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Accruals Quality, Stock Returns, and Macroeconomic Conditions

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ABSTRACT: This study examines whether and how earnings quality, measured as accruals quality (AQ), affects the cost of equity capital. Using two-stage cross-sectional regression tests, we find that the AQ risk factor is significantly priced, after controlling for low-priced stocks. This result is robust in tests using individual stocks, various portfolio formations, and different beta estimations. Furthermore, we show that AQ and its pricing effect systematically vary with business cycles and macroeconomic variables. In particular, this pricing effect is prominent in total AQ and innate AQ but not in discretionary AQ. The risk premium associated with AQ exists only in economic expansion but not in recession periods. Poorer AQ firms are more vulnerable to macroeconomic shocks. The risk premium and the dispersion of AQ are also related to future economic activity. Overall, our results suggest that AQ contributes to the cost of equity capital and that its pricing effect is associated with fundamental risk.

Keywords: *accruals quality; risk factor models; cross-sectional regression tests; macroeconomic conditions; low-priced returns***.**

JEL Classifications: *G12; G14***.**

I. INTRODUCTION

The extent to which earnings quality, and more broadly information quality, is associated with the cost of capital is one of the most important issues in accounting. Despite a sizeable body of research suggesting that earnings quality, measured using various attributes, affects costs of debt and equity capital (Botosan 1997; Botosan and Plumlee 2002; Francis et al. 2004, 2005; Aboody et al. 2005), there is no consensus on whether earnings quality is priced in the cost

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of capital, or the underlying mechanism linking earnings quality to the cost of capital.[1] These two topics are highly interrelated and of critical importance in the earnings quality literature. In this study, we first examine, through two-stage cross-sectional regression (CSR) tests, whether earnings quality, measured as accruals quality (AQ), is a priced risk factor. Our findings that AQ is significantly priced lead to the further investigation on the underlying mechanism of AQ's pricing effect. Motivated by recent accounting literature that suggest potential linkage between earnings quality and fundamental risk, we investigate how the pricing effect of AQ, as well as the pricing effects of innate and discretionary AQs, vary with business cycles and macroeconomic conditions in order to shed light on whether the effect of earnings quality on the cost of capital stems from fundamental risk.

Our study is motivated by the recent influential though conflicting empirical results on whether AQ is a priced factor in capital markets. Francis et al. (2005; hereafter, FLOS), among others, argue that AQ is a priced factor in the cost of equity capital, while Core et al. (2008; hereafter, CGV) counter this argument using two-stage CSR tests.[2] Our results reconcile the difference between FLOS and CGV by showing that AQ is a significant priced risk factor in the CSR tests once low-priced returns, defined as returns with two adjacent prices less than $5 (sometimes referred to as "penny stocks"), are controlled in the CSR regression. The finding that AQ is significant priced in the CSR tests after controlling low-priced returns warrants the future investigation on the underlying mechanism of AQ's pricing effect.

We then study the potential source of the pricing effect of AQ on the cost of capital, drawing motivation from recent accounting research that suggests a linkage between earnings quality and fundamental risk. Dechow and Dichev (2002) show that AQ is associated with innate factors that stem from a firm's business model and operating environment. FLOS provide evidence that both innate AQ and discretionary AQ affect the cost of capital, although innate AQ has a greater impact on cost of capital than does discretionary AQ. Yee (2006) presents an analytical model to show that earnings quality cannot affect cost of capital in the absence of fundamental risk. Yee (2006) demonstrates that earnings quality affects the equity premium by magnifying fundamental risk and that only the systematic component of earnings quality risk contributes to the cost of capital. Chen et al. (2008) provide empirical evidence that the pricing effect of AQ on the cost of capital increases with fundamental risk.[3] These studies evoke the idea that AQ is associated with a firm's fundamental risk and that the pricing effect of AQ on the cost of capital may stem from fundamental risk and its related information risk captured by AQ. We therefore examine the linkage

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[1] See Francis et al. (2008) for an excellent review on earnings quality.

[2] FLOS provide empirical evidence showing that firms with poor AQ have higher realized returns, higher costs of debt, higher betas, and higher P/E ratios than do firms with good AQ. They further estimate a time-series regression of each firm's realized returns on the AQ risk factor after controlling for other risk factors such as the market, firm size, and book-to-market, and take an average of the coefficients on the AQ risk factor for all time-series regressions. They find that the average is positive and statistically significant. They thus conclude that their empirical evidence is consistent with the view that risk related to AQ is a priced factor, and poorer AQ is associated with larger cost of capital. CGV argue that FLOS's time-series regressions of stock returns on the factor returns do not test the hypothesis that AQ is a priced factor. They adopt Fama and MacBeth's (1973) two-stage regression method and conduct cross-sectional regressions (CSR) of stock returns on estimated factor loadings. They find that the CSR coefficients on the AQ betas are not statistically significant. They also show that there is no association between AQ and future stock returns. They thus argue that there is no evidence that AQ is a priced factor.

[3] In addition, Liu and Wysocki (2007) argue that AQ is highly correlated with operating volatility, and operating volatility dominates AQ in determining a firm's cost of capital. Cohen (2008) finds evidence of a negative association between firms' total risk and financial reporting quality, after controlling for firm-specific characteristics that determine financial reporting quality. Decomposing total risk into a systematic component and an idiosyncratic one, Cohen (2008) finds that firms providing financial information of higher quality do not necessarily enjoy a lower cost of equity capital. However, a significant negative relation is documented between reporting quality and idiosyncratic risk. Gray et al. (2009) use Australia data to show that innate accruals quality but not discretionary accruals quality affects costs of debt and equity.

between AQ and its pricing effect with macroeconomic conditions. We borrow this testing methodology from the recent finance literature on whether proposed risk factors such as size, book-to-market and the momentum factor reflect fundamental risk by linking these risk factors to business cycles and macroeconomic variables (Chen 1991; Pontiff and Schall 1998; Liew and Vassalou 2000; Chordia and Shivakumar 2002, 2006).

Following FLOS and CGV, we estimate AQ and construct the AQ risk factor. We confirm CGV's findings that the AQ risk factor is not significantly priced in two-stage CSR tests and that the risk premium associated with AQ beta is even negative in some specifications. However, we find that the AQ risk factor is significantly priced after controlling for low-priced returns. We control for low-priced returns by including an indicator variable that equals 1 if the adjacent stock prices of the return are less than $5, and 0 otherwise. Using Fama and French's (1992) assigned beta,[4] we obtain even stronger results that AQ is priced. When the assigned individual stock betas are obtained from 100 size portfolios and 64 size-BM-AQ portfolios, the AQ risk factor is statistically significant even without controlling for low-priced returns. Among the many risk factors considered in the tests, the AQ risk factor is the only one whose economic and statistical significance is drastically changed after controlling for low-priced returns. However, the economic and statistical significance of the other risk factors remains relatively unchanged even after controlling for low-priced returns. Thus, it is evidence that CGV's results are significantly influenced by low-priced returns.

Asset pricing tests are designed to examine the relation between systematic risk and *ex ante* expected return as suggested by asset pricing theories such as the CAPM. Since *ex ante* expected returns cannot be observed directly, realized returns are often used in the tests. However, realized returns may be biased due to noise trading, sentiment trading, and a micro-structure induced effect. This bias is notoriously more pronounced in low-priced stocks (Bhardwaj and Brooks 1992; Ball et al. 1995; Conrad and Kaul 1993; Baker and Wurgler 2006). Therefore, even if the pricing effect of the AQ risk factor on asset returns exists, it would be difficult to find this pricing effect in low-priced stocks because the realized returns of low-priced stock are severely biased. The exclusion of low-priced stock is not unusual in asset pricing tests (Jegadeesh and Titman 2001; Bali et al. 2005; Chan et al. 2006).[5]

We then examine whether AQ and its pricing effect are systematically related to fundamental risk, as proxied by macroeconomic variables. By using macroeconomic variables as proxies for state variables in the sense of Merton (1973), testing whether proposed risk factors are related to fundamental risk is a widely adopted method in asset pricing tests. If the AQ-return relationship is induced by the risk sourced from AQ and the risk inherent in AQ is a component of fundamental risk, then we expect that returns on AQ-sorted portfolios systematically vary with macroeconomic conditions and business cycles. Furthermore, we decompose the AQ into its innate and discretionary portions and examine the relation between each of these aspects of AQ and macroeconomic conditions.

4 In their approach, portfolios are first constructed, post-ranking betas are estimated using the whole-period portfolio returns, and then the portfolio betas are assigned into individual stocks that were contained in the portfolio. This approach mitigates the estimation errors of betas in the first stage time-series regressions through the use of portfolios, and then it employs individual stocks as test assets in the second stage CSR to increase the power of the test.

5 Ball et al. (1995) argue that market-microstructure factors systematically bias measured raw returns, especially in low-priced stocks. They find that a small price change in low-priced stocks induces a large bias in returns and it generates a highly skewed return distribution. Bhardwaj and Brooks (1992) show that the January anomaly is mainly driven by low-priced stocks. Jegadeesh and Titman (2001) exclude stocks priced below $5 while evaluating various explanations of momentum strategies. Bali et al. (2005) also screen stocks with prices less than $5 while studying idiosyncratic volatility risk. Chan et al. (2006) also regarded $5 as the threshold of low price, and excluded any stock priced below $5 in their examination of earnings quality on stock returns.

We find that the average risk premium of AQ is negative in recession periods but positive in expansion periods. When the market changes from bad state (recession) to good state (expansion), the AQ value (i.e., the risk measure of earnings quality) of poor AQ firms increases greatly, whereas that of good AQ firms remains almost constant. Consistently, when the market shifts from recession to expansion, the return on poorer AQ portfolios increases sharply, whereas the return on better AQ portfolios increases only modestly. These findings suggest that the pricing effect of AQ is more pronounced in expansion periods than in recession periods, and is driven mainly by the deterioration of poorer AQ firms when the market moves to expansion. We also examine the pricing effect of the innate and discretionary portions of AQ over business cycles. We find that innate AQ shows a similar pattern to total AQ, whereas there is no evidence that discretionary AQ and its pricing effect varies with business cycles.

We also find that poorer AQ portfolios are more sensitive to macroeconomic shocks as evidenced by finding that the magnitude of the regression coefficients of AQ-sorted portfolio returns on the selected macroeconomic variables increases almost monotonically from the best AQ portfolios to the poorest AQ portfolios. These findings are consistent with the notion that a firm with poorer AQ is more risky, its accounting quality is more likely to worsen when market conditions change, and its return is consequently more vulnerable to macroeconomic fluctuation. These results are also consistent with Ecker et al.'s. (2006) finding that the sensitivity of returns to earnings quality (e-loadings) is higher for firms with poorer earnings quality. In addition, we find that the risk premia of total AQ and innate AQ systematically vary with macroeconomic variables such as term spread, default premium, and dividend yield, but the risk premium of discretionary AQ does not.

Finally, we relate 12-month-ahead macroeconomic variables to the AQ risk factor by controlling for other widely used risk factors. We find that the risk premium of AQ and the dispersion of AQ between firms with poorest and best earnings quality are significantly negatively related to future economic activities such as dividend yield, growth rate of GDP, and growth rate of employee compensation. We find that both innate and discretionary AQs have some predictive power on future economic activity. The predictive power of discretionary AQ may stem from management discretion and accruals management in which discretionary AQ is used to smooth earnings and thus, discretionary AQ contains information about management's expectations on future economic conditions (Guay et al. 1996; Subramanyam 1996).

Our study is closely related to the line of research on information risk and cost of capital since earnings quality is often regarded as an indicator of information quality. It is important to distinguish between information precision and information asymmetry for which there are other better measures than AQ, such as Easley et al.'s (1997) probability of information-based trading (PIN) measure and bid-ask spread. Since our AQ metric is an accounting-based measure of earnings quality, it mostly reflects the information precision risk embedded in financial reporting. Lambert et al. (2008) develop a model to show that information precision influences a firm's cost of capital, but that information asymmetry does not. Several theoretical studies provide insights as to why earnings quality affects cost of capital. Yee (2006) argues that earnings quality affects equity premium by magnifying fundamental risk. Lambert et al. (2007) show that earnings quality affects investors' assessment of the covariance of a firm's cash flows with those of the market and this effect is nondiversifiable. They point out that earnings quality is not a separate information risk factor, and the earnings quality effect on expected returns occurs because earnings quality is one determinant of the unobservable forward-looking beta. Based on their theoretical model, Epstein and Schneider (2008) also demonstrate that investors require a higher risk premium for poorer information quality, especially when the underlying fundamentals are volatile. Our results are consistent with the view that earnings quality as a proxy of information precision risk is priced in capital markets and its pricing effect is associated with fundamental risk. However, our study is silent on whether information asymmetry risk is priced, as there is a large body of literature on the pricing effect of information quality attributable to information asymmetry (Diamond and Verrecchia 1991; Easley et al. 2002; Hughes et al. 2007).

This study is also related to Ogneva's (2008) investigation of CGV's findings that there is no association between AQ and future stock returns. Ogneva (2008) notes that realized returns are affected by three components: *ex ante* expected return, unexpected cash flow news, and unexpected risk news. After controlling for unexpected cash flow shocks, she documents a significant negative relation between AQ and future stock returns. CGV's conclusion that AQ is not a priced risk factor is based on two-stage CSR tests and investigation of the relation between AQ and future stock returns. Therefore, Ogneva (2008) and our study complement each other in terms of reconciling the differences between CGV and FLOS.

Section II describes the data and how to measure AQ, and Section III describes the formation of AQ-sorted portfolios and the characteristics of such portfolios. Section IV provides the results of the tests of whether AQ is priced in stock returns, and Section V examines the relation between AQ and macroeconomic variables. Section VI concludes.

II. MEASUREMENT OF ACCRUALS QUALITY

We follow FLOS and CGV to estimate AQ as a proxy of earnings quality. This approach was originally developed by Dechow and Dichev (2002) and modified by McNichols (2002). AQ is measured by the extent to which total current accruals accurately map into operating cash flow realizations. Specifically, AQ is based on cross-sectional regressions of total current accruals on cash flow from operations in prior, current, and future periods, change in revenues, and PPE (all variables are scaled by average assets). The model is:

$$TCA_{j,t} = \phi_{0,j} + \phi_{1,j}CFO_{j,t-1} + \phi_{2,j}CFO_{j,t} + \phi_{3,t}CFO_{j,t+1} + \phi_{4,j}\Delta Rev_{j,t} + \phi_{5,j}PPE_{j,t} + \upsilon_{j,t}, \qquad (1)$$

where TCA_{jt} is total current accruals of firm j in year t, calculated as $\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta \text{Cash}_{j,t} + \Delta STDEBT_{j,t}$, in which $\Delta CA_{j,t}$ is change in current assets (ACT)[6] between year $t-1$ and t, $\Delta CL_{j,t}$ is change in current liabilities (LCT) between year $t-1$ and t, $\Delta Cash_{j,t}$ is change in cash (CHE) between year $t-1$ and t, and $\Delta STDEBT_{j,t}$ is change in debt in current liabilities (DLC) between year $t-1$ and t; $CFO_{j,t}$ is cash flow from operations, calculated as $NIBE_{j,t} - TA_{j,t}$, in which $NIBE_{j,t}$ is net income before extraordinary items (IB) and $TA_{j,t}$ is total accruals; $TA_{j,t}$ is estimated as $\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta \text{Cash}_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t}$, in which $DEPN_{j,t}$ is depreciation and amortization (DP); $\Delta Rev_{j,t}$ is change in revenues (SALE) between year $t-1$ and t; and $PPE_{j,t}$ is gross value of property, plant, and equipment (PPEGT).

