R}^2$ of 2.79%. Thus, the impact of firm size on the cross-section of risk-adjusted returns is decreased when *SMB* and *HML* are included as additional risk factors. The conditional versions of the FF model outperform the unconditional FF model and all versions of the CAPM in capturing the impacts of firm attributes on stock returns. All the conditional FF models are able to capture the size effect. Moreover, both SIZE and B/M are no longer significant in the beta specifications A, B, and G that use, respectively, investor sentiment, default spread and both macroeconomic variables in addition to the firm-specific characteristics as conditioning variables. In contrast, the beta specifications D, E, and F that use either only the firm-specific characteristics or a macroeconomic variable as conditioning information are only able to capture SIZE but not B/M.

Strikingly, in the beta specification C which allows factor loadings to vary with both COMP and default spread, the impact of the short-term momentum variable RET2-3 on the cross-section of risk-adjusted returns becomes insignificant. In contrast, Avramov and Chordia (2006) do not consider investor sentiment as conditioning information and find that the conditional FF model fails to capture the impact of the momentum effect on stock returns. Our results suggest that investor sentiment plays an important role for capturing the momentum effect.

We also find that the overall explanatory power of anomaly variables on risk-adjusted returns is reduced when replacing default spread by investor sentiment as conditioning information. Comparing the $\bar{R}^2$s of the conditional FF models, Model E which incorporates investor sentiment as conditioning information has a lower $\bar{R}^2$ than that of Model F which uses default spread. Similarly, the beta specification A which incorporates investor sentiment and firm characteristics as conditioning variables has a slightly lower $\bar{R}^2$ than that of the beta specification B which uses default spread and firm characteristics. These suggest that investor sentiment may be a better instrument than default spread in the pricing models for conveying conditioning information because investor sentiment directly measures investors' expectations about the conditions on stock markets and the economy.

We repeat the tests of the FF models by using GLS cross-sectional regressions. The GLS results are qualitatively similar to those based on OLS. For brevity reason, we do not report the results (but available upon request).[7] Again, the beta

[7] We do not report the results (available upon request) from GLS regressions for FFW and FFPW for the same

specifications A, B, and G can capture both the SIZE and B/M effects, the beta specification C can capture both SIZE and RET2-3, but the other models can capture SIZE only. The *t*-statistics of the captured anomaly variables from using GLS are much lower than those based on OLS. For example, in the beta specification B the *t*-statistics for SIZE and B/M change from -1.27 and 1.00, respectively, in the OLS regressions to 0.03 and 0.50 when GLS regressions are applied. Overall results of the FF model indicate that using GLS estimations enhances the precision of coefficient estimates, but does not change the inferences and conclusions.

4.4. The FF Model plus the Pastor-Stambaugh Liquidity Factor (FFP)

Pastor and Stambaugh (2003) document that stocks with high liquidity betas earn higher average returns than stocks with low liquidity betas. We examine whether the liquidity-augmented FF models capture TURNOVER to which the conditional CAPM and FF models fail to capture. We use the Pastor-Stambaugh liquidity factor which is the difference between the value-weighted return on the stocks with high sensitivities to liquidity and the value-weighted return on the stocks with low sensitivities to liquidity[8].

Table 7 summarizes the results of the FFP model. We find that the inclusion of the liquidity factor improves model performance. In the unconditional FFP model the size effect is no longer significant. The beta specification C of the FFP model fully captures the impacts of both RET2-3 and SIZE regardless of which measure of

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reason.

[8] We thank Lubos Pastor for providing the data.

investor sentiment being used. In addition, Model F which scales factor loadings by default spread alone also captures the impact of RET2-3. These findings show that return momentum is related to the liquidity risk. Adding the liquidity factor to the FF models, however, does not significantly reduce the impact of TURNOVER on stock returns. The adjusted *t*-statistics for TURNOVER in the FFP models remain significant in all beta specifications.

Similar to the results of the conditional FF models, the $\bar{R}^2$ of Model E is lower than that of the beta specification F, and the $\bar{R}^2$ of the beta specification A is lower than that of the beta specification B. These show that the FFP models that use investor sentiment as conditioning information are better than those use default spread to explain expected returns in the first-pass time-series regressions. Consequently, in the second-pass cross-sectional regressions the overall impact of firm attributes on risk-adjusted returns is reduced.

Table 8 shows the results of the FFP model from using GLS regressions. We find striking results for the beta specification G that all of the (transformed) anomaly variables, namely, SIZE, B/M, TURNOVER, RET2-3, and RET4-6 are no longer significant. RET7-12 is also insignificant when either using CCI or COMP. The results of the other conditional versions of the FFP model are qualitatively similar to those based on the OLS regressions in terms of capturing the impacts of anomalies.

4.5. The FF Model plus the Winners-minus-Losers Factor (FFW)

Table 9 reports the results of the FFW model that adds the *WML* risk factor to the FF model. With constant betas, the unconditional FFW model does not capture any of the anomalies. Using MS, CCI or II as the proxy for investor sentiment, the beta specification G of the conditional FFW model can successfully capture the impact of TURNOVER on individual stock returns. In addition, the beta specification G captures RET2-3 when either MS or II is used to proxy for investor sentiment. Specification G also captures RET4-6 when II is used to proxy for sentiment. The results of the other conditional versions of the FFW model are qualitatively similar to those of the FFP model. Comparing with the results of the conditional FF models, the conditional FFW models further capture TURVOVER, RET2-3, and RET4-6 in addition to SIZE. These results suggest that adding investor sentiment to the conditioning information set and adding the momentum factor to the FF model enhance the power of the asset pricing model. In the unreported results of the GLS regressions, the beta specification E which uses either CCI or COMP as conditioning information further captures RET2-3 in addition to SIZE. The results of all the other models are qualitatively unchanged.

4.6. The FF Model plus the Liquidity and WML Factors (FFPW)

Finally, we ask whether adding both the liquidity and momentum factors to the FF model further enhances model performance. Table 10 presents the results of the FFPW model. Overall, the results of the FFPW models are qualitatively similar to those of the FFP models. Contrary to expectation, the explanatory power of the beta specification G of the FFPW is virtually reduced compared with the results of the

FFW. In particular, Model G of the FFPW now loses its power to capture the impacts of B/M, TURNOVER, RET2-3, and RET4-6 on stock returns. All these variables become significant again when both the momentum and the Pastor-Stambaugh liquidity factors are added to the FF model. However, when using GLS cross-sectional regressions to estimate the models, all the anomaly variables in the beta specification G are insignificant.

5. Conclusions

In this paper, we allow stock level betas to vary with investor sentiment, default spread and firm-level size and book-to-market ratio. We first test whether conditional asset pricing models that further incorporate investor sentiment as conditioning information explain conditional alphas. We find that the conditional models outperform the unconditional models in explaining the dynamics of expected stock returns. Next, we test whether incorporating investor sentiment as conditioning information in asset pricing models helps capture the impacts of firm size, book-to-market ratio and the liquidity and momentum effects on individual stock returns. We find that our conditional specifications of models outperform the unconditional beta models in terms of capturing these anomalies. In addition, the conditional versions of the liquidity-augmented FF model, which incorporate investor sentiment and default spread as conditioning information, capture the impact of the momentum effect on the cross-section of risk-adjusted returns of individual stocks. In the conditional versions of the momentum-factor augmented FF model the impacts of both the liquidity and momentum effects on stock returns generally decline and become insignificant in many cases.

