

# ONLINE APPENDIX

## Real Asset Illiquidity and the Cost of Capital

Hernán Ortiz-Molina and Gordon M. Phillips

This appendix reports additional tests which are briefly discussed but not reported in the paper.

The content is summarized below and the tables follow.

**Table A1:** Regressions of the *ICC* on real asset illiquidity, excluding observations with *ICC* below the risk-free rate

**Table A2:** Regressions of the *FFCC* on real asset illiquidity, excluding observations with *FFCC* below the risk-free rate

**Table A3:** Regressions of the *ICC* on real asset illiquidity, controlling for firm-level measures of stock liquidity and systematic liquidity risk

**Table A4:** Regressions of the *ICC* on real asset illiquidity, controlling for industry-level measures of stock liquidity and systematic liquidity risk

**Table A5:** Regressions of the *ICC* on real asset illiquidity, controlling for industry valuation

**Table A6:** Regressions of the unlevered *ICC* on real asset illiquidity

**Table A7:** Industry-level regressions of the *ICC* on real asset illiquidity

**Table A8:** Regressions of Log book-to-market equity on real asset illiquidity

**Table A9:** Regressions of the *ICC* on segment-weighted real asset illiquidity

**Table A1**  
**Real Asset Illiquidity and the Implied Cost of Capital:**  
**Multivariate Analysis Excluding Observations with *ICC* Below the Risk-Free Rate**

The table reports the results from regressions of the implied cost of capital (*ICC*) on the three alternative measures of real asset illiquidity (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*) and a set of control variables (*LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FA/TA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*) defined in Table 1. All observations for which the *ICC* is below the 10-year Treasury Bill rate are excluded from the sample. In columns (1), (3), and (5) we report Fama-MacBeth regressions with *t*-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2), (4), and (6) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. The estimates of the intercept, the year fixed effects, and the industry fixed effects are omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
MNoPotBuy	0.006*** (3.51)	0.006*** (3.15)				
NLPotBuy			0.005*** (3.68)	0.003* (1.68)		
MTotM&A					0.004** (2.45)	0.003*** (3.64)
Observations	25200	25200	25898	25898	25898	25898
R-squared		0.50		0.50		0.51
<b>Empirical Model</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes	No	Yes

**Table A2**  
**Real Asset Illiquidity and the Fama-French Cost of Capital:**  
**Multivariate Analysis Excluding Observations with *FFCC* Below the Risk-Free Rate**

The table reports the results from regressions of the Fama-French Three-Factor Model cost of capital (*FFCC*) on the three alternative measures of real asset illiquidity (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*) and a set of control variables (*LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FA/TA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*) defined in Table 1. All observations for which the *FFCC* is below the 10-year Treasury Bill rate are excluded from the sample. In columns (1), (3), and (5) we report Fama-MacBeth regressions with t-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2), (4), and (6) we report an OLS purely cross-sectional regression using the time-series averages of the variables over the sample period for each firm, with standard errors clustered by three-digit SIC industry. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FA/TA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
MNoPotBuy	0.002* (2.01)	0.003* (1.67)				
NLPotBuy			0.002*** (5.31)	0.003** (2.58)		
MTotM&A					0.001 (0.84)	0.004*** (3.36)
Observations	60905	9232	62517	9402	62517	9402
R-squared		0.10		0.10		0.11
<b>Empirical Model</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	Fama-MacBeth	Cross-Sectional	Fama-MacBeth	Cross-Sectional	Fama-MacBeth	Cross-Sectional
Newey-West 6 lags	Yes	No	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes	No	Yes

**Table A3**  
**Real Asset Illiquidity and the Implied Cost of Capital:**  
**Controlling for the Liquidity and Systematic Liquidity Risk of Firms' Stock**