We use the CRSP/Compustat Merged annual data set to obtain monthly stock returns and annual accounting data. Following the literature, we winsorize 1 percent of the extreme values of earnings, cash flow from operations, and total current accruals. We require firms to have at least seven years accounting data to be included in our sample. We conduct year-by-year cross-sectional regressions of Equation (1) for each of the Fama and French (1997) 48 industry groups containing at least 20 firms. This estimation generates firm- and year-specific residuals $\upsilon_{j,t}$. The standard deviation of firm j's residuals over year $t-4$ through t is used as our accruals quality metric, $\text{AQ}_{j,t}$. A greater AQ value indicates that the mapping of accruals to cash flow is more volatile and this in turn suggests potential inconsistency in accounting. Therefore, a firm with a greater (smaller) AQ value is associated with a poorer (better) quality of accounting information.[7]

[6] Compustat variable name is reported in parentheses.
[7] See in FLOS (2005, 303) for a discussion on why the standard deviation of residuals is a more suitable measure of information quality, especially information uncertainty or information imprecision, than the level of residuals.

III. PORTFOLIO CONSTRUCTION AND CHARACTERISTICS OF AQ-SORTED PORTFOLIOS

We follow FLOS and CGV to form the AQ-sorted portfolios. That is, at the end of each calendar month, firms are assigned into one of ten decile portfolios according to their most recently available AQ values, which are assumed to be available to the public three months after their fiscal year-end month.[8] Monthly portfolio returns are then computed with equal weights. Thus, portfolios are rebalanced every month. Portfolio 1 (Portfolio 10) contains firms having the smallest (largest) AQ values. Hence, Portfolio 1 (Portfolio 10) is the portfolio of firms with the best (poorest) accounting quality. CGV point out that FLOS's monthly rebalance method differs from Fama and French (1993), in which portfolios are rebalanced every year. CGV discuss the potential bias associated with monthly rebalanced equal weighted portfolios. We therefore construct the AQ risk factor using annual rebalanced portfolios. That is, at the end of March in year *t*, we assign firms into one of ten decile portfolios according to their AQ values in year *t*−1. Firms are maintained in the same portfolio from April of year *t* to March of year *t*+1. Portfolio returns are then computed with equal weights. We obtain very similar results using annual rebalanced AQ risk factor (available upon request).

We further require firms with valid AQ estimates of year *t* to have non-missing returns over the following 12 months in order to be included in our sample. This procedure yields 103,682 firm-year observations of AQ over the sample period 1970 through 2006. By comparison, FLOS and CGV report a sample of 91,280 and 93,093 firm-year observations of AQ, respectively, over the period 1970 through 2001.

Table 1 presents average AQ values, monthly returns, standard deviations of returns, the popular risk proxies such as firm size and book-to-market ratio, and stock prices for each of the ten

TABLE 1

Average Monthly Returns on the AQ-Sorted Decile Portfolios

AQ Portfolios	Average AQ	Ave Return (%)	Std. Dev. (%)	Ave Book-to-Market Ratio	Ave Firm Size ($Mils)	Average Price ($)
1	0.009	1.19	4.37	1.63	2369	26.28
2	0.017	1.35	5.11	1.56	2052	24.96
3	0.023	1.32	5.37	1.47	1592	22.51
4	0.029	1.33	5.77	1.36	1454	21.10
5	0.035	1.42	5.89	1.36	1107	19.13
6	0.043	1.39	6.20	1.16	788	17.52
7	0.052	1.37	6.58	1.09	583	14.74
8	0.065	1.46	7.08	1.01	432	12.82
9	0.085	1.50	7.68	0.90	288	10.68
10	0.145	1.52	8.67	0.77	224	8.48

Firms listed on the NYSE, AMEX, and NASDAQ with available accruals quality (AQ) measures are assigned into one of ten decile portfolios on each month based on the firm's most recent AQs known prior to the month. AQs are estimated using annual financial data. We request a firm to have 12 consecutive monthly returns following the announcement of AQs in order to form AQ-sorted portfolios. Portfolio 1 (10) contains firms with the smallest (largest) AQ, that is, firms with best (poorest) accounting quality. The sample period covers from January 1970 through December 2006.

[8] FLOS and CGV sort firms into five quintile AQ portfolios, whereas we sort firms into ten decile AQ portfolios.

decile AQ-sorted portfolios. Average monthly returns increase almost monotonically with the magnitude of the AQ from 1.19 percent (Portfolio 1) to 1.52 percent (Portfolio 10). Portfolios with poor AQ also have a greater standard deviation of returns. Poor AQ firms have smaller firm size, lower book-to-market ratio, and lower stock price. The mean and median of our AQ measure are 0.0535 and 0.0372, respectively (not reported), which are similar to FLOS's AQ measures. FLOS report a mean of 0.0442 and a median of 0.0313.

In order to examine whether AQ is related to fundamental risk and to compare our AQ metric with previous studies, we compute various financial and accounting variables that could affect the uncertainty of future cash flow of firms and the extent of uncertainty faced by investors. Table 2

TABLE 2

Characteristics of AQ-Sorted Decile Portfolios

AQ Portfolios	Cost of Debt	EPS	Std. Dev. of ROA	ROA	% of Negative Earnings	ROA Excl. Negative Earnings
1	0.087	1.891	0.023	0.042	0.054	0.056
2	0.096	1.564	0.033	0.044	0.086	0.066
3	0.100	1.358	0.041	0.039	0.108	0.069
4	0.103	1.205	0.048	0.036	0.126	0.072
5	0.107	0.957	0.054	0.028	0.147	0.072
6	0.113	0.841	0.062	0.023	0.171	0.075
7	0.115	0.439	0.079	0.007	0.201	0.076
8	0.122	0.473	0.090	−0.002	0.243	0.079
9	0.132	0.363	0.142	−0.058	0.302	0.084
10	0.146	−0.048	0.201	−0.115	0.408	0.097
AQ Portfolios	**R&D Ratio**	**Dividend Payout Ratio**	**Size**	**Std. Dev. of Sales**	**Std. Dev. of CFO**	**Operation Length**
1	0.035	0.484	6.676	0.130	0.205	110.051
2	0.038	0.297	6.106	0.181	0.187	142.315
3	0.045	0.281	5.664	0.206	0.186	232.132
4	0.049	0.333	5.407	0.222	0.189	189.470
5	0.057	0.192	5.144	0.237	0.196	154.952
6	0.061	0.166	4.799	0.254	0.215	172.377
7	0.070	0.174	4.481	0.286	0.220	178.905
8	0.077	0.143	4.208	0.326	0.240	184.469
9	0.095	0.123	3.856	0.372	0.267	265.611
10	0.131	0.062	3.275	0.464	0.322	223.855

Firms listed on the NYSE, AMEX, and NASDAQ with available accruals quality (AQ) measures are assigned into one of ten decile portfolios at the end of each month according to the most recent AQs. AQs are estimated using annual financial data. We request a firm to have 12 consecutive monthly returns following the announcement of AQs in order to form AQ-sorted portfolios. Portfolio 1 (10) contains firms with the smallest (largest) AQ. The sample period is from January 1970 through December 2006. Averaged accounting merits of each AQ-sorted portfolio are reported. Cost of Debt is estimated as interest expenses divided by interest bearing debt. EPS is basic earnings per share without extra items. ROA is return on total asset. % of Negative Earnings is the percentage of incidence of negative earnings in the past 10 years. ROA Excl. Negative earnings is the average return on asset excluding negative earnings. R&D Ratio is the R&D expenses divided by the total asset. Dividend Payout Ratio is dividend per share divided by earnings per share. Size is log of total asset. CFO is the cash flow from operations. Std. Dev. of Sales (Std. Dev. of CFO) is the standard deviation of sales (CFO) in the past ten years with sales (CFO) scaled by the total asset. Operation Length is the sum of the accounting receivable cycle and the inventory cycle.

presents financial and accounting characteristics of AQ-sorted decile portfolios. Some of these variables proxy firm's business fundamentals and operating environments and are used to estimate the innate portion of AQ. Consistent with FLOS and Bharath et al. (2008), we find that poorer AQ firms are associated with higher cost of debt.[9] The best AQ firms (Portfolio 1) have a mean cost of debt of 8.7 percent, while the poorest AQ firms (Portfolio 10) have a mean cost of debt of 14.6 percent. The increase in the cost of debt is monotonic across AQ portfolios, with magnitudes similar to the 8.98 percent and 10.77 percent reported by FLOS for their best and worst AQ quintile portfolios, respectively.

For profitability measures, we consider earnings per share (EPS), returns on total assets (ROA), the incidence of negative earnings in the past 10 years and ROA excluding negative earnings. As shown in Table 2, AQ is negatively related to EPS and ROA. For example, Portfolio 1 has an ROA of 4.2 percent, while Portfolio 10 has an ROA of −11.5 percent. Moreover, the percentage of negative earnings over the past 10 years increases with AQ. That is, the probability of negative earnings for firms in the poorest AQ portfolio is 40.8 percent, while the same probability for firms in the best AQ portfolio is only 5.4 percent. When positive earnings are computed alone, firms in the poorest AQ portfolio have the highest earnings. This is consistent with the finding that poorer AQ portfolios are associated with higher standard deviation of ROA.

As for growth opportunity measures, we consider the R&D ratio (R&D expenses divided by total assets) and dividend payout ratio. We find that high AQ firms tend to have a high R&D ratio and a high retention ratio (i.e., low dividend payout ratio). This is consistent with the finding presented in Table 1 that poorer AQ firms have lower book-to-market ratios, suggesting that firms with poorer AQ tend to be growth firms. In addition, we find that firms with poor AQ have greater variability in sales and cash flow from operations and longer operation cycles.[10] Overall, Table 2 provides preliminary evidence that AQ is related to firm operating environment and business nature.

IV. TESTS OF WHETHER ACCRUALS QUALITY IS PRICED IN STOCK RETURNS

In this section, we first construct the AQ risk factor using a method similar to FLOS and CGV. We then employ the Fama and MacBeth (1973) two-stage cross-sectional regression method to examine whether AQ is a priced risk factor.

Constructing the AQ Risk Factor

As in FLOS and CGV, we construct the AQ risk factor as the return on a zero-investment portfolio by buying long the top 40 percent of firms and selling short the bottom 40 percent of firms in terms of the magnitude of AQ. We call this risk factor *PMG*[11] (poor minus good). In addition to *PMG*, we consider the five other risk factors in the cross-sectional tests: the returns of market portfolio (*MKT*), the Fama and French (1993) size factor (*SMB*) and book-to-market factor (*HML*), the one-year price momentum factor (Jegadeesh and Titman 1993) (*MNT*), and the Pastor and Stambaugh (2003) liquidity factor (*LIQ*).[12]

Table 3 summarizes average monthly returns of these six risk factors and the correlation coefficients among the factors over the period January 1970 to December 2006. The average risk

9 Choi (2008) shows that high quality of earnings, measured as AQ, reduces information risk and thereby the cost of equity capital.

10 Operating cycle is the sum of the accounting receivable cycle and the inventory cycle, i.e., 365/accounting receivables turnover ratio plus 365/inventory turnover ratio.

11 *PMG* is constructed as the same method as FLOS's *AQfactor*, which equals the difference between the monthly excess returns of the top two AQ quintiles and the bottom two AQ quintiles.

12 The one-year price momentum factor is obtained from Kenneth French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html). Pastor and Stambaugh's (2003) liquidity factor is obtained from WRDS.

TABLE 3
Basic Statistics of the Risk Factors

	MKTRFT	*SMB*	*HML*	*PMG*	*MNT*	*LIQ*
Average Return (%)	0.494	0.171	0.502	0.166	0.805	−0.081
Correlation Coefficients						
MKTRFT	1.000					
SMB	0.282	1.000				
HML	−0.443	−0.305	1.000			
PMG	0.362	0.704	−0.448	1.000		
MNT	−0.084	−0.007	−0.103	−0.078	1.000	
LIQ	0.373	0.151	−0.122	0.094	−0.039	1.000

The sample period covers from January 1970 through December 2006.

Variable Definitions

MKTRFT = CRSP value-weighted market return in excess of the risk-free return;
SMB and *HML* = Fama and French's (1993) risk factors, which are related to firm size and book-to-market, respectively;
PMG = returns on the zero-investment portfolio by selling the best 40 percent AQ firms and buying the poorest 40 percent AQ firms, and it is the risk factor related to accruals quality;
MNT = risk factor related to stock price momentum (obtained from Kenneth French's website); and
LIQ = Pastor and Stambaugh's (2003) liquidity risk factor.

premia on *MKTRFT*, *SMB*, *HML*, *PMG*, *MNT*, and *LIQ* are 0.494 percent, 0.171 percent, 0.502 percent, 0.166 percent, and 0.805, and −0.081 percent per month, respectively. The 0.704 correlation coefficient between *SMB* and *PMG* is particularly large. This is because smaller firms tend to have poorer AQ than larger firms. *PMG* correlates negatively with *HML*.

Models for Cross-Sectional Regression (CSR) Tests

We use the Fama and MacBeth (1973) two-stage cross-sectional regression to examine whether *PMG* is a priced risk factor.[13] In the first stage, we estimate betas using time-series regressions. In the second stage, we use the betas estimated in the first stage as explanatory variables in the cross-sectional regressions (CSR). The CSR model to be estimated at time t is:

$$R_{it} - R_{ft} = \gamma_{0t} + \gamma_{1t}\hat{\beta}_{i,MKT} + \gamma_{2t}\hat{\beta}_{i,SMB} + \gamma_{3t}\hat{\beta}_{i,HML} + \gamma_{4t}\hat{\beta}_{i,MNT} + \gamma_{5t}\hat{\beta}_{i,LIQ} + \gamma_{6t}\hat{\beta}_{i,PMG} + \varepsilon_{it}, \quad (2)$$

where $\hat{\beta}_i$ is asset i's beta for a particular risk factor estimated from the first-stage multiple time-series regression model. R_{it} is asset i's return at time t, and R_{ft} is the one-month Treasury bill return at time t. *MKT* is the CRSP value-weighted market return. The time-series average $\bar{\hat{\gamma}}_k$ of the CSR coefficient (γ) estimates of Equation (2) is regarded as the risk premium estimate of the corresponding risk factor.