Among the conditional specifications of the liquidity and/or momentum factor augmented FF models, the beta specification C which allows factor loadings to vary with both investor sentiment and default spread always captures the short-term momentum – RET2-3 – regardless of the proxies for investor sentiment. The beta specification G that contains most comprehensive instrumental variables does not necessarily capture more anomalies than those with fewer instruments. The only exception occurs in the momentum-factor augmented FF model where the beta specification G is able to capture most of the anomalies.

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Table 1

Summary statistics and correlations of survey investor sentiment indicators and default spread

Panel A: Descriptive Statistics of survey investor sentiment indicators and default spread

	Mean	Std. Dev.	C.V. (%)	Minimum	Maximum
MS	86.61	12.10	13.97	51.70	112.00
CCI	98.17	23.02	23.45	43.20	144.71
II	44.19	10.08	22.81	10.30	76.66
DEF (%)	1.06	0.42	39.62	0.55	2.69

Panel B: Correlations between survey investor sentiment indicators and default spread

	MS	CCI	II	DEF
MS	1.00			
CCI	0.76*	1.00		
II	0.27*	0.04	1.00	
DEF	- 0.50*	- 0.53*	- 0.02	1.00

*: significant at the 1% level.

MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. DEF is default spread which measures the yield difference between Baa and Aaa bonds. C.V. is the coefficient of variation calculated as the ratio of standard deviation to the mean.

Table 2

Summary statistics (3,918 firms: 07/1964 - 12/2005)

	Mean	Std. Dev.	Coefficient (%)	*t*-statistics
EXCESS RETURN (%)	0.84	5.47		
SIZE ($ billions)	1.97	2.10	-0.12	-2.73
B/M	0.89	0.35	0.26	4.69
TURNOVER	0.05	0.03	-0.09	-1.63
RET2-3	2.61	8.38	0.65	2.23
RET4-6	3.93	10.58	0.82	3.13
RET7-12	7.94	15.44	0.96	6.15
$\overline{R}^2$ (%)	5.76			

This table presents the time-series averages of the cross-sectional means and standard deviations for 3918 NYSE-AMEX stocks over 498 months from July 1964 through December 2005. The column labeled "Coefficient" represents the time-series averages of the slop coefficients from the cross-sectional OLS regressions of excess return on the firm characteristics. The *t*-values for the slop coefficients of the characteristics are in the last column. $\overline{R}^2$ denotes the adjusted *R* squared. SIZE represents the market capitalization in billions of dollars. B/M is the book-to-market ratio of equity. TURNOVER is the monthly trading volume of shares divided by shares outstanding. RET2-3, RET4-6, and RET7-12 are the cumulative returns over the second through third, fourth through sixth, and seven through twelfth months before the current month, respectively. A common stock must meet the following criteria in order to be included in the analysis: (i) the returns of the stock must be available in the current month, *t*, and over the past 36 months in the CRSP, (ii) stock prices and shares outstanding for calculating the size of a firm and the month $t-2$ trading volume for calculating turnover must be available, (iii) the B/M as of December of the previous calendar year has to be available from the COMPUSTAT dataset, (iv) the B/M must be positive, and (v) the B/M values greater than the 0.995 fractile or less than the 0.005 fractile are set to be the 0.995 and 0.005 fractile values, respectively.

Table 3

Tests of the time-varying alphas in the first-pass time-series regressions

Panel A: Test Zero Conditional Alpha

Beta Specification	CAPM		FF		FFP		FFW		FFPW	
	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05
UNCOND	0.001	22.11	0.002	19.05	0.008	14.07	0.009	13.39	0.006	13.49
A	0.000	19.28	0.002	14.91	0.002	14.23	0.000	12.99	0.000	12.58
B	0.000	19.43	0.001	14.58	0.002	13.37	0.000	12.16	0.000	11.62
C	0.001	20.12	0.003	17.08	0.000	13.62	0.000	12.80	0.000	12.52
D	0.000	20.43	0.001	16.93	0.001	15.57	0.000	15.01	0.000	14.37
E	0.001	20.63	0.001	18.46	0.002	14.31	0.014	13.63	0.002	14.10
F	0.001	21.68	0.005	18.16	0.001	13.24	0.000	12.62	0.000	12.07
G	0.000	18.39	0.002	13.76	0.000	12.20	0.000	10.84	0.000	11.04

Panel B: Test Constant Alpha

Beta Specification	CAPM		FF		FFP		FFW		FFPW	
	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05	Bonferroni	% < 0.05
UNCOND	0.000	24.74	0.001	22.01	0.003	16.02	0.004	16.08	0.002	15.92
A	0.000	21.99	0.001	16.80	0.001	15.82	0.000	14.70	0.000	14.14
B	0.000	21.12	0.000	16.29	0.001	15.22	0.000	13.25	0.000	13.05
C	0.000	22.93	0.001	19.74	0.000	15.04	0.000	14.40	0.000	14.01
D	0.000	23.31	0.000	18.08	0.001	17.08	0.000	16.51	0.000	15.90
E	0.000	23.31	0.000	20.91	0.001	15.79	0.006	15.64	0.001	15.66
F	0.000	24.13	0.002	20.28	0.000	15.02	0.000	14.63	0.000	14.57
G	0.000	20.51	0.001	14.84	0.000	12.85	0.000	11.66	0.000	11.38

This table presents the Bonferroni adjusted *p*-values for a joint hypothesis across firms and the percentage of firms whose *p*-values of an *F*-test are below 0.05 for the hypothesis that the conditional alpha is zero (Panel A) and the hypothesis that the alpha is constant (Panel B) for the 3,918 firm in the sample. The row of "UNCOND" displays the results of the unconditional models. The rows for models A through G show the results for the conditional models as per the specifications described in equation (4).

