

# Reference-dependent preferences and the risk-return trade-off: Internet appendix

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# Internet Appendix: Tables for additional robustness checks

**Table A1**

Equal-weighted returns of single-sorted portfolios by risk proxies.

This table reports the time-series averages of the monthly equal-weighted excess returns for portfolios sorted by our risk proxies, the difference in the excess returns between the high and low portfolios, the intercepts of the capital asset pricing model (CAPM) regression  $[R_{i,t} - R_{ft} = \alpha + b_{i,M}(R_{M,t} - R_{ft}) + \varepsilon_{i,t}]$ , the intercepts of the Fama-French three-factor regression  $[R_{i,t} - R_{ft} = \alpha + b_{i,M}(R_{M,t} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{i,t}]$ , and the  $t$ -statistics of the differences. We consider six proxies:  $\beta$  is the coefficient of the monthly CAPM regression  $[R_{i,t} - R_{ft} = \alpha + \beta_{i,M}(R_{M,t} - R_{ft}) + \varepsilon_{i,t}]$  in the past five years with a minimum of two years of data. Stock volatility (RETVOL) is the standard deviation of monthly returns over the past five years with a minimum of two years of data. Idiosyncratic volatility (IVOL) is the standard deviation of the residuals from the Fama-French three-factor model using daily excess returns in the past month. Cash flow volatility (CFVOL) is the standard deviation of cash flow from operations in the past five years. Age (AGE) is the number of years since the firm was first covered by the Center for Research in Security Prices (CRSP). Analyst forecast dispersion (DISPER) is the standard deviation of analyst forecasts of one-year earnings from the Institutional Brokers' Estimate System (I/B/E/S) scaled by the prior year-end stock price to mitigate heteroskedasticity. At the beginning of each month, we sort NYSE, Amex, and Nasdaq ordinary stocks with stock prices of at least \$5 and non-negative book value of equity into five groups based on the quintile of the ranked values of each proxy. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. The excess returns are in percentages. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	Proxy					
	$\beta$	RETVOL	IVOL	CFVOL	1/AGE	DISPER
P1	0.693	0.710	0.713	0.790	0.719	0.825
P2	0.787	0.774	0.869	0.833	0.827	0.824
P3	0.844	0.844	0.958	0.858	0.763	0.769
P4	0.779	0.859	0.831	0.849	0.755	0.768
P5	0.662	0.577	0.197	0.685	0.554	0.625
P5 - P1	-0.031	-0.133	-0.516	-0.105	-0.165	-0.200
$t$ -stat	(-0.13)	(-0.46)	(-2.26)	(-0.73)	(-1.06)	(-1.24)
CAPM- $\alpha$	-0.479	-0.577	-0.838	-0.284	-0.298	-0.329
$t$ -stat	(-2.20)	(-2.31)	(-4.22)	(-2.24)	(-2.07)	(-2.10)
FF3- $\alpha$	-0.370	-0.481	-0.770	-0.229	-0.173	-0.602
$t$ -stat	(-2.50)	(-3.06)	(-6.22)	(-2.83)	(-2.27)	(-4.89)

**Table A2**

Fama-MacBeth regressions controlling for price delay.

Each month, we run a cross-sectional regression of returns on lagged variables. This table reports the time-series average of the regression coefficients. Price delay is calculated based on Hou and Moskowitz (2005), and other variables are defined as in Tables ?? and ?. The coefficients are reported in percentages. We use the all common stocks in NYSE, Amex, and Nasdaq with a price of at least \$5 and non-negative book equity to perform the cross-sectional regression. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. Independent variables are winsorized at 1% and 99%. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses. The intercept of the regression is not reported.