In tests of pricing ability for a given risk factor, especially information risk factors such as *PMG*, it is necessary to control for low-priced returns because the relation between information

[13] Before conducting the main cross-sectional regression tests, we have estimated time-series regressions of returns of ten decile size-sorted portfolios on *PMG* and the other risk factors considered in order to preliminarily examine whether there is a cross-sectional relation between average returns and the factor loadings (or betas) on the risk factors. We find that the factor loading on *PMG* has a stronger cross-sectional relation with average returns than any other factor loadings. Furthermore, the *PMG* has a stronger intertemporal explanatory power for returns on size-sorted portfolios than any other risk factors considered. The results are available upon request.

risk and returns tends to be severely distorted in low-priced stocks due to the bias in measured realized returns. Realized returns may be biased due to noise trading, sentiment trading, and market-microstructure induced effects. This bias is notoriously more pronounced in low-priced stocks (Bhardwaj and Brooks 1992; Ball et al. 1995; Conrad and Kaul 1993; Baker and Wurgler (2006). Another possible reason is illiquidity. A stock with poor liquidity is often traded inactively. Hence, newly released information would be hardly impounded into stock prices due to the lack of frequent trading. Since illiquidity is especially severe in low-priced stocks, the pricing effect of information risk on stock returns would be difficult to detect in low-priced stocks.

The literature shows that the biased returns of low-priced stocks tend to spuriously exaggerate market anomalies. For example, Bhardwaj and Brooks (1992) show that the January anomaly is driven mainly by low-priced stocks, and Conrad and Kaul (1993) and Ball et al. (1995) argue that profits of contrarian strategies are largely attributable to low-priced stocks. Accordingly, the exclusion of low-priced stocks in asset pricing tests is not unusual in the literature. Jegadeesh and Titman (2001) exclude stocks with prices below \$5 in evaluating explanations of momentum strategies. Bali et al. (2005) also screen stocks with prices less than \$5 in studying idiosyncratic volatility risk. We control for low-price returns by including an indicator variable in Equation (2) that equals 1 if the return is calculated with the adjacent prices less than \$5, and 0 otherwise, rather than excluding low-priced returns in the test assets.[14] We also provide a robustness check by excluding the low-priced returns, obtaining similar results.

Individual Stocks versus Portfolios as Test Assets

There is a trade-off between using individual stocks and using portfolios in the two-stage asset pricing tests with respect to the measurement error of the beta in the first stage and test power in the second stage. Tests using portfolios reduce the errors-in-variables (EIV) bias caused by the use of estimated betas instead of true betas, but have weaker test power in examining the explanatory power of betas for the cross-sectional variation of average returns. On the other hand, tests using individual stocks have a stronger testing power, but lead to a greater EIV bias (Shanken 1992; Kim 1995, 1997). Our main concern is, however, on the sensitivity of the test results to the portfolio formation method and data-snooping biases (Lo and MacKinlay 1990). In particular, when portfolios are used as test assets, we face a more serious problem than the EIV bias or the test power issues; the results are quite sensitive to how test portfolios are constructed. Moreover, the issue of beta measurement error in the first stage could be somewhat resolved, since a relatively long time-series of return observations are available to estimate betas and thus the beta measurement error can be reduced. For these reasons, we use individual stocks rather than portfolios for our tests. In the Appendix (Table A1), we report estimation results using portfolios similar to CGV's.

Empirical Results of Cross-Sectional Regression (CSR) Tests

Table 4 shows estimation results from month-by-month OLS cross-sectional regressions over the period January 1970 through December 2006 (444 months) using 23,634 individual firms. Panel A of Table 4 presents CSR results when betas are estimated using whole-period return observations. The upper part of Panel A of Table 4, labeled as models (1)–(5), provides CSR estimation results without controlling for low-priced returns. These results are very similar to CGV (Table 4, Panel D) in terms of the magnitude and statistical significance of estimates. For example, when the Fama and French's (1993; hereafter FF) three factors are included, CGV report that the estimated coefficients on *MKT*, *SMB*, and *HML* betas are 0.50 ($t = 1.99$; $p < 0.05$ in

[14] The benchmark of \$5 as low price was used in 1992 by the NYSE when it reduced the minimum tick size to sixteenths for stocks under \$5.

TABLE 4

Time-Series Averages of the Estimated Coefficients (in percent) from the Cross-Sectional Regression Estimation Using Individual Stocks

Panel A: Using the Whole-Period Betas

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ $(\hat{\beta}_{MKT})$	$\bar{\gamma}_2$ $(\hat{\beta}_{SMB})$	$\bar{\gamma}_3$ $(\hat{\beta}_{HML})$	$\bar{\gamma}_4$ $(\hat{\beta}_{MNT})$	$\bar{\gamma}_5$ $(\hat{\beta}_{LIQ})$	$\bar{\gamma}_6$ $(\hat{\beta}_{PMG})$	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	0.37 ***	0.47 **					0.11		0.054
	(3.11)	(2.06)					(0.63)		
(2)	0.35 ***	0.43 *	0.17	−0.17					0.066
	(3.35)	(1.92)	(0.96)	(−1.08)					
(3)	0.38 ***	0.43 *	0.17	−0.19			0.13		0.081
	(3.83)	(1.89)	(1.02)	(−1.22)			(0.75)		
(4)	0.37 ***	0.45 **	0.18	−0.18	0.36 *		0.14		0.090
	(3.85)	(2.00)	(1.10)	(−1.17)	(1.66)		(0.83)		
(5)	0.41 ***	0.41 *	0.18	−0.17	0.36 *	0.03	0.14		0.099
	(4.43)	(1.86)	(1.08)	(−1.10)	(1.66)	(0.12)	(0.82)		
(1a)	0.62 ***	0.39 *					0.28 *	−1.27 ***	0.058
	(5.54)	(1.73)					(1.71)	(−10.10)	
(2a)	0.57 ***	0.39 *	0.32 *	−0.21				−1.21 ***	0.073
	(5.85)	(1.75)	(1.89)	(−1.31)				(−7.46)	
(3a)	0.61 ***	0.37	0.27	−0.18			0.32 *	−1.26 ***	0.084
	(6.43)	(1.64)	(1.59)	(−1.19)			(1.85)	(−11.35)	
(4a)	0.60 ***	0.39 *	0.28 *	−0.17	0.38 *		0.33 **	−1.29 ***	0.094
	(6.56)	(1.77)	(1.65)	(−1.11)	(1.75)		(1.96)	(−11.64)	
(5a)	0.63 ***	0.36	0.27	−0.16	0.38 *	0.05	0.33 **	−1.28 ***	0.103
	(7.23)	(1.64)	(1.63)	(−1.05)	(1.75)	(0.20)	(1.96)	(−11.81)	

(continued on next page)

Panel B: Using the Rolling-Over Betas

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	0.98 ***	−0.14					0.02		0.028
	(6.12)	(−1.21)					(0.22)		
(2)	0.90 ***	−0.12	0.05	0.17 **					0.030
	(5.75)	(−1.01)	(0.49)	(1.99)					
(3)	0.87 ***	−0.09	0.04	0.17 **			0.04		0.033
	(5.60)	(−0.82)	(0.41)	(2.10)			(0.40)		
(4)	0.87 ***	−0.10	0.03	0.17 **	−0.17 **		0.04		0.034
	(5.62)	(−0.87)	(0.35)	(2.14)	(−2.17)		(0.42)		
(5)	0.86 ***	−0.09	0.03	0.17 **	−0.17 **	0.08	0.05		0.035
	(5.52)	(−0.77)	(0.39)	(2.08)	(−2.18)	(0.99)	(0.46)		
(1a)	1.16 ***	−0.16					0.18 *	−1.23 ***	0.036
	(7.34)	(−1.35)					(1.89)	(−6.77)	
(2a)	1.05 ***	−0.10	0.17 *	0.16 **				−1.16 ***	0.039
	(6.89)	(−0.91)	(1.94)	(1.97)				(−6.30)	
(3a)	1.04 ***	−0.10	0.14 *	0.17 **			0.20 **	−1.29 ***	0.040
	(6.80)	(−0.89)	(1.72)	(2.23)			(2.15)	(−7.47)	
(4a)	1.04 ***	−0.11	0.13 *	0.18 **	−0.21 **		0.21 **	−1.30 ***	0.042
	(6.81)	(−0.95)	(1.66)	(2.26)	(−2.88)		(2.17)	(−7.59)	
(5a)	1.03 ***	−0.09	0.14 *	0.17 **	−0.21 **	0.10	0.21 **	−1.30 ***	0.042
	(6.72)	(−0.85)	(1.68)	(2.21)	(−2.89)	(1.24)	(2.21)	(−7.60)	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

The month-by-month cross-sectional regression (CSR) models are estimated using Fama and MacBeth's (1973) two-pass methodology and using individual stocks (23,634 firms). The whole-period betas are estimated from the first-stage multiple time-series regression model using the whole period return observations (January 1970 through December 2006), and the rolling-over betas are estimated using the past five years' monthly return observations (at least 24 observations) available up to month $t-1$. The low-priced return is the return observation computed with two adjacent prices less than \$5. The time-series averages ($\bar{\gamma}_k$) of the CSR coefficient (γ's) estimates from January 1970 through December 2006 are reported as the corresponding risk premium estimates. Numbers in parentheses indicate t-statistics. Adj. R^2 is the average (adjusted) R^2 of the month-by-month CSRs.

(continued on next page)

Variable Definitions

MKT = CRSP value-weighted market returns;
SMB and *HML* = Fama and MacBeth's (1973) risk factors, which are related to firm size and book-to-market, respectively;
PMG = risk factor related to accruals quality;
MNT = risk factor related to stock price momentum;
LIQ = Pastor and Stambaugh's (2003) liquidity risk factor; and
Low_Priced = indicator variable equal to 1 for low-priced returns, and 0 otherwise.

two-tailed test), 0.20 ($t = 1.05$; $p = 0.29$), and -0.21 ($t = -1.20$; $p = 0.23$), respectively. We report the coefficients as 0.43 ($t = 1.92$; $p < 0.1$), 0.17 ($t = 0.96$; $p = 0.34$), and -0.17 ($t = -1.08$; $p = 0.28$), respectively. When the AQ risk factor (*PMG*) is added to the FF three-factor model, CGV report that the coefficient on *PMG* betas (i.e., β_{PMC}) is 0.25 ($t = 0.63$; $p = 0.53$) while we report it as 0.13 ($t = 0.75$; $p = 0.45$).

In fact, the results in the upper part of Table 4, Panel A confirm CGV's results that the AQ beta is insignificant in any model specification in explaining average stock returns. That is, without controlling for low-priced returns, the gamma estimates on β_{PMC} are 0.11 percent ($t = 0.63$; $p = 0.53$), 0.13 percent ($t = 0.75$; $p = 0.45$), 0.14 percent ($t = 0.83$; $p = 0.41$), and 0.14 percent ($t = 0.82$; $p = 0.41$), respectively, for the following four model specifications; (1) market beta plus AQ beta, (2) FF three-factor betas plus AQ beta, (3) FF three-factor betas plus the momentum beta and AQ beta, and (4) FF's three-factor betas plus the momentum beta, liquidity beta, and AQ beta. We also repeat the CSR tests using the same set of test portfolios as in CGV and obtain results similar to CGV. These CSR results using portfolios are reported in the Appendix.

Controlling for low-priced returns, however, the economic and statistical significance of the AQ beta changes substantially. The bottom part of Panel A of Table 4, labeled as models (1a)–(5a), reports CSR estimation results after controlling for low-priced returns. We find that β_{PMC} is positively significant in all models considered. For example, the gamma estimates on β_{PMC} ($\hat{\hat{\gamma}}_6$) in the above four model specifications are 0.28 percent ($t = 1.71$; $p < 0.1$), 0.32 percent ($t = 1.85$; $p < 0.1$), 0.33 percent ($t = 1.96$; $p < 0.05$), and 0.33 percent ($t = 1.96$; $p < 0.05$). We also find that the significance of the gamma estimates on the other betas and their statistical significance remain nearly unchanged, even after controlling for low-priced returns. These findings indicate that the explanatory power of information risk, as proxied by earnings quality, for stock returns is particularly sensitive to low-priced returns. The estimated coefficients on the indicator variable (*Low_Priced*) are significantly negative in all models.

Panel B of Table 4 reports CSR results using five-year rolling betas that could update the more recent risk information.[15] The overall results are similar to the case with whole-period betas. That is, when low-priced returns are not controlled, the gamma estimates on the AQ beta are also insignificant. After controlling for low-priced returns, however, the gamma estimates on the AQ beta become strongly significant. Regardless of whether we use whole-period or five-year rolling betas, the significance of the gamma estimates on AQ beta changes more drastically than the gamma estimates on any other betas considered, after controlling for low-priced returns. Note that all returns are used in constructing the risk factors and portfolios and in estimating betas for the CSR tests throughout this study.[16] Low-priced returns are controlled only in the CSR tests by adding the *Low_Priced* indicator variable to the CSR models. The results presented here suggest only that the pricing effect of AQ is not found in low-priced returns; but they do not necessarily imply that the pricing effect of AQ does not exist in low-priced returns.

As a compromise between the greater test power from using individual stocks and the smaller EIV bias from using portfolios, Fama and French (1992) introduced the assigned beta approach. In this approach, portfolios are constructed, post-ranking betas are estimated using whole-period portfolio returns, and the estimated post-ranking portfolio betas are then assigned to individual stocks in the portfolio. This approach mitigates the estimation errors of betas in the first stage time-series regressions by using portfolios, and then employs individual stocks in the second stage cross-sectional regression tests to increase test power.

[15] Betas are estimated by using the most recently available five-year (at least 24 months) monthly return observations.
[16] The reason that all returns are used in constructing the risk factors including *PMG* is that a risk factor should be a well-diversified portfolio in the APT context in which as many assets as possible are included (Ross 1976).

Table 5 reports CSR estimation results when individual stock returns are regressed on the assigned betas. In order to obtain the post-ranking portfolio betas, we construct four sets of equally weighted portfolios: 100 size portfolios, 100 AQ portfolios, 100 size-BM portfolios, and 64 size-BM-AQ portfolios.[17] When the assigned betas are obtained from 100 size portfolios, the AQ beta is strongly positively significant, no matter whether low-priced returns are controlled or not controlled. Even without controlling for low-priced returns, the gamma estimates on the AQ betas (in Panel A) are 1.21 percent ($t = 5.54$; $p < 0.01$ in a two-tailed test), 1.29 percent ($t = 5.65$; $p < 0.01$), 1.28 percent ($t = 5.63$; $p < 0.01$), and 1.17 percent ($t = 5.16$; $p < 0.01$), respectively, in the above-mentioned four model specifications (i.e., (1) market beta + AQ beta, (2) FF three-factor betas + AQ beta, (3) FF three-factor betas + momentum beta + AQ beta, and (4) FF three-factor betas + momentum beta + liquidity beta + AQ beta). Controlling for low-priced returns, the explanatory power of AQ beta for average returns is also stronger. When assigned betas are obtained from 64 size-BM-AQ portfolios, the AQ beta is also strongly positively significant, even without controlling for low-priced returns. When assigned betas are obtained from the other sets of portfolios (100 AQ portfolios or 100 size-BM portfolios), the gamma estimates on the AQ beta are insignificant without controlling for low-priced returns, but strongly positively significant when controlling for low-priced returns. Similar to the previous results in Table 4, we also find that the economic and statistical significance of the gamma estimates on AQ beta changes substantially after controlling for low-priced returns. However, the economic and statistical significance of the other risk factors remain relatively unchanged even after controlling for low-priced returns. We also construct the four sets of portfolios with value weights to obtain the assigned portfolio betas. The CSR results are very similar (available upon request). In sum, we conclude that CGV's results that AQ is not significantly priced are driven mostly by low-priced returns.