Table 4

Fama-MacBeth OLS regression estimates with excess market return as the risk factor (OLS-CAPM)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND		-0.099				0.265				-0.161				0.764				0.850				1.024				4.84		
		{-2.36}				{5.01}				{-3.84}				{2.82}				{3.56}				{7.12}				[4.39,5.30]		
		[-2.47]				[5.22]				[-4.01]				[2.92]				[3.68]				[7.40]						
A	-0.093	-0.087	-0.010	-0.085	0.253	0.266	0.234	0.271	-0.160	-0.180	-0.157	-0.184	0.925	0.878	0.953	0.846	0.933	1.005	0.968	0.977	1.046	1.151	1.067	1.125	4.70	4.52	4.64	4.54
	{-2.31}	{-2.07}	{-2.47}	{-2.03}	{5.02}	{5.08}	{4.70}	{5.19}	{-4.08}	{-4.49}	{-3.98}	{-4.62}	{3.51}	{3.40}	{3.67}	{3.27}	{4.20}	{4.54}	{4.35}	{4.38}	{7.55}	{8.21}	{7.70}	{8.00}	[4.24,5.15]	[4.10,4.95]	[4.20,5.08]	[4.10,4.97]
	[-2.42]	[-2.17]	[-2.58]	[-2.13]	[5.25]	[5.31]	[4.90]	[5.43]	[-4.26]	[-4.69]	[-4.15]	[-4.83]	[3.63]	[3.53]	[3.79]	[3.39]	[4.35]	[4.71]	[4.50]	[4.54]	[7.89]	[8.59]	[8.03]	[8.36]				
B		-0.087				0.241				-0.152				0.936				1.009				1.119				4.67		
		{-2.15}				{4.79}				{-3.86}				{3.58}				{4.53}				{8.10}				[4.24,5.10]		
		[-2.25]				[5.01]				[-4.02]				[3.71]				[4.69]				[8.44]						
C	-0.088	-0.081*	-0.099	-0.079*	0.257	0.271	0.256	0.276	-0.162	-0.183	-0.143	-0.187	0.748	0.639	0.733	0.625	0.875	0.918	0.857	0.905	1.048	1.096	1.010	1.107	4.78	4.61	4.78	4.60
	{-2.13}	{-1.91}	{-2.40}	{-1.86}	{4.99}	{5.04}	{5.00}	{5.19}	{-3.97}	{-4.38}	{-3.48}	{-4.50}	{2.75}	{2.36}	{2.74}	{2.30}	{3.80}	{4.02}	{3.69}	{3.93}	{7.41}	{7.63}	{7.08}	{7.77}	[4.33,5.23]	[4.17,5.05]	[4.33,5.23]	[4.16,5.04]
	[-2.23]	[-1.99]	[-2.52]	[-1.94]	[5.20]	[5.27]	[5.22]	[5.42]	[-4.15]	[-4.57]	[-3.64]	[-4.70]	[2.85]	[2.44]	[2.82]	[2.38]	[3.92]	[4.12]	[3.81]	[4.06]	[7.70]	[7.95]	[7.35]	[8.09]				
D		-0.093				0.266				-0.158				0.852				0.910				1.050				4.73		
		{-2.26}				{5.20}				{-3.92}				{3.22}				{3.99}				{7.39}				[4.28,5.18]		
		[-2.37]				[5.43]				[-4.10]				[3.33]				[4.14]				[7.72]						
E	-0.097	-0.088	-0.100	-0.087	0.268	0.290	0.260	0.292	-0.162	-0.185	-0.158	-0.189	0.784	0.684	0.785	0.673	0.861	0.887	0.842	0.882	1.024	1.090	1.010	1.088	4.80	4.64	4.80	4.63
	{-2.34}	{-2.04}	{-2.40}	{-2.02}	{5.12}	{5.31}	{5.02}	{5.39}	{-3.93}	{-4.39}	{-3.79}	{-4.51}	{2.89}	{2.53}	{2.92}	{2.47}	{3.70}	{3.81}	{3.56}	{3.78}	{7.20}	{7.51}	{7.07}	{7.54}	[4.35,5.26]	[4.19,5.08]	[4.35,5.26]	[4.19,5.08]
	[-2.45]	[-2.14]	[-2.51]	[--2.11]	[5.35]	[5.55]	[5.24]	[5.63]	[-4.10]	[-4.59]	[-3.96]	[-4.71]	[2.99]	[2.61]	[3.01]	[2.55]	[3.81]	[3.93]	[3.68]	[3.90]	[7.48]	[7.81]	[7.34]	[7.84]				
F		-0.095				0.268				-0.150				0.726				0.846				1.032				4.81		
		{-2.28}				{5.09}				{-3.61}				{2.70}				{3.60}				{7.20}				[4.36,5.28]		
		[-2.38]				[5.31]				[-3.77]				[2.79]				[3.72]				[7.48]						
G	-0.087	-0.074**	-0.093	-0.076**	0.221	0.238	0.215	0.240	-0.157	-0.178	-0.151	-0.180	0.979	0.928	0.936	0.895	0.998	1.053	1.066	1.035	1.074	1.130	1.091	1.135	4.63	4.44	4.60	4.44
	{-2.19}	{-1.82}	{-2.37}	{-1.85}	{4.52}	{4.70}	{4.39}	{4.77}	{-4.10}	{-4.57}	{-3.93}	{-4.63}	{3.77}	{3.64}	{3.64}	{3.51}	{4.59}	{4.85}	{4.92}	{4.75}	{8.03}	{8.30}	{8.04}	{8.36}	[4.20,5.06]	[4.03,4.85]	[4.17,5.02]	[4.03,4.85]
	[-2.29]	[-1.90]	[-2.47]	[-1.94]	[4.73]	[4.92]	[4.58]	[4.99]	[-4.26]	[-4.76]	[-4.08]	[-4.82]	[3.90]	[3.78]	[3.76]	[3.64]	[4.76]	[5.04]	[5.08]	[4.93]	[8.37]	[8.65]	[8.35]	[8.71]				

This table presents the averages of the coefficient estimates from the second-pass OLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return as the risk factor. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the time-series average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted R squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 5

Fama-MacBeth GLS regression estimates with excess market return as the risk factor (GLS-CAPM)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND		-0.057				0.251				-0.159				0.716				0.874				1.055				32.02		
		{-1.42}				{4.88}				{-3.91}				{2.69}				{3.71}				{7.37}				[30.36,33.68]		
		[-1.48]				[5.10]				[-4.09]				[2.78]				[3.83]				[7.66]						
A	-0.054	-0.051	-0.061	-0.048	0.239	0.255	0.222	0.260	-0.157	-0.175	-0.155	-0.182	0.902	0.846	0.905	0.806	0.926	1.006	0.975	0.974	1.058	1.173	1.087	1.145	30.83	31.17	30.57	31.02
	{-1.39}	{-1.25}	{-1.56}	{-1.18}	{4.86}	{4.97}	{4.60}	{5.08}	{-4.15}	{-4.51}	{-4.03}	{-4.71}	{3.49}	{3.33}	{3.54}	{3.16}	{4.19}	{4.55}	{4.43}	{4.41}	{7.70}	{8.42}	{7.93}	{8.16}	[29.15,32.51]	[29.41,32.93]	[28.92,32.23]	[29.28,32.75]
	[-1.46]	[-1.32]	[-1.63]	[-1.24]	[5.09]	[5.20]	[4.81]	[5.31]	[-4.34]	[-4.71]	[-4.21]	[-4.93]	[3.61]	[3.45]	[3.66]	[3.27]	[4.35]	[4.73]	[4.58]	[4.58]	[8.05]	[8.81]	[8.28]	[8.54]				
B		-0.049				0.227				-0.151				0.902				1.019				1.128				31.99		
		{-1.25}				{4.61}				{-3.92}				{3.51}				{4.62}				{8.19}				[30.30,33.67]		
		[-1.30]				[4.83]				[-4.09]				[3.64]				[4.79]				[8.55]						
C	-0.049	-0.043	-0.060	-0.040	0.244	0.255	0.240	0.262	-0.159	-0.183	-0.138	-0.183	0.729	0.616	0.701	0.623	0.886	0.936	0.867	0.911	1.070	1.117	1.036	1.125	31.56	31.55	31.60	30.77
	{-1.23}	{-1.04}	{-1.50}	{-0.97}	{4.88}	{4.86}	{4.82}	{5.05}	{-4.01}	{-4.51}	{-3.45}	{-4.53}	{2.73}	{2.31}	{2.68}	{2.33}	{3.89}	{4.13}	{3.78}	{3.99}	{7.63}	{7.85}	{7.30}	{7.97}	[29.87,33.24]	[29.84,33.25]	[29.89,33.32]	[29.09,32.44]
	[-1.28]	[-1.09]	[-1.58]	[-1.01]	[5.10]	[5.87]	[5.04]	[5.28]	[-4.18]	[-4.71]	[-3.60]	[-4.73]	[2.83]	[2.40]	[2.76]	[2.41]	[4.02]	[4.28]	[3.90]	[4.13]	[7.95]	[8.18]	[7.59]	[8.30]				
D		-0.053				0.253				-0.157				0.818				0.932				1.067				32.00		
		{-1.33}				{5.07}				{-3.99}				{3.14}				{4.14}				{7.61}				[30.30,33.71]		
		[-1.40]				[5.30]				[-4.18]				[3.26]				[4.30]				[7.96]						
E	-0.054	-0.049	-0.059	-0.047	0.257	0.273	0.247	0.280	-0.161	-0.184	-0.159	-0.188	0.763	0.645	0.749	0.634	0.881	0.92	0.864	0.911	1.053	1.118	1.043	1.119	31.32	31.49	31.88	31.53
	{-1.34}	{-1.17}	{-1.47}	{-1.12}	{5.04}	{5.16}	{4.91}	{5.30}	{-4.01}	{4.48}	{-3.94}	{-4.59}	{2.86}	{2.42}	{2.83}	{2.36}	{3.83}	{4.00}	{3.70}	{3.96}	{7.48}	{7.77}	{7.32}	{7.85}	[29.66,32.99]	[29.80,33.17]	[30.20,33.55]	[29.78,33.28]
	[-1.40]	[-1.22]	[-1.53]	[-1.17]	[5.26]	[5.39]	[5.13]	[5.54]	[-4.19]	[-4.69]	[-4.12]	[-4.81]	[2.96]	[2.50]	[2.93]	[2.44]	[3.95]	[4.14]	[3.82]	[4.09]	[7.77]	[8.09]	[7.61]	[8.17]				
F		-0.053				0.256				-0.151				0.699				0.873				1.055						
		(-1.31)				(5.00)				(-3.74)				(2.65)				(3.77)				(7.43)				31.41		
		{-1.31}				{5.00}				{-3.74}				{2.64}				{3.77}				{7.42}				[29.79,33.03]		
		[-1.37]				[5.22]				[-3.91]				[2.74]				[3.89]				[7.72]						
G	-0.050	-0.040	-0.056	-0.041	0.212	0.226	0.205	0.225	-0.152	-0.174	-0.146	-0.177	0.939	0.862	0.901	0.856	0.996	1.066	1.055	1.029	1.076	1.150	1.104	1.151	31.12	30.01	30.45	30.05
	{-1.31}	{-1.01}	{-1.48}	{-1.03}	{4.43}	{4.57}	{4.30}	{4.59}	{-4.06}	{-4.57}	{-3.91}	{-4.67}	{3.69}	{3.45}	{3.56}	{3.40}	{4.62}	{4.95}	{4.93}	{4.76}	{8.10}	8.49}	{8.19}	{8.52}	[29.44,32.79]	[28.42,31.61]	[28.84,32.06]	[28.37,31.72]
	[-1.37]	[-1.06]	[-1.55]	[-1.08]	[4.63]	[4.79]	[4.49]	[4.80]	[-4.22]	[-4.76]	[-4.06]	[-4.86]	[3.82]	[3.58]	[3.68]	[3.53]	[4.79]	[5.16]	[5.10]	[4.95]	[8.46]	[8.87]	[8.51]	[8.89]				