The table reports the results from regressions of the implied cost of capital (*ICC*) on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*), a measure of a stock's market-wide liquidity risk (*PSLiqBeta*), a measure of a stock's illiquidity (*AmihudIll*), and a set of control variables. In columns (1) and (3) we report Fama-MacBeth regressions with t-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2) and (4) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. *PSLiqBeta* is the sensitivity of a firm's stock return to the Pástor and Stambaugh (2003) liquidity factor; and *AmihudIll* is the Amihud (2002) measure of a firm's stock illiquidity. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FATA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetPI2M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are also omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
<b>Panel A: The measure of real asset illiquidity is MNoPotBuy</b>				
MNoPotBuy	0.014*** (3.64)	0.014*** (2.80)	0.014*** (3.52)	0.014*** (2.86)
PSLiqBeta×100	0.173 (1.65)	0.050 (0.65)		
AmihudIll			0.003** (2.71)	0.005*** (2.63)
<b>Panel B: The measure of real asset illiquidity is NLPotBuy</b>				
NLPotBuy	0.015*** (7.11)	0.012*** (6.21)	0.014*** (6.84)	0.011*** (6.33)
PSLiqBeta×100	0.186 (0.93)	0.093 (1.47)		
AmihudIll			0.004*** (3.19)	0.005*** (2.72)
<b>Panel C: The measure of real asset illiquidity is MTotM&amp;A</b>				
MTotM&A	0.008** (2.34)	0.004** (2.40)	0.009** (2.40)	0.005** (2.53)
PSLiqBeta×100	0.137 (0.71)	0.054 (0.77)		
AmihudIll			0.004*** (2.87)	0.005*** (2.75)
<b>Empirical Model (All Panels)</b>				
All Control Variables	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes

**Table A4**  
**Real Asset Illiquidity and the Implied Cost of Capital:**  
**Controlling for the Liquidity and Systematic Liquidity Risk of Firms' Stock at the Industry Level**

The table reports the results from regressions of the implied cost of capital (*ICC*) on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*), a measure of the average market-wide liquidity risk of stocks in the industry (*IndPSLiqBeta*), a measure of the average liquidity of stocks in the industry (*IndAmihudIII*), and a set of control variables. In columns (1) and (3) we report Fama-MacBeth regressions with *t*-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2) and (4) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. *IndPSLiqBeta* is the value-weighted average sensitivity of stock returns to the Pástor and Stambaugh (2003) liquidity factor across all stocks in the three-digit SIC industry; and *IndAmihudIII* is the value-weighted average Amihud (2000) illiquidity across all stocks in the three-digit SIC industry. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FATA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are also omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
<b>Panel A: The measure of real asset illiquidity is MNoPotBuy</b>				
MNoPotBuy	0.014*** (3.37)	0.014*** (2.84)	0.013*** (3.31)	0.014*** (2.86)
IndPSLiqBeta×100	0.663 (0.91)	-0.028 (0.12)		
IndAmihudIII			0.030*** (3.29)	0.010 (1.13)
<b>Panel B: The measure of real asset illiquidity is NLPotBuy</b>				
NLPotBuy	0.014*** (6.86)	0.011*** (6.43)	0.014*** (7.17)	0.011*** (6.34)
IndPSLiqBeta×100	0.469 (0.78)	0.115 (0.64)		
IndAmihudIII			0.046*** (3.00)	0.002 (0.27)
<b>Panel C: The measure of real asset illiquidity is MTotM&amp;A</b>				
MTotM&A	0.008** (2.47)	0.005** (2.57)	0.008*** (2.33)	0.005** (2.52)
IndPSLiqBeta×100	0.249 (0.40)	-0.111 (0.48)		
IndAmihudIII			0.074*** (2.51)	0.002 (0.17)
<b>Empirical Model (All Panels)</b>				
All Control Variables	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes

**Table A5**  
**Real Asset Illiquidity and Implied Cost of Capital: Controlling for Industry Valuation**

The table reports the results from regressions of the implied cost of capital (*ICC*) on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*), measures of industry valuation (*LogIndMBE*) or misvaluation (*IndRelVal*), and a set of control variables. In columns (1) and (3) we report Fama-MacBeth regressions with *t*-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2) and (4) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. *LogIndMBE* is the logarithm of the mean market-to-book equity ratio in the firm's three-digit SIC industry and *IndRelVal* is the three-digit SIC industry's relative valuation, computed as the difference between the industry market-to-book equity ratio and its predicted value based on the benchmark Pástor and Veronesi (2003) specification. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FA/TA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetPI2M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are also omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
<b>Panel A: The measure of real asset illiquidity is MNoPotBuy</b>				
MNoPotBuy	0.012*** (3.31)	0.014*** (2.88)	0.014*** (3.09)	0.014*** (2.89)
LogIndMBE	-0.014*** (8.08)	0.003* (1.82)		
IndRelVal			0.004 (0.96)	-0.004 (1.29)
<b>Panel B: The measure of real asset illiquidity is NLPotBuy</b>				
NLPotBuy	0.012*** (6.95)	0.011*** (6.41)	0.015*** (8.06)	0.011*** (6.71)
LogIndMBE	-0.012*** (3.94)	0.004** (2.03)		
IndRelVal			0.005 (1.14)	-0.001 (0.33)
<b>Panel C: The measure of real asset illiquidity is MTotM&amp;A</b>				
MTotM&A	0.007* (1.90)	0.005** (2.52)	0.009** (2.34)	0.005** (2.53)
LogIndMBE	-0.016*** (4.32)	0.003 (1.64)		
IndRelVal			0.003 (0.48)	-0.003 (0.90)
<b>Empirical Model (All Panels)</b>				
All Control Variables	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes

**Table A6**  
**Real Asset Illiquidity and Unlevered Implied Cost of Capital**

The table reports the results from regressions of the *unlevered* implied cost of capital (*UNLICC*) on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*) and a set of control variables. In columns (1), (3), and (5) we report Fama-MacBeth regressions with *t*-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2), (4), and (6) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *ROE*, *VolRoe*, *FATA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are also omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
MNoPotBuy	0.012*** (3.38)	0.012** (2.43)				
NLPotBuy			0.012*** (6.47)	0.009*** (6.29)		
MTotM&A					0.008** (2.53)	0.004** (2.14)
Observations	32767	32767	33494	33494	33494	33494
R-squared		0.57		0.58		0.57
<b>Empirical Model</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No	Yes	No
Clustering by SIC3	No	Yes	No	Yes	No	Yes

**Table A7**  
**Real Asset Illiquidity and the Implied Cost of Capital: Industry Level Tests**

The table reports the results from industry-level regressions of the implied cost of capital (*ICC*) on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*,) and a set of control variables. For this purpose, all variables are converted into equal-weighted averages across all firms in the three-digit SIC industry. All regression models are estimated by weighted least squares (WLS), wherein the weight on each industry-year observation is the number of firms in the industry. In columns (1), (3), and (5) we report we report pooled (panel) OLS regressions with year fixed effects and standard errors clustered by three-digit SIC industry. In columns (2), (4), and (6) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FATA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
MNoPotBuy	0.011*** (3.61)	0.013*** (2.79)				
NLPotBuy			0.013*** (5.86)	0.012*** (7.42)		
MTotM&A					0.008*** (4.91)	0.004** (2.29)
Observations	4625	4625	4787	4787	4787	4787
R-squared	0.63	0.86	0.63	0.86	0.63	0.85
<b>Empirical Model</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
SIC3 Dummies	No	Yes	No	Yes	No	Yes
Estimation	WLS	WLS	WLS	WLS	WLS	WLS
Clustering by SIC3	Yes	Yes	Yes	Yes	Yes	Yes