We report in the Appendix the CSR test results using portfolios with and without controlling for low-priced returns. These results are comparable with CGV, since the test portfolios (25 size-BM portfolios, 100 AQ portfolios, and 64 size-BM-AQ portfolios) are the same as those CGV used. We add two sets of test portfolios: 100 size-BM portfolios and 100 size portfolios. Without controlling for low-priced returns, the results are similar to CGV. That is, the AQ beta is insignificant. After controlling for low-priced returns, however, the AQ beta is significant. Note that low-priced returns are controlled by excluding low-priced returns in constructing portfolios because the indicator variable, *Low_priced*, cannot be used in the CSR when using portfolios. Note also that the construction of AQ risk factor (*PMG*) uses all returns including low-priced returns.

V. ACCRUALS QUALITY AND MACROECONOMIC FUNDAMENTALS

The CSR tests in the previous section show that AQ is significantly priced after controlling for low-priced returns and in many ways is as strong as, or stronger than, the other risk factors considered. The apparent strength of AQ, combined with the previous studies' finding that the innate portion of AQ, which is linked with firm's fundamentals and business environment, has the strongest cost of capital effects, motivate us to further investigate a linkage of AQ with economic fundamentals. In this section, therefore, we examine whether AQ and its pricing effect vary systematically with fundamental risk, as proxied by macroeconomic variables.

This methodology used to examine the linkage between AQ and economic fundamental risk is motivated by the recent finance literature on empirical asset pricing tests. Specifically, the existence of the robust risk premium of a hedged portfolio such as *SMB* may not be sufficient to justify that this hedged portfolio proxies fundamental risk, since the risk premium may arise only from

[17] The two way (size-BM) or three way (size-BM-AQ) portfolios are formed by an independent sorting. That is, the break-points in each variable are independently determined, and then stocks are sorted according to these break-points.

TABLE 5

Time-Series Averages of the Estimated Coefficients (in percent) from the Cross-Sectional Regression Estimation by Using Portfolio Betas Assigned into Individual Stocks

Panel A: Using 100 Size Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	1.65 ***	−0.54					1.21 ***		0.013
	(3.34)	(−1.30)					(5.54)		
(2)	4.57 ***	−3.52 ***	0.24	−1.57 ***					0.014
	(7.57)	(−5.64)	(1.40)	(−5.14)					
(3)	1.33 ***	−0.36	−0.01	−1.91 ***			1.29 ***		0.015
	(3.60)	(−0.87)	(−0.08)	(−6.12)			(5.65)		
(4)	1.35 ***	−0.62	−0.05	−1.93 ***	−1.51 ***		1.28 ***		0.015
	(3.66)	(−1.48)	(−0.27)	(−6.16)	(−3.67)		(5.63)		
(5)	1.15 ***	−0.43	0.04	−1.86 ***	−1.13 ***	1.78 ***	1.17 ***		0.015
	(3.17)	(−1.04)	(0.26)	(−5.98)	(−2.80)	(3.28)	(5.16)		
(1a)	3.12 ***	−2.25 ***					1.89 ***	−2.77 ***	0.024
	(8.43)	(−5.23)					(9.01)	(−14.04)	
(2a)	10.45 ***	−9.15 ***	0.30 *	−0.51 *				−2.61 ***	0.024
	(19.18)	(−15.28)	(1.77)	(−1.68)				(−13.30)	
(3a)	3.11 ***	−2.01 ***	−0.31 *	−1.18 ***			1.95 ***	−2.76 ***	0.024
	(8.26)	(−4.67)	(−1.79)	(−3.87)			(9.25)	(−14.06)	
(4a)	3.13 ***	−2.30 ***	−0.35 **	−1.21 ***	−1.87 ***		1.94 ***	−2.76 ***	0.024
	(8.37)	(−5.35)	(−2.00)	(−3.91)	(−4.57)		(9.23)	(−14.06)	
(5a)	2.80 ***	−1.97 ***	−0.19	−1.05 ***	−1.15 ***	2.99 ***	1.72 ***	−2.78 ***	0.025
	(7.60)	(−4.64)	(−1.07)	(−3.43)	(−2.84)	(5.43)	(8.24)	(−14.13)	

(continued on next page)

Panel B: Using 100 AQ Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	0.37	0.45					0.14		0.010
	(1.31)	(1.15)					(0.83)		
(2)	0.46	0.37	0.12	−0.16					0.010
	(1.49)	(0.92)	(0.55)	(−0.56)					
(3)	0.43	0.38	0.18	−0.21			0.14		0.011
	(1.41)	(0.95)	(0.74)	(−0.80)			(0.83)		
(4)	0.44	0.48	0.13	−0.20	0.59		0.14		0.011
	(1.42)	(1.21)	(0.53)	(−0.76)	(1.50)		(0.86)		
(5)	0.44	0.48	0.13	−0.20	0.59	0.17	0.15		0.011
	(1.43)	(1.21)	(0.53)	(−0.75)	(1.48)	(0.29)	(0.86)		
(1a)	0.39	0.46					0.39 ***	−0.98 ***	0.019
	(1.38)	(1.16)					(2.70)	(−5.09)	
(2a)	0.39	0.46	0.40 **	−0.38				−0.97 ***	0.019
	(1.27)	(1.17)	(2.07)	(−1.37)				(−5.01)	
(3a)	0.41	0.45	0.29	−0.26			0.39 ***	−0.98 ***	0.020
	(1.34)	(1.13)	(1.20)	(−0.97)			(2.70)	(−5.06)	
(4a)	0.42	0.58	0.24	−0.25	0.59		0.40 ***	−0.98 ***	0.020
	(1.37)	(1.41)	(0.98)	(−0.93)	(1.50)		(2.72)	(−5.02)	
(5a)	0.42	0.58	0.23	−0.26	0.60	0.05	0.40 ***	−0.98 ***	0.020
	(1.36)	(1.46)	(0.96)	(−0.96)	(1.53)	(0.08)	(2.74)	(−5.07)	

Panel C: Using 100 Size × BM Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	2.34 ***	−1.66 ***					0.03		0.028
	(8.33)	(−5.04)					(0.15)		
(2)	2.50 ***	−1.89 ***	0.25	0.20					0.029
	(8.48)	(−5.05)	(1.17)	(1.10)					
(3)	2.21 ***	−1.54 ***	−0.03	0.41			0.02		0.031
	(8.33)	(−4.56)	(−0.18)	(2.32)			(0.11)		

(continued on next page)

Panel C: Using 100 Size × BM Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(4)	1.92 ***	−1.15 ***	0.02	0.37 **	0.96 **		0.10		0.031
	(7.68)	(−3.47)	(0.12)	(2.12)	(2.34)		(0.57)		
(5)	1.70 ***	−0.98 ***	0.09	0.28	0.87 **	1.65 ***	0.12		0.031
	(6.88)	(−2.97)	(0.53)	(1.57)	(2.13)	(3.10)	(0.68)		
(1a)	3.56 ***	−2.94 ***					0.71 ***	−2.38 ***	0.035
	(13.33)	(−9.15)					(4.79)	(−14.23)	
(2a)	4.40 ***	−3.83 ***	1.08 ***	−0.23				−2.11 ***	0.036
	(15.73)	(−10.71)	(6.15)	(−1.33)				(−12.14)	
(3a)	3.30 ***	−2.50 ***	−0.11	0.68 ***			0.74 ***	−2.44 ***	0.038
	(12.26)	(−7.37)	(−0.61)	(3.86)			(5.03)	(−14.63)	
(4a)	2.71 ***	−1.70 ***	−0.00	0.60 ***	1.79 ***		0.90 ***	−2.45 ***	0.038
	(10.92)	(−5.14)	(−0.01)	(3.43)	(4.44)		(5.93)	(−14.70)	
(5a)	2.22 ***	−1.33 ***	0.16	0.38 **	1.58 ***	4.08 ***	0.96 ***	−2.50 ***	0.038
	(9.13)	(−4.04)	(0.92)	(2.16)	(3.98)	(7.71)	(6.32)	(−14.97)	

Panel D: Using 64 Size × BM × AQ Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
(1)	1.10 ***	−0.49 **					0.76 ***		0.012
	(4.40)	(−2.19)					(3.43)		
(2)	2.52 ***	−1.80 ***	0.44 **	−0.41 ***					0.013
	(4.10)	(−3.39)	(2.54)	(−3.05)					
(3)	1.83 ***	−0.93 *	0.17	−0.30 **			0.84 ***		0.018
	(2.73)	(−1.65)	(0.84)	(−2.44)			(3.54)		
(4)	1.91 ***	−1.05 ***	0.17	−0.34 **	−0.36		0.83 ***		0.019
	(4.05)	(−2.77)	(0.74)	(−2.38)	(−0.31)		(3.81)		
(5)	2.29 ***	−1.41 ***	0.17	−0.28 **	0.06	−1.58 *	0.75 ***		0.020
	(4.37)	(−2.86)	(0.74)	(−2.32)	(0.05)	(−1.81)	(3.81)		
(1a)	1.48 ***	−0.79 ***					1.60 ***	−1.59***	0.020

(continued on next page)

Panel D: Using 64 Size × BM × AQ Portfolios' Betas Assigned into Individual Stocks

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ ($\hat{\beta}_{MKT}$)	$\bar{\gamma}_2$ ($\hat{\beta}_{SMB}$)	$\bar{\gamma}_3$ ($\hat{\beta}_{HML}$)	$\bar{\gamma}_4$ ($\hat{\beta}_{MNT}$)	$\bar{\gamma}_5$ ($\hat{\beta}_{LIQ}$)	$\bar{\gamma}_6$ ($\hat{\beta}_{PMG}$)	$\bar{\gamma}_7$ *Low_Priced*	Adj. R^2
	(4.18)	(−3.70)					(8.70)	(−8.54)	
(2a)	4.62 ***	−3.67 ***	0.91 ***	−0.97 ***				−1.59 ***	0.021
	(8.56)	(−7.78)	(5.86)	(−8.78)				(−8.63)	
(3a)	3.47 ***	−2.17 ***	0.41 **	−0.79 ***			1.69 ***	−1.67 ***	0.023
	(5.70)	(−4.18)	(2.19)	(−7.71)			(7.54)	(−8.99)	
(4a)	3.19 ***	−1.87 ***	0.46 **	−0.72 ***	0.71		1.72 ***	−1.65 ***	0.027
	(7.28)	(−4.99)	(2.14)	(−5.53)	(0.64)		(8.87)	(−9.11)	
(5a)	4.17 ***	−2.80 ***	0.46 **	−0.55 ***	1.85 **	−3.75 ***	1.52 ***	−1.67 ***	0.027
	(8.50)	(−5.72)	(2.19)	(−4.92)	(1.96)	(−4.27)	(8.64)	(−9.20)	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

As in Fama and French (1992), portfolios are first formed according to a particular value (firm size, book-to-market, and/or AQ) by rebalancing every year, and betas of the portfolios are computed by using the whole-period returns. The betas of the portfolios are then assigned into individual stocks that were included in the portfolio. The cross-sectional regression (CSR) models of individual stocks' returns on the individual stock's assigned betas are estimated month by month. The total number of individual stocks used is 23,634 firms. The low-priced return is the return observation computed with two adjacent prices less than \$5. The time-series averages ($\bar{\gamma}_k$) of the CSR coefficient (γ's) estimates from January 1970 through December 2006 are reported as the corresponding risk premium estimates. Numbers in parentheses indicate t-statistics. Adj. R^2 is the average (adjusted) R^2 of the month-by-month CSRs.

Variable Definitions

MKT = CRSP value-weighted market returns;
SMB and *HML* = Fama and French's (1993) risk factors, which are related to firm size and book-to-market, respectively;
PMG = risk factor related to accruals quality;
MNT = risk factor related to stock price momentum;
LIQ = Pastor and Stambaugh's (2003) liquidity risk factor; and
Low_Priced = indicator variable equal to 1 for low-priced returns, and 0 otherwise.

market mispricing. Examination of whether the risk premium of a proposed risk factor is related to "state variables," as proxied by macroeconomic measures, is a widely used method to determine whether the risk factor is related to fundamental risk (Chen 1991; Pontiff and Schall 1998; Liew and Vassalou 2000; Chordia and Shivakumar 2002, 2006). For example, Liew and Vassalou (2000) test whether returns on *SMB*, *HML*, and *MNT* are linked to future gross domestic product (GDP) growth. They find that *SMB* and *HML* are proxies of fundamental risk, but *MNT* is not. Chordia and Shivakumar (2002) study the relation between momentum profits and a set of macroeconomic variables arguing that momentum profits are not abnormal profits but rather a risk premium sourced from the change of fundamental risk. In this study, we follow this line of research to study whether the risk premium associated with earnings quality varies with macroeconomic conditions. If the AQ-return relationship found in the previous section is induced by the fundamental risk embedded in earnings quality, then we expect that returns of AQ-sorted portfolios vary systematically with macroeconomic conditions.

Moreover, the literature documents that the portion of earnings quality associated with innate factors, which stem from the firm's business model and operating environment, is strongly associated with the cost of capital, whereas the discretionary portion is much more weakly associated with the cost of capital (see Dechow and Dichev 2002; FLOS). In order to further investigate the AQ-return relation, we decompose the AQ into its innate and discretionary portions and examine the relation between each of these aspects of AQ and macroeconomic conditions. If the innate portion of AQ is more associated with the cost of capital, then we expect returns of innate AQ-sorted portfolios to vary systematically with macroeconomic shocks.

