More Extensive Interactive Tests on the Investment and Profitability Effects☆

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This version: November 2015

Not for quotation

Comments are welcome

☆All errors are ours.

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Abstract

We perform 364 finer and more appropriate tests to evaluate the *q*-theory with investment frictions versus the mispricing theory with limits to arbitrage in explaining the investment effect (324 tests) and/or the profitability effect (40 tests). Our improvements concurrently address the following. (1) The *q*-theory requires both effects to be examined simultaneously while the mispricing theory does not. (2) A comprehensive list of investment measures is used instead of a single measure. (3) An index of limits to arbitrage or investment frictions are used to involve equal number of interactions in the two dimensions for fair comparison. (4). More restrictive tests hinging on the contour of investment-return relation along low versus high investment sectors in the cross section are used to provide further test avenue. For the profitability effect, 81% of results support the *q*-theory but only 25% of results support the mispricing theory. Overall, for investment effect, 67% of results support the mispricing theory while 57% of results support the *q*-theory.

JEL Classification: G14, G31, G32, M41, M42

Keywords: Investment effect; Profitability effect; *q*-theory of investment; Investment frictions; Mispricing; Limits to arbitrage

1. Introduction

Cochrane (1991, 1996) proposes that corporate investment is an important predictor of subsequent stock returns via the *q*-theory of investment. When the discount rate or cost of capital of a firm is lower, the net present values of its marginal business projects are higher hence it decides to invest more and vice versa. The rational decision leads to a negative relation between real investment and future returns or the so called investment effect in the asset pricing literature. [1] More recently, Hou, Xue, and Zhang (2015) develop an equilibrium pricing model based on the *q*-theory to simultaneously predict a negative relation between investment and expected returns and a positive relation between expected profitability and expected returns. They show that a factor that longs low investment stocks and shorts high investment stocks and a factor that longs high profitability stocks (using profitability as a proxy for expected profitability) and shorts low profitability stocks both earn positive future average stock returns. These investment and profitability factors together with the conventional market and size factors capture many of the 35 significant anomalies among 80 anomalies they examine hence they suggest these anomalies are various manifestations of the investment and profitability effects.

Alternatively, behavioral theories might also explain the empirical relation between investment or profitability and subsequent average stock return. E.g., Cooper, Gulen, and Schill (2008) suggest that extrapolative investors overreact to corporate expansion hence overvalue high investment stocks. Such investors also overreact to business contraction hence undervalue low investment stocks. Separately, Wang and Yu (2013) suggest that conservative investors

[1] Papers have separately extended the *q*-theory explanation to various stock return anomalies, notably Xing (2008) on the book-to-market equity effect, Lyandres, Sun, and Zhang (2008) on the new issuance puzzle, Li, Livdan, and Zhang (2009) on the external financing effect, and Wu, Zhang, and Zhang (2010) on the accruals anomaly.

underreact to good profitability hence underprice high profitability stocks. Such investors also underreact to poor profitability hence overprice low profitability stocks.

Since both the rational and behavioral explanations share the same predictions on the relation between investment or profitability and future stock return, it is infeasible to distinguish the explanations from each other by empirically examining the unconditional relations. Therefore studies have turned to interactive tests or tests on conditional relations. Li and Zhang (2010) develop the *q*-theory with investment frictions and test whether the negative investment-return relation is stronger when investment frictions are more severe. As mispricing should be more evident when arbitrage is more restricted, Lipson, Mortal, and Schill (2011) examine whether the relation between total asset growth (using asset growth as a measure of investment) and future return turns more negative when limits to arbitrage are more severe.[2]

Lam and Wei (2011) show that investment frictions proxies and limits to arbitrage proxies are positive correlated hence the above interactive tests, when performed separately, would not be able to distinguish the *q*-theory from the mispricing theory. Upon controlling for limits to arbitrage (investment frictions) and examining the asset growth effect conditional on investment frictions (limits to arbitrage), the authors find that each explanation has a fair and similar amount of supporting evidence.

We point out the following deficiencies in the above strand of literature. (1) Previous unconditional tests, interactive tests, and controlled interactive tests investigating the *q*-theory (e.g., Lam and Wei, 2011) omit the profitability effect hence suffer from misspecification. (2) Previous controlled interactive tests that attempt to differentiate the *q*-theory from the mispricing theory utilize unequal number of investment frictions interactions and limits to arbitrage

[2] Ali, Hwang, and Trombley (2003) and Mashruwala, Rajgopal, and Shevlin (2006) execute similar tests on the book-to-market equity effect and the accruals anomaly, respectively.

interactions hence might result in unfair comparison; these tests also do not employ a broad list of investment measures hence the findings do not provide a comprehensive evaluation. (3) Wang and Yu (2013) examine the effect of limits to arbitrage on the positive profitability-return relation without addressing the potential effect of investment frictions from the *q*-theory's perspective.

We perform more appropriate and extensive tests to provide further findings for the literature to make a fairer and more comprehensive assessment on the merits of the *q*-theory and the mispricing theory in explaining the investment and profitability effects. (1) We examine the investment *or* profitability effect separately for the mispricing theory with limits to arbitrage, controlling for investment frictions, while we examine the investment *and* profitability effects simultaneously for the *q*-theory with investment frictions, controlling for limits to arbitrage. We further control for beta, market capitalization, the book-to-market equity ratio, and past stock return in all specifications. (2) We construct an index of limits to arbitrage from various proxies for limits to arbitrage and an index of investment frictions from various proxies for investment frictions. This enables us to utilize equal number of investment frictions interactions and limits to arbitrage interactions in the interactive tests and controlled interactive tests to compare the *q*-theory with the mispricing theory in equal footing.

(3) We comprehensively involve nine main corporate investment measures including total asset growth (Cooper, Gulen, Schill, 2008), the investment-to-asset ratio (Hou, Xue, and Zhang, 2015), the investment-to-capital ratio (Xing, 2008), net operating assets (Hirshleifer, Hou, Teoh, and Zhang, 2008), accruals (Sloan, 1996), investment growth (Xing, 2008), abnormal capital expenditures (Titman, Wei, and Xie, 2004), net share issuance (Pontiff and Woodgate, 2008), and composite share issuance (Daniel and Titman, 2006) as well as two recent

profitability measures, the gross-profitability-to-asset ratio (Novy-Marx, 2013) and operating profitability (Ball, Gerakos, Linnainmaa, and Nikolaev, 2015), the literature has recently shown to be powerful return predictors. (4) We further provide more restrictive tests hinging on the contour of investment-return relation along low versus high investment sectors in the cross section. We expect high investment stocks to be more sensitive to shifts in limits to arbitrage or investment frictions than low investment stocks due to asymmetric arbitrage or the nonlinearity in the equilibrium *q*-theory asset pricing model. These extra conditions would provide us an addition avenue to distinguish the *q*-theory from the mispricing theory.

2. Hypothesis Development

This section discusses the interactive implications on the investment and profitability effects with limits to arbitrage and investment frictions from the mispricing theory and the *q*-theory of investment, respectively.

2.1 The mispricing theory and limits to arbitrage

If the investment and profitability effects are due to mispricing driven by correlated behavioral biases, arbitrageurs should immediately exploit the associated arbitrage profits and correct the misvaluations if the corresponding arbitrage activities are free. However, when the arbitrage activities are riskier and more costly (see, e.g., Shleifer and Vishny, 1997) arbitrageurs are unlikely or unable to act on the opportunities in a timely fashion hence the misvaluations tend to persist longer. This leads to our first hypothesis.

H1a: *The negative relation between investment and subsequent average stock return is stronger for stocks that are subject to higher difficulty to arbitrage.*

H1b: *The positive relation between profitability and subsequent average stock return is stronger for stocks that are subject to higher difficulty to arbitrage.*

2.2 The q-theory of investment and investment frictions

The firm value maximization problem in the q-theory of investment asset pricing model states that the expected return to capital is a function of firm's investment and expected profitability (see, e.g., Hou, Xue, and Zhang, 2015):

$$R_i = \frac{\pi + 1 - \delta}{1 + a\frac{I_{i0}}{A_{i0}}} \tag{1}$$

where I_0 is the investment and A_0 is the total assets at time 0. Fixing expected productivity (π) constant, the expected return (R_i) is negatively related to scaled investments (I_0/A_0). Holding scaled investments constant, the expected return is positively related to expected profitability. When the investment frictions (a) increase, investment is less responsive to change in expected return and, simultaneously, expected profitability is more responsive to change in expected return. This leads to our second hypothesis.

H2a: *Controlling for profitability, the negative relation between investment and subsequent average stock return is stronger for stocks that are subject to higher investment frictions.*

H2b: *Controlling for investment, the positive relation between profitability and subsequent average stock return is weaker for stocks that are subject to higher investment frictions.*

As will be seen in Table 1 proxies for limits to arbitrage and proxies for investment frictions are positively correlated hence empirical findings that support Hypothesis 1a could be deemed to be evidence for Hypothesis 2a and vice versa. Therefore, we have to control for investment frictions when we test Hypothesis 1a and control for limits to arbitrage when we test Hypothesis 2a. But since limits to arbitrage and investment frictions are predicted to take the opposite interaction with the profitability effect, we can compare the two theories by testing Hypothesis 1b without controlling for investment frictions and testing Hypothesis 2b without controlling for limits to arbitrage.

2.3 Additional restrictions on the interactive investment effects

Arbitrage asymmetry (see, e.g., Stambaugh, Yu, and Yuan, 2015) means that within a high arbitrage risk and costs environment arbitrageurs are more reluctant to exploit short positions on overpriced stocks than to exploit long positions on underpriced stocks due to the noisy trader risk and short sale constraint that are present in short positions but not in long ones. Thus an increment in limits to arbitrage reduces the future average stock returns on high investment stocks by a magnitude more than it raises the future average stock returns on low investment stocks. This provides a tighter extension of Hypothesis 1a.

H3: *The interaction between the negative investment-return relation and limits to arbitrage is stronger within the high investment sector.*

One can deduce from the *q*-theory asset pricing model that the investment effect within the high investment sector is more sensitive to change in investment frictions than that within the low investment sector. Specifically, the total differential of equation (1) leads to the follow partial derivative of the absolute value of the return-investment relation with respect to investment frictions (see, e.g., Li and Zhang, 2010).

$$\frac{d}{da}\left|\frac{d\left(\frac{I_{i0}}{A_{i0}}\right)}{dR_i}\right| = -\frac{\left(1+a\frac{I_{i0}}{A_{i0}}\right)^2}{a^2(\pi+1-\delta)} \tag{2}$$

When investment frictions (a) increase, the absolute value of $d(I_0/A_0)/dR$ decreases, steepening $dR/d(I_0/A_0)$ or the negative investment-return relation. As the partial derivative is a decreasing function of I_0/A_0, within the high investment sector a decrement in investment frictions reduces the absolute value of $d(I_0/A_0)/dR$ more hence steepening the negative investment-return relation $dR/d(I_0/A_0)$ more. This provides a tighter extension of Hypothesis 2a.

H4: *The interaction between the negative investment-return relation and investment frictions is stronger within the high investment sector.*

3. Sample Selection, Variable Definitions, and Methodologies

Our sample includes firms traded on the NYSE, Amex, and NASDAQ. Their annual financial statements are from Compustat and stock market data are from the Center for Research in Security Prices (CRSP). Similar to Fama and French (1992, 1993), we exclude certificates, American depositary receipts (ADRs), shares of beneficial interest (SBIs), unit trusts, closed-end funds, real estate investment trusts (REITs), and financial firms. We also remove stocks with prices less than or equal to $5 at the end of June of a calendar year *t* or negative book value of equity at the end of fiscal year t–1.

3.1 Investment variables

The nine stock level corporate investment measures mentioned at the onset are defined as following. (1) Total asset growth (*TAG*) is the change in total assets (Computstat item AT) between fiscal yearend $t-1$ to fiscal yearend t scaled by total assets at the beginning of the period. (2) The investment-to-asset ratio (*IA*) is the change in the sum of inventories (item INVT) and gross property, plant, and equipment (item PPEGT) between fiscal yearend $t-1$ and fiscal yearend t scaled by total assets at fiscal yearend $t-1$. (3) The investment-to-capital ratio (*IK*) is the ratio of capital expenditures (Computstat item CAPX) for fiscal year t to the net book value of property, plant, and equipment (item PPENT) at fiscal yearend *t*−1. (4) Net operating assets (*NOA*) is the difference between operating assets and operating liabilities at fiscal yearend *t* scaled by total assets at fiscal yearend *t*−1. Operating assets is total assets minus cash and short-term investments (Computstat item CHE). Operating liabilities is total assets less current liabilities (item DLC), long-term debt (item DLTT), minority interests (item MIB), preferred stocks (item PSTK), and common equity (item CEQ).

(5) Accruals (*ACC*) is the change in current assets (Compustat item ACT) less the change in cash and short-term investments less the change in current liabilities (item LCT) less depreciation (item DP) plus the change in current liabilities between fiscal yearend *t*−1 to fiscal yearend *t*, scaled by average total assets over the period. (6) Growth in capital expenditures (*IG*) is the change in capital expenditures from fiscal year *t*−1 to fiscal year *t*, scaled by capital expenditure for fiscal year *t*−1. (7) Abnormal capital expenditures (*ACX*) is the ratio of capital expenditures for fiscal year *t* scaled by the year's revenue (item REVT) to the three-year average of scaled capital expenditures over fiscal years *t*–3, *t*–2, and *t*–1. (8) Net share issuance (*NSI*) is the natural logarithm of the ratio of split-adjusted shares outstanding (item CSHO multiplied by item ADJEX_C) at fiscal yearend *t* to those at fiscal yearend *t*−1. (9) Composite share issuance (*CSI*) is the difference between the continuous growth in market capitalization over the five years ending at the end of June of calendar year *t*+1 and the continuous growth in stock price over the five years ending at the end of June of calendar year *t*+1.

3.2 Profitability variables

The two stock level profitability measures mentioned at the onset are defined as following. (1) The gross-profitability-to-asset ratio (*GPA*) is the ratio of gross profit (Compustat item GP) for fiscal year *t* scaled by total assets at the end of the period. (2) Operating profitability (*OP*) is the ratio of operating profit (Compustat item GP less item XSGA plus item XRD) for fiscal year *t* scaled by total assets at the end of the period.