Variable	$\beta$	RETVOL	IVOL	CFVOL	1/AGE	DISPER
CGO	0.501 (1.89)	-0.441 (-1.45)	-0.577 (-2.34)	0.497 (2.19)	0.389 (1.92)	0.138 (0.46)
PROXY	0.188 (1.89)	0.666 (0.44)	-16.150 (-4.98)	-0.980 (-1.68)	-0.388 (-1.32)	-5.564 (-1.20)
PROXY $\times$ CGO	0.488 (3.23)	13.111 (6.09)	63.148 (7.54)	6.904 (4.49)	6.872 (6.03)	66.276 (4.23)
DELAY $\times$ CGO	19.085 (1.79)	4.256 (0.35)	4.427 (0.37)	20.043 (1.36)	19.059 (1.80)	161.135 (3.25)
DELAY	-1.941 (-0.56)	-3.618 (-1.03)	-2.975 (-0.87)	4.091 (0.79)	-3.193 (-0.92)	-20.988 (-1.62)
LOGBM	0.141 (2.19)	0.110 (1.80)	0.083 (1.20)	0.069 (1.05)	0.115 (1.69)	0.078 (0.83)
LOGME	-0.081 (-2.27)	-0.080 (-2.49)	-0.108 (-2.96)	-0.088 (-2.5)	-0.086 (-2.39)	-0.113 (-2.78)
MOM(-1,0)	-5.650 (-11.55)	-5.609 (-11.58)	-4.965 (-10.68)	-5.218 (-10.42)	-5.244 (-10.96)	-4.223 (-8.05)
MOM(-12,-1)	0.432 (2.85)	0.336 (2.07)	0.523 (3.20)	0.315 (1.79)	0.414 (2.49)	0.393 (1.99)
MOM(-36,-12)	-0.155 (-3.05)	-0.180 (-3.36)	-0.137 (-2.50)	-0.182 (-3.16)	-0.174 (-3.20)	-0.113 (-1.82)
TURNOVER	-2.985 (-2.29)	-2.713 (-2.31)	-1.382 (-0.91)	-1.743 (-0.97)	-2.145 (-1.33)	-1.628 (-1.63)

**Table A3**

Fama-MacBeth regressions controlling for illiquidity.

Each month, we run a cross-sectional regression of returns on lagged variables. This table reports the time-series average of the regression coefficients. ILLIQ is illiquidity calculated based on Amihud (2002), and other variables are defined as in Tables ?? and ?. The coefficients are reported in percentages. We use the all common stocks in NYSE, Amex, and Nasdaq with a price of at least \$5 and non-negative book equity to perform the cross-sectional regression. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. Independent variables are winsorized at 1% and 99%. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses. The intercept of the regression is not reported.

Variable	$\beta$	RETVOL	IVOL	CFVOL	1/AGE	DISPER
CGO	0.469 (1.77)	-0.453 (-1.47)	-0.613 (-2.46)	0.509 (2.15)	0.407 (1.96)	0.424 (1.64)
PROXY	0.177 (1.75)	0.468 (0.31)	-20.818 (-6.12)	-0.971 (-1.70)	-0.472 (-1.62)	-5.466 (-1.15)
PROXY $\times$ CGO	0.521 (3.36)	13.304 (6.06)	66.969 (8.14)	7.307 (4.55)	7.314 (6.02)	68.484 (4.35)
ILLIQ $\times$ CGO	0.147 (2.23)	0.038 (0.54)	-0.012 (-0.17)	0.089 (0.49)	0.091 (1.31)	0.625 (1.56)
ILLIQ	0.021 (0.70)	0.020 (0.68)	0.053 (1.67)	0.061 (1.24)	0.027 (0.87)	0.089 (0.50)
LOGBM	0.147 (2.17)	0.112 (1.74)	0.081 (1.12)	0.073 (1.09)	0.124 (1.75)	0.078 (0.82)
LOGME	-0.086 (-2.49)	-0.090 (-2.80)	-0.117 (-3.37)	-0.101 (-2.91)	-0.091 (-2.63)	-0.088 (-2.26)
MOM(-1,0)	-5.596 (-11.29)	-5.537 (-11.28)	-4.890 (-10.45)	-5.294 (-10.38)	-5.226 (-10.76)	-4.220 (-8.04)
MOM(-12,-1)	0.458 (3.10)	0.371 (2.32)	0.536 (3.32)	0.319 (1.83)	0.430 (2.64)	0.403 (2.03)
MOM(-36,-12)	-0.139 (-2.67)	-0.166 (-3.06)	-0.124 (-2.24)	-0.170 (-2.96)	-0.157 (-2.88)	-0.108 (-1.76)
TURNOVER	-3.304 (-2.43)	-3.143 (-2.55)	-1.265 (-0.79)	-2.153 (-1.14)	-2.464 (-1.49)	-1.488 (-1.50)

**Table A4**

Double-sorted portfolio returns of NYSE and Amex stocks.