**Table A8**  
**Effect of Real Asset Illiquidity on Equity Values**

The table reports the results from regressions of the logarithm of book-to-market equity ratio on the three alternative measures of real asset illiquidity defined in Table 1 (*MNoPotBuy*, *NLPotBuy*, and *MTotM&A*) and a set of control variables. The sample includes all firms for which we can compute the Fama-French cost of capital, but results are similar if we use the smaller samples of firms for which we can calculate the implied cost of capital. In columns (1), (3), and (5) we report Fama-MacBeth regressions with *t*-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2), (4), and (6) we report OLS purely cross-sectional regressions using the time-series averages of the variables over the sample period for each firm, with standard errors clustered by three-digit SIC industry. We also include but do not report the coefficients of the following control variables: *LogAssets*, *Blev*, *ROE*, *VolRoe*, *LogAge*, *DivPay*, and *SalGrow* (defined in Table 1) as well as *MShr*, defined as the firm's market share in the three-digit SIC industry, and *Rated*, which equals one if the firm has rated debt and zero otherwise. The estimates of the intercept, the year fixed effects, and the coefficients of the control variables are omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
MNoPotBuy	0.103*** (6.16)	0.146*** (3.28)				
NLPotBuy			0.195*** (14.36)	0.221*** (5.99)		
MTotM&A					0.108*** (6.55)	0.100*** (5.29)
Observations	73893	9930	76575	10180	76575	10180
<b>Empirical Model</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	Fama-MacBeth	Cross-Sectional	Fama-MacBeth	Cross-Sectional	Fama-MacBeth	Cross-Sectional
Clustering by SIC3	No	Yes	No	Yes	No	Yes
Newey-West 6 lags	Yes	No	Yes	No	Yes	No

**Table A9**  
**Real Asset Illiquidity and Implied Cost of Capital:**  
**Segment-Weighted Measures of Real Asset Illiquidity**

The table reports the results from regressions of the implied cost of capital (*ICC*) on three alternative measures of segment-weighted real asset illiquidity (*SWMNoPotBuy*, *SWNLPotBuy*, and *SWMTotM&A*) and a set of control variables. For multiple-segment firms, these real asset illiquidity measures calculated as the weighted-average real asset illiquidity of each of its three-digit SIC industry segments (measured by *MNoPotBuy*, *NLPotBuy*, and *MTotM&A*, respectively), with weights equal to the fraction of a firm's total assets accounted for by each segment's assets. In the case of *SWMNoPotBuy* and *SWNLPotBuy*, which depend on identifying a firm's industry rivals, we also consider all rivals, including the secondary segments of multiple-segment firms. For single-segment firms, these real asset illiquidity measures are equal to *MNoPotBuy*, *NLPotBuy*, and *MTotM&A* as defined in Table 1, respectively. In columns (1) and (3) we report Fama-MacBeth regressions with t-statistics adjusted for autocorrelation using the Newey-West procedure based on 6 lags. In columns (2) and (4) we report pooled (panel) OLS regressions with three-digit SIC industry fixed effects and year fixed effects, and standard errors clustered by three-digit SIC industry. We also include but do not report the coefficients of the following control variables defined in Table 1: *LogMCap*, *LogBM*, *DRP*, *Blev*, *ROE*, *VolRoe*, *FA/TA*, *R&DExp*, *LogAge*, *DivPay*, *SalGrow*, *LogInvPrice*, *RetPM*, and *RetP12M*. The estimates of the intercept, the year fixed effects, and the industry fixed effects are also omitted. The absolute values of the *t*-statistics are reported in parentheses below each estimate. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>SWMNoPotBuy</i>	0.020*** (5.53)	0.014*** (4.11)				
<i>SWNLPotBuy</i>			0.015*** (6.11)	0.012*** (7.26)		
<i>SWMTotM&amp;A</i>					0.009** (2.62)	0.006*** (2.98)
Observations	32767	32767	33494	33494	33494	33494
R-squared		0.56		0.57		0.56
<b>Empirical Model (All Panels)</b>						
All Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	No	Yes	No	Yes	No	Yes
SIC3 Dummies	No	Yes	No	Yes	No	Yes
Estimation	Fama-MacBeth	Panel	Fama-MacBeth	Panel	Fama-MacBeth	Panel
Newey-West 6 lags	Yes	No	Yes	No	Yes	No
Clustering by SIC3	Yes	Yes	Yes	Yes	Yes	Yes