3.3 Limits to arbitrage index

We construct the stock level limits to arbitrage index (*LTA*) as the sum of the tercile rankings of seven individual proxies for limits to arbitrage largely following Lam and Wei (2011). The seven measures are as follows. (1) Idiosyncratic stock return volatility (*IVOL*) is the standard deviation of the residuals of the time-series market model with monthly stock return as the dependent variable and S&P 500 return as the independent variable. The model is estimated with 36 months of stock returns ending in June of calendar year *t*+1, requiring a full 3 year history. (2) Cash flow volatility (*CVOL*) is the standard deviation of cash flow from operations during the 5 fiscal years ending fiscal year *t*, requiring a minimum of 3 year of observations. Cash flow is earnings before extraordinary items (Compustat item IB) minus total accruals, divided by average total book assets over a fiscal year.

(3) Analyst coverage (*COV*) is the latest number of I/B/E/S analysts following the stock available between the beginning of January of calendar year *t*+1 and the end of June of calendar year *t*+1. (4) Share price (*PRICE*) is the CRSP closing stock price (or the average of bid and ask prices if the closing price is unavailable) at the end of June of calendar year *t*+1. (5) Bid-ask spread (*BIDASK*) is the time-series average of 2×|(Price–(Ask+Bid)/2)|/Price at the end of each trading day over the year ending at the end of June of calendar year *t*+1, where Price is the closing stock price and Ask (Bid) is the ask (bid) quote. (6) Institutional ownership (*IHOLD*) is the latest percentage of outstanding shares held by DFA or V500 available between the

beginning of January of calendar year *t*+1 and the end of June of calendar year *t*+1. (7) Short interest (*SINTEREST*) is the latest percentage of outstanding shares held short available between the beginning of January of calendar year *t*+1 and the end of June of calendar year *t*+1. *IVOL*, *COV*, *BIDASK*, and *SINTEREST* are ranked into terciles in ascending order while the rest are ranked in descending order.

3.4 Investment frictions index

We construct the stock level investment frictions index (*IF*) as the sum of the tercile rankings of four individual proxies for investment frictions largely following Lam and Wei (2011). The four measures are as follows. (1) Asset size (*ASSET*) is the book value of total assets at the end of the fiscal year *t*. (2) Firm age (*AGE*) is the number of years a stock has appeared in CRSP at the end of June of calendar year *t*+1. (3) Payout ratio (*PAYOUT*) is the tercile ranking according to all distributions to equity holders, including share repurchases (Compustat item PRSTKC), dividends to preferred stock (items DVP), and dividends to common stock (item DVC), scaled by operating income before depreciation (item OIBDP) during fiscal year *t*. Stocks with zero or negative earnings but positive distributions are put into the high payout ratio tercile, while stocks with zero or negative earnings and zero distributions are put into the low payout ratio tercile. (4) Credit rating dummy (*RATING*) is zero if the stock does not have a Standard & Poor's (S&P) long-term credit rating in the Compustat database between the beginning of January of calendar year *t*+1 and the end of June of calendar year *t*+1 and one otherwise. *ASSET*, *AGE*, and *PAYOUT* are ranked into terciles in descending order. We set the tercile ranking of *RATING* to be 1 when *RATING* equals 1 and 3 when *RATING* equals 0.

3.5 Remaining data issues

We update the investment and profitability variables as well as the limits to arbitrage index and investment index annually. Each year we require a firm in our sample to have at least one *LTA* constituent, at least one *IF* constituent, and all control variables to be available.[3] When an investment or profitability variable needed for a test in a year is missing, we remove the firm from the test for the year.

Following the standard practice in the asset pricing literature we then match monthly stock returns from the end of June of calendar year *t*+1 to the end of June of calendar year *t*+2 to the annual stock characteristics complied at the end of June of calendar year *t*+1. We use delisting returns to mitigate the survivorship bias.[4] The sample period of annual stock characteristics is from fiscal year 1962 to 2013 and that of holding period monthly stock returns is from the end of June of 1963 to the end December 2014.[5]

4. Empirical Findings

Panel A of Table 1 reports summary statistics of the stock characteristics in the study. The statistics are in general comparable with those in prior studies such as Li and Zhang (2010)

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[3] We have four control variables in all our tests. (1) The Capital Asset Pricing Model beta (β) is the slope coefficient of the time series regression of monthly stock return in excess of the risk free rate on the market risk premium. The regression is estimated with 36 months of observations ending in June of calendar year *t*+1, requiring a full 3 year history. We obtain the monthly risk free rate and market risk premium from the Kenneth French Data Library. (2) Market capitalization (*ME*) is the closing stock price multiplied by the number of shares outstanding at the end of June of calendar year *t*+1. (3) The book-to-market equity ratio (*BM*) is the book value of equity divided by the market value of equity at the end of fiscal year *t*. Book equity is total assets minus liabilities (Compustat item LT), plus balance sheet deferred taxes (item TXDB) and investment tax credits (item ITCI), minus preferred stock liquidation value (item PSTKL) if available, or redemption value (item PSTKRV) if available, or carrying value (item PSTK) if available. (4) Prior one-year stock return (*PRET*) is the compounded monthly stock return, skipping the latest month, over the year ending in June of calendar year *t*+1.

[4] Shumway (1997) suggests that the returns of stocks delisted for poor performance (delisting codes 500 and 520 to 584) are usually unavailable. Following Shumway and Warther (1999), when the return is missing for an available CRSP month date, we use the delisting return wherever available. When delisting return is not available, we use –30% for poor performance delisting and 0% for other cases.

[5] For any *LTA* or *IF* constituent that are available after 1962, the pre-available tercile ranking is set to 2. As such all our tests start from 1962.

and Lam and Wei (2011). Panel B of Table 1 shows the correlations among variables. Most importantly, *LTA* and *IF* are strongly related with a positive correlation of 49%. Hence it is important to control for investment frictions when we test Hypothesis 1a and control for limits to arbitrage when we test Hypothesis 2a as mentioned in the previous section.

We systematically test our hypotheses with Fama and MacBeth (1973) regressions that take the following form.

$$R_{i,t+1} = a + \left[INV_{i,t}\ PRO_{i,t}\right]b + c'CONTROLS_{i,t} + \epsilon_{i,t+1} \tag{3}$$

where R_{t+1} is the monthly stock return between the end of June of calendar year t+1 and the end of June of calendar year t+2. INV_t is one of our annual investment measures and PRO_t is the one of our annual profitability measures. The set of control variables ($CONTROLS_t$), which are always included in the regression, includes the Capital Asset Pricing Model (β), market capitalization (*ME*), the book-to-market equity ratio (*BM*), and prior one-year stock return skipping the latest month (*PRET*). To test hypotheses related to the mispricing theory, we include either an *INV* or a *PRO* variable. To test hypotheses related to the *q*-theory, we include an *INV* and a *PRO* variable. The monthly cross-sectional regressions are estimated with ordinary least squares (OLS) or weighted least square (WLS) with the market capitalization at the end of June of calendar year t+1 as the weight. We perform the estimation on the full cross section, subsamples annually sorted by limits to arbitrage and/or investments frictions (H1a, H1b, H2a, and H2b), as well as subsamples annually sorted by investments and limits to arbitrage or investments frictions (H3 and H4). We report the time series average of the estimated coefficients and the corresponding *t*-statistics (*t*) are based on Newey and West (1986) standard errors with autocorrelations up to 12 lags.

4.1. The investment and/or profitability effects

Panel A of Table 2 shows the estimated slope coefficients of equation (3) with an investment variable or a profitability variable, i.e., the effects are investigated separately under the mispricing theory. Since we have nine investment measures and two estimation methods for the cross sectional regression, we have a total of 18 investment slopes to characterize the investment-return effect. All the 18 slopes (100%) take a negative value and 16 of them are statistically significant at the 5% level. Besides, we have two profitability measures and two estimation methods for the cross sectional regression, thus we have a total of four profitability slopes to characterize the profitability-return effect. All the four slopes (100%) take a positive value and all of them are statistically significant at the 5% level.

Panel B of Table 2 shows the estimated slope coefficients of equation (3) with an investment variable and a profitability variable, i.e., the effects are investigated simultaneously under the *q*-theory. Since we have nine investment measures, two profitability measures, and two estimation methods for the cross sectional regression, we have a total of 36 profitability controlled investment slopes to characterize the investment-return effect. All the 36 slopes (100%) take a negative value and 31 of them are statistically significant at the 5% level. Similarly, we have a total of 36 investment controlled profitability slopes to characterize the profitability -return effect. All the 36 slopes (100%) take a positive value and all of them are statistically significant at the 5% level. No matter the investment and profitability effects are tested separately and simultaneously, we find a negative relation between investment and future average stock return as well as a positive relation between profitability and future average stock return. There are very close supporting evidence for both the mispricing theory and the *q*-theory.

4.2.The investment or profitability effects across limits to arbitrage

We first sort each yearly cross section into tercile by *LTA*. We then estimate equation (3) with an *INV* variable or a *PRO* variable for the high *LTA* subsample and for the low *LTA* subsample. Table 3 reports the time series averages of the differences in the investment slopes or profitability slopes between high *LTA* subsample and low *LTA* subsample. Our nine investment measures and two estimation methods for the cross sectional regression provides us with a total of 18 differences in the investment slopes to characterize the investment-return effect conditional on limits to arbitrage. 13 of the 18 differences (72%) take a negative value and five of them are statistically significant at the 5% level. Consistent with the mispricing theory (H1a), the investment effect seems to be stronger when limits to arbitrage are more severe.

Our two investment measures and two estimation methods for the cross sectional regression provides us with a total of four differences in the profitability slopes to characterize the profitability-return effect conditional on limits to arbitrage. Only one of the four differences (25%) take a positive value and none of them are statistically significant at the 5% level. Rather inconsistent with the mispricing theory (H1b), the profitability effect does not seem to be stronger when limits to arbitrage are more severe.

4.3.The investment and profitability effects across investment frictions

We first sort each yearly cross section into tercile by *IF*. We then estimate equation (3) with an *INV* variable and a *PRO* variable for the high *IF* subsample and for the low *IF* subsample. Table 4 reports the time series averages of the differences in the investment slopes and profitability slopes between high *IF* subsample and low *IF* subsample. Our nine investment measures, two profitability measures, and two estimation methods for the cross sectional regression provides us with a total of 36 differences in the profitability controlled investment slopes to characterize the investment-return effect conditional on investment frictions. 24 of the 36 differences (67%) take a negative value and seven of them are statistically significant at the 5% level. Consistent with the *q*-theory (H2a), the profitability controlled investment effect seems to be stronger when investment frictions are more severe. Similarly we have a total of 36 differences in the investment controlled profitability slopes to characterize the profitability-return effect conditional on investment frictions. 29 of the 36 differences (81%) take a negative value even though none of them are statistically significant at the 5% level. Consistent with the *q*-theory (H2b), investment controlled the profitability effect seems to be weaker when investment frictions are more severe.

Limits to arbitrage and investment frictions are predicted to take the opposite interaction with the profitability effect hence we compare the mispricing theory and the *q*-theory by contrasting the test results on Hypothesis 1b without controlling for investment frictions with those on Hypothesis 2b without controlling for limits to arbitrage as discussed above. We find that the results incline towards supporting the *q*-theory but decline to support the mispricing theory as an economically viable explanation of the profitability effect. However, as shown in Table 1, *LTA* and *IF* are positively correlated, therefore, the above results that support Hypothesis 1a could be deemed to be evidence for Hypothesis 2a and vice versa. Therefore, to provide further test to distinguish the mispricing theory from the *q*-theory for the investment effect, we now control for investment frictions when we test Hypothesis 1a and control for limits to arbitrage when we test Hypothesis 2a.

4.4. The investment effect across limits to arbitrage controlling for investment frictions

We first independently double sort each yearly cross section into tercile by *LTA* and tercile by *IF*. We then estimate equation (3) with an *INV* variable for each of the nine *LTA*×*IF* subsamples except for the subsamples containing the medium *LTA* tercile. Panel A of Table 5 reports the time series averages of the differences in the investment slopes between high *LTA* tercile and low *LTA* tercile for each *IF* tercile. In other words, we examine Hypothesis 1a controlling for investment frictions. Our nine investment measures and two estimation methods for the cross sectional regression on three investment frictions groupings provides us with a total of 54 differences in the investment slopes to characterize the investment-return effect conditional on limits to arbitrage controlling for investment frictions. 43 of the 54 differences (80%) take a negative value and three of them are statistically significant at the 5% level. Consistent with the mispricing theory (H1a), the investment effect still seems to be stronger as limits to arbitrage are more severe even when investment frictions are controlled for.

4.5. The investment effect across investment frictions controlling for limits to arbitrage

We first independently double sort each yearly cross section into tercile by *IF* and tercile by *LTA*. We then estimate equation (3) with an *INV* variable and a *PRO* variable for each of the nine *IF*×*LTA* subsamples except for the subsamples containing the medium *IF* tercile. Panel B of Table 5 reports the time series averages of the differences in the investment slopes between high *IF* tercile and low *IF* tercile for each *LTA* tercile. In other words, we examine Hypothesis 2a controlling for limits to arbitrage. Our nine investment measures, two profitability measures, and two estimation methods for the cross sectional regression on three limits to arbitrage groupings provides us with a total of 108 differences in the investment slopes to characterize the investment-return effect conditional on investment frictions controlling for limits to arbitrage. 50 of the 108 differences (46%) take a negative value and six of them are statistically significant at the 5% level. When limits to arbitrage are controlled for, the findings become less consistent with the *q*-theory (H2a). Whether the investment effect is stronger as investment frictions are more severe seems to be in doubt. We now turn to the final Hypotheses 3 and 4, which are tighter extensions of Hypotheses 1a and 2a. As mentioned in the onset, the extra conditions would provide us an addition avenue to distinguish the *q*-theory from the mispricing theory.