Decomposing Accruals Quality into Innate and Discretionary Components

In order to decompose total AQ into innate and discretionary portions, we follow FLOS and Dechow and Dichev (2002), as follows:

$$AQ_{j,t} = \delta_0 + \delta_1 Size_{j,t} + \delta_2 Std(CFO)_{j,t} + \delta_3 Std(Sales)_{j,t} + \delta_4 OperCycle_{j,t} + \delta_5 NegEarn_{j,t} + \varepsilon_{j,t}, \tag{3}$$

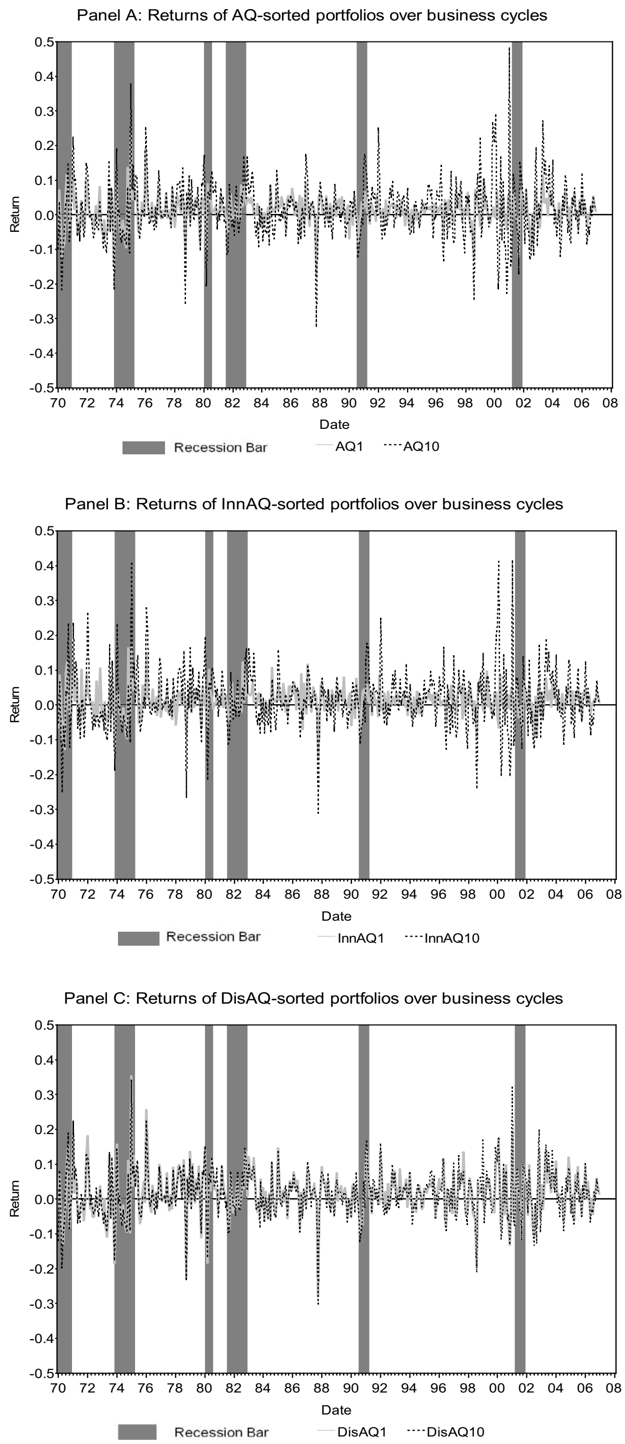
where $AQ_{j,t}$ is the estimated accruals quality of firm j at year t using Equation (1); *Size* is the log of total assets; *Std*(*CFO*) is the standard deviation of cash flow from operations in the past 10 years; *Std*(*Sales*) is the standard deviation of sales in the past ten years; *OperCycle* is operation cycles calculated as the sum of the accounting receivable cycle and the inventory cycle; and *NegEarn* is the incidence of negative earnings in the past 10 years. The predicted value from Equation (3), $\widehat{AQ}_{j,t}$, is the innate portion of firm j's AQ, namely *InnAQ*. The residual from Equation (3), $\hat{\varepsilon}_{j,t}$, is the discretionary portion of firm j's AQ, namely *DisAQ*.

Since *InnAQ* measures accruals quality sourced from the firm's business model and operation environment, *InnAQ* is a proxy of earnings quality attributable to fundamental business risk. *DisAQ* is a measure of earnings quality stemming from accounting choices, implementation decisions, and managerial errors. *DisAQ* is therefore a proxy of earnings quality arising from managerial discretion. It is important to note that *DisAQ* is not a pure noise component. Guay et al. (1996) discuss how discretionary accruals can contain up to three subcomponents: performance, opportunism, and pure noise. They find that the performance and opportunism components dominate the noise component. FLOS provide evidence that both *InnAQ* and *DisAQ* affect cost of capital, although *InnAQ* has a larger impact on cost of capital than does *DisAQ*.

Accruals Quality and Business Cycles

We begin by characterizing the time-series pattern of returns and AQ (*InnAQ* and *DisAQ*) values of AQ-sorted (*InnAQ*-sorted and *DisAQ*-sorted) portfolios over the sample period. Figure 1

FIGURE 1
Returns of Accruals Quality-Sorted Portfolios



This figure indicates returns of the best and poorest accruals quality-sorted portfolios from January 1970 to December 2006. The solid light grey line denotes the return of the best accounting quality portfolio (AQ1 in Panel A, *InnAQ*1 in Panel B, *DisAQ*1 in Panel C); the dotted black line denotes the return of the poorest accounting quality portfolio (AQ10 in Panel A, *InnAQ*10 in Panel B, *DisAQ*10 in Panel C). *InnAQ* and *DisAQ* indicate the innate and discretionary portion of AQ, respectively. The gray bar indicates the recession period.

depicts the time-series pattern of returns of the AQ-sorted, *InnAQ*-sorted, and *DisAQ*-sorted portfolios in Panels A, B, and C, respectively. As shown in Panel A, returns of the portfolio with poorest AQ (i.e., AQ10) are more volatile than those of the portfolio with best AQ (i.e., AQ1). In addition, returns of the portfolios with poorest and best AQ tend to converge during economic contraction and diverge during expansion. This suggests that the spread of returns between poorest AQ firms and best AQ firms widens during expansion, but shrinks during recession. As shown in Panel B of Figure 1, the pattern of returns of *InnAQ*-sorted portfolios is very similar to those of AQ-sorted portfolios. However, such a pattern is not found in returns of *DisAQ*-sorted portfolios. Panel C shows that there is no significant difference in average returns between portfolios with poorest and best *DisAQ*.[18]

Figure 2 demonstrates time-series trends for AQ, *InnAQ*, and *DisAQ* values over the sample period in Panels A, B, and C, respectively. Again, the trends for AQ and *InnAQ* are quite similar. Panel A (Panel B) shows that the spread of AQ (*InnAQ*) values between firms with best and poorest AQ (*InnAQ*) tends to increase over time with a slight decline after 2002. This decline may be due to the Sarbanes-Oxley Act of 2002. We also find that the divergence of AQ values over time is driven mainly by the worsened accruals quality of already poor AQ firms. The AQ value of good AQ firms tends to stay stable, while that of poor AQ firms tends to increase over time. However, the discretionary AQ value shows a quite different trend from the AQ and innate AQ values. Panel C of Figure 2 suggests that the spread of discretionary AQ widens over time, in that the positive discretionary AQ continues to rise and the negative discretionary AQ continues to deepen.

Table 6 shows average returns for AQ-sorted, *InnAQ*-sorted, and *DisAQ*-sorted decile portfolios over business cycles in Panels A, B, and C, respectively. As shown in Panel A, the difference in average returns between P1 and P10 is −0.2 percent during contraction, while it is 0.4 percent during expansion. That is, the AQ risk premium is negative during contraction but positive during expansion. However, the differences in the AQ risk premium between contraction and expansion periods (reported in the column "Con—Exp" of Table 6) are not statistically significant, possibly because return series are too volatile.

In addition, there is no monotonic pattern in average returns across the portfolios during contraction. In contrast, we observe that there is an increasing monotonic pattern in average returns from best AQ to poorest AQ portfolios during expansion. These results suggest that the greater risk premium is given to poorer AQ firms during expansion periods but not during contraction periods. These results suggest that the pricing effect of AQ exists primarily in economic expansion periods. Ball et al. (1995) show that low-priced stocks cluster in years after market declines. Therefore, controlling for low-priced stocks in the CSR tests systematically captures the

[18] The average returns of *AQ*-sorted, *InnAQ*-sorted, and *DisAQ*-sorted portfolios in expansion and contraction periods are reported in Table 6.

TABLE 6

Average Returns of Accruals Quality-Sorted Portfolio over Business Cycle

Panel A: Returns of AQ-Sorted Portfolio in Contraction and Expansion Periods

	Contraction		Expansion		Con − Exp	
AQ Portfolios	**Mean (μ_C)**	**t-value**	**Mean (μ_E)**	**t-value**	$\mu_E - \mu_C$	**t-test H0: $\mu_E = \mu_C$**
1	0.009	(1.07)	0.013	(6.29)***	0.004	(0.46)
2	0.011	(1.14)	0.014	(5.89)***	0.003	(0.35)
3	0.009	(0.95)	0.014	(5.58)***	0.005	(0.52)
4	0.008	(0.78)	0.014	(5.32)***	0.006	(0.62)
5	0.008	(0.75)	0.015	(5.54)***	0.007	(0.68)
6	0.007	(0.67)	0.015	(5.08)***	0.008	(0.76)
7	0.008	(0.69)	0.015	(4.77)***	0.007	(0.58)
8	0.007	(0.63)	0.016	(4.67)***	0.008	(0.69)
9	0.006	(0.53)	0.017	(4.48)***	0.010	(0.80)
10	0.006	(0.48)	0.017	(3.89)***	0.010	(0.76)
P10 − P1	−0.002	(−0.34)	0.004	(1.28)	0.007	(0.84)

Panel B: Returns of *InnAQ*-Sorted Portfolio in Contraction and Expansion Periods

	Contraction		Expansion		Con − Exp	
***InnAQ* Portfolios**	**Mean (μ_C)**	**t-value**	**Mean (μ_E)**	**t-value**	$\mu_E - \mu_C$	**t-test H0: $\mu_E = \mu_C$**
1	0.009	(1.23)	0.012	(6.29)***	0.002	(0.31)
2	0.009	(1.07)	0.013	(6.04)***	0.004	(0.45)
3	0.011	(1.20)	0.013	(5.68)***	0.003	(0.28)
4	0.009	(0.90)	0.013	(5.27)***	0.004	(0.40)
5	0.008	(0.82)	0.014	(5.52)***	0.006	(0.61)
6	0.008	(0.82)	0.014	(5.26)***	0.006	(0.56)
7	0.005	(0.48)	0.015	(5.17)***	0.009	(0.82)
8	0.006	(0.54)	0.016	(5.15)***	0.010	(0.84)
9	0.007	(0.64)	0.016	(4.58)***	0.009	(0.73)

(continued on next page)

Panel B: Returns of *InnAQ*-Sorted Portfolio in Contraction and Expansion Periods

	Contraction		Expansion		Con − Exp	
***InnAQ* Portfolios**	**Mean (μ_C)**	**t-value**	**Mean (μ_E)**	**t-value**	**$\mu_E - \mu_C$**	**t-test H0: $\mu_E = \mu_C$**
10	0.008	(0.59)	0.018	(4.33)***	0.010	(0.72)
P10 − P1	−0.001	(−0.14)	0.006	(1.71)*	0.008	(0.72)

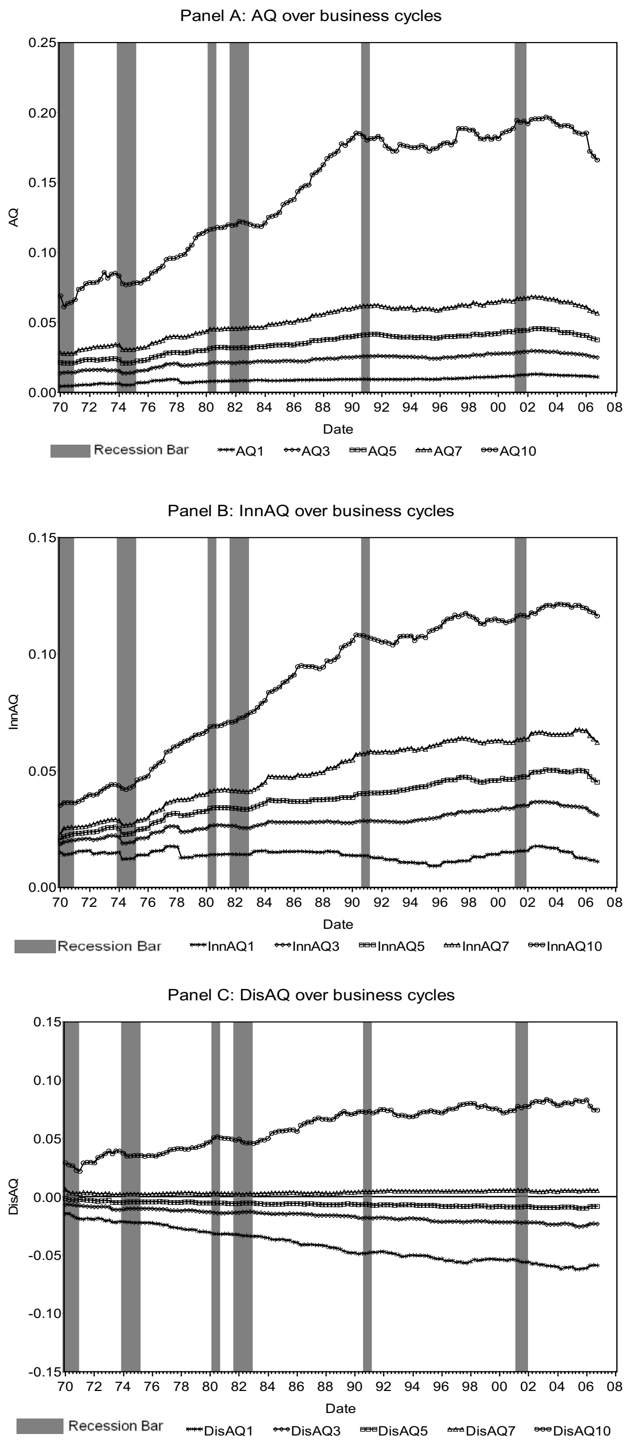
Panel C: Returns of *DisAQ*-Sorted Portfolio in Contraction and Expansion Periods

	Contraction		Expansion		Con − Exp	
***DisAQ* Portfolios**	**Mean (μ_C)**	**t-value**	**Mean (μ_E)**	**t-value**	**$\mu_E - \mu_C$**	**t-test H0: $\mu_E = \mu_C$**
1	0.010	(0.89)	0.016	(5.21)***	0.006	(0.54)
2	0.008	(0.83)	0.016	(5.89)***	0.008	(0.77)
3	0.010	(1.07)	0.015	(6.23)***	0.005	(0.56)
4	0.010	(1.07)	0.014	(6.00)***	0.005	(0.50)
5	0.008	(0.81)	0.014	(5.76)***	0.006	(0.56)
6	0.009	(0.97)	0.013	(5.35)***	0.004	(0.41)
7	0.008	(0.89)	0.014	(5.45)***	0.005	(0.56)
8	0.005	(0.47)	0.014	(5.49)***	0.009	(0.86)
9	0.005	(0.47)	0.013	(4.75)***	0.008	(0.77)
10	0.008	(0.70)	0.015	(4.48)***	0.007	(0.56)
P10 − P1	−0.002	(−0.48)	−0.001	(−0.63)	0.001	(0.22)

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

This table presents the summary statistics of the returns of AQ-Sorted, *InnAQ*-Sorted, and *DisAQ*-Sorted decile portfolios in expansion and contraction periods in Panels A, B, and C, respectively. Con–Exp indicates the difference in the average returns between contraction and expansion periods. The sample period covers January 1970 through December 2006. P10 − P1 is the return from selling Portfolio 1 (best accruals quality) and buying Portfolio 10 (poorest accruals quality). *InnAQ* and *DisAQ* indicate the innate and discretionary portion of AQ, respectively.