This table presents the averages of the coefficient estimates from the second-pass GLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return as the risk factor. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the time-series average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted R squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 6

Fama-MacBeth OLS regression estimates with Fama-French three factors as the risk factors (FF)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND	-0.046				0.166				-0.161				0.726				0.846				0.954				2.79			
	(-1.91)				(4.04)				(-4.31)				(2.91)				(3.93)				(7.10)				[2.54,3.03]			
	{-1.87}				{3.96}				{-4.23}				{2.85}				{3.85}				{6.96}							
	[-1.94]				[4.11]				[-4.39]				[2.95]				[3.99]				[7.29]							
A	-0.029	-0.019	-0.026	-0.025	0.034	0.034	0.060	0.040	-0.154	-0.170	-0.158	-0.163	0.812	0.773	0.992	0.774	0.991	0.986	1.116	0.982	1.028	1.080	1.031	1.073	2.45	2.36	2.39	2.35
	(-1.43)	(-0.92)	(-1.29)	(-1.22)	(1.07)	(1.06)	(1.81)	(1.23)	(-4.84)	(-5.13)	(-5.01)	(-4.94)	(3.46)	(3.32)	(4.38)	(3.36)	(5.44)	(5.49)	(6.34)	(5.43)	(8.97)	(9.39)	(8.65)	(9.34)	[2.26,2.64]	[2.17,2.55]	[2.20,2.59]	[2.16,2.54]
	{-1.40}	{-0.90}	{-1.26}	{-1.19}	{1.05}	{1.04}	{1.77}	{1.21}	{-4.76}	{-5.03}	{-4.91}	{-4.85}	{3.40}	{3.26}	{4.29}	{3.30}	{5.34}	{5.38}	{6.21}	{5.33}	{8.81}	{9.21}	{8.47}	{9.16}				
	[-1.46]	[-0.94]	[-1.31]	[-1.24]	[1.09]	[1.08]	[1.83]	[1.25]	[-4.91]	[-5.20]	[-5.08]	[-5.01]	[3.48]	[3.36]	[4.41]	[3.38]	[5.51]	[5.58]	[6.41]	[5.50]	[9.24]	[9.66]	[8.86]	[9.61]				
B	-0.026				0.032				-0.153				0.781				1.009				1.025				2.46			
	(-1.27)				(1.00)				(-4.81)				(3.36)				(5.51)				(8.78)				[2.26,2.66]			
	{-1.25}				{0.98}				{-4.72}				{3.30}				{5.40}				{8.61}							
	[-1.29]				[1.01]				[-4.87]				[3.39]				[5.58]				[9.01]							
C	-0.040	-0.026	-0.041	-0.035	0.105	0.105	0.107	0.111	-0.151	-0.160	-0.152	-0.167	0.522	0.482	0.583	0.432	0.781	0.801	0.893	0.792	0.902	0.918	0.899	0.937	2.65	2.58	2.66	2.56
	(-1.79)	(-1.17)	(-1.84)	(-1.56)	(2.94)	(2.82)	(2.85)	(3.02)	(-4.30)	(-4.50)	(-4.37)	(-4.69)	(2.09)	(1.92)	(2.36)	(1.73)	(3.87)	(4.01)	(4.53)	(3.96)	(7.28)	(7.21)	(6.97)	(7.50)	[2.42,2.87]	[2.36,2.81]	[2.44,2.89]	[2.33,2.78]
	{-1.75}	{-1.14}	{-1.80}	{-1.53}	{2.87}	{2.76}	{2.79}	{2.96}	{-4.21}	{-4.40}	{-4.27}	{-4.59}	{2.05}	{1.88}	{2.31}	{1.69}	{3.79}	{3.93}	{4.42}	{3.88}	{7.13}	{7.05}	{6.81}	{7.34}				
	[1.82]	[-1.19]	[-1.88]	[-1.59]	[2.99]	[2.87]	[2.90]	[3.07]	[-4.37]	[-4.58]	[-4.45]	[-4.77]	[2.12]	[1.95]	[2.39]	[1.75]	[3.93]	[4.07]	[4.59]	[4.01]	[7.48]	[7.41]	[7.17]	[7.71]				
	-0.030				0.083				-0.156				0.856				1.003				1.046				2.48			
D	(-1.37)				(2.43)				(-4.58)				(3.65)				(5.26)				(8.39)				[2.27,2.68]			
	{-1.34}				{2.38}				{-4.49}				{3.58}				{5.16}				{8.22}							
	[-1.39]				[2.47]				[-4.65]				[3.69]				[2.34]				[8.61]							
E	-0.044	-0.037	-0.047	-0.041	0.144	0.147	0.148	0.156	-0.159	-0.171	-0.161	-0.178	0.688	0.595	0.757	0.586	0.847	0.847	0.880	0.834	0.918	0.952	0.951	0.954	2.70	2.60	2.70	2.58
	(-1.89)	(-1.55)	(-2.03)	(-1.73)	(3.71)	(3.66)	(3.72)	(3.91)	(-4.35)	(-4.58)	(-4.49)	(-4.78)	(2.78)	(2.40)	(3.09)	(2.37)	(4.13)	(4.18)	(4.26)	(4.11)	(7.14)	(7.22)	(7.19)	(7.30)	[2.46,2.94]	[2.37,2.83]	[2.46,2.93]	[2.35,2.81]
	{-1.85}	{-1.52}	{-1.99}	{-1.70}	{3.63}	{3.58}	{3.64}	{3.82}	{-4.26}	{-4.48}	{-4.39}	{-4.67}	{2.73}	{2.34}	{3.02}	{2.32}	{4.04}	{4.09}	{4.17}	{4.02}	{7.00}	{7.06}	{7.03}	{7.14}				
	[-1.92]	[-1.58]	[-2.07]	[-1.77]	[3.77]	[3.73]	[3.79]	[3.97]	[-4.42]	[-4.66]	[-4.57]	[-4.86]	[2.82]	[2.44]	[3.13]	[2.40]	[4.19]	[4.26]	[4.33]	[4.18]	[7.34]	[7.43]	[7.38]	[7.51]				
F	-0.040				0.135				-0.154				0.542				0.802				0.907				2.74			
	(-1.70)				(3.44)				(-4.19)				(2.18)				(3.85)				(6.87)				[2.50,2.97]			
	{-1.66}				{3.36}				{-4.10}				{2.13}				{3.77}				{6.72}							
	[-1.73]				[3.50]				[-4.26]				[2.21]				[3.91]				[7.05]							
G	-0.022	-0.007	-0.014	-0.016	0.010	0.015	0.012	0.018	-0.148	-0.157	-0.154	-0.154	0.806	0.770	0.882	0.765	0.988	0.974	1.100	1.013	0.961	0.985	0.954	1.008	2.43	2.33	2.41	2.34
	(-1.17)	(-0.37)	(-0.76)	(-0.88)	(0.35)	(0.49)	(0.39)	(0.59)	(-5.07)	(-5.21)	(-5.32)	(-5.16)	(3.44)	(3.36)	(3.85)	(3.33)	(5.63)	(5.71)	(6.57)	(5.83)	(9.14)	(9.26)	(8.63)	(9.57)	[2.24,2.61]	[2.14,2.51]	[2.22,2.60]	[2.15,2.53]
	{-1.15}	{-0.36}	{-0.75}	{-0.86}	{0.34}	{0.48}	{0.38}	{0.58}	{-4.98}	{-5.11}	{-5.22}	{-5.06}	{3.37}	{3.29}	{3.78}	{3.27}	{5.53}	{5.60}	{6.44}	{5.72}	{8.97}	{9.08}	{8.46}	{9.39}				
	[-1.19]	[-0.37]	[-0.78]	[-0.89]	[0.35]	[0.49]	[0.40]	[0.60]	[-5.12]	[-5.26]	[-5.38]	[-5.22]	[3.43]	[3.36]	[3.86]	[3.34]	[5.68]	[5.76]	[6.62]	[5.89]	[9.36]	[9.50]	[8.85]	[9.81]				