4.6. The investment effect across limits to arbitrage controlling for investment frictions: high versus low investment sector

We first independently triple sort each yearly cross section into low versus high investment using the *INV* variable to be included in the regression equation (3), tercile by *LTA*, and tercile by *IF*. We then estimate equation (3) with an *INV* variable for each of the 18 *INV*×*LTA*×*IF* subsamples except for the subsample containing the medium *LTA* tercile. Panel A of Table 6 reports the time series averages of the differences between high and low investment in the differences in the investment slopes between high *LTA* tercile and low *LTA* tercile for each *IF* tercile. In other words, we examine Hypothesis 3 controlling for investment frictions. Our nine investment measures and two estimation methods for the cross sectional regression on three investment frictions groupings provides us with a total of 54 differences in differences in the investment slopes to characterize the difference in the investment-return effect conditional on limits to arbitrage across low and high investment, controlling for investment frictions. 29 of the 54 differences (54%) take a negative value and four of them are statistically significant at the 5%

level. Rather consistent with the mispricing theory (H3), the interaction between the investment effect and limits to arbitrage seems to be stronger within the high investment sector.

4.7. The investment effect across investment frictions controlling for limits to arbitrage: high versus low investment sector

We first independently triple sort each yearly cross section into low versus high investment using the *INV* variable to be included in the regression equation (3), tercile by *IF*, and tercile by *LTA*. We then estimate equation (3) with an *INV* variable and a *PRO* variable for each of the 18 *INV*×*IF*×*LTA* subsamples except for the subsample containing the medium *IF* tercile. Panel B of Table 6 reports the time series averages of the differences between high and low investment in the differences in the investment slopes between high *IF* tercile and low *IF* tercile for each *LTA* tercile. In other words, we examine Hypothesis 4 controlling for limits to arbitrage. Our nine investment measures, two profitability measures, and two estimation methods for the cross sectional regression on three limits to arbitrage groupings provides us with a total of 108 differences in differences in the investment slopes to characterize the difference in the investment-return effect conditional on investment frictions across low and high investment, controlling for limits to arbitrage. 73 of the 108 differences (68%) take a negative value and four of them are statistically significant at the 5% level. Consistent with the *q*-theory (H4), the interaction between the investment effect and investment frictions seems to be stronger within the high investment sector.

5. Conclusion

In view of the deficiencies in the existing strand of tests, we perform more appropriate and extensive tests to provide further findings to the literature in order to motivate a fairer and more comprehensive assessment on the merits of the *q*-theory and the mispricing theory in explaining the investment and profitability effects. Our key comparative results are as follows. For the profitability effect, we find that 81% of the investment frictions interactions support the *q*-theory with investment frictions but only 25% of the limits to arbitrage interactions support the mispricing theory with limits to arbitrage.

For the investment effect, we find that 80% of the limits to arbitrage interactions, with investment frictions being controlled for, support the mispricing theory with limits to arbitrage while 46% of the investment frictions interactions, with limits to arbitrage being controlled for, support the *q*-theory with investment frictions. From the more restrictive tests hinging on the contour of investment-return relation, we find 68% of the investment frictions interactions across low and high investment sector, controlling for limits to arbitrage, support the *q*-theory with investment frictions while 54% of the limits to arbitrage interactions across low and high investment sector, controlling for investment frictions, support the mispricing theory with limits to arbitrage. Overall, 67% [=(43+29)/(54+54)] of the cases support the mispricing theory and 57% [=(50+29)/(73+108)] of the cases support the *q*-theory. Two major findings concurrently emerge from our study. First, rational pricing seems to be the main driver of the profitability effect. Second, both rational pricing and mispricing seem to lead to the investment effect.

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Table 1
Summary statistics and correlations

Panel A reports time-series averages of the means, standard deviations (stdev), and 0th (P0), 10th (P10), 25th P(25), 50th P(50), 75th (P75), 90th (P90), and 100th (P100) percentiles of the firm characteristics used in this study. The variables include total asset growth (*TAG*), the investment-to-asset ratio (*IA*), the investment-to-capital ratio (*IK*), net operating assets (*NOA*), accruals (*ACC*), investment growth (*IG*), abnormal capital expenditures (*ACX*), net share issuance (*NSI*), composite share issuance (*CSI*), the gross-profitability-to-asset ratio (*GPA*), operating profitability (*OP*), idiosyncratic stock return volatility (*IVOL*), cash flow volatility (*CVOL*), analyst coverage (*COV*), share price (*PRICE*), bid-ask spread (*BIDASK*), institutional holdings (*IHOLD*), short interests (*SINTEREST*), total asset size (*ASSET*), firm age (*AGE*), payout ratio (*PAYOUT*), credit rating dummy (*RATING*), the Capital Asset Pricing Model beta (β), market capitalization (*ME*), the book-to-market equity ratio (*BM*), and prior one-year stock return skipping the latest month (*PRET*). Accounting variables are measured over fiscal year t while market variables are measured at the end of June of calendar year t+1. Panel B reports the time-series averages of the correlations among the variables as well as the indices of investment frictions (*IF*) and limits to arbitrage (*LTA*). The sample period is between fiscal year 1962 to 2013 and calendar year 1963 to 2014.

Panel A: Summary statistics

	mean	stdev	P0	P10	P25	P50	P75	P90	P100
TAG	0.17	0.47	-0.64	-0.05	0.02	0.09	0.19	0.40	11.84
IA	0.10	0.23	-0.92	-0.02	0.02	0.07	0.13	0.24	5.34
IK	0.34	1.17	0.00	0.08	0.13	0.22	0.36	0.59	45.77
NOA	0.72	0.36	-0.92	0.42	0.58	0.72	0.83	0.97	7.80
ACC	-0.02	0.08	-0.64	-0.11	-0.07	-0.03	0.01	0.06	0.65
IG	0.57	6.83	-0.99	-0.44	-0.18	0.11	0.52	1.24	281.42
ACX	0.37	12.15	-0.99	-0.54	-0.31	-0.05	0.28	0.79	551.84
NSI	0.03	0.15	-1.45	-0.03	0.00	0.00	0.02	0.11	2.09
CSI	0.38	0.54	-2.44	-0.07	0.01	0.24	0.67	1.09	3.26
GPA	0.38	0.26	-0.86	0.11	0.20	0.34	0.51	0.71	2.28
OP	0.16	0.11	-0.66	0.06	0.11	0.15	0.21	0.28	0.91
IVOL	0.10	0.05	0.02	0.05	0.07	0.09	0.13	0.17	0.74
CVOL	0.07	0.16	0.00	0.02	0.03	0.05	0.09	0.14	5.23
COV	2.47	3.08	0.00	0.15	0.79	1.08	3.22	6.51	24.62
PRICE	26.53	28.91	5.10	7.93	12.27	20.88	33.51	49.23	727.81
BIDASK	0.02	0.01	0.00	0.01	0.01	0.02	0.02	0.03	0.07
IHOLD	0.01	0.02	0.00	0.00	0.00	0.01	0.02	0.05	0.10
SINTEREST	0.02	0.03	0.00	0.00	0.01	0.01	0.03	0.05	0.42
ASSET (10^8)	21.41	94.38	0.03	0.40	1.01	3.27	11.98	41.96	2758.73
AGE	19.96	15.72	3.00	5.43	8.55	14.46	27.94	43.49	63.50
PAYOUT	0.27	2.72	0.00	0.01	0.04	0.13	0.26	0.45	121.17
RATING	0.27	0.38	0.00	0.00	0.00	0.00	0.81	0.81	0.89
β	1.16	0.68	-1.49	0.38	0.69	1.08	1.54	2.04	5.06
ME (10^8)	20.89	83.36	0.04	0.42	1.05	3.25	11.40	38.04	1736.10
BM	0.86	0.84	0.02	0.26	0.44	0.71	1.07	1.51	17.70
PRET	0.17	0.81	-0.78	-0.29	-0.12	0.06	0.29	0.62	20.65

Table 1 – continued

Panel B: Correlations

	TAG	*IA*	*IK*	*NOA*	*ACC*	*IG*	*ACX*	*NSI*	*CSI*	*GPA*	*OP*	*IVOL*	*CVOL*	*COV*
IA	0.68													
IK	0.35	0.36												
NOA	0.64	0.62	0.21											
ACC	0.26	0.25	0.11	0.29										
IG	0.27	0.29	0.50	0.17	0.07									
ACX	0.15	0.20	0.46	0.10	0.06	0.54								
NSI	0.30	0.23	0.08	0.22	0.10	0.06	0.03							
CSI	0.19	0.18	0.09	0.13	0.09	0.02	0.01	0.15						
GPA	-0.03	-0.01	0.04	-0.10	0.05	-0.03	-0.04	-0.08	0.02					
OP	0.04	0.07	0.06	-0.02	0.04	-0.02	-0.05	-0.08	0.13	0.53				
IVOL	0.16	0.08	0.15	0.00	0.04	0.10	0.06	0.13	0.02	0.04	-0.11			
CVOL	0.16	0.05	0.15	-0.04	0.08	0.09	0.07	0.09	0.03	0.00	-0.07	0.38		
COV	0.02	0.03	0.00	0.01	-0.02	-0.03	-0.03	0.01	0.15	0.00	0.13	-0.15	-0.09	
PRICE	0.03	0.03	-0.01	-0.01	-0.03	-0.02	-0.02	-0.03	0.02	0.02	0.20	-0.29	-0.15	0.21
BIDASK	0.07	0.03	0.09	-0.01	0.01	0.04	0.02	0.11	0.10	-0.01	-0.11	0.56	0.24	0.02
IHOLD	-0.09	-0.07	-0.04	-0.01	-0.01	-0.02	-0.01	-0.06	-0.17	0.01	-0.10	0.04	0.00	-0.14
SINTEREST	0.10	0.07	0.09	0.04	0.03	0.03	0.02	0.04	0.07	-0.02	-0.02	0.19	0.10	0.06
LTA	0.10	0.04	0.12	-0.02	0.05	0.07	0.05	0.09	0.04	0.04	-0.13	0.65	0.45	-0.27
ASSET	-0.01	-0.01	-0.03	0.01	-0.05	-0.02	-0.02	-0.01	0.01	-0.10	-0.01	-0.18	-0.12	0.15
AGE	-0.11	-0.10	-0.11	-0.04	-0.05	-0.05	-0.02	-0.06	-0.07	-0.09	-0.04	-0.34	-0.18	0.13
PAYOUT	-0.07	-0.06	-0.03	-0.07	-0.02	-0.02	0.01	-0.07	-0.06	-0.04	-0.08	-0.09	0.00	0.00
RATING	-0.03	0.00	-0.08	0.09	-0.05	-0.04	-0.02	-0.02	0.05	-0.15	-0.03	-0.26	-0.19	0.16
IF	0.11	0.07	0.14	0.00	0.08	0.07	0.04	0.07	-0.01	0.15	0.04	0.50	0.27	-0.23
β	0.10	0.05	0.10	0.01	0.04	0.03	0.01	0.08	0.15	0.04	0.02	0.44	0.17	0.09
ME	-0.01	0.00	-0.01	-0.01	-0.04	-0.02	-0.02	-0.02	0.06	0.00	0.12	-0.19	-0.10	0.19
BM	-0.13	-0.11	-0.11	0.01	-0.06	-0.03	-0.03	-0.04	-0.23	-0.16	-0.28	-0.05	-0.07	-0.12
PRET	0.01	-0.02	-0.01	-0.03	-0.06	0.02	-0.01	0.05	-0.16	0.01	-0.02	0.22	0.09	-0.07

Table 1 – continued

	PRICE	*BIDASK*	*IHOLD*	*SINTEREST*	*LTA*	*ASSET*	*AGE*	*PAYOUT*	*RATING*	*IF*	β	*ME*	*BM*
BIDASK	-0.24												
IHOLD	-0.17	0.12											
SINTEREST	0.00	0.20	-0.07										
LTA	-0.40	0.58	-0.02	0.26									
ASSET	0.19	-0.11	-0.09	-0.04	-0.20								
AGE	0.25	-0.21	-0.01	-0.09	-0.35	0.28							
PAYOUT	0.01	-0.07	0.01	-0.02	-0.06	0.01	0.07						
RATING	0.21	-0.24	-0.20	0.05	-0.27	0.23	0.34	-0.01					
IF	-0.32	0.29	0.13	0.03	0.49	-0.25	-0.62	-0.14	-0.66				
β	-0.09	0.43	-0.03	0.15	0.35	-0.07	-0.17	-0.09	-0.02	0.20			
ME	0.34	-0.13	-0.11	-0.06	-0.22	0.73	0.28	0.02	0.24	-0.25	-0.07		
BM	-0.16	-0.06	0.14	0.01	0.03	0.02	0.08	0.01	0.01	-0.05	-0.10	-0.08	
PRET	0.07	0.12	-0.02	0.01	0.08	-0.03	-0.05	-0.03	-0.05	0.11	0.04	-0.02	-0.01

Table 2
Fama-MacBeth regressions of future stock returns on investment and/or profitability

This table reports the estimated slope coefficients (b and c) for 58 specifications of the Fama and MacBeth (1973) regression in the following form

$R_{i,t+1} = a + [INV_{i,t}\ PRO_{i,t}]b + c'CONTROLS_{i,t} + \epsilon_{i,t+1}$,

where R_{t+1} is the monthly stock return between the end of June of calendar year t+1 and the end of June of calendar year t+2. INV_t is one of our annual investment measures, which includes total asset growth (*TAG*), the investment-to-asset ratio (*IA*), the investment-to-capital ratio (*IK*), net operating assets (*NOA*), accruals (*ACC*), investment growth (*IG*), abnormal capital expenditures (*ACX*), net share issuance (*NSI*), and composite share issuance (*CSI*). PRO_t is the one of our annual profitability measures, which includes the gross-profitability-to-asset ratio (*GPA*) and operating profitability (*OP*). The set of control variables ($CONTROLS_t$) includes the Capital Asset Pricing Model (β), market capitalization (*ME*), the book-to-market equity ratio (*BM*), and prior one-year stock return skipping the latest month (*PRET*). Accounting variables are measured over fiscal year t while market variables are measured at the end of June of calendar year t+1. The models in Panel A include either *INV* or *PRO* while the models in Panel B include both *INV* and *PRO*. The monthly cross-sectional regressions are estimated with ordinary least squares (OLS) or weighted least square (WLS) with the market capitalization at the end of June of calendar year t+1 as the weight. The time series t-statistics (t) are based on Newey and West (1986) standard errors with autocorrelations up to 12 lags. The sample period of monthly returns is from the end of June of calendar year 1963 to the end of December of calendar year 2014. Investment or profitability slopes that are significant at the 5% level are in bold.