FIGURE 2
Accruals Quality Values of Accruals Quality-Sorted Portfolios



This figure presents the values of AQ, *InnAQ*, and *DisAQ* of AQ-, *InnAQ*-, and *DisAQ*-sorted portfolios from January 1970 to December 2006 in Panels A, B, and C, respectively. *InnAQ* and *DisAQ* indicate the innate and discretionary portion of AQ, respectively. Among ten deciles portfolios, only five portfolios (best, third best, fifth best, seventh best, and poorest accounting quality) are denoted (i.e., AQ1, AQ3, AQ5, AQ7, AQ10 in Panel A; *InnAQ*1, *InnAQ*3, *InnAQ*5, *InnAQ*7, *InnAQ*10 in Panel B; *DisAQ*1, *DisAQ*3, *DisAQ*5, *DisAQ*7, *DisAQ*10 in Panel C). Solid line denotes the best AQ (*InnAQ*, *DisAQ*) portfolio, dotted line denotes the poorest AQ (*InnAQ*, *DisAQ*) portfolio, the three broken lines from the bottom to up represent the third best, fifth best, and seventh best AQ (*InnAQ*, *DisAQ*) portfolios, respectively. The gray bar indicates the recession period.

recession effect. This can be a reason why the performance of the AQ risk factor changes substantially once low-priced stocks are controlled in the CSR test. This evidence that the AQ pricing effect is driven mainly during economic expansion periods is also consistent with the notion that the AQ risk is related to growth. We provide evidence that AQ is related to growth, as measured by the book-to-market ratio, R&D expense ratio, and dividend payout ratio in Tables 1 and 2.

Another interesting finding is that when the economy changes from bad state (contraction) to good state (expansion), returns of firms with poor AQ increase more sharply than returns of firms with good AQ. For example, the return of P10 increases from 0.6 percent to 1.7 percent from bad state to good state, while the return of P1 increases from 0.9 percent to 1.3 percent.

Panel B of Table 6 provides average returns and innate AQ values for *InnAQ*-sorted portfolios over business cycles. The results are very similar to those of AQ-sorted portfolios. The risk premium of innate AQ is positive in expansion but negative in contraction. Moreover, the risk premium of innate AQ is even greater than the risk premium of AQ in terms of magnitude and statistical significance. During expansion periods, for example, the risk premium of innate AQ (P10—P1 in Panel B) is 0.6 percent ($t = 1.71$; $p < 0.1$), and the risk premium of AQ (P10—P1 in Panel A) is 0.4 percent ($t = 1.28$; $p = 0.20$). The results using discretionary AQ-sorted portfolios, however, are quite different from those using AQ-sorted and *InnAQ*-sorted portfolios. Panel C of Table 6 shows that the risk premium of discretionary AQ (P10—P1 in Panel C) is quite small and even negative in both contraction and expansion periods. It is −0.2 percent in contraction and −0.1 percent in expansion. No monotonic pattern of average returns across *DisAQ*-sorted portfolios characterizes either contraction or expansion periods. Overall, these results suggest that the innate portion of AQ varies symmetrically with business cycles and affects cost of capital, but the discretionary portion of AQ does not.

Accruals Quality and Macroeconomic Conditions

In order to further examine whether the AQ risk factor is systematically related to fundamental risk that stems from macroeconomic conditions, we regress the returns of AQ-sorted portfolios on macroeconomic variables. Following the literature, we adopt five macroeconomic variables representing financial market conditions: (1) the yield on the three-month Treasury Bill (*TB*); (2) the return of the market portfolio (*MKT*), defined as return of the CRSP value-weighted index; (3) the term spread (*TERM*), defined as the difference between the yield on ten-year government bonds and the yield on the three-month Treasury Bill; (4) the default spread (*DEFAULT*), defined as the difference between the yield on Moody's BAA rated bonds and the yield on Moody's AAA rated bonds; and (5) the dividend yield on the market (*DIV*), defined as the total dividend yield of the CRSP value-weighted index.[19]

Panel A of Table 7 presents estimation results of the time-series regressions of AQ-sorted portfolio returns on these macroeconomic variables. We find that the absolute value of the estimated coefficients increases almost monotonically from the best AQ portfolio to the poorest AQ portfolio for each of the five financial market variables, consistent with the notion that poor AQ firms are more responsive to changes in financial market conditions. For example, a 1 percent increase in the market portfolio return is associated with an increase of 0.826 percent return on the best AQ portfolio (P1), but an increase of 1.431 percent return on the poorest AQ portfolio (P10).[20] On the other hand, a 1 percent increase in the Treasury bill rate is associated with a decrease of 0.178 percent return on the best AQ portfolio, but a decrease of 1.955 percent return on the poorest AQ portfolio. That is, when the market interest rate rises, returns of poor AQ firms fall more severely; when the market return increases, returns of poor AQ firms soar more sharply.

The last row in Table 7, Panel A shows the regression results of the difference in returns between AQ Portfolios 10 and 1 (P10—P1) on the five macroeconomic variables. This difference is the return on a zero-investment portfolio and can be regarded as the risk premium for bearing AQ risk. The results suggest that the AQ risk premium increases with market return (estimated coefficient $= 0.605$; $t = 10.2$; $p < 0.01$), while it decreases with the Treasury bill rate (estimated coefficient $= -1.777$; $t = -1.53$; $p = 0.13$), the term spread (estimated coefficient $= -0.613$; $t = -5.19$; $p < 0.01$), and the dividend yield (estimated coefficient $= -1.964$; $t = -1.11$; $p = 0.27$). These results are consistent with our previous findings in Table 6 that the risk premium of AQ increases with economic expansion.

Panel B of Table 7 reports regression results using *InnAQ*-sorted decile portfolios. These results are quite similar to those in Panel A. That is, the absolute magnitude of the estimated coefficient increases monotonically from the best innate AQ portfolio to the poorest innate AQ portfolio for each of the five macroeconomic variables. The risk premium of innate AQ (P10—P1 in Panel B) is also positively related to market return but is negatively related to Treasury rate, term spread, and dividend yield.

Panel C of Table 7 reports regression results using *DisAQ*-sorted portfolios. Here, we observe no monotonic pattern in the estimated coefficients. That is, the estimated coefficients on the macroeconomic variables have no relation with the discretionary portion of AQ. Moreover, the risk premium of discretionary AQ (P10—P1 in Panel C) is not significantly related to any macroeconomic variables except for the market return variable. The estimated coefficient on the market return is 0.161 ($t = 6.40$; $p < 0.01$). Although statically significant, the coefficient value is much smaller than in AQ-sorted or *InnAQ*-sorted portfolios. Note that the estimated coefficients on the market return are 0.605 ($t = 10.2$; $p < 0.01$) and 0.546 ($t = 7.43$; $p < 0.01$) in the cases of AQ-sorted and *InnAQ*-sorted portfolios, respectively.

Accruals Quality and Future Economic Activity

Finally, we relate AQ to future economic activity. Following Chen (1991), Liew and Vassalou (2000), and Chordia and Shivakumar (2006), we regress each of the 12-month-ahead macroeco-

[19] Pontiff and Schall (1998) and Chordia and Shivakumar (2006) also use Treasury Bill, default premium, term spread, and dividend yield as the state variables of economic conditions. They, however, do not include the market portfolio return as we do in this study. Excluding the market portfolio return greatly reduces the R^2 of the regressions but does not change our results.

[20] The coefficient on *MKT* is essentially a market beta. Table 7 shows that estimated market betas increase monotonically across the AQ deciles. This is indirect evidence that AQ is positively associated with the cost of equity capital. These results are consistent with the results reported in FLOS (2005, Table 2).

TABLE 7

Time-Series Regressions of AQ-Sorted Portfolio Returns on Macroeconomic Fundamentals

Panel A: Using AQ-Sorted Portfolio Returns

AQ Portfolio	α_p Intercept		β_{p1} *TB*		β_{p2} *MKT*		β_{p3} *DEFAULT*		β_{p4} *TERM*		β_{p5} *DIV*		Number of Obs.	Adj. R^2
1	−0.002	(−0.75)	−0.178	(−0.40)	0.826***	(36.2)	0.918***	(3.07)	0.058	(1.29)	−1.171*	(−1.73)	444	0.765
2	0.000	(−0.12)	−0.904*	(−1.89)	1.012***	(41.2)	1.057***	(3.29)	−0.082*	(−1.68)	−0.983	(−1.35)	444	0.804
3	−0.001	(−0.16)	−0.920*	(−1.67)	1.045***	(36.9)	1.138***	(3.07)	−0.229***	(−4.07)	−1.278	(−1.52)	444	0.763
4	0.000	(0.06)	−1.342**	(−2.25)	1.112***	(36.5)	1.196***	(2.99)	−0.244***	(−4.04)	−1.182	(−1.31)	444	0.759
5	0.004	(1.08)	−1.410**	(−2.24)	1.139***	(35.3)	1.010**	(2.39)	−0.307***	(−4.80)	−1.626*	(−1.70)	444	0.745
6	0.005	(0.99)	−1.340*	(−1.88)	1.164***	(31.8)	0.841*	(1.75)	−0.377***	(−5.19)	−1.298	(−1.20)	444	0.702
7	0.001	(0.16)	−1.357*	(−1.72)	1.216***	(30.0)	1.119**	(2.11)	−0.376***	(−4.68)	−1.217	(−1.01)	444	0.678
8	0.003	(0.49)	−1.526*	(−1.70)	1.262***	(27.4)	1.140*	(1.89)	−0.447***	(−4.90)	−1.550	(−1.14)	444	0.636
9	0.006	(0.86)	−1.951*	(−1.90)	1.332***	(25.3)	1.244*	(1.80)	−0.494***	(−4.73)	−2.198	(−1.41)	444	0.599
10	0.005	(0.61)	−1.955	(−1.58)	1.431***	(22.5)	1.463*	(1.76)	−0.555***	(−4.40)	−3.135*	(−1.67)	444	0.542
P10 − P1	0.007	(0.93)	−1.777	(−1.53)	0.605***	(10.2)	0.546	(0.70)	−0.613***	(−5.19)	−1.964	(−1.11)	444	0.210

Panel B: Using *InnAQ*-Sorted Portfolio Returns

InnAQ Portfolio	α_p Intercept		β_{p1} *RF*		β_{p2} *MKT*		β_{p3} *DEFAULT*		β_{p4} *TERM*		β_{p5} *DIV*		Number of Obs.	Adj. R^2
1	−0.002	(−0.68)	0.356	(0.90)	0.780***	(38.5)	0.491*	(1.85)	0.163***	(4.07)	−0.743	(−1.24)	444	0.792
2	−0.001	(−0.49)	−0.397	(−0.99)	0.937***	(45.6)	0.787***	(2.92)	0.033	(0.80)	−0.712	(−1.17)	444	0.836
3	−0.002	(−0.70)	−0.737*	(−1.68)	0.990***	(44.0)	0.862***	(2.92)	−0.066	(−1.48)	−0.081	(−0.12)	444	0.824
4	−0.004	(−1.08)	−1.345**	(−2.55)	1.026***	(37.9)	1.286***	(3.63)	−0.134**	(−2.50)	−0.239	(−0.30)	444	0.776
5	−0.001	(−0.15)	−1.287**	(−2.23)	1.037***	(35.1)	1.275***	(3.29)	−0.188***	(−3.20)	−1.191	(−1.36)	444	0.746
6	0.001	(0.22)	−1.474**	(−2.18)	1.073***	(30.9)	1.343***	(2.95)	−0.288***	(−4.19)	−1.613	(−1.57)	444	0.693
7	0.001	(0.27)	−1.955***	(−2.59)	1.133***	(29.3)	1.420***	(2.80)	−0.300***	(−3.91)	−1.261	(−1.10)	444	0.671
8	0.004	(0.80)	−2.047**	(−2.46)	1.186***	(27.8)	1.258**	(2.25)	−0.394***	(−4.65)	−1.255	(−0.99)	444	0.645
9	0.007	(1.09)	−1.566	(−1.52)	1.242***	(23.5)	1.053	(1.52)	−0.444***	(−4.25)	−2.526	(−1.62)	444	0.563
10	0.008	(0.94)	−1.083	(−0.82)	1.327***	(19.6)	1.026	(1.16)	−0.529***	(−3.94)	−3.358*	(−1.67)	444	0.469
P10 − P1	0.01	(1.05)	−1.438	(−1.00)	0.546***	(7.43)	0.535	(0.56)	−0.693***	(−4.75)	−2.615	(−1.20)	444	0.131

Panel C: Using *DisAQ*-Sorted Portfolio Returns

DisAQ Portfolio	α_p Intercept		β_{p1} *RF*		β_{p2} *MKT*		β_{p3} *DEFAULT*		β_{p4} *TERM*		β_{p5} *DIV*		Number of Obs.	Adj. R^2
1	0.005	(0.90)	−1.361	(−1.58)	1.114***	(25.2)	1.188**	(2.05)	−0.368***	(−4.20)	−2.257*	(−1.72)	444	0.597
2	0.003	(0.69)	−1.821**	(−2.51)	1.014***	(27.2)	1.418***	(2.90)	−0.200***	(−2.71)	−1.368	(−1.24)	444	0.639

(continued on next page)

Panel C: Using *DisAQ*-Sorted Portfolio Returns

DisAQ	α_p		β_{p1}		β_{p2}		β_{p3}		β_{p4}		β_{p5}		Number	
Portfolio	**Intercept**		***RF***		***MKT***		***DEFAULT***		***TERM***		***DIV***		**of Obs.**	**Adj. R^2**
3	0.002	(0.66)	−1.039*	(−1.82)	0.977***	(33.4)	0.999***	(2.61)	−0.177***	(−3.06)	−1.024	(−1.18)	444	0.726
4	0.003	(0.79)	−0.950*	(−1.78)	0.984***	(35.9)	0.864**	(2.41)	−0.147***	(−2.71)	−1.050	(−1.29)	444	0.754
5	−0.002	(−0.46)	−0.998*	(−1.85)	0.999***	(36.00)	1.126***	(3.10)	−0.068	(−1.24)	−0.798	(−0.97)	444	0.758
6	0.000	(−0.09)	−0.489	(−0.91)	1.033***	(37.40)	0.946***	(2.61)	−0.152***	(−2.78)	−1.752**	(−2.14)	444	0.768
7	−0.001	(−0.26)	−0.883*	(−1.68)	1.065***	(39.60)	0.959***	(2.72)	−0.157***	(−2.94)	−0.716	(−0.90)	444	0.789
8	0.000	(0.04)	−1.359**	(−2.40)	1.107***	(38.10)	1.086***	(2.85)	−0.245***	(−4.26)	−0.839	(−0.97)	444	0.774
9	−0.001	(−0.21)	−1.237**	(−1.98)	1.166***	(36.50)	1.030**	(2.46)	−0.255***	(−4.03)	−0.966	(−1.02)	444	0.758
10	0.003	(0.48)	−1.389	(−1.58)	1.276***	(28.30)	1.194**	(2.02)	−0.377***	(−4.21)	−2.294*	(−1.72)	444	0.651
P10 − P1	−0.002	(−0.72)	−0.028	(−0.06)	0.161***	(6.36)	0.006	(0.018)	−0.008	(−0.16)	−0.037	(−0.049)	444	0.078

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

This table reports the estimates of the contemporaneous time-series regression of returns of each of AQ-Sorted, *InnAQ*-Sorted, and *DisAQ*-Sorted portfolios on the macroeconomic variables in Panels A, B, and C, respectively. Numbers reported in parentheses are t-statistics based Newey-West adjusted standard errors. *InnAQ* and *DisAQ* indicate the innate and discretionary portion of AQ, respectively.