This table presents the averages of the coefficient estimates from the second-pass OLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return, SMB, and HML as the risk factors. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted *R* squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 7

Fama-MacBeth OLS regression estimates with Fama-French three factors plus Pastor-Stambaugh liquidity as the risk factors (OLS-FFP)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND	-0.039				0.171				-0.154				0.643				0.859				0.972				2.71			
	{-1.57}				{3.92}				{-4.08}				{2.46}				{3.86}				{6.98}				[2.46,297]			
A	[-1.63]				[4.05]				[-4.21]				[2.53]				[3.99]				[7.32]				2.33	2.33	2.27	2.30
	-0.021	-0.006	-0.013	-0.013	0.012	0.019	0.059	0.018	-0.129	-0.136	-0.132	-0.131	0.748	0.768	0.823	0.755	1.082	1.071	1.121	1.066	1.005	1.031	1.006	1.025	[2.14,2.53]	[2.14,2.51]	[2.08,2.47]	[2.12,2.49]
	{-1.05}	{-0.31}	{-0.67}	{-0.67}	{0.35}	{0.58}	{1.77}	{0.54}	{-4.21}	{-4.37}	{-4.39}	{-4.24}	{3.18}	{3.30}	{3.60}	{3.25}	{6.00}	{5.98}	{6.38}	{6.01}	{8.84}	{8.90}	{8.59}	{8.91}				
B	[-1.08]	[-0.32]	[-0.69]	[-0.69]	[0.36]	[0.60]	[1.82]	[0.56]	[-4.32]	[-4.49]	[-4.52]	[-4.35]	[3.24]	[3.38]	[3.69]	[3.32]	[6.16]	[6.19]	[6.58]	[6.17]	[9.20]	[9.30]	[9.00]	[9.26]				
	-0.012**				0.026				-0.126				0.725				1.054				0.994				2.34			
	{-0.57}				{0.82}				{-4.15}				{3.07}				{5.76}				{8.83}				[2.14,2.54]			
C	[-0.59]				[0.84]				[-4.26]				[3.14]				[5.93]				[9.20]							
	-0.032	-0.021	-0.027	-0.029	0.105	0.097	0.107	0.109	-0.137	-0.129	-0.138	-0.136	0.434	0.440	0.462	0.368	0.738	0.824	0.856	0.764	0.864	0.860	0.902	0.859	2.61	2.61	2.59	2.57
	{-1.40}	{-0.92}	{-1.19}	{-1.28}	{2.85}	{2.56}	{2.78}	{2.90}	{-3.94}	{-3.76}	{-4.00}	{-3.94}	{1.66}	{1.69}	{1.80}	{1.42}	{3.60}	{4.14}	{4.28}	{3.84}	{6.92}	{6.69}	{6.97}	{6.85}	[2.36,2.85]	[2.37,2.85]	[2.35,2.82]	[2.33,2.81]
D	[-1.45]	[-0.95]	[-1.24]	[-1.33]	[2.95]	[2.65]	[2.88]	[3.01]	[-4.09]	[-3.90]	[-4.15]	[-4.09]	[1.71]	[1.75]	[1.85]	[1.46]	[3.72]	[4.31]	[4.44]	[3.98]	[7.29]	[7.06]	[7.32]	[7.22]				
	-0.024				0.074				-0.136				0.722				1.048				1.042				2.37			
	{-1.08}				{2.11}				{-4.05}				{2.99}				{5.44}				{8.24}				[2.16,2.58]			
E	[-1.12]				[2.18]				[-4.17]				[3.06]				[5.62]				[8.64]							
	-0.036	-0.032	-0.036	-0.033	0.146	0.139	0.158	0.150	-0.153	-0.146	-0.152	-0.154	0.599	0.603	0.710	0.589	0.799	0.855	0.885	0.816	0.904	0.918	0.965	0.911	2.62	2.58	2.61	2.55
	{-1.49}	{-1.32}	{-1.51}	{-1.38}	{3.58}	{3.35}	{3.74}	{3.66}	{-4.15}	{-3.99}	{-4.26}	{-4.23}	{2.34}	{2.36}	{2.80}	{2.32}	{3.80}	{4.23}	{4.20}	{4.03}	{6.77}	{6.74}	{7.09}	{6.78}	[2.37,2.87]	[2.34,2.81]	[2.37,2.85]	[2.32,2.78]
F	[-1.55]	[-1.37]	[-1.56]	[-1.43]	[3.72]	[3.48]	[3.87]	[3.80]	[-4.31]	[-4.15]	[-4.41]	[-4.39]	[2.42]	[2.46]	[2.88]	[2.40]	[3.95]	[4.41]	[4.34]	[4.20]	[7.16]	[7.12]	[7.44]	[7.19]				
	-0.037				0.135				-0.142				0.457				0.798				0.893				2.67			
	{-1.47}				{3.30}				{-3.84}				{1.75}				{3.74}				{6.64}				[2.42,2.92]			
	[-1.52]				[3.42]				[-3.97]				[1.81]				[3.87]				[6.96]							
G	0.055	0.022	0.092	-0.027	-0.213	-0.494	0.172	0.018	-0.167	-0.133	-0.192	-0.362	1.437	0.908	0.760	0.635	1.568	1.118	1.097	0.862	1.340	0.687	1.065	0.494	1.61	1.66	1.64	1.82
	{1.87}	{1.13}	{4.63}	{-1.23}	{-5.13}	{-6.32}	{4.65}	{0.45}	{-3.70}	{-3.97}	{-5.93}	{-8.55}	{4.33}	{2.73}	{3.01}	{1.97}	{5.75}	{4.24}	{5.73}	{3.10}	{7.30}	{4.18}	{8.82}	{2.59}	[1.45,1.78]	[1.50,1.82]	[1.48,1.79]	[1.54,2.10]
	[1.86]	[1.12]	[4.75]	[-1.06]	[-5.00]	[-5.98]	[4.72]	[0.37]	[-3.65]	[-3.88]	[-6.06]	[-8.09]	[4.01]	[2.36]	[2.91]	[1.43]	[5.22]	[3.49]	[5.56]	[1.76]	[6.99]	[3.63]	[8.91]	[1.80]				