Panel A: The investment or profitability effects

INV=	*INV*	*t*	β	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.668**	-5.762	0.058	0.573	-0.049	-1.426	0.184	3.259	0.195	1.765
TAG (WLS)	**-0.425**	-2.538	-0.004	-0.027	-0.059	-1.957	0.038	0.542	0.137	1.121
IA (OLS)	**-0.830**	-5.562	0.023	0.230	-0.049	-1.408	0.189	3.229	0.194	1.755
IA (WLS)	**-0.521**	-2.248	-0.065	-0.429	-0.070	-2.249	0.045	0.611	0.150	1.191
IK (OLS)	**-0.442**	-4.022	0.027	0.277	-0.056	-1.669	0.180	3.155	0.204	1.802
IK (WLS)	-0.304	-1.235	-0.056	-0.403	-0.068	-2.126	0.034	0.471	0.146	1.176
NOA (OLS)	**-1.080**	-6.216	0.034	0.338	-0.049	-1.395	0.233	3.791	0.179	1.642
NOA (WLS)	**-0.992**	-5.071	-0.055	-0.376	-0.060	-2.036	0.094	1.207	0.131	0.990
ACC (OLS)	**-1.346**	-5.131	0.012	0.123	-0.057	-1.650	0.194	3.267	0.186	1.705
ACC (WLS)	**-1.554**	-3.585	-0.088	-0.586	-0.083	-2.496	0.025	0.353	0.137	1.070
IG (OLS)	**-0.128**	-5.195	0.011	0.115	-0.050	-1.486	0.199	3.271	0.227	1.997
IG (WLS)	**-0.172**	-2.912	-0.067	-0.442	-0.070	-2.247	0.043	0.592	0.150	1.187
ACX (OLS)	**-0.105**	-4.792	-0.014	-0.139	-0.049	-1.522	0.200	3.378	0.238	2.062
ACX (WLS)	**-0.190**	-3.812	-0.084	-0.541	-0.068	-2.238	0.046	0.629	0.155	1.243
NSI (OLS)	**-0.836**	-6.842	0.051	0.497	-0.052	-1.497	0.216	3.676	0.221	2.003
NSI (WLS)	**-0.650**	-3.971	-0.022	-0.148	-0.059	-1.973	0.068	0.946	0.159	1.287
CSI (OLS)	**-0.163**	-4.500	0.050	0.505	-0.041	-1.293	0.175	3.331	0.111	0.985
CSI (WLS)	-0.108	-1.891	0.022	0.150	-0.054	-1.915	0.027	0.375	0.068	0.549
PRO=	*PRO*	*t*	β	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
GPA (OLS)	**0.878**	4.546	0.027	0.267	-0.041	-1.203	0.275	4.597	0.199	1.832
GPA (WLS)	**1.045**	3.889	-0.023	-0.153	-0.053	-1.743	0.205	2.954	0.149	1.255
OP (OLS)	**2.549**	7.621	0.029	0.283	-0.070	-2.111	0.305	4.928	0.208	1.883
OP (WLS)	**2.218**	4.931	-0.033	-0.220	-0.073	-2.474	0.209	2.830	0.165	1.350

Table 2 – continued

Panel B: The investment and profitability effects

INV=	*INV*	*t*	*GPA*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.610**	-5.370	**0.830**	4.346	0.060	0.592	-0.040	-1.193	0.230	4.015	0.195	1.794
TAG (WLS)	**-0.330**	-2.067	**0.945**	3.587	0.002	0.012	-0.053	-1.774	0.176	2.620	0.151	1.273
IA (OLS)	**-0.798**	-5.524	**0.714**	3.369	0.028	0.276	-0.043	-1.231	0.217	3.558	0.190	1.748
IA (WLS)	-0.424	-1.931	**0.826**	2.799	-0.044	-0.296	-0.065	-2.056	0.163	2.216	0.163	1.336
IK (OLS)	**-0.453**	-4.172	**0.737**	3.379	0.034	0.348	-0.050	-1.472	0.207	3.454	0.198	1.776
IK (WLS)	-0.296	-1.215	**0.851**	2.825	-0.032	-0.230	-0.064	-1.942	0.152	2.077	0.158	1.320
NOA (OLS)	**-1.116**	-6.636	**0.674**	3.153	0.035	0.353	-0.042	-1.196	0.259	4.129	0.176	1.641
NOA (WLS)	**-0.896**	-4.923	**0.744**	2.467	-0.024	-0.161	-0.055	-1.840	0.199	2.566	0.143	1.123
ACC (OLS)	**-1.420**	-5.541	**0.802**	3.720	0.019	0.184	-0.050	-1.441	0.225	3.655	0.179	1.680
ACC (WLS)	**-1.599**	-3.735	**0.953**	3.149	-0.063	-0.422	-0.080	-2.417	0.157	2.154	0.145	1.162
IG (OLS)	**-0.128**	-5.361	**0.732**	3.391	0.017	0.168	-0.043	-1.273	0.229	3.588	0.221	1.973
IG (WLS)	**-0.155**	-2.686	**0.837**	2.783	-0.046	-0.304	-0.064	-2.037	0.162	2.182	0.162	1.323
ACX (OLS)	**-0.112**	-5.240	**0.724**	3.216	-0.011	-0.115	-0.041	-1.256	0.237	3.811	0.227	1.997
ACX (WLS)	**-0.184**	-3.778	**0.854**	2.769	-0.056	-0.361	-0.061	-1.949	0.169	2.294	0.165	1.364
NSI (OLS)	**-0.736**	-6.345	**0.815**	4.235	0.053	0.522	-0.042	-1.255	0.259	4.346	0.219	2.004
NSI (WLS)	**-0.576**	-3.563	**0.981**	3.645	-0.008	-0.054	-0.053	-1.775	0.205	2.958	0.169	1.412
CSI (OLS)	**-0.152**	-4.405	**0.902**	4.428	0.051	0.522	-0.031	-0.983	0.232	4.271	0.108	0.971
CSI (WLS)	-0.088	-1.629	**1.045**	3.905	0.027	0.190	-0.048	-1.664	0.182	2.688	0.084	0.702

Table 2 – continued

INV=	*INV*	*t*	*OP*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.724**	-6.253	**2.588**	7.704	0.066	0.647	-0.070	-2.088	0.256	4.298	0.203	1.836
TAG (WLS)	**-0.363**	-2.209	**2.098**	4.865	-0.008	-0.058	-0.073	-2.483	0.182	2.562	0.163	1.343
IA (OLS)	**-0.927**	-6.441	**2.406**	6.134	0.032	0.317	-0.070	-2.093	0.247	3.879	0.200	1.800
IA (WLS)	**-0.524**	-2.317	**1.932**	4.067	-0.055	-0.367	-0.082	-2.714	0.172	2.246	0.183	1.451
IK (OLS)	**-0.490**	-4.479	**2.304**	5.455	0.038	0.396	-0.078	-2.404	0.232	3.656	0.209	1.843
IK (WLS)	-0.386	-1.637	**1.993**	4.199	-0.042	-0.303	-0.082	-2.620	0.160	2.091	0.177	1.429
NOA (OLS)	**-1.185**	-6.912	**2.260**	5.459	0.040	0.403	-0.069	-2.049	0.291	4.392	0.186	1.705
NOA (WLS)	**-0.868**	-4.824	**2.014**	4.248	-0.044	-0.303	-0.073	-2.508	0.229	2.832	0.163	1.231
ACC (OLS)	**-1.494**	-5.867	**2.360**	5.917	0.019	0.192	-0.080	-2.377	0.250	3.882	0.192	1.768
ACC (WLS)	**-1.442**	-3.271	**2.073**	3.982	-0.074	-0.498	-0.098	-3.025	0.162	2.130	0.173	1.333
IG (OLS)	**-0.144**	-6.128	**2.397**	5.822	0.020	0.202	-0.070	-2.170	0.262	3.904	0.230	2.013
IG (WLS)	**-0.167**	-2.829	**1.960**	4.037	-0.058	-0.382	-0.082	-2.710	0.174	2.227	0.182	1.442
ACX (OLS)	**-0.106**	-5.011	**2.456**	5.495	-0.003	-0.033	-0.066	-2.124	0.283	4.306	0.239	2.062
ACX (WLS)	**-0.174**	-3.458	**1.867**	3.638	-0.068	-0.443	-0.078	-2.602	0.172	2.205	0.189	1.523
NSI (OLS)	**-0.698**	-6.100	**2.430**	7.343	0.054	0.531	-0.071	-2.115	0.290	4.698	0.226	2.042
NSI (WLS)	**-0.553**	-3.365	**2.127**	4.737	-0.018	-0.121	-0.072	-2.491	0.212	2.859	0.184	1.489
CSI (OLS)	**-0.170**	-4.732	**2.715**	7.311	0.059	0.602	-0.059	-1.910	0.272	4.895	0.115	1.020
CSI (WLS)	-0.099	-1.795	**2.194**	4.743	0.024	0.165	-0.068	-2.465	0.179	2.422	0.098	0.798

Table 3
The investment or profitability effects across limits to arbitrage

This table reports the estimated differences in investment or profitability slopes between high and low limits to arbitrage subsamples for 22 specifications of the regression described in Table 2 with either *INV* or *PRO*. The high and low limits to arbitrage subsamples are the highest tercile and lowest tercile, respectively, grouped by the index of limits to arbitrage (*LTA*). The index is the average of the tercile rankings of idiosyncratic stock return volatility (*IVOL*), cash flow volatility (*CVOL*), bid-ask spread (*BIDASK*), and short interests (*SINTEREST*) as well as the inverse tercile rankings of analyst coverage (*COV*), share price (*PRICE*), and institutional holdings (*IHOLD*).

INV=	*INV*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.593**	-2.990	-0.080	-0.780	0.010	0.310	0.219	3.060	0.000	0.000
TAG (WLS)	-0.522	-1.790	-0.019	-0.150	0.025	0.440	0.118	1.200	0.247	1.460
IA (OLS)	**-0.631**	-2.710	-0.026	-0.250	0.010	0.340	0.245	3.420	-0.038	-0.340
IA (WLS)	-0.768	-1.780	-0.024	-0.180	0.037	0.640	0.122	1.250	0.222	1.290
IK (OLS)	-0.367	-1.620	-0.008	-0.090	-0.009	-0.270	0.231	3.230	0.010	0.090
IK (WLS)	-0.197	-0.440	-0.014	-0.110	0.015	0.250	0.117	1.130	0.283	1.640
NOA (OLS)	**-0.636**	-2.790	0.026	0.240	0.027	0.930	0.295	4.300	-0.082	-0.700
NOA (WLS)	-0.233	-0.570	0.044	0.320	0.062	1.010	0.195	2.000	0.197	1.040
ACC (OLS)	0.211	0.500	-0.018	-0.170	0.007	0.240	0.278	4.010	-0.028	-0.250
ACC (WLS)	1.273	1.390	-0.017	-0.130	0.037	0.640	0.180	1.880	0.255	1.480
IG (OLS)	-0.062	-1.430	-0.018	-0.180	-0.008	-0.240	0.253	3.550	0.028	0.230
IG (WLS)	-0.108	-1.270	-0.038	-0.280	0.016	0.260	0.113	1.090	0.294	1.700
ACX (OLS)	0.016	0.360	-0.021	-0.210	-0.009	-0.290	0.251	3.440	0.063	0.490
ACX (WLS)	0.062	0.590	-0.052	-0.350	0.043	0.730	0.170	1.570	0.315	1.770
NSI (OLS)	**-0.468**	-2.150	-0.069	-0.670	-0.006	-0.180	0.239	3.460	0.031	0.270
NSI (WLS)	0.365	0.960	-0.062	-0.470	0.003	0.050	0.155	1.530	0.290	1.680
CSI (OLS)	-0.121	-1.700	-0.115	-1.100	0.035	0.950	0.253	3.430	-0.010	-0.080
CSI (WLS)	**-0.278**	-2.460	-0.105	-0.780	0.068	1.170	0.051	0.450	0.154	0.850
PRO=	*PRO*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
GPA (OLS)	-0.160	-0.720	-0.057	-0.560	-0.013	-0.410	0.147	2.120	-0.013	-0.120
GPA (WLS)	-0.093	-0.260	-0.053	-0.410	-0.007	-0.120	0.004	0.030	0.281	1.690
OP (OLS)	-0.531	-0.950	-0.074	-0.710	-0.037	-1.200	0.073	0.960	0.003	0.030
OP (WLS)	0.546	0.700	-0.050	-0.410	-0.009	-0.150	0.071	0.620	0.306	1.830

Table 4
The investment and profitability effects across investment frictions

This table reports the estimated differences in investment and profitability slopes between high and low investment frictions subsamples for 36 specifications of the regression described in Table 2 with both *INV* and *PRO*. The high and low investment frictions subsamples are the highest tercile and lowest tercile, respectively, grouped by the index of investment frictions (*IF*). The index is the average of the inverse tercile rankings of total asset size (*ASSET*), firm age (*AGE*), payout ratio (*PAYOUT*), and credit rating dummy (*RATING*).