At the beginning of each month, we divide all firms into five groups based on lagged capital gains overhang (CGO); then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. Only NYSE and Amex common stocks with a price of at least \$5 and non-negative book equity are used in the double-sorting procedure. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	Proxy = $\beta$				Proxy = RETVOL			
P1	0.521	0.472	0.539		0.601	0.483	0.540	
P3	0.554	0.477	0.736		0.294	0.435	0.798	
P5	0.160	0.402	0.874		-0.110	0.467	1.092	
P5 - P1	-0.361	-0.070	0.335	0.696	-0.711	-0.017	0.552	1.263
$t$ -stat	(-1.20)	(-0.29)	(1.64)	(2.95)	(-2.24)	(-0.06)	(2.38)	(4.27)
FF3- $\alpha$	-0.694	-0.467	0.099	0.793	-1.046	-0.471	0.178	1.224
$t$ -stat	(-2.81)	(-2.46)	(0.66)	(3.35)	(-4.15)	(-2.30)	(0.94)	(4.08)
	Proxy = IVOL				Proxy = CFVOL			
P1	0.817	0.478	0.635		0.586	0.586	0.601	
P3	0.551	0.487	0.729		0.703	0.478	0.631	
P5	-0.578	0.417	0.893		0.278	0.405	0.833	
P5 - P1	-1.394	-0.061	0.258	1.653	-0.308	-0.180	0.233	0.540
$t$ -stat	(-4.59)	(-0.26)	(1.34)	(5.78)	(-1.33)	(-0.94)	(1.28)	(2.09)
FF3- $\alpha$	-1.711	-0.377	-0.012	1.699	-0.424	-0.279	0.064	0.488
$t$ -stat	(-6.72)	(-2.30)	(-0.07)	(5.99)	(-1.92)	(-1.57)	(0.36)	(1.81)
	Proxy = 1/AGE				Proxy = DISPER			
P1	0.479	0.451	0.597		0.698	0.553	0.772	
P3	0.373	0.414	0.685		0.659	0.667	0.818	
P5	0.124	0.510	1.071		-0.165	0.663	0.952	
P5 - P1	-0.355	0.058	0.474	0.829	-0.864	0.110	0.181	1.044
$t$ -stat	(-1.56)	(0.41)	(3.21)	(3.65)	(-2.24)	(0.49)	(0.78)	(2.78)
FF3- $\alpha$	-0.450	-0.107	0.337	0.787	-1.585	-0.298	-0.234	1.352
$t$ -stat	(-2.53)	(-0.82)	(2.47)	(3.84)	(-4.57)	(-1.35)	(-1.15)	(3.46)

**Table A5**

Double-sorted portfolio returns of top 90% liquid stocks.