This table presents the averages of the coefficient estimates from the second-pass OLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return, SMB, HML and the Pastor-Stambaugh liquidity factor as the risk factors. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted R squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 8

Fama-MacBeth GLS regression estimates with Fama-French three factors plus Pastor-Stambaugh liquidity as the risk factors (GLS-FFP)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND	-0.006				0.151				-0.155				0.625				0.888				0.976				24.10			
	{-0.25}				{3.58}				{-4.23}				{2.41}				{4.05}				{7.02}				[22.69,25.51]			
	[-0.26]				[3.74]				[-4.41]				[2.50]				[4.23]				[7.42]							
A	-0.001	0.016	0.009	0.009	-0.009	0.003	0.043	0.004	-0.130	-0.133	-0.139	-0.130	0.687	0.719	0.812	0.715	1.100	1.076	1.147	1.067	1.005	1.045	1.001	1.027	21.11	21.28	20.85	20.98
	{-0.03}	{0.81}	{0.46}	{0.45}	{-0.29}	{0.11}	{1.33}	{0.13}	{-4.36}	{-4.34}	{-4.71}	{-4.30}	{2.92}	{3.12}	{3.57}	{3.11}	{6.16}	{6.02}	{6.60}	{6.04}	{8.83}	{9.07}	{8.56}	{8.99}	[19.87,22.35]	[20.02,22.54]	[19.57,22.14]	[19.71,22.25]
	[-0.03]	[0.84]	[0.47]	[0.47]	[-0.30]	[0.00]	[1.38]	[0.13]	[-4.50]	[-4.49]	[-4.89]	[-4.45]	[3.00]	[3.22]	[3.69]	[3.20]	[6.36]	[6.26]	[6.86]	[6.25]	[9.25]	[9.55]	[9.03]	[9.42]				
B	0.010				0.007				-0.130				0.656				1.058				0.985				20.64			
	{0.50}				{0.24}				{-4.40}				{2.78}				{5.88}				{8.73}				[19.40,21.88]			
	[0.52]				[0.25]				[-4.56]				[2.86]				[6.11]				[9.17]							
C	-0.006	0.006	-0.001	-0.001	0.089	0.077	0.088	0.091	-0.140	-0.128	-0.140	-0.136	0.415	0.432	0.493	0.341	0.768	0.835	0.894	0.766	0.872	0.874	0.916	0.868	22.61	22.06	21.95	21.44
	{-0.27}	{0.26}	{-0.05}	{-0.04}	{2.49}	{2.09}	{2.39}	{2.49}	{-4.12}	{-3.79}	{-4.18}	{-4.01}	{1.60}	{1.68}	{1.94}	{1.33}	{3.80}	{4.22}	{4.55}	{3.89}	{7.01}	{6.84}	{7.12}	{6.98}	[21.27,23.95]	[20.77,23.35]	[20.67,23.23]	[20.17,22.70]
	[-0.28]	[0.27]	[-0.06]	[-0.05]	[2.61]	[2.19]	[2.50]	[2.61]	[-4.31]	[-3.97]	[-4.38]	[-4.19]	[1.66]	[1.76]	[2.02]	[1.38]	[3.97]	[4.43]	[4.75]	[4.07]	[7.45]	[7.29]	[7.54]	[7.42]				
D	0.003				0.059				-0.138				0.702				1.064				1.030				21.13			
	{0.12}				{1.75}				{-4.25}				{2.93}				{5.56}				{8.14}				[19.90,22.36]			
	[0.12]				[1.82]				[-4.42]				[3.03]				[5.79]				[8.60]							
E	-0.006	-0.001	-0.008	-0.002	0.127	0.125	0.133	0.137	-0.152	-0.145	-0.157	-0.155	0.583	0.587	0.718	0.562	0.836	0.867	0.924	0.832	0.925	0.938	0.984	0.930	21.64	22.57	22.34	23.09
	{-0.28}	{-0.02}	{-0.35}	{-0.08}	{3.24}	{3.10}	{3.28}	{3.43}	{-4.26}	{-4.05}	{-4.49}	{-4.32}	{2.28}	{2.33}	{2.84}	{2.24}	{4.04}	{4.32}	{4.44}	{4.13}	{6.99}	{6.96}	{7.24}	{6.99}	[20.40,22.88]	[21.21,23.94]	[20.98,23.69]	[21.65,24.52]
	[-0.29]	[-0.02]	[-0.36]	[-0.08]	[3.39]	[3.25]	[3.42]	[3.59]	[-4.45]	[-4.25]	[-4.69]	[-4.53]	[2.38]	[2.45]	[2.95]	[2.33]	[4.24]	[4.56]	[4.64]	[4.35]	[7.47]	[7.41]	[7.67]	[7.48]				
F	-0.007				0.115				-0.146				0.451				0.839				0.904				22.82			
	{-0.30}				{2.90}				{-4.08}				{1.74}				{3.99}				{6.76}				[21.50,24.14]			
	[-0.32]				[3.03]				[-4.26]				[1.81]				[4.18]				[7.16]							
G	-0.230	0.183	-0.187	0.045	-0.389	0.121	0909	-0.503	-0.516	-0.555	0.389	0.123	1.288	6.494	1.800	6.559	8.730	1.587	-1.379	-6.456	3.857	0.594	2.512	-10.371	26.54	23.09	21.85	23.65
	{-0.58}	{0.95}	{-0.57}	{0.07}	{-0.22}	{0.13}	{0.59}	{-0.67}	{-1.10}	{-1.64}	{0.48}	{0.08}	{0.17}	{1.29}	{0.62}	{0.79}	{1.13}	{0.45}	{-0.61}	{-0.63}	{2.00}	{0.34}	{1.78}	{-1.02}	[25.07,28.01]	[21.72,24.45]	[20.65,23.05]	[22.29,25.02]
	[-0.57]	[0.92]	[-0.67]	[0.07]	[-0.22]	[0.12]	[0.70]	[-0.60]	[-1.07]	[-1.56]	[0.57]	[0.08]	[0.15]	[1.08]	[0.70]	[0.63]	[1.02]	[0.36]	[-0.68]	[-0.39]	[1.90]	[0.29]	[2.07]	[-0.77]				