INV=	*INV*	*t*	*GPA*	*t*	β	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.312**	-1.970	-0.209	-0.980	0.024	0.280	0.052	1.390	0.135	2.070	0.052	0.570
TAG (WLS)	-0.105	-0.460	-0.409	-1.310	-0.031	-0.290	0.095	1.690	0.045	0.610	0.494	3.720
IA (OLS)	**-0.563**	-2.200	-0.101	-0.480	0.058	0.670	0.059	1.630	0.175	2.770	0.024	0.270
IA (WLS)	-0.690	-1.590	-0.264	-0.820	-0.025	-0.220	0.104	1.720	0.045	0.570	0.462	3.570
IK (OLS)	0.091	0.390	-0.211	-0.970	0.053	0.620	0.035	0.900	0.145	2.230	0.043	0.480
IK (WLS)	0.321	0.950	-0.352	-1.060	-0.042	-0.400	0.064	1.080	0.025	0.320	0.507	3.720
NOA (OLS)	-0.076	-0.250	0.056	0.230	0.075	0.820	0.050	1.420	0.182	2.640	0.010	0.100
NOA (WLS)	0.186	0.460	-0.125	-0.330	0.012	0.100	0.065	1.110	0.073	0.860	0.611	3.490
ACC (OLS)	-0.541	-1.250	-0.073	-0.330	0.073	0.850	0.049	1.340	0.174	2.820	0.027	0.290
ACC (WLS)	0.742	0.930	-0.246	-0.730	0.002	0.020	0.085	1.410	0.038	0.480	0.503	3.670
IG (OLS)	**-0.123**	-2.470	-0.122	-0.570	0.066	0.780	0.044	1.180	0.159	2.560	0.053	0.580
IG (WLS)	-0.101	-1.180	-0.324	-0.940	-0.021	-0.190	0.069	1.180	0.012	0.160	0.527	3.840
ACX (OLS)	-0.057	-1.150	-0.036	-0.170	0.077	0.910	0.028	0.740	0.190	3.460	0.039	0.400
ACX (WLS)	-0.005	-0.060	-0.313	-0.850	-0.046	-0.400	0.055	0.890	0.116	1.420	0.575	3.780
NSI (OLS)	0.006	0.020	-0.246	-1.170	0.032	0.370	0.026	0.710	0.141	2.280	0.078	0.860
NSI (WLS)	0.437	1.230	-0.359	-1.140	-0.080	-0.750	0.066	1.140	0.037	0.490	0.518	3.810
CSI (OLS)	-0.059	-0.690	-0.090	-0.430	-0.026	-0.280	0.083	2.150	0.225	3.460	-0.020	-0.180
CSI (WLS)	-0.251	-1.930	-0.166	-0.510	-0.104	-0.930	0.151	2.380	0.059	0.590	0.294	1.960

Table 4 – continued

INV=	*INV*	*t*	*OP*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
TAG (OLS)	**-0.479**	-2.980	-0.525	-0.960	0.015	0.170	0.031	0.860	0.074	1.110	0.068	0.760
TAG (WLS)	-0.134	-0.570	0.015	0.020	-0.019	-0.180	0.083	1.490	0.087	1.040	0.501	3.760
IA (OLS)	**-0.601**	-2.340	-0.271	-0.500	0.035	0.410	0.032	0.920	0.126	2.050	0.038	0.440
IA (WLS)	-0.720	-1.670	0.066	0.090	-0.022	-0.190	0.095	1.620	0.079	0.890	0.464	3.640
IK (OLS)	0.050	0.220	-0.655	-1.240	0.032	0.380	0.013	0.340	0.089	1.380	0.050	0.560
IK (WLS)	0.404	1.230	-0.087	-0.120	-0.029	-0.290	0.058	1.000	0.065	0.740	0.506	3.790
NOA (OLS)	-0.136	-0.480	-0.436	-0.830	0.049	0.540	0.022	0.640	0.110	1.740	0.022	0.210
NOA (WLS)	0.121	0.310	-0.377	-0.530	0.044	0.360	0.054	0.950	0.067	0.740	0.601	3.530
ACC (OLS)	**-0.894**	-1.990	-0.533	-0.930	0.045	0.520	0.023	0.660	0.117	1.910	0.042	0.470
ACC (WLS)	0.397	0.490	-0.055	-0.080	-0.013	-0.120	0.069	1.170	0.072	0.810	0.497	3.620
IG (OLS)	**-0.130**	-2.600	-0.339	-0.660	0.041	0.480	0.018	0.490	0.112	1.830	0.060	0.660
IG (WLS)	-0.093	-1.070	0.028	0.040	-0.019	-0.170	0.066	1.120	0.055	0.650	0.525	3.890
ACX (OLS)	-0.067	-1.350	-0.168	-0.320	0.049	0.590	0.000	0.000	0.151	2.610	0.059	0.610
ACX (WLS)	-0.003	-0.040	0.150	0.190	-0.037	-0.330	0.046	0.730	0.171	1.960	0.587	3.950
NSI (OLS)	0.007	0.030	-0.832	-1.510	0.019	0.220	0.006	0.170	0.087	1.360	0.092	1.030
NSI (WLS)	0.453	1.370	0.075	0.110	-0.070	-0.680	0.056	0.970	0.093	1.120	0.520	3.840
CSI (OLS)	-0.086	-0.950	-0.377	-0.720	-0.025	-0.270	0.066	1.710	0.189	2.610	0.003	0.030
CSI (WLS)	-0.244	-1.880	0.601	0.880	-0.089	-0.830	0.140	2.240	0.133	1.290	0.308	2.060

Table 5
The investment effects across limits to arbitrage controlling for investment frictions or across investment frictions controlling for limits to arbitrage

Panel A reports the estimated differences in investment slopes between high and low limits to arbitrage subsamples for 18 specifications of the regression described in Table 2 with *INV* but without *PRO* across terciles sorted independently by investment frictions (*IF*). Panel B reports the estimated differences in investment slopes between high and low investment frictions subsamples for 36 specifications of the regression described in Table 2 with *INV* and *PRO* across terciles sorted independently by limits to arbitrage (*LTA*).

Panel A: Differences in investment effects across limits to arbitrage controlling for investment frictions

IF	*INV=*	*INV*	*t*	β	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
1	*TAG* (OLS)	**-0.936**	-2.260	-0.035	-0.190	0.055	0.590	-0.434	-1.130	1.182	2.870
2	*TAG* (OLS)	-0.507	-1.500	-0.236	-1.960	-0.001	-0.030	0.120	1.280	-0.107	-0.600
3	*TAG* (OLS)	-0.697	-1.290	-0.065	-0.470	0.064	0.690	0.297	2.260	-0.192	-0.750
1	*TAG* (WLS)	-0.856	-1.630	0.153	0.770	0.040	0.330	-0.597	-1.210	0.744	1.620
2	*TAG* (WLS)	-0.707	-1.370	-0.236	-1.430	0.034	0.340	0.160	1.240	0.194	0.720
3	*TAG* (WLS)	-0.536	-0.800	0.015	0.060	0.303	2.180	0.271	1.600	0.518	1.480
1	*IA* (OLS)	-0.915	-1.460	0.004	0.020	-0.025	-0.220	-0.402	-1.310	1.170	3.180
2	*IA* (OLS)	-0.224	-0.550	-0.205	-1.390	-0.019	-0.340	0.119	1.200	-0.072	-0.420
3	*IA* (OLS)	0.047	0.070	-0.046	-0.320	0.079	0.840	0.370	2.630	-0.223	-0.870
1	*IA* (WLS)	-0.670	-0.910	0.148	0.720	-0.054	-0.390	-0.500	-1.380	0.743	1.920
2	*IA* (WLS)	-0.487	-0.840	-0.252	-1.310	0.027	0.270	0.146	1.070	0.238	0.840
3	*IA* (WLS)	1.291	1.380	-0.110	-0.560	0.268	1.880	0.281	1.610	0.452	1.340
1	*IK* (OLS)	-0.586	-0.950	-0.024	-0.140	0.088	0.960	0.001	0.010	0.892	3.080
2	*IK* (OLS)	-0.526	-1.380	-0.197	-1.480	-0.027	-0.510	0.122	1.320	-0.116	-0.690
3	*IK* (OLS)	-0.468	-0.950	0.016	0.110	0.085	0.900	0.361	2.540	-0.202	-0.730
1	*IK* (WLS)	-0.612	-0.680	0.103	0.500	0.111	0.840	-0.213	-1.060	0.554	1.800
2	*IK* (WLS)	-0.177	-0.270	-0.246	-1.400	-0.016	-0.160	0.167	1.170	0.290	1.080
3	*IK* (WLS)	-0.255	-0.480	0.072	0.350	0.204	1.400	0.173	1.030	0.445	1.240
1	*NOA (OLS)*	-0.744	-0.970	0.048	0.160	-0.050	-0.320	-0.154	-0.420	2.376	2.500
2	*NOA (OLS)*	-0.812	-1.690	-0.137	-1.070	-0.020	-0.360	0.129	1.280	-0.302	-1.710
3	*NOA (OLS)*	-1.055	-1.950	-0.032	-0.210	0.113	1.220	0.339	2.370	-0.342	-1.200
1	*NOA (WLS)*	-0.482	-0.480	0.140	0.600	0.027	0.180	-0.471	-0.700	1.941	2.140
2	*NOA (WLS)*	**-1.479**	-2.400	-0.021	-0.130	0.065	0.600	0.207	1.550	0.003	0.010
3	*NOA (WLS)*	-1.292	-1.850	-0.127	-0.610	0.399	2.660	0.439	2.350	0.414	1.130
1	*ACC (OLS)*	1.358	1.310	-0.027	-0.140	0.006	0.060	-0.335	-0.930	1.479	3.290
2	*ACC (OLS)*	-0.076	-0.090	-0.259	-1.570	-0.004	-0.070	0.163	1.700	-0.087	-0.520
3	*ACC (OLS)*	0.130	0.140	0.044	0.280	0.100	1.070	0.425	2.890	-0.266	-1.050
1	*ACC (WLS)*	2.414	1.680	0.274	1.320	0.013	0.110	-0.305	-0.990	0.659	1.740
2	*ACC (WLS)*	-0.875	-0.720	-0.285	-1.580	0.038	0.360	0.226	1.800	0.262	0.940
3	*ACC (WLS)*	0.653	0.500	0.085	0.390	0.270	1.770	0.230	1.220	0.484	1.410
1	*IG (OLS)*	0.103	0.660	0.028	0.150	0.038	0.410	0.003	0.030	0.842	3.010
2	*IG (OLS)*	-0.036	-0.510	-0.181	-1.260	-0.020	-0.380	0.167	1.830	-0.056	-0.320
3	*IG (OLS)*	-0.148	-1.400	-0.039	-0.250	0.035	0.390	0.341	2.360	-0.152	-0.540
1	*IG (WLS)*	-0.084	-0.440	0.132	0.630	0.051	0.400	-0.117	-0.660	0.449	1.500
2	*IG (WLS)*	0.132	1.010	-0.208	-1.160	0.032	0.310	0.205	1.540	0.285	1.040
3	*IG (WLS)*	-0.148	-1.270	-0.060	-0.300	0.200	1.370	0.170	0.920	0.422	1.210
1	*ACX (OLS)*	0.145	0.960	-0.104	-0.450	-0.016	-0.130	0.046	0.350	1.335	2.930
2	*ACX (OLS)*	-0.076	-0.950	-0.188	-1.220	-0.019	-0.370	0.145	1.540	-0.063	-0.370
3	*ACX (OLS)*	-0.071	-0.650	-0.061	-0.350	0.041	0.520	0.404	2.940	-0.102	-0.310
1	*ACX (WLS)*	0.051	0.280	0.070	0.350	0.112	0.920	-0.029	-0.170	0.637	2.020
2	*ACX (WLS)*	0.002	0.010	-0.190	-1.040	0.057	0.540	0.185	1.290	0.247	0.850
3	*ACX (WLS)*	-0.075	-0.510	-0.098	-0.440	0.148	1.080	0.251	1.260	0.390	1.010

Table 5 – continued

1	*NSI (OLS)*	-0.773	-0.780	0.047	0.240	0.057	0.610	-0.012	-0.080	1.028	3.450
2	*NSI (OLS)*	-0.264	-0.560	-0.221	-1.800	-0.008	-0.160	0.145	1.580	-0.052	-0.290
3	*NSI (OLS)*	-1.205	-1.120	-0.028	-0.190	0.031	0.380	0.355	2.520	-0.133	-0.500
1	*NSI (WLS)*	-1.628	-0.980	0.109	0.530	-0.010	-0.080	-0.150	-0.760	0.559	1.660
2	*NSI (WLS)*	-0.459	-0.670	-0.240	-1.470	0.018	0.170	0.236	1.710	0.356	1.250
3	*NSI (WLS)*	-0.707	-0.520	0.062	0.300	0.211	1.570	0.299	1.800	0.458	1.270
1	*CSI (OLS)*	-0.200	-1.440	-0.016	-0.080	0.087	0.850	-0.243	-0.900	1.109	3.170
2	*CSI (OLS)*	-0.141	-1.500	-0.194	-1.680	0.007	0.120	0.104	1.080	-0.111	-0.640
3	*CSI (OLS)*	-0.351	-1.200	-0.296	-1.550	0.117	0.840	0.290	1.090	-0.511	-1.380
1	*CSI (WLS)*	-0.112	-0.640	0.008	0.040	0.038	0.270	-0.247	-0.930	0.673	2.110
2	*CSI (WLS)*	**-0.341**	-2.150	-0.136	-0.870	0.081	0.780	0.061	0.380	0.144	0.490
3	*CSI (WLS)*	-0.532	-1.670	-0.231	-1.050	0.286	1.630	0.119	0.410	-0.158	-0.330

Table 5 – continued

Panel B: Differences in investment effects across investment frictions controlling for limits to arbitrage