At the beginning of each month, we divide all firms in NYSE, Amex, and Nasdaq into five groups based on lagged capital gains overhang (CGO); then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. Only the top 90% liquid [using the Amihud (2002) illiquidity measure] common stocks in NYSE, Amex, and Nasdaq with a price of at least \$5 and non-negative book equity are used in the double-sorting procedure. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	Proxy = $\beta$				Proxy = RETVOL			
P1	0.453	0.451	0.578		0.584	0.438	0.570	
P3	0.315	0.583	0.766		0.386	0.498	0.792	
P5	-0.112	0.362	0.900		-0.397	0.411	1.151	
P5 - P1	-0.565	-0.089	0.322	0.887	-0.981	-0.027	0.581	1.562
$t$ -stat	(-1.65)	(-0.31)	(1.35)	(3.17)	(-2.75)	(-0.09)	(2.15)	(4.06)
FF3- $\alpha$	-0.815	-0.364	0.138	0.953	-1.172	-0.326	0.349	1.522
$t$ -stat	(-3.05)	(-1.82)	(0.81)	(3.39)	(-4.04)	(-1.42)	(1.50)	(3.69)
	Proxy = IVOL				Proxy = CFVOL			
P1	0.834	0.409	0.652		0.688	0.601	0.658	
P3	0.173	0.415	0.790		0.511	0.432	0.759	
P5	-0.987	0.132	0.917		0.305	0.280	0.931	
P5 - P1	-1.821	-0.278	0.265	2.086	-0.383	-0.320	0.274	0.657
$t$ -stat	(-6.25)	(-1.16)	(1.25)	(7.82)	(-1.58)	(-1.57)	(1.97)	(2.71)
FF3- $\alpha$	-2.062	-0.517	0.093	2.155	-0.411	-0.356	0.193	0.604
$t$ -stat	(-8.63)	(-2.90)	(0.48)	(7.68)	(-1.77)	(-2.41)	(1.63)	(2.32)
	Proxy = 1/AGE				Proxy = DISPER			
P1	0.478	0.447	0.552		0.551	0.529	0.916	
P3	0.150	0.368	0.865		0.581	0.723	0.871	
P5	-0.102	0.530	1.019		-0.275	0.695	1.057	
P5 - P1	-0.580	0.083	0.468	1.048	-0.826	0.167	0.141	0.967
$t$ -stat	(-2.51)	(0.54)	(2.68)	(4.32)	(-2.28)	(0.67)	(0.61)	(2.76)
FF3- $\alpha$	-0.608	-0.012	0.363	0.971	-1.367	-0.305	-0.247	1.120
$t$ -stat	(-3.18)	(-0.09)	(2.28)	(3.82)	(-4.04)	(-1.39)	(-1.14)	(2.84)

**Table A6**

Double-sorted portfolio returns of largest one thousand stocks.

At the beginning of each month, we divide all firms into five groups based on lagged capital gains overhang (CGO); then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. Only the one thousand largest common stocks in NYSE, Amex, and Nasdaq with a price of at least \$5 and non-negative book equity are used in the double-sorting procedure. The sample period is from January 1964 to December 2014, except for DISPER, which is from January 1976 to December 2014. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	Proxy = $\beta$				Proxy = RETVOL			
P1	0.619	0.417	0.496		0.620	0.406	0.563	
P3	0.451	0.410	0.736		0.454	0.403	0.702	
P5	0.072	0.430	0.895		0.135	0.667	1.229	
P5 - P1	-0.547	0.013	0.399	0.946	-0.484	0.261	0.666	1.150
$t$ -stat	(-1.73)	(0.05)	(1.64)	(3.90)	(-1.32)	(0.84)	(2.51)	(4.21)
FF3- $\alpha$	-0.746	-0.237	0.246	0.992	-0.735	0.026	0.480	1.215
$t$ -stat	(-3.08)	(-1.13)	(1.45)	(4.05)	(-2.86)	(0.10)	(2.20)	(4.47)
	Proxy = IVOL				Proxy = CFVOL			
P1	0.822	0.351	0.616		0.571	0.629	0.614	
P3	0.330	0.464	0.717		0.506	0.467	0.744	
P5	-0.432	0.274	0.847		0.329	0.357	0.896	
P5 - P1	-1.254	-0.077	0.231	1.485	-0.242	-0.273	0.283	0.525
$t$ -stat	(-3.40)	(-0.34)	(1.15)	(5.03)	(-1.11)	(-1.33)	(1.97)	(2.57)
FF3- $\alpha$	-1.516	-0.262	0.106	1.622	-0.272	-0.282	0.187	0.459
$t$ -stat	(-5.11)	(-1.44)	(0.60)	(5.63)	(-1.47)	(-1.86)	(1.39)	(2.11)
	Proxy = 1/AGE				Proxy = DISPER			
P1	0.453	0.426	0.554		0.690	0.596	0.934	
P3	0.538	0.378	0.730		0.499	0.624	0.706	
P5	0.045	0.526	1.011		0.014	0.627	0.980	
P5 - P1	-0.408	0.100	0.457	0.865	-0.676	0.030	0.046	0.722
$t$ -stat	(-1.67)	(0.60)	(2.90)	(3.74)	(-2.45)	(0.16)	(0.20)	(2.24)
FF3- $\alpha$	-0.465	0.032	0.407	0.872	-1.270	-0.325	-0.343	0.927
$t$ -stat	(-2.36)	(0.20)	(3.07)	(3.75)	(-5.02)	(-1.78)	(-1.52)	(2.74)