This table presents the averages of the coefficient estimates from the second-pass GLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return, SMB, HML and the Pastor-Stambaugh liquidity factor as the risk factors. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the average and the confidence interval of the 5^{th} and the 95^{th} percentiles of the monthly adjusted *R* squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 9

Fama-MacBeth OLS regression estimates with Fama-French three factors plus WML as the risk factors (FFW)

MODEL	SIZE				B/M				TURNOVER				RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND	-0.046				0.182				-0.125				0.680				0.833				0.927				2.73			
	{-1.90}				{4.34}				{-3.30}				{2.73}				{3.99}				{6.93}				[2.49,2.96]			
	[-1.99]				[4.54]				[-3.45]				[2.85]				[4.16]				[7.29]							
A	-0.017	-0.004	-0.012	-0.012	0.061	0.063	0.051	0.073	-0.131	-0.145	-0.125	-0.139	0.676	0.642	0.934	0.666	0.862	0.872	1.074	0.917	0.948	0.963	0.944	0.976	2.26	2.15	2.25	2.14
	{-0.88}	{-0.20}	{-0.59}	{-0.59}	{1.93}	{1.99}	{1.59}	{2.28}	{-4.31}	{-4.54}	{-4.09}	{-4.41}	{2.93}	{2.80}	{4.17}	{2.95}	{5.13}	{5.23}	{6.54}	{5.49}	{8.91}	{9.27}	{8.28}	{9.43}	[2.08,2.44]	[1.99,2.31]	[2.07,2.43]	[1.97,2.30]
	[-0.92]	[-0.21]	[-0.62]	[-0.61]	[2.01]	[2.08]	[1.66]	[2.38]	[-4.49]	[-4.74]	[-4.27]	[-4.60]	[3.05]	[2.91]	[4.35]	[3.07]	[5.39]	[5.48]	[6.85]	[5.75]	[9.45]	[9.82]	[8.76]	[9.97]				
B	-0.004				0.041				-0.132				0.689				0.861				0.943				2.31			
	{-0.17}				{1.30}				{-4.29}				{2.99}				{5.04}				{8.51}				[2.13,2.50]			
	[-0.18]				[1.36]				[-4.47]				[3.12]				[5.27]				[8.98]							
C	-0.031	-0.017	-0.028	-0.025	0.151	0.154	0.133	0.166	-0.119	-0.128	-0.121	-0.133	0.333	0.363	0.456	0.301	0.621	0.706	0.830	0.673	0.795	0.835	0.819	0.840	2.48	2.44	2.57	2.40
	{-1.37}	{-0.75}	{-1.27}	{-1.09}	{4.20}	{4.16}	{3.55}	{4.51}	{-3.41}	{-3.62}	{-3.48}	{-3.74}	{1.35}	{1.46}	{1.85}	{1.22}	{3.30}	{3.75}	{4.37}	{3.59}	{6.89}	{6.85}	{6.53}	{7.12}	[2.27,2.68]	[2.24,2.64]	[2.36,2.79]	[2.20,2.60]
	[-1.44]	[-0.79]	[-1.34]	[-1.14]	[4.39]	[4.36]	[3.72]	[4.73]	[-3.56]	[-3.80]	[-3.65]	[-3.92]	[1.41]	[1.52]	[1.93]	[1.27]	[3.43]	[3.91]	[4.57]	[3.74]	[7.26]	[7.23]	[6.90]	[7.52]				
D	-0.023				0.084				-0.133				0.796				0.947				1.010				2.36			
	{-1.03}				{2.48}				{-3.92}				{3.42}				{5.24}				{8.36}				[2.17,2.55]			
	[-1.08]				[2.60]				[-4.10]				[3.56]				[5.48]				[8.83]							
E	-0.046	-0.034	-0.041	-0.040	0.181	0.183	0.170	0.195	-0.124	-0.134	-0.127	-0.140	0.579	0.485	0.736	0.496	0.764	0.785	0.870	0.785	0.866	0.897	0.911	0.904	2.57	2.46	2.64	2.46
	{-1.97}	{-1.44}	{-1.74}	{-1.68}	{4.54}	{4.51}	{4.19}	{4.79}	{-3.38}	{-3.57}	{-3.48}	{-3.74}	{2.37}	{1.98}	{3.00}	{2.02}	{3.93}	{4.07}	{4.39}	{4.07}	{7.05}	{7.07}	{6.99}	{7.24}	[2.36,2.79]	[2.25,2.66]	[2.42,2.86]	[2.25,2.66]
	[-2.07]	[-1.52]	[-1.82]	[-1.77]	[4.76]	[4.73]	[4.39]	[5.02]	[-3.54]	[-3.74]	[-3.65]	[-3.92]	[2.47]	[2.08]	[3.14]	[2.12]	[4.11]	[4.28]	[4.60]	[4.27]	[7.45]	[7.49]	[7.38]	[7.67]				
F	-0.034				0.164				-0.123				0.458				0.733				0.865				2.64			
	{-1.42}				{4.13}				{-3.31}				{1.85}				{3.64}				{6.68}				[2.42,2.87]			
	[-1.50]				[4.33]				[-3.46]				[1.93]				[3.80]				[7.03]							
G	0.049	0.034	0.112	0.065	0.105	0.241	0.076	-0.064	-0.051	0.040	0.052	-0.012	0.422	0.910	0.168	0.574	0.670	1.125	0.544	0.914	0.794	1.082	0.834	1.076	1.69	1.55	1.51	1.49
	{2.55}	{1.68}	{4.30}	{2.96}	{3.28}	{3.66}	{2.30}	{-1.83}	{-1.69}	{0.76}	{1.01}	{-3.11}	{1.70}	{3.14}	{0.46}	{2.04}	{3.77}	{5.35}	{1.87}	{4.36}	{7.39}	{8.86}	{5.36}	{9.27}	[1.52,1.86]	[1.41,1.69]	[1.36,1.67]	[1.35,1.62]
	[2.70]	[1.72]	[4.36]	[3.07]	[3.44]	[3.64]	[2.23]	[-1.87]	[-1.78]	[0.75]	[1.00]	[-3.18]	[1.74]	[2.89]	[0.38]	[2.00]	[3.91]	[4.95]	[1.61]	[4.28]	[7.90]	[8.91]	[5.09]	[9.47]				

This table presents the averages of the coefficient estimates from the second-pass OLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return, SMB, HML and WML as the risk factors. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted R squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.