LTA	*INV*=	*INV*	*t*	*GPA*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
1	*TAG* (OLS)	0.001	0.000	-0.163	-0.450	0.070	0.490	-0.003	-0.030	-0.021	-0.140	0.321	1.260
2	*TAG* (OLS)	-0.147	-0.540	-0.089	-0.290	-0.045	-0.490	0.103	1.900	0.082	0.900	0.281	1.900
3	*TAG* (OLS)	0.127	0.310	-0.248	-0.310	0.053	0.330	-0.022	-0.210	0.815	1.620	-1.068	-2.590
1	*TAG* (WLS)	0.100	0.150	-0.558	-0.980	0.087	0.400	-0.027	-0.210	0.036	0.190	-0.251	-0.740
2	*TAG* (WLS)	-0.256	-0.780	-0.515	-1.060	-0.116	-0.750	0.088	1.120	-0.008	-0.060	0.667	2.770
3	*TAG* (WLS)	0.236	0.470	-0.101	-0.120	0.033	0.160	0.190	1.230	1.209	1.600	-0.714	-1.310
1	*IA* (OLS)	-0.831	-1.190	-0.094	-0.240	0.092	0.570	-0.012	-0.130	-0.054	-0.340	0.297	1.170
2	*IA* (OLS)	-0.296	-0.770	-0.111	-0.380	-0.034	-0.340	0.103	1.880	0.107	1.190	0.254	1.670
3	*IA* (OLS)	-0.222	-0.320	-0.194	-0.190	0.061	0.370	0.073	0.580	0.766	1.950	-1.011	-2.990
1	*IA* (WLS)	**-1.836**	-1.980	-0.431	-0.650	0.215	0.960	-0.002	-0.010	0.043	0.200	-0.199	-0.610
2	*IA* (WLS)	-0.535	-0.920	-0.556	-1.200	-0.080	-0.480	0.114	1.370	-0.009	-0.070	0.661	2.800
3	*IA* (WLS)	-0.368	-0.450	0.368	0.320	0.063	0.230	0.271	1.620	1.041	1.800	-0.642	-1.470
1	*IK* (OLS)	0.545	0.900	0.251	0.600	-0.032	-0.180	-0.143	-0.880	-0.199	-0.910	0.291	1.020
2	*IK* (OLS)	0.219	0.610	-0.123	-0.400	-0.037	-0.370	0.088	1.620	0.091	0.930	0.258	1.700
3	*IK* (OLS)	0.174	0.270	**-2.399**	-2.120	-0.017	-0.100	-0.081	-0.850	-0.002	-0.010	-0.704	-2.640
1	*IK* (WLS)	0.753	1.040	-0.194	-0.310	-0.043	-0.190	-0.120	-0.670	-0.090	-0.430	-0.215	-0.600
2	*IK* (WLS)	-0.143	-0.310	-0.694	-1.380	-0.051	-0.320	0.109	1.310	-0.006	-0.050	0.674	2.770
3	*IK* (WLS)	0.629	0.950	**-2.383**	-1.990	-0.105	-0.470	0.059	0.420	0.196	0.950	-0.241	-0.790
1	*NOA* (OLS)	1.051	1.730	0.055	0.150	0.203	1.220	-0.068	-0.680	0.006	0.040	0.411	1.500
2	*NOA* (OLS)	0.384	0.670	0.009	0.030	-0.039	-0.370	0.077	1.320	0.110	1.060	0.354	2.090
3	*NOA* (OLS)	-0.124	-0.150	0.138	0.140	0.156	0.530	0.067	0.380	0.488	1.240	-2.333	-2.380
1	*NOA* (WLS)	1.103	1.330	-0.317	-0.500	0.296	1.300	-0.167	-1.270	-0.093	-0.480	-0.106	-0.300
2	*NOA* (WLS)	1.230	1.890	-0.210	-0.390	-0.103	-0.620	0.091	1.110	0.032	0.190	0.908	3.440
3	*NOA* (WLS)	-0.108	-0.100	0.668	0.600	0.193	0.670	0.216	1.050	0.978	1.220	-2.018	-1.860
1	*ACC* (OLS)	-0.087	-0.080	0.006	0.020	0.049	0.300	-0.048	-0.530	-0.087	-0.570	0.369	1.430
2	*ACC* (OLS)	**-1.252**	-1.970	-0.109	-0.360	0.014	0.140	0.085	1.550	0.071	0.800	0.217	1.430
3	*ACC* (OLS)	-1.235	-1.320	-0.244	-0.240	0.134	0.710	0.055	0.470	0.956	1.570	-1.351	-2.930
1	*ACC (WLS)*	0.736	0.450	-0.302	-0.450	0.050	0.210	0.004	0.030	0.110	0.590	-0.165	-0.480
2	*ACC (WLS)*	-0.293	-0.310	-0.481	-1.000	-0.072	-0.420	0.117	1.450	0.018	0.130	0.515	2.100
3	*ACC (WLS)*	-1.158	-1.090	0.206	0.220	0.007	0.030	0.246	1.510	1.201	1.600	-0.857	-1.600

Table 5 – continued

1	*IG* (OLS)	0.074	0.650	0.146	0.350	0.083	0.510	-0.007	-0.080	-0.033	-0.200	0.290	1.090
2	*IG* (OLS)	-0.097	-1.210	-0.052	-0.180	-0.011	-0.110	0.092	1.730	0.074	0.830	0.248	1.630
3	*IG* (OLS)	-0.218	-1.490	-1.545	-1.690	-0.010	-0.060	-0.064	-0.660	0.101	0.530	-0.672	-2.520
1	*IG* (WLS)	0.039	0.240	-0.448	-0.720	0.155	0.660	0.008	0.070	0.123	0.670	-0.119	-0.340
2	*IG* (WLS)	-0.178	-1.310	-0.657	-1.350	-0.066	-0.410	0.097	1.180	-0.004	-0.030	0.678	2.740
3	*IG* (WLS)	-0.072	-0.360	-1.604	-1.440	0.015	0.060	0.107	0.680	0.170	0.710	-0.252	-0.710
1	*ACX* (OLS)	0.133	1.090	0.038	0.080	0.020	0.090	-0.156	-0.800	-0.333	-1.020	0.148	0.460
2	*ACX* (OLS)	-0.156	-1.880	0.031	0.100	0.026	0.240	0.085	1.440	0.151	1.450	0.155	0.960
3	*ACX* (OLS)	-0.081	-0.520	-0.052	-0.040	0.093	0.370	0.027	0.200	0.277	1.100	-1.027	-2.340
1	*ACX* (WLS)	0.227	1.440	-0.554	-0.920	0.065	0.240	-0.158	-0.740	-0.308	-0.860	-0.191	-0.510
2	*ACX* (WLS)	**-0.271**	-2.230	-0.885	-1.710	-0.047	-0.260	0.116	1.260	0.124	0.830	0.654	2.620
3	*ACX* (WLS)	0.161	0.910	0.258	0.200	0.112	0.400	0.107	0.630	0.499	1.670	-0.569	-1.380
1	*NSI* (OLS)	0.801	0.770	-0.043	-0.120	0.030	0.200	-0.004	-0.050	-0.065	-0.440	0.297	1.110
2	*NSI* (OLS)	0.596	1.220	-0.064	-0.220	-0.051	-0.550	0.072	1.340	0.089	1.000	0.313	2.090
3	*NSI* (OLS)	0.436	0.380	-0.254	-0.270	-0.003	-0.020	-0.034	-0.310	0.606	1.600	-0.959	-2.820
1	*NSI* (WLS)	1.057	0.790	-0.337	-0.600	0.002	0.010	-0.022	-0.180	-0.029	-0.180	-0.118	-0.340
2	*NSI* (WLS)	0.639	1.020	-0.459	-0.950	-0.177	-1.160	0.089	1.080	0.051	0.400	0.763	3.240
3	*NSI* (WLS)	1.530	0.930	-0.267	-0.240	0.059	0.230	0.192	1.210	0.937	1.600	-0.562	-1.210
1	*CSI* (OLS)	1.043	0.850	-0.082	-0.760	-0.458	-0.780	-0.127	-0.910	-0.202	-1.300	0.805	2.310
2	*CSI* (OLS)	0.034	0.300	-0.346	-1.030	-0.083	-0.800	0.084	1.360	0.200	1.800	0.147	0.720
3	*CSI* (OLS)	-0.033	-0.190	0.134	0.160	0.024	0.120	0.011	0.090	0.846	1.620	-1.074	-2.780
1	*CSI* (WLS)	0.988	0.850	-0.397	-0.650	-0.442	-0.790	-0.130	-0.900	-0.249	-1.300	0.458	1.030
2	*CSI* (WLS)	-0.095	-0.570	-0.839	-1.540	-0.164	-0.930	0.107	1.090	0.091	0.590	0.293	1.010
3	*CSI* (WLS)	-0.315	-1.240	0.032	0.030	0.070	0.260	0.256	1.490	0.899	1.490	-0.796	-1.900

Table 5 – continued

LTA	*INV=*	*INV*	*t*	*OP*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
1	*TAG* (OLS)	-0.169	-0.330	-0.920	-0.720	0.073	0.490	0.025	0.360	0.008	0.060	0.357	1.490
2	*TAG* (OLS)	-0.190	-0.710	0.673	0.960	-0.046	-0.500	0.099	1.730	0.137	1.390	0.290	1.980
3	*TAG* (OLS)	0.051	0.120	0.155	0.080	0.086	0.540	0.000	0.000	0.861	1.540	-1.072	-2.400
1	*TAG* (WLS)	0.063	0.090	-1.759	-1.100	0.111	0.510	0.013	0.120	0.046	0.250	-0.187	-0.550
2	*TAG* (WLS)	-0.196	-0.580	-0.515	-0.520	-0.139	-0.910	0.111	1.300	0.032	0.230	0.684	2.680
3	*TAG* (WLS)	0.397	0.730	0.107	0.050	0.101	0.490	0.159	1.100	1.423	1.490	-0.817	-1.220
1	*IA* (OLS)	-0.720	-0.990	-0.760	-0.560	0.073	0.430	0.022	0.320	-0.002	-0.020	0.317	1.330
2	*IA* (OLS)	-0.310	-0.800	0.761	1.070	-0.073	-0.730	0.104	1.830	0.176	1.780	0.275	1.810
3	*IA* (OLS)	0.006	0.010	-0.096	-0.050	0.070	0.440	0.074	0.670	0.712	1.930	-1.015	-2.900
1	*IA* (WLS)	-1.599	-1.710	-1.556	-0.930	0.241	1.070	0.013	0.130	0.002	0.010	-0.163	-0.490
2	*IA* (WLS)	-0.525	-0.850	-0.386	-0.390	-0.154	-0.980	0.144	1.630	0.040	0.280	0.706	2.850
3	*IA* (WLS)	0.136	0.160	-1.166	-0.720	0.021	0.100	0.263	1.700	0.780	2.110	-0.502	-1.330
1	*IK* (OLS)	0.325	0.710	-0.128	-0.110	0.048	0.300	-0.034	-0.430	-0.011	-0.080	0.394	1.580
2	*IK* (OLS)	0.164	0.490	0.825	1.140	-0.062	-0.630	0.095	1.690	0.170	1.570	0.275	1.810
3	*IK* (OLS)	0.650	0.990	**-1.450**	-2.270	0.041	0.250	-0.043	-0.390	0.089	0.530	-0.601	-2.320
1	*IK* (WLS)	0.760	1.170	-0.541	-0.370	0.072	0.320	-0.035	-0.310	0.102	0.610	-0.054	-0.160
2	*IK* (WLS)	-0.302	-0.670	-0.457	-0.450	-0.090	-0.600	0.141	1.600	0.049	0.340	0.698	2.780
3	*IK* (WLS)	1.193	1.490	**-1.649**	-2.390	-0.044	-0.210	0.058	0.340	0.195	1.060	-0.106	-0.320
1	*NOA* (OLS)	0.878	1.510	0.897	0.630	0.233	1.280	-0.080	-0.920	0.059	0.390	0.392	1.520
2	*NOA* (OLS)	0.246	0.450	0.513	0.710	-0.076	-0.740	0.075	1.240	0.139	1.300	0.355	2.120
3	*NOA* (OLS)	0.009	0.010	-1.907	-0.580	-0.090	-0.170	0.205	0.970	0.193	1.010	-2.150	-2.190
1	*NOA* (WLS)	1.363	1.700	0.187	0.110	0.433	1.800	-0.187	-1.490	-0.055	-0.290	-0.140	-0.390
2	*NOA* (WLS)	0.923	1.490	-1.681	-1.590	-0.128	-0.760	0.098	1.120	-0.063	-0.390	0.879	3.170
3	*NOA* (WLS)	0.229	0.210	-0.215	-0.090	0.221	0.640	0.286	1.370	0.750	1.400	-1.994	-1.690
1	*ACC* (OLS)	0.064	0.060	-0.399	-0.310	-0.007	-0.040	-0.020	-0.250	-0.029	-0.190	0.407	1.650
2	*ACC* (OLS)	**-1.526**	-2.360	0.211	0.290	-0.023	-0.220	0.089	1.560	0.113	1.150	0.222	1.480
3	*ACC* (OLS)	-1.262	-1.160	2.023	0.690	0.212	1.020	0.038	0.400	1.178	1.420	-1.574	-2.630
1	*ACC (WLS)*	0.794	0.460	-0.574	-0.340	0.061	0.250	0.008	0.070	0.144	0.750	-0.125	-0.350
2	*ACC (WLS)*	-0.624	-0.610	-0.842	-0.870	-0.120	-0.720	0.140	1.650	0.015	0.100	0.543	2.140
3	*ACC (WLS)*	-0.821	-0.660	2.381	0.740	0.180	0.670	0.200	1.360	1.541	1.420	-1.390	-1.670

Table 5 – continued

1	*IG* (OLS)	0.072	0.650	-0.040	-0.030	0.112	0.610	0.046	0.670	0.095	0.710	0.363	1.510
2	*IG* (OLS)	-0.092	-1.150	0.806	1.060	-0.052	-0.520	0.091	1.630	0.144	1.430	0.262	1.700
3	*IG* (OLS)	-0.145	-0.920	-4.536	-1.810	-0.047	-0.280	-0.013	-0.130	0.061	0.350	-0.526	-1.880
1	*IG* (WLS)	0.070	0.420	-0.951	-0.560	0.238	0.990	0.023	0.210	0.140	0.750	-0.008	-0.020
2	*IG* (WLS)	-0.178	-1.320	-0.735	-0.740	-0.132	-0.850	0.132	1.500	0.041	0.280	0.691	2.650
3	*IG* (WLS)	-0.002	-0.010	**-6.055**	-2.050	-0.062	-0.290	0.130	0.870	0.066	0.310	-0.015	-0.040
1	*ACX* (OLS)	0.196	1.180	1.718	1.040	0.043	0.210	-0.236	-0.790	-0.152	-0.530	0.070	0.160
2	*ACX* (OLS)	**-0.162**	-1.990	0.912	1.100	-0.023	-0.210	0.087	1.430	0.225	1.860	0.164	1.000
3	*ACX* (OLS)	-0.228	-1.270	1.481	0.360	0.196	0.790	0.178	0.880	0.291	0.760	-1.351	-2.200
1	*ACX* (WLS)	0.288	1.460	2.368	0.720	0.156	0.600	-0.230	-0.750	-0.074	-0.230	-0.269	-0.560
2	*ACX* (WLS)	**-0.278**	-2.200	-1.730	-1.480	-0.099	-0.570	0.154	1.600	0.132	0.850	0.701	2.610
3	*ACX* (WLS)	0.005	0.030	1.305	0.200	0.196	0.730	0.262	1.160	0.282	0.720	-0.915	-1.290
1	*NSI* (OLS)	1.179	1.070	-0.073	-0.060	0.047	0.290	0.023	0.350	0.020	0.150	0.321	1.260
2	*NSI* (OLS)	0.452	0.950	0.548	0.800	-0.045	-0.490	0.067	1.180	0.136	1.430	0.318	2.150
3	*NSI* (OLS)	0.656	0.600	-0.578	-0.310	-0.007	-0.040	-0.028	-0.300	0.406	1.650	-0.866	-2.900
1	*NSI* (WLS)	1.137	0.730	-0.196	-0.130	0.057	0.250	-0.004	-0.040	0.056	0.320	-0.092	-0.260
2	*NSI* (WLS)	0.631	1.070	-0.532	-0.550	-0.194	-1.280	0.110	1.240	0.082	0.620	0.783	3.150
3	*NSI* (WLS)	1.765	0.990	-2.575	-1.750	0.010	0.050	0.161	1.100	0.404	1.730	-0.306	-0.910
1	*CSI* (OLS)	-0.105	-0.460	-1.000	-0.480	0.290	1.330	-0.030	-0.250	-0.106	-0.510	0.591	1.790
2	*CSI* (OLS)	0.024	0.200	0.450	0.640	-0.072	-0.690	0.100	1.490	0.310	2.340	0.175	0.890
3	*CSI* (OLS)	-0.033	-0.180	0.503	0.260	0.041	0.220	0.028	0.280	0.840	1.730	-1.019	-2.740
1	*CSI* (WLS)	-0.152	-0.600	-2.573	-1.080	0.357	1.220	0.039	0.290	-0.027	-0.130	0.250	0.590
2	*CSI* (WLS)	-0.122	-0.690	-0.166	-0.160	-0.185	-1.080	0.182	1.750	0.211	1.260	0.302	1.050
3	*CSI* (WLS)	-0.322	-1.210	-1.303	-0.820	0.044	0.190	0.220	1.340	0.551	1.510	-0.620	-1.860