**Table A7**

Double-sorted portfolio returns: subperiod analysis.

At the beginning of each month, we divide all NYSE, Amex, and Nasdaq common stocks with a price of at least \$5 and non-negative book equity into five groups based on lagged capital gains overhang (CGO); then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month, and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses. We perform the double-sorting analysis for two subperiods, January 1964–June 1989 and July 1989–December 2014, for all risk proxies except for DISP, for which the two subperiods are January 1976–June 1995 and July 1995–December 2014.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	January 1964–June 1989				July 1989–December 2014			
	Proxy = $\beta$							
P1	0.605	0.370	0.539		0.587	0.617	0.551	
P3	0.195	0.297	0.644		0.814	0.776	0.918	
P5	-0.049	0.270	0.779		-0.044	0.486	0.991	
P5 - P1	-0.654	-0.101	0.240	0.894	-0.631	-0.131	0.441	1.071
$t$ -stat	(-1.86)	(-0.32)	(0.93)	(2.83)	(-1.11)	(-0.29)	(1.10)	(2.68)
FF3- $\alpha$	-0.844	-0.323	0.133	0.978	-1.138	-0.596	0.075	1.213
$t$ -stat	(-3.34)	(-1.23)	(0.62)	(3.06)	(-2.60)	(-1.97)	(0.27)	(3.06)
	Proxy = RETVOL							
P1	0.464	0.347	0.541		0.895	0.613	0.626	
P3	0.357	0.278	0.698		0.500	0.784	0.922	
P5	-0.452	0.228	1.175		-0.314	0.605	1.193	
P5 - P1	-0.916	-0.118	0.634	1.551	-1.208	-0.008	0.567	1.775
$t$ -stat	(-2.12)	(-0.31)	(2.01)	(3.95)	(-1.98)	(-0.02)	(1.26)	(2.86)
FF3- $\alpha$	-1.115	-0.501	0.290	1.405	-1.533	-0.479	0.265	1.798
$t$ -stat	(-3.46)	(-1.87)	(1.33)	(3.73)	(-3.12)	(-1.57)	(0.73)	(2.83)
	Proxy = IVOL							
P1	0.630	0.208	0.522		1.121	0.746	0.817	
P3	0.287	0.384	0.856		0.180	0.600	0.738	
P5	-0.802	0.039	0.860		-1.298	0.104	1.119	
P5 - P1	-1.432	-0.169	0.338	1.770	-2.419	-0.642	0.302	2.721
$t$ -stat	(-4.49)	(-0.51)	(1.41)	(6.01)	(-4.50)	(-1.79)	(0.92)	(5.91)
FF3- $\alpha$	-1.644	-0.426	-0.023	1.622	-2.660	-1.004	0.147	2.807
$t$ -stat	(-6.90)	(-1.72)	(-0.10)	(5.26)	(-6.19)	(-4.49)	(0.61)	(6.59)