Table 10

Fama-MacBeth OLS regression estimates with Fama-French three factors plus (PS Liquidity + WML) as the risk factors (FFPW)

MODEL	SIZE				B/M				TURNOVER			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND		-0.045				0.184				-0.129		
		{-1.80}				{4.25}				{-3.44}		
		[-1.88]				[4.42]				[-3.57]		
A	-0.015	0.004	-0.003	-0.007	0.046	0.054	0.057	0.058	-0.122	-0.118	-0.126	-0.122
	{-0.79}	{0.18}	{-0.17}	{-0.36}	{1.49}	{1.71}	{1.79}	{1.83}	{-4.19}	{-3.93}	{-4.33}	{-4.17}
	[-0.82]	[0.19]	[-0.18]	[-0.38]	[1.55]	[1.79]	[1.87]	[1.91]	[-4.34]	[-4.10]	[-4.51]	[-4.33]
B		-0.005				0.008				-0.112		
		{-0.25}				{0.24}				{-3.79}		
		[-0.26]				[0.25]				[-3.93]		
C	-0.032	-0.022	-0.021	-0.031	0.150	0.130	0.122	0.150	-0.118	-0.114	-0.119	-0.119
	{-1.42}	{-0.98}	{-0.97}	{-1.38}	{4.16}	{3.59}	{3.25}	{4.14}	{-3.43}	{-3.37}	{-3.54}	{-3.48}
	[-1.48]	[-1.02]	[1.01]	[-1.44]	[4.33]	[3.74]	[3.38]	[4.31]	[-3.58]	[-3.52]	[-3.70]	[-3.63]
D		-0.025				0.073				-0.116		
		{-1.12}				{2.16}				{-3.52}		
		[1.17]				[2.24]				[-3.66]		
E	-0.042	-0.034	-0.036	-0.037	0.177	0.167	0.171	0.181	-0.126	-0.121	-0.131	-0.128
	{-1.76}	{-1.43}	{-1.54}	{-1.56}	{4.37}	{4.12}	{4.08}	{4.47}	{-3.48}	{-3.37}	{-3.68}	{-3.56}
	[-1.84]	[-1.50]	[-1.61]	[-1.63]	[4.56]	[4.31]	[4.26]	[4.67]	[-3.63]	]-3.53]	[-3.84]	[-3.72]
F		-0.034				0.163				-0.123		
		{-1.36}				{4.02}				{-3.37}		
		[-1.42]				[4.21]				[-3.51]		
G	-0.061	0.030	0.072	-0.008	0.082	-0.096	0.140	0.176	0.040	-0.138	-0.168	-0.464
	{-2.97}	{1.70}	{3.83}	{-0.29}	{2.02}	{-2.74}	{3.96}	{4.56}	{1.21}	{-4.65}	{-4.95}	{-9.52}
	[-2.98]	[1.72]	[3.92]	[-0.25]	[2.00]	[-2.68]	[3.98]	[3.59]	[1.21]	[-4.69]	[-5.02]	[-8.90]

MODEL	RET2-3				RET4-6				RET7-12				Adj. R^2(%)			
	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP	MS	CCI	II	COMP
UNCOND		0.589				0.838				0.938				2.63		
		{2.32}				{3.93}				{6.91}				[2.39,2.86]		
		[2.40]				[4.09]				[7.28]						
A	0.663	0.642	0.869	0.740	0.941	0.879	1.059	0.991	0.941	0.910	0.953	0.985	2.08	2.06	2.05	2.08
	{3.00}	{2.80}	{3.90}	{3.33}	{5.64}	{5.17}	{6.33}	{6.00}	{9.26}	{8.52}	{8.72}	{9.58}	[1.91,2.25]	[1.90,2.22]	[1.88,2.22]	[1.92,2.24]
	[3.10]	[2.89]	[4.04]	[3.45]	[5.86]	[5.38]	[6.60]	[6.24]	[9.74]	[8.98]	[9.24]	[10.06]				
B		0.699				0.918				0.933				2.12		
		{3.14}				{5.38}				{8.91}				[1.95,2.30]		
		[3.25]				[5.58]				[9.33]						
C	0.337	0.395	0.416	0.315	0.613	0.712	0.806	0.638	0.795	0.803	0.872	0.802	2.43	2.43	2.45	2.39
	{1.36}	{1.59}	{1.69}	{1.27}	{3.20}	{3.79}	{4.26}	{3.41}	{6.97}	{6.64}	{7.14}	{6.89}	[2.22,2.64]	[2.23,2.64]	[2.23,2.66]	[2.19,2.59]
	[1.41]	[1.64]	[1.75]	[1.31]	[3.33]	[3.93]	[4.43]	[3.54]	[7.35]	[6.99]	[7.54]	[7.29]				
D		0.702				0.989				1.017				2.22		
		{3.04}				{5.45}				{8.57}				[2.05,2.43]		
		[3.14]				[5.67]				[9.04]						
E	0.490	0.478	0.676	0.480	0.743	0.790	0.868	0.768	0.859	0.874	0.926	0.874	2.48	2.44	2.52	2.42
	{1.99}	{1.94}	{2.73}	{1.95}	{3.74}	{4.06}	{4.35}	{3.97}	{6.94}	{6.79}	{7.07}	{6.94}	[2.26,2.71]	[2.24,2.65]	[2.30,2.74]	[2.21,2.62]
	[2.06]	[2.03]	[2.83]	[2.03]	[3.90]	[4.27]	[4.55]	[4.17]	[7.35]	[7.21]	[7.46]	[7.39]				
F		0.415				0.745				0.884				2.56		
		{1.65}				{3.63}				{6.87}				[2.33,2.79]		
		[1.72]				[3.78]				[7.23]						
G	0.689	0.569	0.862	0.779	0.978	0.772	1.100	0.878	0.991	0.605	0.977	0.474	1.61	1.55	1.56	1.54
	{2.68}	{2.16}	{3.71}	{2.30}	{4.56}	{3.73}	{6.10}	{3.06}	{7.09}	{4.74}	{8.24}	{2.50}	[1.46,1.77]	[1.41,1.68]	[1.41,1.70]	[1.26,1.81]
	[2.52]	[1.77]	[3.41]	[1.48]	[4.20]	[2.86]	[5.62]	[1.44]	[6.95]	[4.28]	[8.12]	[1.52]				

This table presents the averages of the coefficient estimates from the second-pass OLS cross-sectional regressions for the NYSE-AMEX individual stocks over 498 months from July 1964 through December 2005. The dependent variable is the excess risk-adjusted return using the excess market return, SMB, HML, the Pastor-Stambaugh liquidity factor and WML as the risk factors. The explanatory variables are SIZE, B/M, TURNOVER, RET2-3, RET4-6, and RET7-12 as defined in 3.2. UNCOND denotes the constant beta model specified in the first-pass. Models A – G represent the conditional versions of the asset pricing model as in (4). The conditioning variables for factor loadings are investor sentiment index, default spread, SIZE and B/M. The columns under $Adj.\ R^2$ report the average and the confidence interval of the 5th and the 95th percentiles of the monthly adjusted *R* squared. MS, CCI, and II are the investor/consumer sentiment indices compiled by the University of Michigan, Consumer Conference Board, and Investor's Intelligence, respectively. COMP is the composite sentiment index derived from the principal component analysis. The *t*-statistics in curly brackets use standard errors as in Shanken (1992) and the *t*-statistics in square brackets use standard errors as in Jagannathan and Wang (1998). All coefficients are multiplied by 100.