Variable Definitions

TB_t = rate of return of the three-month Treasury Bill at time t;
MKT = rate of return of the CRSP value-weighted market portfolio;
DEFAULT = default spread between Moody's Baa corporate bond yield and Aaa corporate bond yield;
TERM = term spread between ten-year government bond yields and three-month Treasury bill yields; and
DIV = dividend yield of the CRSP market index of NYSE, AMEX, and NASDAQ listed firms.

nomic variables on AQ-related risk factors, the Fama-French factors, and the momentum factor. Beyond from the five macroeconomic variables used above, we consider five additional macroeconomic variables reflecting the real business environment: (1) the growth rate of the industrial production index (*GINDPRO*), (2) the growth rate of gross domestic production (*GGDP*), (3) the growth rate of personal consumption expenditure (*GPCE*), (4) the growth rate of employee compensation including wages and salaries (*GWAGE*), and (5) the growth rate of corporate profit (*GPROFIT*). Since *GGDP*, *GWAGE*, and *GPROFIT* data are available only in quarterly frequency; we calculate the compounded quarterly growth rates of industrial production (*GINDPRO*) and personal consumption expenditure (*GPCE*) using monthly data obtained from the website of the Federal Reserve Bank of St. Louis. We include two AQ-based risk factors: *AQ_PMG* is the difference in the AQ value between the poorest AQ and best AQ portfolios; and *RetAQ_PMG* is the difference in the returns between the poorest AQ and best AQ portfolios (i.e., P10—P1 of AQ-sorted portfolios).

Panel A of Table 8 presents the regression results of each of these 12-month-ahead macroeconomic variables on the risk factors. Since the financial market variables (*TB*, *MKT*, *DEFAULT*, *TERM*, and *DIV*) are at a monthly frequency, and the real business variables (*GINDPRO*, *GGDP*, *GPCE*, *GWAGE*, and *GPROFIT*) are at a quarterly frequency, the risk factors as explanatory variables are converted (or compounded) suitably according to the frequency of the dependent variable. We find that the AQ-based risk factors, *AQ_PMG* and *RetAQ_PMG*, are negatively correlated with most of the future macroeconomic variables, regardless of whether the other risk factors are included. For example, *AQ_PMG* is significantly negatively related to future values of the Treasury Bill rate (*TB*), the default risk premium (*DEFAULT*), the dividend yield (*DIV*), the GDP growth rate (*GGDP*), the personal consumption growth rate (*GPCE*), and the employee compensation growth rate (*GWAGE*). *RetAQ_PMG* is also significantly negatively related to future values of the market portfolio return (*MKT*), the dividend yield (*DIV*), and the employee compensation growth rate (*GWAGE*). *AQ_PMG* and *RetAQ_PMG* are mostly negatively related to the future values of the other macroeconomic variables, although the statistical significance is weak.[21] For a robustness check, we repeat the above regressions by annualizing all risk factors and macroeconomic variables, obtaining very similar results in terms of sign and statistical significance. These results are available upon request.

Panels B and C of Table 8 present the estimation results using the *InnAQ*- and *DisAQ*-based risk factors, respectively. We find that the risk factors based on both *InnAQ* and *DisAQ* are also negatively related to future economic activity. The magnitude and statistical significance of the estimated coefficients on the *InnAQ*- and *DisAQ*-based risk factors are similar. Hence, the discretionary portion of AQ has the similar predictive power on future economic activities to the innate portion of AQ. Guay et al. (1996) argue that discretionary accruals can reflect management's attempts to enhance the ability of earnings to reflect performance in reliable and timely ways though discretionary accruals can also be employed to hide poor performance or postpone a portion of unusually good current earnings to future years. Therefore, we conjecture that the predictive power of *DisAQ* on future economic activity is derived from earnings management, which in turn reflects manager's expectations on future economic conditions. Managers employ discretionary accruals to adjust current earnings based on their forecasts of future economic conditions and firm performance. Subramanyam (1996) provides some evidence that discretionary accruals predict future profitability and dividend changes.

[21] Our results on the momentum factor are consistent with Chordia and Shivakumar (2006), which shows that momentum profits are negatively related to 12-month ahead macroeconomic variables such as growth in industrial production, growth in consumption, and growth in labor income.

TABLE 8

Regressions of Future Macroeconomic Variables on the Risk Factors

Panel A: Including the AQ-Related Factors

	TB	*MKT*	*DEFAULT*	*TERM*	*DIV*	*GINDPRO*	*GGDP*	*GPCE*	*GWAGE*	*GPROFIT*
AQ_PMG	−0.028***	0.023	−0.040***	0.024	−0.017***	−0.006	−0.032***	−0.031***	−0.030***	−0.002
	(−3.06)	(0.45)	(−2.98)	(1.08)	(−5.34)	(−0.53)	(−7.20)	(−8.39)	(−6.06)	(−0.07)
RetAQ_PMG	−0.002	−0.119***	−0.004	−0.023	−0.003**	−0.003	−0.002	−0.006	−0.007	−0.017
	(−0.91)	(−3.28)	(−0.90)	(−0.76)	(−2.07)	(−0.25)	(−0.29)	(−1.00)	(−1.28)	(−0.38)
MKTRF	0.000	0.079	−0.005	0.021	0.000	0.031*	−0.006	−0.006	0.017**	0.041
	(0.05)	(1.48)	(−1.38)	(0.79)	(−0.28)	(1.80)	(−0.67)	(−0.75)	(1.96)	(0.53)
SMB	0.000	0.073	0.011	0.025	0.002	−0.001	0.020	0.000	0.003	0.048
	(−0.10)	(0.79)	(1.30)	(0.47)	(0.70)	(−0.05)	(0.98)	(0.03)	(0.22)	(0.43)
HML	−0.011*	0.054	0.001	−0.016	−0.004	−0.005	−0.005	−0.028**	−0.011	0.199*
	(−1.67)	(0.65)	(0.22)	(−0.37)	(−1.59)	(−0.17)	(−0.33)	(−2.14)	(−1.01)	(1.89)
MNT	0.002	−0.035	0.001	0.050	0.001	−0.018	0.006	−0.005	0.002	0.109*
	(0.66)	(−0.57)	(0.25)	(1.47)	(0.65)	(−0.83)	(0.55)	(−0.61)	(0.26)	(1.75)
Intercept	0.009***	0.007	0.016***	−0.002	0.005***	0.010	0.032***	0.034***	0.031***	0.016
	(6.29)	(0.90)	(7.30)	(−0.60)	(9.92)	(1.63)	(13.2)	(16.2)	(12.3)	(0.94)
Num. Obs.	432	432	432	432	432	144	144	144	144	144
Adj. R^2	0.162	0.008	0.157	0.001	0.188	0.002	0.282	0.298	0.312	0.011

Panel B: Including *InnAQ*-Related Factors

	TB	*MKT*	*DEFAULT*	*TERM*	*DIV*	*GINDPRO*	*GGDP*	*GPCE*	*GWAGE*	*GPROFIT*
InnAQ_PMG	−0.039 ***	0.044	−0.058***	0.033	−0.025***	−0.006	−0.051***	−0.049***	−0.045***	−0.013
	(−2.96)	(0.58)	(−2.83)	(1.07)	(−4.92)	(−0.33)	(−7.01)	(−8.14)	(−5.34)	(−0.25)
RetInnAQ_PMG	−0.001	−0.114**	−0.005	−0.030	−0.004***	−0.001	−0.002	−0.002	−0.008	−0.006
	(−0.48)	(−2.52)	(−1.54)	(−1.22)	(−2.63)	(−0.14)	(−0.26)	(−0.36)	(−1.63)	(−0.18)
MKTRF	0.000	0.065	−0.005	0.018	0.000	0.030*	−0.004	−0.005	0.018**	0.040
	(0.075)	(1.19)	(−1.31)	(0.68)	(−0.29)	(1.77)	(−0.45)	(−0.60)	(2.07)	(0.53)
SMB	−0.001	0.131	0.015*	0.049	0.005	−0.003	0.020	−0.004	0.010	0.036
	(−0.25)	(1.18)	(1.75)	(0.83)	(1.34)	(−0.09)	(0.87)	(−0.22)	(0.62)	(0.30)

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Panel B: Including *InnAQ*-Related Factors

	TB	***MKT***	***DEFAULT***	***TERM***	***DIV***	***GINDPRO***	***GGDP***	***GPCE***	***GWAGE***	***GPROFIT***
HML	−0.009	0.084	0.002	−0.013	−0.003	−0.003	−0.003	−0.024*	−0.008	0.208**
	(−1.40)	(1.05)	(0.33)	(−0.30)	(−1.36)	(−0.12)	(−0.19)	(−1.91)	(−0.67)	(2.03)
MNT	0.002	−0.035	0.001	0.049	0.001	−0.019	0.006	−0.005	0.003	0.107*
	(0.70)	(−0.55)	(0.20)	(1.46)	(0.62)	(−0.83)	(0.55)	(−0.67)	(0.37)	(1.73)
Intercept	0.008***	0.007	0.015***	−0.001	0.004***	0.008	0.030***	0.031***	0.027***	0.018
	(6.83)	(1.05)	(7.84)	(−0.45)	(9.93)	(1.58)	(13.9)	(16.7)	(12.5)	(1.22)
Num. Obs.	432	432	432	432	432	144	144	144	144	144
Adj. R^2	0.146	0.009	0.157	0.002	0.192	0	0.278	0.286	0.274	0.011

Panel C: Including *DisAQ*-Related Factors

	TB	***MKT***	***DEFAULT***	***TERM***	***DIV***	***GINDPRO***	***GGDP***	***GPCE***	***GWAGE***	***GPROFIT***
DisAQ_PMG	−0.039***	0.027	−0.054***	0.026	−0.024***	−0.008	−0.044***	−0.042***	−0.040***	−0.009
	(−3.12)	(0.40)	(−3.04)	(0.86)	(−5.31)	(−0.53)	(−6.80)	(−7.96)	(−5.64)	(−0.21)
RetDisAQ_PMG	−0.002	−0.226**	0.006	0.052	0.001	−0.019	−0.003	0.001	−0.015	0.020
	(−0.43)	(−2.30)	(0.95)	(1.16)	(0.22)	(−0.52)	(−0.22)	(0.10)	(−1.09)	(0.19)
MKTRF	0.000	0.081	−0.006	0.012	−0.001	0.031*	−0.005	−0.006	0.018*	0.038
	(0.05)	(1.41)	(−1.53)	(0.46)	(−0.60)	(1.81)	(−0.55)	(−0.77)	(1.91)	(0.51)
SMB	−0.003	−0.060	0.007	0.001	−0.001	−0.005	0.017	−0.008	−0.006	0.022
	(−0.89)	(−0.73)	(1.09)	(0.04)	(−0.43)	(−0.22)	(1.06)	(−0.56)	(−0.45)	(0.24)
HML	−0.010	0.064	0.005	0.009	−0.002	−0.008	−0.003	−0.024*	−0.010	0.214**
	(−1.56)	(0.86)	(0.76)	(0.21)	(−0.83)	(−0.27)	(−0.25)	(−1.73)	(−0.91)	(2.03)
MNT	0.002	−0.037	0.002	0.057*	0.001	−0.020	0.006	−0.006	0.000	0.106*
	(0.70)	(−0.63)	(0.45)	(1.67)	(0.95)	(−0.84)	(0.50)	(−0.76)	(−0.01)	(1.65)
Intercept	0.009***	0.007	0.016***	−0.002	0.005***	0.010	0.032***	0.033***	0.030***	0.018
	(6.26)	(0.94)	(7.33)	(−0.45)	(9.52)	(1.63)	(12.8)	(15.5)	(12.0)	(1.06)
Num. Obs.	432	432	432	432	432	144	144	144	144	144
Adj. R^2	0.173	0.008	0.161	0.001	0.193	0.004	0.271	0.277	0.275	0.011

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

This table reports the regressions of each of the 12-month-ahead macroeconomic variables on the AQ related factors and Fama-French three factors (*MKTRFT, SMB*, and *HML*), and the momentum factor (*MNT*). Panels A, B, and C includes the AQ-Related, *InnAQ*-Related, and *DisAQ*-Related risk factors, respectively. *AQ_PMG* (*InnAQ_PMG* or *DisAQ_PMG*)

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is the difference of the AQ (*InnAQ* or *DisAQ*) values between the poorest and the best AQ decile portfolios. *RetAQ_PMG* (*RetInnAQ_PMG* or *RetDisAQ_PMG*) is the spread of returns between of the poorest and the best AQ (*InnAQ* or *DisAQ*) decile portfolios. *InnAQ* and *DisAQ* indicate the innate and discretionary portion of AQ, respectively. The financial market variables (*TB, MKT, DEFAULT, TERM*, and *DIV*) are in monthly frequency, and the real business environment variables (*GINDPRO, GGDP, GPCE, GWAGE*, and *GPROFIT*) are in quarterly frequency. Numbers reported in parentheses are t-statistics based on Newey-West standard errors. The sample period covers January 1970 through December 2006.

Variable Definitions

TB = return of the three-month Treasury Bill;
MKT = return of the CRSP value-weighted market portfolio;
DEFAULT = default spread between Moody's Baa corporate bond yield and Aaa corporate bond yield;
TERM = term spread between ten-year government bond yields and three-month Treasury bill yields;
DIV = dividend yield of the CRSP market index of NYSE, AMEX, and NASDAQ listed firms;
GINDPRO = growth rate of industrial production index;
GGDP = growth rate of GDP;
GPCE = growth rate of personal consumption expenditure;
GWAGE = growth rate of employee compensation; and
GPROFIT = growth rate of corporate profits.