Table 6
The asymmetric investment effects across limits to arbitrage controlling for investment frictions or across investment frictions controlling for limits to arbitrage

Panel A reports the estimated differences between high and low investment subsamples in the differences in investment slopes between high and low limits to arbitrage subsamples for 18 specifications of the regression described in Table 2 with *INV* but without *PRO* across terciles sorted independently by investment frictions (*IF*). Panel B reports the estimated differences between high and low investment subsamples in the differences in investment slopes between high and low investment frictions subsamples for 36 specifications of the regression described in Table 2 with *INV* and *PRO* across terciles sorted independently by limits to arbitrage (*LTA*). The high and low investment subsamples are split at the median.

Panel A: Differences across high and low investment in investment effects across limits to arbitrage controlling for investment frictions

IF	*INV=*	*INV*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
1	*TAG* (OLS)	-13.553	-1.540	0.423	0.370	0.830	1.200	-0.178	-0.150	-0.949	-0.760
2	*TAG* (OLS)	**-3.224**	-2.390	0.276	1.150	-0.111	-1.300	0.074	0.380	-0.218	-0.660
3	*TAG* (OLS)	1.152	2.550	0.409	1.070	0.205	0.920	0.143	0.320	0.926	1.920
1	*TAG* (WLS)	**-19.433**	-2.000	0.468	0.390	0.751	1.050	-0.213	-0.180	-1.575	-0.870
2	*TAG* (WLS)	**-5.292**	-3.050	0.121	0.360	-0.003	-0.020	0.451	1.690	-0.080	-0.180
3	*TAG* (WLS)	0.218	0.090	0.343	0.790	0.075	0.300	-0.056	-0.140	1.658	2.570
1	*IA* (OLS)	15.894	1.370	-0.992	-0.780	0.812	1.250	0.079	0.270	-0.041	-0.070
2	*IA* (OLS)	-1.481	-0.990	0.426	1.450	0.138	0.620	0.232	1.130	-0.288	-0.730
3	*IA* (OLS)	-6.354	-1.270	-0.127	-0.360	-0.099	-0.340	-0.821	-1.370	1.505	2.370
1	*IA* (WLS)	15.920	1.440	-1.136	-0.900	0.935	1.390	0.389	1.020	0.409	0.670
2	*IA* (WLS)	-2.260	-1.020	0.518	1.450	0.230	0.900	0.255	0.880	-0.342	-0.680
3	*IA* (WLS)	-7.241	-1.370	-0.263	-0.650	-0.157	-0.480	-0.934	-1.500	1.223	1.600
1	*IK* (OLS)	-10.658	-0.870	-0.368	-0.610	-2.453	-1.060	-21.213	-1.160	1.154	1.280
2	*IK* (OLS)	-2.364	-0.910	0.231	0.710	0.219	1.300	0.070	0.280	-0.115	-0.240
3	*IK* (OLS)	10.039	0.760	-1.897	-1.110	-0.992	-1.050	-1.414	-1.300	-1.394	-0.990
1	*IK* (WLS)	-9.958	-0.780	-0.853	-1.300	-2.399	-1.040	-21.453	-1.170	2.165	2.050
2	*IK* (WLS)	-1.472	-0.460	0.223	0.610	0.116	0.630	0.049	0.190	0.195	0.390
3	*IK* (WLS)	7.150	0.530	-1.877	-1.090	-0.850	-0.920	-1.310	-1.170	-0.384	-0.270
1	*NOA (OLS)*	19.432	1.110	4.367	1.090	-3.492	-1.090	0.766	1.090	-2.890	-1.090
2	*NOA (OLS)*	-3.287	-1.070	0.711	1.020	-0.042	-0.380	0.250	0.900	0.708	0.990
3	*NOA (OLS)*	-0.945	-0.220	-3.181	-1.240	0.410	0.740	-0.622	-0.920	-0.013	-0.010
1	*NOA (WLS)*	20.751	1.140	4.598	1.110	-3.463	-1.090	0.988	1.090	-3.025	-1.100
2	*NOA (WLS)*	-2.336	-0.810	0.499	0.760	-0.187	-1.020	0.184	0.520	0.959	1.130
3	*NOA (WLS)*	-2.235	-0.500	-3.196	-1.230	0.410	0.690	-0.560	-0.800	0.103	0.110
1	*ACC (OLS)*	4.022	0.420	1.084	0.830	0.293	0.350	-0.211	-0.240	0.512	0.500
2	*ACC (OLS)*	0.203	0.070	0.135	0.650	0.038	0.450	-0.413	-0.830	-0.177	-0.530
3	*ACC (OLS)*	4.132	0.900	-0.466	-1.470	0.266	1.300	0.151	0.450	0.954	1.860
1	*ACC (WLS)*	8.718	0.900	1.820	1.350	0.418	0.480	-0.108	-0.140	0.277	0.270
2	*ACC (WLS)*	-2.824	-0.760	0.708	2.290	-0.181	-1.100	-0.545	-0.930	-0.570	-1.270
3	*ACC (WLS)*	6.012	1.230	-0.340	-0.860	0.279	1.010	0.493	1.220	1.239	1.760
1	*IG (OLS)*	-0.223	-0.400	1.049	1.630	-0.198	-0.580	0.506	0.870	-0.063	-0.100
2	*IG (OLS)*	0.573	2.150	0.318	1.470	-0.044	-0.480	0.093	0.570	0.265	0.690
3	*IG (OLS)*	1.719	1.420	0.633	1.000	-0.062	-0.430	0.091	0.410	0.057	0.120
1	*IG (WLS)*	-0.132	-0.200	1.250	1.800	-0.286	-0.720	0.751	1.130	0.588	0.850
2	*IG (WLS)*	0.502	1.160	0.469	1.380	-0.038	-0.260	0.260	1.000	0.078	0.160
3	*IG (WLS)*	1.466	1.210	0.786	1.100	-0.234	-1.120	-0.088	-0.280	0.467	0.820
1	*ACX (OLS)*	-0.029	-0.060	-1.036	-1.260	-0.594	-1.090	0.274	0.310	2.587	1.610
2	*ACX (OLS)*	0.622	0.920	-0.110	-0.430	-0.162	-1.480	-0.174	-0.870	-0.349	-0.900
3	*ACX (OLS)*	-1.128	-0.740	0.894	1.120	-0.196	-0.440	0.192	0.300	0.750	0.750
1	*ACX (WLS)*	-0.403	-0.590	-1.314	-1.240	-0.725	-1.090	-0.099	-0.100	2.477	1.250
2	*ACX (WLS)*	0.627	0.740	-0.005	-0.010	-0.124	-0.720	-0.022	-0.080	-0.074	-0.150
3	*ACX (WLS)*	-0.615	-0.400	1.380	1.600	-0.395	-0.810	0.242	0.350	0.202	0.190

Table 6 – continued

1	*NSI (OLS)*	8.066	1.110	0.223	0.300	-1.776	-1.300	-0.435	-0.620	-1.138	-1.430
2	*NSI (OLS)*	-4.596	-2.020	-0.395	-1.730	0.058	0.630	0.117	0.720	0.078	0.210
3	*NSI (OLS)*	5.171	0.410	0.651	0.580	0.495	0.980	0.824	1.440	1.877	1.430
1	*NSI (WLS)*	8.129	1.080	0.074	0.090	-1.812	-1.320	-0.041	-0.050	-0.875	-0.900
2	*NSI (WLS)*	-4.659	-1.910	-0.147	-0.520	0.116	0.620	0.312	1.190	0.648	1.330
3	*NSI (WLS)*	-8.367	-0.800	-0.423	-0.470	0.263	0.570	0.311	0.560	1.295	1.210
1	*CSI (OLS)*	4.477	1.370	-1.812	-1.820	1.203	2.000	-1.101	-0.640	0.535	0.680
2	*CSI (OLS)*	0.068	0.130	0.206	1.150	0.075	0.730	-0.075	-0.430	0.017	0.040
3	*CSI (OLS)*	-4.290	-1.330	-3.405	-1.200	1.711	1.410	1.395	1.110	-0.279	-0.360
1	*CSI (WLS)*	4.577	1.400	-2.043	-1.960	1.264	1.960	-1.187	-0.700	-0.166	-0.200
2	*CSI (WLS)*	-0.564	-0.830	0.123	0.450	-0.074	-0.440	-0.305	-1.180	0.310	0.570
3	*CSI (WLS)*	-4.607	-1.480	-3.593	-1.260	1.605	1.340	1.399	1.110	0.464	0.510

Table 6 – continued

Panel B: Differences across high and low investment in investment effects across investment frictions controlling for limits to arbitrage

LTA	*INV=*	*INV*	*t*	*GPA*	*t*	*β*	*t*	*ME*	*t*	*BM*	*t*	*PRET*	*t*
1	*TAG* (OLS)	-4.187	-1.480	1.403	1.180	-0.419	-0.910	1.493	1.530	1.150	1.530	1.237	0.730
2	*TAG* (OLS)	**-2.911**	-2.400	0.205	0.370	0.204	1.110	0.102	1.200	-0.211	1.360	-0.356	-0.960
3	*TAG* (OLS)	-3.071	-0.790	-5.980	-0.870	-7.383	-0.820	-2.319	-0.870	-3.444	-0.870	-6.328	-0.600
1	*TAG* (WLS)	-4.372	-1.310	1.442	1.200	-0.144	-0.290	1.480	1.500	1.304	1.660	0.825	0.480
2	*TAG* (WLS)	-1.671	-1.190	-1.005	-1.250	0.067	0.270	-0.180	-1.160	-0.437	-1.780	0.258	0.580
3	*TAG* (WLS)	-2.494	-0.790	-5.669	-0.870	-7.112	-0.820	-2.349	-0.870	-3.438	-0.870	-6.108	-0.600
1	*IA* (OLS)	-4.566	-0.860	-0.387	-0.410	-0.228	-0.220	-0.225	-0.410	0.028	0.020	-0.972	-1.820
2	*IA* (OLS)	**-2.462**	-2.190	-0.209	-0.340	0.019	0.120	0.079	0.800	0.050	0.290	-0.519	-1.630
3	*IA* (OLS)	-0.965	-1.200	-2.139	-0.630	-3.783	-1.510	1.042	1.010	0.073	0.130	0.473	0.540
1	*IA* (WLS)	-2.675	-0.480	-0.280	-0.210	-0.284	-0.260	-0.339	-0.580	-0.058	-0.040	-0.366	-0.530
2	*IA* (WLS)	-0.039	-0.020	-0.552	-0.690	0.043	0.180	-0.124	-0.780	-0.227	-0.830	0.053	0.130
3	*IA* (WLS)	-0.781	-1.110	-3.204	-0.870	-1.761	-0.460	-0.050	-0.030	-0.129	-0.200	-0.025	-0.030
1	*IK* (OLS)	5.112	0.990	1.796	1.150	-0.473	-0.740	-0.379	-0.670	-0.099	-0.110	-0.541	-0.800
2	*IK* (OLS)	-1.294	-0.840	-0.625	-0.950	0.013	0.060	-0.052	-0.440	-0.475	-2.480	0.017	0.050
3	*IK* (OLS)	-3.507	-0.920	-4.673	-0.730	0.074	0.090	0.578	1.230	0.821	1.210	-0.598	-0.840
1	*IK* (WLS)	7.897	1.420	2.309	1.290	-0.215	-0.310	-0.332	-0.540	-0.218	-0.230	-1.583	-1.830
2	*IK* (WLS)	2.654	1.350	-0.912	-0.980	-0.033	-0.120	-0.201	-1.330	-0.511	-2.020	0.864	1.950
3	*IK* (WLS)	-2.832	-0.670	-2.324	-0.360	0.326	0.360	0.609	1.270	1.007	1.480	-1.012	-1.230
1	*NOA* (OLS)	-4.150	-0.720	-2.313	-1.040	-0.087	-0.170	0.170	0.590	-0.365	-0.750	-0.372	-0.590
2	*NOA* (OLS)	-0.595	-0.310	-1.448	-1.590	0.225	1.030	0.240	1.690	0.160	0.730	0.658	1.210
3	*NOA* (OLS)	-8.030	-1.190	-10.363	-1.570	-0.922	-0.970	-0.540	-1.140	-2.162	-1.180	1.147	0.750
1	*NOA* (WLS)	-4.761	-0.810	-3.113	-1.240	-0.164	-0.300	0.105	0.330	-0.539	-1.050	-0.507	-0.770
2	*NOA* (WLS)	-0.150	-0.060	0.897	0.940	-0.115	-0.450	0.032	0.180	-0.187	-0.670	-0.299	-0.550
3	*NOA* (WLS)	-8.720	-1.240	-9.607	-1.450	-1.116	-1.160	-0.541	-1.090	-2.159	-1.160	1.171	0.780
1	*ACC* (OLS)	-9.496	-1.800	1.034	0.990	0.047	0.160	-0.145	-0.810	-0.172	-0.520	-0.915	-1.540
2	*ACC* (OLS)	-3.370	-1.910	0.773	1.190	0.038	0.200	-0.129	-1.490	-0.164	-0.980	-0.335	-1.090
3	*ACC* (OLS)	-4.539	-0.350	35.296	0.410	-0.978	-0.510	-0.849	-0.630	0.025	0.020	-0.067	-0.050
1	*ACC (WLS)*	-9.064	-1.560	1.945	1.490	0.247	0.630	-0.137	-0.610	-0.372	-1.030	-1.437	-2.000
2	*ACC (WLS)*	-0.360	-0.130	1.959	2.760	-0.332	-1.150	0.094	0.590	-0.198	-0.750	-0.213	-0.470
3	*ACC (WLS)*	-4.237	-0.350	2.443	0.410	-1.450	-0.760	-1.015	-0.760	-0.038	-0.030	-0.178	-0.130