	January 1964-June 1989				July 1989-December 2014			
	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
Proxy = CFVOL								
P1	0.539	0.340	0.635		0.945	0.857	0.762	
P3	0.373	0.471	0.555		0.598	0.352	1.132	
P5	0.098	0.274	0.869		0.449	0.339	1.003	
P5 - P1	-0.441	-0.066	0.234	0.675	-0.496	-0.518	0.241	0.737
<i>t</i> -stat	(-1.43)	(-0.22)	(1.29)	(2.21)	(-1.28)	(-1.78)	(1.11)	(2.02)
FF3- $\alpha$	-0.459	-0.081	0.134	0.593	-0.613	-0.677	0.100	0.713
<i>t</i> -stat	(-1.77)	(-0.43)	(0.74)	(1.90)	(-1.73)	(-3.40)	(0.62)	(1.94)
Proxy = 1/AGE								
P1	0.391	0.286	0.541		0.531	0.669	0.589	
P3	0.154	0.284	0.612		0.244	0.649	1.214	
P5	0.056	0.394	1.002		-0.066	0.657	1.190	
P5 - P1	-0.335	0.108	0.461	0.796	-0.597	-0.012	0.601	1.198
<i>t</i> -stat	(-1.13)	(0.54)	(2.41)	(2.89)	(-1.69)	(-0.05)	(2.45)	(3.01)
FF3- $\alpha$	-0.298	0.003	0.303	0.601	-0.678	-0.176	0.464	1.142
<i>t</i> -stat	(-1.33)	(0.02)	(1.86)	(2.24)	(-2.05)	(-1.08)	(1.95)	(2.54)
Proxy = DISPER								
	January 1976-June 1995				July 1995-December 2014			
	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
P1	0.487	0.584	0.967		0.713	0.502	0.894	
P3	0.553	0.563	0.794		0.362	0.849	0.864	
P5	0.095	0.720	1.042		-0.787	0.805	1.010	
P5 - P1	-0.393	0.136	0.075	0.467	-1.500	0.302	0.116	1.616
<i>t</i> -stat	(-1.22)	(0.46)	(0.23)	(1.65)	(-2.45)	(0.79)	(0.35)	(2.83)
FF3- $\alpha$	-1.062	-0.451	-0.354	0.709	-1.949	-0.047	-0.235	1.714
<i>t</i> -stat	(-4.24)	(-1.65)	(-1.35)	(2.29)	(-3.39)	(-0.14)	(-0.73)	(2.68)

**Table A8**

Double-sorted portfolio returns based on stocks within bottom 50% of institution holding stocks.

At the beginning of each month, we divide all firms into five groups based on lagged capital gains overhang (CGO); then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month, and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. Only stocks within the bottom 50% of institutional holdings are used in the double-sorting procedure. Data on institutional holdings are obtained from Thomson Reuters. The sample period is from January 1980 to October 2014. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	Proxy = $\beta$				Proxy = RETVOL			
P1	0.441	0.574	0.754		0.461	0.947	0.812	
P3	0.282	0.882	1.099		0.137	0.642	1.335	
P5	-0.540	0.558	1.218		-0.844	0.110	1.034	
P5 - P1	-0.981	-0.016	0.464	1.445	-1.306	-0.837	0.222	1.527
$t$ -stat	(-1.85)	(-0.04)	(1.44)	(3.11)	(-2.50)	(-1.69)	(0.57)	(2.84)
FF3- $\alpha$	-1.300	-0.336	0.119	1.419	-1.656	-1.303	-0.133	1.523
$t$ -stat	(-3.04)	(-1.02)	(0.50)	(3.05)	(-4.00)	(-3.33)	(-0.41)	(2.79)
	Proxy = IVOL				Proxy = CFVOL			
P1	0.647	0.924	1.082		0.942	0.781	0.705	
P3	0.044	0.234	1.050		0.320	1.110	1.509	
P5	-1.894	-0.160	1.211		0.024	-0.166	1.022	
P5 - P1	-2.542	-1.084	0.129	2.671	-0.918	-0.947	0.317	1.235
$t$ -stat	(-5.97)	(-2.63)	(0.30)	(6.33)	(-1.92)	(-2.23)	(0.83)	(2.47)
FF3- $\alpha$	-2.457	-1.396	-0.082	2.375	-0.991	-1.249	0.144	1.135
$t$ -stat	(-6.90)	(-3.77)	(-0.23)	(5.56)	(-2.25)	(-3.56)	(0.38)	(2.02)
	Proxy = 1/AGE				Proxy = DISPER			
P1	0.268	0.755	0.665		0.354	0.927	0.839	
P3	0.168	0.426	1.356		0.532	0.634	1.065	
P5	-0.220	0.510	1.220		-0.506	0.742	1.637	
P5 - P1	-0.487	-0.245	0.556	1.043	-0.860	-0.184	0.799	1.659
$t$ -stat	(-1.36)	(-0.60)	(1.76)	(2.49)	(-1.93)	(-0.41)	(2.00)	(3.17)
FF3- $\alpha$	-0.331	-0.218	0.381	0.711	-1.130	-0.758	0.519	1.649
$t$ -stat	(-1.01)	(-0.66)	(1.12)	(1.74)	(-2.20)	(-1.79)	(1.25)	(2.66)