VI. CONCLUSIONS

This study contributes to the ongoing debate on whether AQ is priced in capital markets (Francis et al. 2005 [FLOS]; Core et al. 2008 [CGV]; Ogneva 2008). We re-examine the relationship between AQ and stock returns in two-stage CSR tests by controlling for low-priced returns. The reason we control for low-priced returns is that realized returns of low-priced stocks are notoriously biased due to unsystematic factors such as noise trading, sentiment trading, and market-microstructure induced effects. Therefore, even if the relation between AQ and expected returns exists, it would be difficult to detect such a pricing relation in low-priced returns. We find in CSR tests using individual stocks that the AQ risk premium is statistically and economically significant after controlling for low-priced returns. These results are robust for various beta estimation methods and portfolio formations. In particular, when assigned betas are used in the CSR, the AQ risk factor is statistically significant even without controlling for low-priced returns. Among the many risk factors considered, the AQ risk factor is the only one whose economic and statistical significance is changed drastically after controlling for low-priced returns. However, the economic and statistical significance of the other risk factors remains relatively unchanged even after controlling for low-priced returns. Thus, CGV's results that AQ is not significantly priced are severely affected by low-priced returns.

This study also contributes to a broader stream of literature on earnings quality. We show that the AQ and its pricing effect are related to fundamental risk. We find that the return of AQ (i.e., the risk premium associated with AQ) react systematically to business cycles and macroeconomic conditions. Firms with poorer AQ are more exposed to macroeconomic shocks. More importantly, only the innate portion of AQ varies with macroeconomic conditions; the discretionary portion of AQ does not. Therefore, only the innate portion of earnings quality is related to economy-wide fundamental risk, and only this portion of AQ demonstrates the pricing effect on stock returns. These results support the argument that AQ is related to fundamental risk, with its pricing effect on expected returns stemming from the innate component of AQ.

We also find that the risk premium of AQ and the dispersion of AQ between firms with poorest and best earnings quality are significantly negatively related to future economic activity. In addition, the discretionary portion of AQ has predictive power on future economic activity similar to the innate portion of AQ. This predictive power may stem from earnings management and management discretion that reflect management's expectations for future economic conditions.

APPENDIX

TABLE A1

Time-Series Averages of the Estimated Coefficients (in percent) from the Cross-Sectional Regression Estimation Using Portfolios

Panel A: 25 Size and Book-to-Market (5 × 5) Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	1.12 ***	−1.50 **					−0.29	0.50
	(4.28)	(−2.17)					(−1.64)	
(2)	1.11 ***	−1.72 **	−0.60 ***	0.84 ***				0.53
	(4.66)	(−2.34)	(−2.87)	(4.98)				
(3)	1.17 ***	−1.88 **	−0.57 ***	0.83 ***			−0.50 ***	0.59
	(4.20)	(−2.34)	(−3.07)	(4.89)			(−2.70)	
(4)	1.70 ***	−1.74 **	−0.57 ***	0.80 ***	−0.10 ***		−0.47 ***	0.60
	(4.04)	(−2.20)	(−3.02)	(4.75)	(−2.99)		(−2.53)	
(5)	1.09 ***	−1.78 **	−0.60 ***	0.80 ***	−0.09 **	1.22	−0.44 **	0.61
	(4.03)	(−2.23)	(−3.16)	(4.74)	(−2.46)	(1.20)	(−2.36)	
Excluding Low-Priced Returns								
(1a)	1.20 ***	−1.84 **					0.39 *	0.46
	(4.80)	(−2.31)					(1.72)	
(2a)	1.08 ***	−1.56 **	0.27	0.48 ***				0.49
	(4.32)	(−2.04)	(1.42)	(2.99)				
(3a)	1.02 ***	−1.39 ***	0.03	0.62 ***			0.55 *	0.58
	(4.06)	(−2.91)	(0.17)	(3.68)			(2.08)	
(4a)	1.03 ***	−1.41 ***	0.03	0.62 ***	0.04		0.55 **	0.58
	(4.77)	(−2.86)	(0.18)	(3.64)	(0.16)		(2.00)	
(5a)	1.04 ***	−1.42 ***	0.03	0.62 ***	0.03	−0.72	0.55 **	0.58
	(4.72)	(−2.86)	(0.18)	(3.61)	(0.16)	(−0.87)	(1.96)	

(continued on next page)

Panel B: 100 AQ Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	0.24	0.59					0.15	0.15
	(0.70)	(1.36)					(0.89)	
(2)	−0.05	0.75 *	0.17	0.04				0.15
	(−0.15)	(1.76)	(0.78)	(0.15)				
(3)	0.03	0.70	0.05	0.13			0.15	0.17
	(0.07)	(1.63)	(0.22)	(0.53)			(0.91)	
(4)	0.19	0.70	−0.04	0.16	0.75 *		0.16	0.17
	(0.51)	(1.63)	(−0.18)	(0.63)	(1.76)		(0.94)	
(5)	0.20	0.73 *	−0.05	0.12	0.78 *	−0.41	0.16	0.17
	(0.53)	(1.70)	(−0.22)	(0.47)	(1.84)	(−0.75)	(0.95)	
Excluding Low-Priced Returns								
(1a)	0.72 **	0.08					0.58 ***	0.15
	(2.39)	(0.19)					(3.09)	
(2a)	0.68 **	0.08	0.54 **	−0.40				0.15
	(2.09)	(0.19)	(2.36)	(−1.31)				
(3a)	0.70 **	0.05	0.45 *	−0.15			0.57 ***	0.16
	(2.12)	(0.12)	(1.85)	(−0.53)			(2.96)	
(4a)	0.68 **	0.11	0.42 *	−0.12	0.22		0.56 ***	0.16
	(2.07)	(0.27)	(1.70)	(−0.40)	(0.48)		(2.91)	
(5a)	0.68 **	0.11	0.42 *	−0.12	0.22	0.04	0.56 ***	0.17
	(2.06)	(0.27)	(1.70)	(−0.39)	(0.48)	(0.06)	(2.88)	

Panel C: 64 Size, Book-to-Market, and AQ (4 × 4 × 4) Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	2.29 ***	−3.50 ***					−0.07	0.19
	(6.77)	(−4.89)					(−0.39)	
(2)	1.11 *	−1.29	0.25	0.84***				0.21

(continued on next page)

Panel C: 64 Size, Book-to-Market, and AQ (4 × 4 × 4) Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
	(1.91)	(−1.11)	(1.00)	(4.80)				
(3)	1.01 *	−0.90	0.06	0.90 ***			−0.03	0.24
	(1.68)	(−0.74)	(0.28)	(4.99)			(−0.15)	
(4)	1.58 ***	−1.92 *	−0.02	0.61 ***	−0.21 ***		−0.05	0.27
	(3.44)	(−1.94)	(−0.11)	(3.31)	(−2.59)		(−0.25)	
(5)	1.36 ***	−1.80 *	0.02	0.58 ***	−0.24 ***	0.38	−0.02	0.30
	(3.47)	(−1.84)	(0.10)	(3.25)	(−2.97)	(0.47)	(−0.10)	
Excluding Low-Priced Returns								
(1a)	1.89 ***	−2.94 ***					0.35 *	0.15
	(6.80)	(−4.53)					(1.75)	
(2a)	0.98 ***	−1.00	0.36 *	0.57 ***				0.18
	(3.43)	(−1.35)	(1.98)	(3.44)				
(3a)	1.06 ***	−1.16	0.21	0.69 ***			0.40 **	0.20
	(3.75)	(−1.60)	(1.11)	(4.06)			(2.02)	
(4a)	0.98 ***	−0.97	0.26	0.62 ***	−0.13 **		0.44 **	0.21
	(3.47)	(−1.31)	(1.41)	(3.65)	(−2.50)		(2.23)	
(5a)	1.16 ***	−0.81	0.27	0.65 ***	−0.19 ***	−1.07 *	0.44 **	0.22
	(3.98)	(−1.12)	(1.46)	(3.78)	(−3.03)	(−1.65)	(2.22)	

Panel D: 100 Size and Book-to-Market (10 × 10) Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	0.95 **	−1.21 **					−0.23	0.29
	(2.28)	(−2.25)					(−1.28)	
(2)	0.48 *	−1.46 **	−0.23	0.88 ***				0.30
	(1.90)	(−2.58)	(−1.11)	(5.16)				
(3)	0.23 *	−1.74 **	−0.39 **	0.94 ***			−0.26	0.34
	(1.91)	(2.35)	(−2.18)	(5.43)			(−1.40)	
(4)	0.13	−1.16 ***	−0.37 **	0.86 ***	−0.24***		−0.27	0.35

(continued on next page)

Panel D: 100 Size and Book-to-Market (10 × 10) Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
	(1.37)	(−2.69)	(−2.07)	(5.04)	(−5.17)		(−1.48)	
(5)	0.54 **	−1.20 ***	−0.39 **	0.86 ***	−0.12 ***	1.32 **	−0.24	0.35
	(2.35)	(−2.74)	(−2.16)	(5.03)	(−4.82)	(2.00)	(−1.35)	
Excluding Low-Priced Returns								
(1a)	1.09 ***	−1.53 **					0.36 *	0.26
	(2.67)	(−2.20)					(1.67)	
(2a)	0.81 ***	−1.91 ***	0.28	0.49 ***				0.28
	(2.83)	(−2.76)	(1.49)	(3.00)				
(3a)	0.73 **	−1.74 ***	0.08	0.62 ***			0.50 **	0.32
	(2.44)	(−2.60)	(0.44)	(3.63)			(2.00)	
(4a)	0.78 **	−1.86 ***	0.09	0.60 ***	0.03		0.45 *	0.33
	(2.58)	(−2.84)	(0.51)	(3.53)	(1.26)		(1.75)	
(5a)	0.91 ***	−1.88 ***	0.09	0.60 ***	0.02	−1.11 **	0.43 *	0.33
	(2.76)	(−2.85)	(0.50)	(3.49)	(1.20)	(−1.97)	(1.67)	

Panel E: 100 Size Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	1.36 ***	−0.83 ***					0.35 *	0.31
	(4.50)	(−2.78)					(1.66)	
(2)	3.46 ***	−2.62 ***	0.11	−0.48 *				0.32
	(5.94)	(−4.32)	(0.63)	(−1.73)				
(3)	1.15 ***	−0.38	−0.10	−0.85 ***			0.78 ***	0.33
	(3.43)	(−0.98)	(−0.06)	(−3.16)			(3.60)	
(4)	1.26 ***	−0.60	−0.04	−0.90 ***	−0.86 **		0.77 ***	0.34
	(3.71)	(−1.53)	(−0.21)	(−3.28)	(−2.29)		(3.56)	
(5)	1.06 ***	−0.41	0.05	−0.89 ***	−0.53	1.86 ***	0.70 ***	0.34
	(3.19)	(−1.05)	(0.27)	(−3.27)	(−1.44)	(3.58)	(3.24)	

(continued on next page)

Panel E: 100 Size Portfolios

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Excluding Low-Priced Returns								
(1a)	2.41 ***	−1.72 ***					0.14	0.25
	(7.98)	(−4.62)					(0.55)	
(2a)	2.52 ***	−1.89 ***	−0.01	0.76 ***				0.26
	(7.65)	(−4.78)	(−0.06)	(3.21)				
(3a)	2.31 ***	−1.68 ***	−0.02	0.75 ***			−0.12	0.27
	(8.95)	(−5.01)	(−0.10)	(3.19)			(−0.48)	
(4a)	2.41 ***	−1.82 ***	−0.01	0.74 ***	−0.39		−0.11	0.28
	(9.24)	(−5.40)	(−0.03)	(3.14)	(−1.20)		(−0.47)	
(5a)	2.40 ***	−1.82 ***	−0.00	0.74 ***	−0.38	−0.62	−0.12	0.28
	(9.36)	(−5.43)	(−0.03)	(3.13)	(−1.18)	(−1.42)	(−0.47)	

Panel F: Individual Stocks (all 23,634 firms)

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
Using ALL Returns								
(1)	0.37 ***	0.47 **					0.11	0.054
	(3.11)	(2.06)					(0.63)	
(2)	0.35 ***	0.43 *	0.17	−0.17				0.066
	(3.35)	(1.92)	(0.96)	(−1.08)				
(3)	0.38 ***	0.43 *	0.17	−0.19			0.13	0.081
	(3.83)	(1.89)	(1.02)	(−1.22)			(0.75)	
(4)	0.37 ***	0.45 **	0.18	−0.18	0.36 *		0.14	0.090
	(3.85)	(2.00)	(1.10)	(−1.17)	(1.66)		(0.83)	
(5)	0.41 ***	0.41 *	0.18	−0.17	0.36 *	0.03	0.14	0.099
	(4.43)	(1.86)	(1.08)	(−1.10)	(1.66)	(0.12)	(0.82)	
Excluding Low-Priced Returns								
(1a)	0.52 ***	0.50 **					0.31 *	0.07
	(4.62)	(2.20)					(1.89)	
(2a)	0.55 ***	0.45 **	0.31 *	−0.29 *				0.08

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Panel F: Individual Stocks (all 23,634 firms)

Model	$\bar{\gamma}_0$ Intercept	$\bar{\gamma}_1$ (β_{MKT})	$\bar{\gamma}_2$ (β_{SMB})	$\bar{\gamma}_3$ (β_{HML})	$\bar{\gamma}_4$ (β_{MNT})	$\bar{\gamma}_5$ (β_{LIQ})	$\bar{\gamma}_6$ (β_{PMG})	Adj. R^2
	(6.62)	(1.99)	(1.88)	(−1.84)				
(3a)	0.56 ***	0.43 *	0.30 *	−0.28 *			0.33 *	0.10
	(7.02)	(1.91)	(1.81)	(−1.78)			(1.91)	
(4a)	0.56 ***	0.46 **	0.30 *	−0.25	0.46 **		0.33 *	0.12
	(7.25)	(2.05)	(1.84)	(−1.63)	(2.15)		(1.95)	
(5a)	0.57 ***	0.44 *	0.30 *	−0.23	0.46 **	0.09	0.34 **	0.12
	(7.74)	(1.96)	(1.87)	(−1.51)	(2.16)	(0.36)	(1.98)	

*, **, *** Indicate statistical significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

The month-by-month cross-sectional regression (CSR) models are estimated using Fama and MacBeth's (1973) two-pass methodology and using portfolios. We construct the test portfolios as in CGV. That is, in order to construct the test portfolios, individual stocks are assigned into one of the portfolios according to the value of the sorting variable (size, book-to-market, and AQ) at the end of the previous month. For the two-way (size and book-to-market 5 × 5 portfolios) or three-way (size, book-to-market and AQ 4 × 4 × 4 portfolios) sorting, we first determine the break-points and assign firms independently into one of the portfolios. The whole-period betas are estimated from the first-stage multiple time-series regression model using the whole period return observations (January 1970 through December 2006). The risk factors are constructed using all returns, not excluding low-priced returns. The time-series averages ($\bar{\gamma}_k$) of the CSR coefficient (γ ' s) estimates from January 1970 through December 2006 are reported as the corresponding risk premium estimates. Numbers in parentheses indicate t-statistics. Adj. R^2 is the average (adjusted) R^2 of the month-by-month CSRs.

Variable Definitions

MKT = CRSP value-weighted market returns;
SMB and *HML* = Fama and French's (1993) which are related to firm size and book-to-market, respectively;
PMG = risk factor related to accruals quality;
MNT = risk factor related to stock price momentum; and
LIQ = Pastor and Stambaugh's (2003) liquidity risk factor.

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