Table 6 – continued

1	*IG* (OLS)	0.347	0.530	1.409	0.840	-0.829	-1.400	-0.479	-1.010	-0.887	-0.980	-0.709	-1.000
2	*IG* (OLS)	0.146	0.770	0.290	0.510	0.019	0.110	-0.065	-0.590	-0.139	-0.810	-0.533	-2.010
3	*IG* (OLS)	-3.860	-1.090	14.520	0.800	-1.367	-0.480	-1.272	-0.510	-1.745	-0.440	-3.487	-1.660
1	*IG* (WLS)	0.552	0.780	1.062	0.620	-0.813	-1.240	-0.497	-1.000	-0.981	-1.030	-1.013	-1.210
2	*IG* (WLS)	0.181	0.610	0.411	0.440	-0.094	-0.360	-0.111	-0.640	-0.150	-0.640	-0.072	-0.160
3	*IG* (WLS)	-3.939	-1.100	15.252	0.840	-1.545	-0.540	-1.525	-0.620	-2.469	-0.630	-3.820	-1.790
1	*ACX* (OLS)	7.068	1.240	-6.918	-0.970	-2.004	-1.690	0.373	0.950	0.930	1.330	-6.290	-1.040
2	*ACX* (OLS)	-0.015	-0.060	-0.165	-0.270	-0.081	-0.380	0.008	0.070	-0.020	-0.100	-0.338	-0.890
3	*ACX* (OLS)	0.826	1.540	2.666	0.570	2.049	1.180	1.227	1.200	0.759	0.530	-3.866	-1.440
1	*ACX* (WLS)	6.577	1.150	-7.677	-1.070	-1.905	-1.570	0.288	0.730	0.666	0.970	-5.991	-0.970
2	*ACX* (WLS)	0.060	0.160	-0.732	-0.860	-0.005	-0.020	-0.060	-0.340	-0.111	-0.390	-0.201	-0.370
3	*ACX* (WLS)	0.921	1.460	4.248	0.890	2.448	1.380	1.010	0.970	0.852	0.590	-3.927	-1.440
1	*NSI* (OLS)	-0.804	-0.070	-0.450	-0.550	-0.768	-0.740	-0.223	-0.500	-0.610	-1.120	-1.563	-1.340
2	*NSI* (OLS)	-0.924	-0.440	-0.415	-0.670	0.079	0.420	-0.132	-1.940	-0.097	-0.550	0.104	0.290
3	*NSI* (OLS)	-8.296	-1.120	8.434	0.690	-1.727	-1.840	0.220	0.930	-0.581	-0.670	0.208	0.290
1	*NSI* (WLS)	7.697	0.660	-1.113	-1.040	-0.362	-0.340	-0.261	-0.540	-0.515	-0.860	-1.501	-1.200
2	*NSI* (WLS)	-1.769	-0.730	-1.227	-1.380	0.159	0.700	-0.142	-1.070	-0.024	-0.090	1.018	2.380
3	*NSI* (WLS)	-9.481	-1.200	5.127	0.410	-1.567	-1.710	0.225	0.730	-0.849	-0.880	0.260	0.330
1	*CSI* (OLS)	4.809	1.090	-0.092	-0.010	1.618	1.680	-0.465	-0.990	0.145	0.160	0.536	0.620
2	*CSI* (OLS)	-0.122	-0.240	-0.014	-0.020	-0.246	-1.160	-0.005	-0.040	0.181	0.790	-0.073	-0.170
3	*CSI* (OLS)	-4.908	-1.520	-9.098	-2.000	-0.352	-0.380	-0.377	-0.770	-0.279	-0.340	-1.814	-1.610
1	*CSI* (WLS)	5.316	1.170	-0.502	-0.060	1.653	1.720	-0.572	-1.220	-0.158	-0.170	-0.524	-0.550
2	*CSI* (WLS)	-0.647	-0.920	-1.461	-1.500	-0.404	-1.330	-0.331	-1.690	-0.399	-1.520	0.205	0.440
3	*CSI* (WLS)	-5.418	-1.660	-8.552	-1.830	-0.498	-0.510	-0.628	-1.160	-0.271	-0.320	-1.562	-1.280

Table 6 – continued

LTA	*Inv=*	*Inv*	*t*	*OP*	*t*	*beta*	*t*	*ME*	*t*	*BM*	*t*	*pRet*	*t*
1	*TAG* (OLS)	-3.406	-1.280	-7.525	-1.570	-0.386	-1.080	0.274	0.820	-0.191	-0.440	-1.066	-2.030
2	*TAG* (OLS)	**-2.537**	-2.040	0.190	0.140	0.209	1.150	0.093	1.060	-0.182	-1.100	-0.399	-1.120
3	*TAG* (OLS)	4.633	1.610	-16.025	-1.150	-0.103	-0.040	-2.038	-0.950	0.202	0.330	6.953	1.000
1	*TAG* (WLS)	-3.412	-1.150	-10.152	-1.910	-0.088	-0.210	0.418	0.105	-0.150	-0.300	-1.380	-2.340
2	*TAG* (WLS)	-1.815	-1.240	-2.028	-1.050	-0.041	-0.160	-0.118	-0.730	-0.421	-1.560	0.178	0.400
3	*TAG* (WLS)	4.987	1.660	-15.470	-1.140	0.416	0.150	-2.073	-0.960	0.205	0.330	6.877	0.980
1	*IA* (OLS)	-2.948	-0.420	-3.964	-0.680	-0.650	-0.370	-0.259	-0.290	-0.648	-0.220	-1.126	-1.960
2	*IA* (OLS)	**-2.270**	-2.010	0.051	0.030	0.054	0.350	0.106	1.130	0.092	0.450	-0.650	-2.040
3	*IA* (OLS)	2.287	1.280	4.156	0.980	-1.786	-1.090	-0.277	-0.330	0.093	0.200	0.245	0.380
1	*IA* (WLS)	-2.983	-0.390	-5.292	-0.880	-0.711	-0.390	-0.410	-0.450	-0.757	-0.260	-0.562	-0.740
2	*IA* (WLS)	-0.017	-0.010	-2.334	-1.030	-0.027	-0.110	-0.014	-0.080	-0.322	-1.070	-0.175	-0.420
3	*IA* (WLS)	2.651	1.170	-31.331	-1.020	-1.691	-1.020	-0.297	-0.350	-0.214	-0.400	-0.307	-0.420
1	*IK* (OLS)	3.114	0.700	5.339	1.460	0.167	0.300	0.150	0.670	0.923	1.540	0.281	0.520
2	*IK* (OLS)	-0.245	-0.150	-0.627	-0.370	0.036	0.170	-0.027	-0.230	-0.408	-1.780	0.003	0.010
3	*IK* (OLS)	-1.390	-0.330	-2.599	-0.390	0.231	0.170	0.142	0.320	0.633	1.180	-0.150	-0.060
1	*IK* (WLS)	6.010	1.260	6.352	1.450	0.424	0.700	0.168	0.700	0.871	1.310	-0.260	-0.390
2	*IK* (WLS)	3.334	1.520	-0.294	-0.120	-0.101	-0.370	-0.181	-1.100	-0.412	-1.570	0.605	1.290
3	*IK* (WLS)	-4.638	-0.830	2.247	0.310	0.934	0.740	0.269	0.590	1.172	1.990	-0.348	-0.140
1	*NOA* (OLS)	0.989	1.350	-12.523	-1.560	4.341	1.270	-0.054	-0.010	-5.416	-0.420	-0.620	-0.830
2	*NOA* (OLS)	-0.936	-0.520	0.373	0.200	0.238	1.140	0.233	1.800	0.410	1.390	0.397	0.940
3	*NOA* (OLS)	8.097	0.920	10.813	0.790	0.209	0.260	0.392	0.700	0.614	0.420	-1.322	-0.830
1	*NOA* (WLS)	2.574	1.040	-22.079	-1.160	3.815	1.120	-5.850	-1.090	-1.582	-1.090	-0.804	-1.190
2	*NOA* (WLS)	-1.815	-0.800	1.477	0.650	-0.042	-0.160	-0.090	-0.570	-0.090	-0.280	-0.531	-1.090
3	*NOA* (WLS)	9.708	0.900	14.456	0.940	0.055	0.070	0.536	0.790	0.715	0.450	-1.450	-0.780
1	*ACC* (OLS)	-5.675	-0.880	0.286	0.040	0.598	0.830	-0.195	-0.860	-0.143	-0.270	-1.547	-1.710
2	*ACC* (OLS)	-3.032	-1.680	-1.435	-0.950	-0.032	-0.160	-0.117	-1.290	-0.247	-1.310	-0.319	-1.030
3	*ACC* (OLS)	-11.710	-1.350	3.234	0.720	-0.789	-0.750	-0.302	-0.380	0.792	0.690	-0.583	-0.500
1	*ACC (WLS)*	-7.907	-1.080	-2.331	-0.240	1.329	1.500	-0.287	-1.080	-0.560	-0.740	-2.963	-1.750
2	*ACC (WLS)*	0.377	0.140	0.058	0.030	-0.323	-1.160	0.076	0.470	-0.312	-1.080	-0.169	-0.370
3	*ACC (WLS)*	-13.041	-1.490	3.487	0.780	-1.182	-1.110	-0.375	-0.460	0.749	0.630	-0.632	-0.520

Table 6 – continued

1	*IG* (OLS)	-0.559	-0.990	-5.298	-0.830	-0.288	-0.520	-0.325	-1.150	-0.496	-1.060	-1.189	-1.500
2	*IG* (OLS)	0.172	0.830	-0.207	-0.150	0.014	0.080	-0.080	-0.750	-0.155	-0.830	-0.544	-2.100
3	*IG* (OLS)	0.282	0.260	1.414	0.250	0.377	0.540	0.241	0.470	0.267	0.400	-0.721	-0.920
1	*IG* (WLS)	-0.527	-0.910	-4.130	-0.600	0.067	0.130	-0.366	-1.270	-0.382	-0.770	-1.253	-1.490
2	*IG* (WLS)	0.184	0.580	-1.773	-0.870	-0.100	-0.370	-0.121	-0.710	-0.319	-1.230	-0.249	-0.600
3	*IG* (WLS)	0.343	0.310	7.652	1.360	0.090	0.120	-0.118	-0.230	-0.285	-0.430	-1.019	-1.190
1	*ACX* (OLS)	-0.510	-0.290	0.766	0.130	0.524	0.530	0.146	0.490	0.364	0.640	-0.107	-0.160
2	*ACX* (OLS)	-0.013	-0.050	1.565	1.020	-0.057	-0.270	-0.002	-0.020	0.074	0.330	-0.476	-1.250
3	*ACX* (OLS)	0.208	0.380	-2.748	-0.260	0.657	0.550	0.628	0.950	-0.072	-0.060	-2.848	-1.490
1	*ACX* (WLS)	-1.063	-0.600	0.626	0.100	0.434	0.420	0.101	0.290	0.060	0.090	0.394	0.550
2	*ACX* (WLS)	-0.007	-0.020	0.027	0.010	0.024	0.080	0.002	0.010	-0.159	-0.520	-0.400	-0.800
3	*ACX* (WLS)	0.086	0.140	0.598	0.050	0.933	0.760	0.363	0.520	0.043	0.040	-2.740	-1.400
1	*NSI* (OLS)	-11.058	-0.670	-4.102	-1.500	-1.231	-0.770	-0.525	-0.730	-1.084	-1.180	-2.416	-1.420
2	*NSI* (OLS)	-1.339	-0.580	-2.294	-1.750	0.127	0.640	-0.066	-1.030	-0.159	-0.780	0.075	0.210
3	*NSI* (OLS)	-8.262	-1.080	10.313	0.480	-0.454	-0.860	0.333	1.090	-0.986	-1.210	0.391	0.810
1	*NSI* (WLS)	-1.858	-0.110	-5.267	-1.740	-0.793	-0.490	-0.484	-0.660	-0.960	-1.000	-2.441	-1.350
2	*NSI* (WLS)	-1.579	-0.680	-4.250	-2.140	0.204	0.830	-0.068	-0.540	-0.184	-0.710	0.856	2.000
3	*NSI* (WLS)	-9.551	-1.090	10.061	0.470	-0.346	-0.570	0.377	1.020	-1.205	-1.220	0.123	0.220
1	*CSI* (OLS)	3.117	0.810	-7.277	-1.430	1.201	1.570	-0.213	-0.570	-0.069	-0.170	0.870	1.120
2	*CSI* (OLS)	-0.071	-0.150	0.445	0.270	-0.250	-1.150	0.033	0.290	0.148	0.650	-0.096	-0.250
3	*CSI* (OLS)	-3.011	-1.120	-27.511	-1.750	-0.342	-0.250	0.014	0.020	1.641	0.900	-1.171	-1.050
1	*CSI* (WLS)	3.456	0.880	-8.829	-1.660	1.160	1.490	-0.261	-0.710	-0.286	-0.580	0.210	0.230
2	*CSI* (WLS)	-0.340	-0.590	-0.175	-0.070	-0.494	-1.530	-0.309	-1.510	-0.294	-0.910	0.227	0.500
3	*CSI* (WLS)	-3.720	-1.390	-11.491	-1.620	-0.291	-0.210	-0.124	-0.170	1.653	0.910	-0.913	-0.770