**Table A9**

Double-sorted portfolio returns based on stocks within top 50% of institution holding stocks.

At the beginning of each month, we divide all firms into five groups based on lagged CGO; then within each of the CGO groups, firms are further divided into five portfolios based on lagged risk proxies. CGO and risk proxies are defined as in Tables ?? and ?. The portfolio is then held for one month and value-weighted excess returns are calculated. Monthly excess returns are reported in percentages. Only stocks within the top 50% of institutional holdings are used in the double-sorting procedure. Data on institutional holdings are obtained from Thomson Reuters. The sample period is from January 1980 to October 2014. The  $t$ -statistics are calculated based on Newey and West (1987) adjusted standard errors and reported in parentheses.

Portfolio	CGO1	CGO3	CGO5	Diff-in-Diff	CGO1	CGO3	CGO5	Diff-in-Diff
	Proxy = $\beta$				Proxy = RETVOL			
P1	0.598	0.765	0.648		0.982	0.721	0.658	
P3	0.892	0.840	0.820		0.474	0.543	1.046	
P5	0.417	0.595	1.061		0.046	0.569	1.395	
P5 - P1	-0.181	-0.170	0.412	0.594	-0.936	-0.152	0.737	1.673
$t$ -stat	(-0.46)	(-0.51)	(1.38)	(1.87)	(-2.67)	(-0.47)	(2.03)	(4.87)
FF3- $\alpha$	-0.444	-0.561	0.106	0.550	-1.109	-0.468	0.537	1.646
$t$ -stat	(-1.33)	(-2.31)	(0.43)	(1.67)	(-4.23)	(-1.97)	(1.82)	(4.48)
	Proxy = IVOL				Proxy = CFVOL			
P1	1.085	0.725	0.731		0.936	0.785	0.771	
P3	0.785	0.614	0.854		0.544	0.431	1.009	
P5	-0.463	0.356	1.150		0.813	0.692	1.080	
P5 - P1	-1.548	-0.369	0.419	1.967	-0.123	-0.093	0.309	0.432
$t$ -stat	(-4.53)	(-1.33)	(1.30)	(5.47)	(-0.43)	(-0.43)	(1.59)	(1.38)
FF3- $\alpha$	-1.812	-0.589	0.391	2.203	-0.131	-0.036	0.288	0.418
$t$ -stat	(-6.59)	(-2.54)	(1.42)	(6.32)	(-0.47)	(-0.18)	(1.72)	(1.24)
	Proxy = 1/AGE				Proxy = DISPER			
P1	0.797	0.766	0.646		0.434	0.651	0.943	
P3	0.498	0.598	1.035		0.863	0.668	0.832	
P5	0.207	0.618	1.159		0.339	0.656	1.057	
P5 - P1	-0.590	-0.148	0.514	1.104	-0.095	0.005	0.114	0.209
$t$ -stat	(-2.19)	(-0.93)	(2.50)	(4.31)	(-0.22)	(0.02)	(0.42)	(0.50)
FF3- $\alpha$	-0.721	-0.272	0.468	1.189	-0.548	-0.345	-0.228	0.320
$t$ -stat	(-2.86)	(-1.52)	(2.75)	(4.29)	(-1.51)	(-1.64)	(-0.87)	(0.72)